JAPAN TRANSPORT SAFETY BOARD
ANNUAL REPORT 2012

JTSB Japan Transport Safety Board

A Message from the Chairman

The Japan Transport Safety Board (JTSB) was established in October 2008 as an independent and multi transport-mode accident investigation agency through the merger of the Aircraft and Railway Accidents Investigation Commission (ARAIC) and the Japan Marine Accident Inquiry Agency (JMAIA). It aims to enhance the investigation function which is to determine the causes of aircraft, railway and marine accidents or incidents, and to prevent their recurrence.

Our mission is to contribute to preventing the occurrence of accidents and mitigating the damage caused by them, thus improving transport safety while raising public awareness, and thereby protecting the people's lives by accomplishing appropriate accident investigations which thoroughly unveil the causes of accidents and damages incidental to them, and urging the implementation of necessary policies and measures through the issuance of safety recommendations and opinions or provision of safety information. Since its establishment until 2011, the JTSB has published 72 aircraft investigation reports, 49 railway investigation reports, and 3,831 marine investigation reports, together with its recommendations and opinions where required.

This Annual Report is the summary of the JTSB activities in 2011. We are honored to be able to share with people around the world our work and activities in the Report.

In 2011, investigation reports on 12 accidents and 8 serious incidents were published regarding aviation, and an opinion on a fatal helicopter accident was issued to the Minister of the Land, Infrastructure, Transport and Tourism. In terms of railway safety, investigation reports on 8 accidents and 6 serious incidents were published, and a recommendation regarding a serious incident involving an electric tramway was issued to the operator. In marine safety, investigation reports on 1,027 accidents and 138 incidents were published with 16 recommendations and opinions issued.

2011 was also an important year in determining how the JTSB should operate in future.

Following a problem in connection with a previous investigation conducted by the ARAIC, a series of verification meetings involving victims, their families and experts were convened to carry out a verification of the investigation. After a year and a half of verification, the meeting issued a proposal regarding the ideal future of the JTSB in April 2011.

Responding to the proposal, we decided to work together for the improvement of our duties, and in July 2011 a panel of experts for improvement of duties was established. Subsequently, we established the Duty Improvement Action Plan and since then, we have been continuously working on duty improvement together with experts. Some of the specific improvements include a regular press conference conducted by the Chairman, and the establishment of the Victims and their Families Liaison Office so that accident investigation information can be provided to accident victims in a timely and appropriate manner.

In this Annual Report, we provide introductions in relation to the JTSB's activities in general. I hope that the Annual Report will provide people with a better understanding of the JTSB and also contribute to improving the safety of international transport.

Norihiro Goto
Chairman

Japan Transport Safety Board
Annual Report 2012

Contents

Special Topic – Establishment of the JTSB Mission, Principles and Duty Improvement Action Plan

The Japan Transport Safety Board (JTSB) was established in October 2008 under Article 3 of the National Government Organization Act. It is an independent professional investigation agency formed by the merger of the Aircraft and Railway Accidents Investigation Commission (ARAIC) and the Japan Marine Accident Inquiry Agency (JMAIA), which investigated marine accidents. The agency's purpose is to conduct scientific investigation into the causes of aviation, railway, and marine accidents or incidents from impartial and neutral standpoint so as to contribute to prevent the occurrence of accidents and mitigate the damage by them.

However, in September 2009, it came to light that a member of the ARAIC leaked information on the investigation of the train derailment accident on the West Japan Railway Company's Fukuchiyama line in 2005 and that undermined the public's confidence in our investigation. After verification of this regrettable event, the JTSB established a mission, principles and the Duty Improvement Action Plan in March 2012 to promote its reforms so that the JTSB can achieve truly needed investigation and greater social confidence by improving the issues identified through the verification.

1. Duty improvement review process

(1) In order to verify the reliability of the Final Report on the JR Fukuchiyama line accident which was publicized in June 2007, including whether the information leakage had any influence on the report, a verification meeting consisting of the victims, their families and experts (the Verification Members) was formed in November 2009. The verification was subsequently conducted over the next one and a half years.

The verification concluded that the Final Report was not influenced by the leakage, but the Verification Members pointed out other issues and challenges the JTSB faced, and compiled a proposal on the future of the JTSB (the Proposal). The Proposal pointed out key areas that require improvement, such as ensuring transparency in accident investigation, enhancing the provision of information to victims, and various other issues. It recommended that the JTSB address the issue of duty improvement by setting up a panel of external advisors to review and improve the Board's duties where necessary in future.

The Proposal on the future of the JTSB (excerpt)

10. JTSB Duty Improvement Policy

Taking the regtettable event as a lesson, the JTSB is in the process of reviewing the work processes. It should continue to proactively review its duties so as to achieve truly needed investigation and greater social confidence, exploiting the Board's great capabilities. To this end, the external advisors should be invited to set up a panel to identify specific organizational and duty improvements to address the key issues raised in the Proposal and others necessary.

(2) In July 2011, the Advisory Meeting for the duty improvement of the JTSB was established. The members and the meetings held are as follows:

Members of the Advisory Meeting

Mr. Seiji Abe	Professor, Kansai University
Mr. Takemune Sato	Attorney at law, Secretary-General of the TASK (Railroad Safety Promotion Conference)
Mr. Shigeru Haga	Professor, Rikkyo University
Mr. Kunio Yanagida	Writer
Mr. Hiroyuki Yamato	Professor, Graduate School, the University of Tokyo

・First Meeting

Date : July 27, 2011 (Wed)
Venue : JTSB Board Room
Agenda : (i) Current initiatives
(ii) Scope of review on JTSB duty improvement
(iii) Introduction to concrete efforts in investigation reports
(iv) Others

・Second Meeting

Date : March 19, 2012 (Mon)
Venue : JTSB Board Room
Agenda : (i) JTSB Duty Improvement Action Plan (Draft)
(ii) Others

(3) In December 2011, a meeting on duty improvement was held among the advisors and the JTSB to exchange opinions on various issues. A meeting was also held with the Verification Members of the JR Fukuchiyama Line accident report to hear their comments.

2. Mission and Principles

As part of the duty improvement process, the mission of the JTSB and its guiding principles were established. The mission and principles are displayed at the Tokyo Headquarters and eight regional offices nationwide to remind each and every staff member to bear this in mind while carrying out their daily work.

(1) JTSB Mission

We contribute to
-preventing the occurrence of accidents and
-mitigating the damage caused by them,
thus improving transport safety while raising public awareness, and thereby protecting the people's lives by
-accomplishing appropriate accident investigations which thoroughly unveil the causes of accidents and damages incidental to them, and
-urging the implementation of necessary policies and measures through the issuance of safety recommendations and opinions or provision of safety information.

(2) JTSB Principles

1. Conduct of appropriate accident investigations

We conduct scientific and objective accident investigations separated from apportioning blame and liability, while deeply exploring into the background of the accidents, including the organizational factors, and produce reports with speed. At the same time, we ensure that the reports are clear and easy to understand and we make efforts to deliver information for better understanding.

<Key efforts>

- To thoroughly probe into the background of accidents such as organizational issues and conduct accident investigations on a scientific and objective basis that is separate from apportioning blame and liability.
- To improve the investigation process and promptly publish reports so as to contribute to prevent the occurrence of accidents and mitigate the damage by them.
- To conduct accident investigations independently that is separate from apportioning blame and liability.
- To strive to compile reports that are easy to read and understand.

2. Timely and appropriate feedback

In order to contribute to the prevention of accidents and mitigation of the damage caused by them, we send messages timely and proactively in the forms of recommendations, opinions or factual information notices nationally and internationally. At the same time, we make efforts towards disclosing information in view of ensuring the

transparency of accident investigations.

<Key efforts>

- To send messages such as recommendations, opinions, and factual information nationally and internationally in a timely and proactive manner.
- To strive to disclose information to maintain transparency of investigation.

3. Consideration for victims

We think of the feelings of victims and their families, or the bereaved appropriately, and provide them with information regarding the accident investigations in a timely and appropriate manner, and respond to their voices sincerely as well.

<Key efforts>

- To provide information to victims and their families in a timely and appropriate manner.
- To respond to feedback from victims and their families with respect.

4. Strengthening the foundation of our organization

We take every opportunity to develop the skills of our staff, including their comprehensive understanding of investigation methods, and create an environment where we can exchange opinions freely and work as a team to invigorate our organization as a whole.

<Key efforts>

- To strive to improve individual capability, including a comprehensive understanding of investigation methods.
- To strive to create an environment where we can exchange opinions freely and work as a team to invigorate our organization as a whole.

3. Duty Improvement Action Plan

The Duty Improvement Action Plan comprising 31 specific items was established in line with the four principles as stated in the mission.

(1) Conduct of appropriate accident investigations

(Main items)

Describing Chapter 4 "Conclusions (Probable causes)" in investigation reports	The conclusions of investigation reports shall clearly include critical safety items identified during the investigation in an easy-to-understand manner, including all risk factors that need to be improved, even if there is no or unclear causual relationship with the accidents involved.	To be implemented in investigation reports deliberated from April 2012 onwards

Addition of synopsis and flow charts	Investigation reports shall be easy to read and understand by adding a synopsis and flow charts.	Implemented in May 2012

(Others)

- Development of accident investigation manuals for practical use, detailed procedure for getting relevant parties to participate in the investigations based on a convention (aviation), ways to acquire appropriate professional knowledge, and enhancement of training for capacity building.
- Schedule management for investigations, application of simplified methods for some accident investigations (aviation and railway).
- Smooth conduct of accident investigation (relationship between accident investigation and criminal investigation).
- Review the description method of statements, easy-to-understand description of occurrence type (aviation), insertion figures and photos in the text of the report, better expression and wording.

(2) Timely and appropriate feedback

(Main items)

Ways of information dissemination for the prevention of recurrence	Recommendations and opinions shall be issued to related agencies and parties in a timely and proactive manner so as to contribute to prevent the occurrence of accidents and mitigate the damage by them.	In progress
Regular information dissemination by the Chairman	In the monthly press conference conducted by the Chairman starting in August 2011, progress of investigations and safety information for accident prevention have been provided. Questionnaire surveys shall be done for further improvement of the conference.	Survey was done in February, 2012

(Others)

- Provision of information immediately after accidents causing public concern, improvement of our webpage with public release of media briefing material on each accident, and review and enhancement of newsletter and other information tools.
- Disclosure of basic data on accidents, and further improvement of the transparency of the Board's deliberations.

(3) Consideration for victims

(Main items)

Provision of information to victims	Information regarding the accident investigations shall be provided in a timely and appropriate manner, while feedback from victims shall be reported at the deliberation of the Board.	In progress

(Others)

・Enhancement of training for capacity building.

・Appropriate actions for victims' opinions.

(4) Strengthening the foundation of our organization

(Main items)

Enhancement of training for capacity building	Training on human factor analysis and communication skills for interview shall be carried out to improve staff skills and investigation capabilities.	To be implemented
Strengthening the activities of the regional offices	Aiming to strengthen the activities of regional offices, training shall be conducted to improve the skills of staff members and the investigation process at regional offices. Analysis reports written at the regional offices shall be improved, and outreach activities shall be carried out more proactively.	To be implemented

(Others)

・Conducting simulation training assuming the occurrence of particularly serious accident.

・Establishment of the mission and principles of the JTSB, logo, and exchange of information across all modes.

4. Continuous duty improvement

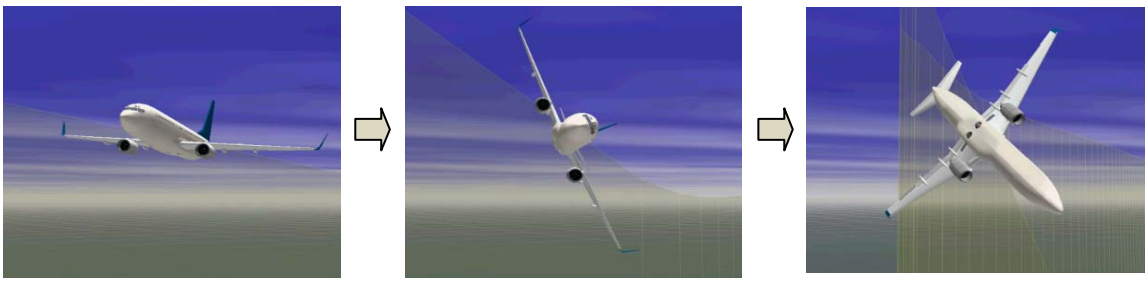
The JTSB will diligently implement the Duty Improvement Action Plan and review the plan on a timely and appropriate basis, while action items shall be followed-up during the Advisory Meeting.

Column Commencement of regular press conference by the Chairman

As one of the Duty Improvement Action Plan, a regular press conference by the Chairman was conducted from August 2011 with the aim of releasing information timely that is useful in preventing the occurrence of accidents. The press conference is held on the fourth Wednesday of every month (two days before the publication of investigation reports).

During the conference, the progress of accident investigations causing public concern is given in view of ensuring the transparency of the investigation process and safety information is provided to prevent the occurrence of accidents even before the completion of investigation. In addition, actions that have been taken in accordance with the recommendations and opinions issued by the Board are also introduced to the press.

In the September 2011 conference, the progress of investigation on the serious incident which occurred over south of Hamamatsu-City, Shizuoka Prefecture on September 6 was provided. The passenger aircraft experienced a steep descent and two crewmembers were injured in the incident. The situation of the incident, in which the aircraft entered an abnormal flight attitude and descended about 6,300 ft (1,900 m), was presented using the animation based on data from the DFDR (Digital Flight Data Recorder). This case was widely reported by media such as newspapers, television, and overseas magazines.



[The animation based on data from the DFDR]

Provided information at the conferences conducted in fiscal year 2011 are; progress of investigations:13, safety information provided to relevant authorities:4, actions taken in accordance with the recommendations:4, as well as matters concerning our duties improvement, the publication of annual report, and others.

In addition, we conducted a questionnaire survey on the press conference for the media. According to the result of the survey, comments such as “The prompt release of information soon after the occurrence enabled us to report on accidents before public concern has declined," and "The presentation manner which is visually easy to understand, such as computer graphics, can be evaluated" were received.

We will continue to provide information proactively to further improve air safety.

Column

"Victims and their Families Liaison Office" was established in April 2012

Accident investigations have a variety of roles to play.

The most important one is to unveil the cause of the accident to prevent recurrence of the accidents. At the same time, when taking into consideration the wishes of the victims and the bereaved "to know how the accident occurred" and "that similar accidents will never occur again", the role of providing them with information becomes even more important.

Therefore, we believe that we are required to release the progress report of the investigation and factual information even before the completion of the investigation, and to carefully listen to the victims' perspective and integrate it into analyses relating mitigation of the damage. Moreover, we are also expected to make the reports more easily understandable and convincing to the public.

Last April, we gave an assignment to one official as a contact point to provide information to victims and this April the Victims and their Families Liaison Office as stipulated in the official directives was established and increased the number of staff (additional post) in conjunction with the movement of the Ministry of Land, Infrastructure, Transport and Tourism.

The Victims and their Families Liaison Office's role is to put into practice the principle "Consideration for victims" of the JTSB Principles. In light of the opinions of victims and experts, we strive to ensure mutual communications with victims by carefully listening to their perspective and concerns besides simply providing information.

Communications with victims are mainly through the Victims and their Families Liaison Office in the Tokyo Headquarters. In order to have even closer communications, staff were assigned to the eight regional offices in Hakodate, Sendai, Yokohama, Kobe, Hiroshima, Moji, Nagasaki, and Naha, so that more comprehensive support can be provided together with the Headquarters.

We, the Victims and their Families Liaison Office, shall make our best efforts to build trust with the victims as the contact points for them.

Victims and their Families Liaison Office (Tokyo)
Tel: +81-3-5253-8823
Fax: +81-3-5253-1680
E-mail:jtsb_faminfo@mlit.go.jp

Column

The logo of the Japan Transport Safety Board

Upon the completion of the verification for the Final Report on the JR Fukuchiyama line accident in April 2011, we decided to create an appropriate logo for making a new start.

We invited our staff to offer their idea about a logo and a design by a female staff was adopted.

The logo adopted and its meaning by the designer are as follows.

Our logo and its meaning

A sphere expresses;

-determination to sustain fairness and independency,

-will to carry out investigation into the causes of accidents, and promote prevention of the occurrence of accidents and mitigation of the damage, and global activities to contribute to worldwide transport safety through international cooperation.

Three lines respectively express air, land and sea.

The color of the sphere is an intermediate color between blue and green, which expresses safety.

Chapter 1 Aircraft accident and serious incident investigation

1. Summary of major investigation report

Summaries of five of the 20 investigation reports publicized in 2011 are presented below.

Aircraft 1 The tail rotor became uncontrollable while the aircraft was flying, and the aircraft rapidly lost its altitude and crashed into terrain.
(All Nippon Helicopter Co., Ltd. Eurocopter EC135T2, registered JA31NH)

Full text of the investigation report : http://www.mlit.go.jp/jtsb/eng-air_report/JA31NH.pdf

1. Summary of the accident

(1) Date and time: At around 10:53 JST, December 9 (Sunday), 2007

(2) Location: Minami-Numagami, Aoi-Ku, Shizuoka City, Shizuoka Prefecture

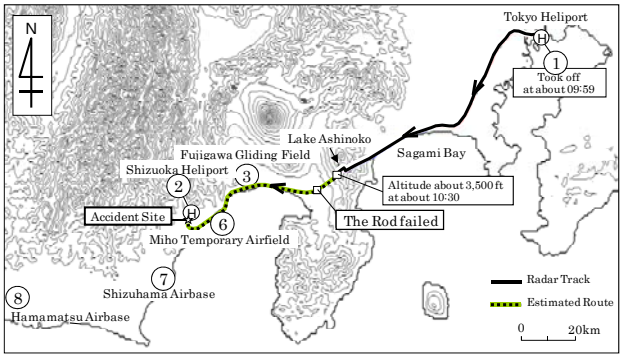
(3) Outline of the accident:

The accident aircraft

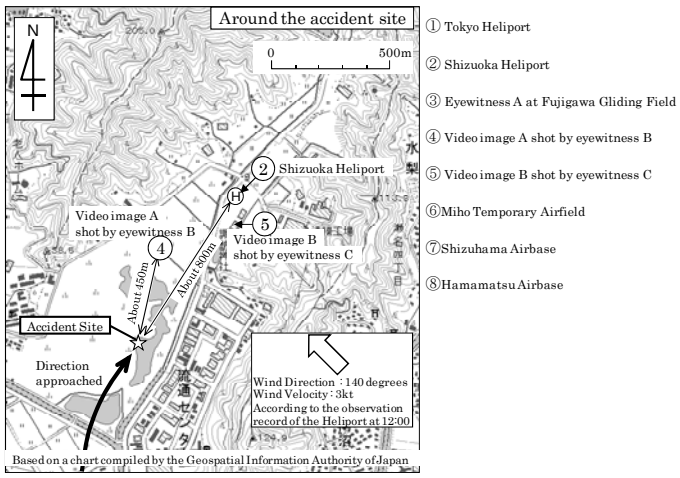
A Eurocopter EC135T2 (Rotorcraft), operated by All Nippon Helicopter Co., Ltd. took off from Tokyo Heliport for a ferry flight. While flying to Shizuoka Heliport, the aircraft crashed in Minami-Numagami, Aoi-Ku, Shizuoka City, Shizuoka Prefecture, at about 10:53 Japan Standard Time.

There were two persons on board the aircraft, consisting of the captain and one mechanic. The captain died and the mechanic on board was seriously injured. The aircraft was destroyed, but there was no outbreak of fire.

(4) Date of publication: April 22, 2011



Estimated flight route



Around the accident site

2. Findings

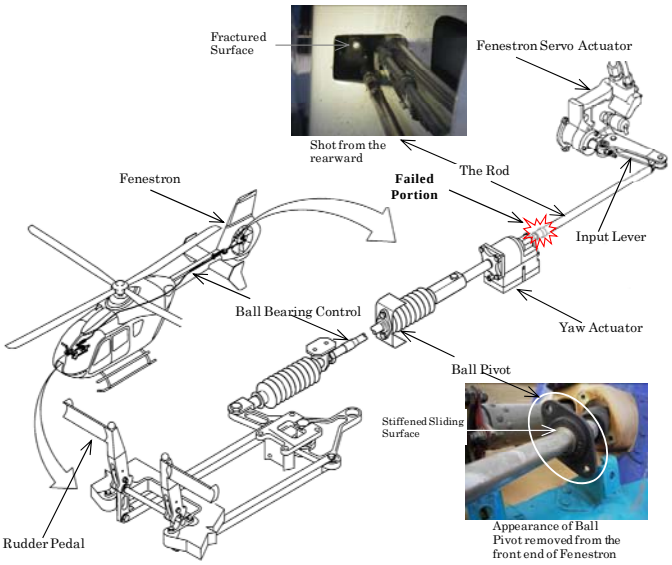
(1) Failure of the tail rotor control rod

a. A periodical check for the tail rotor (TR) control system, including the ball pivot, was performed on March 9, 2006, in accordance with the maintenance manual. There was neither looseness in the threaded part of the TR control rod (the Rod) nor abnormality with the ball pivot. But it was stated by the maintenance service company involved that

it was possible to turn the threaded part of the Rod by hand in the trouble shooting for the TR control system performed on October 20, 2007.

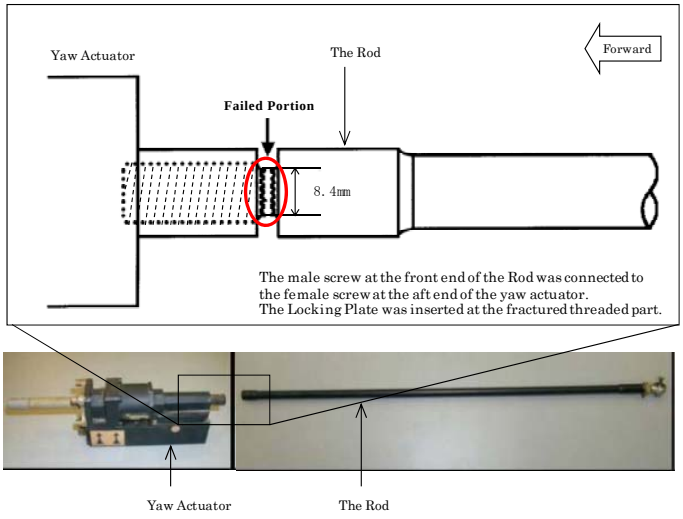
Based on the findings, it is highly probable that the threaded part of the Rod had become loose and the ball pivot had become stiff sometime after the periodical inspection and as a result, a crack had been created in the threaded part of the Rod.

b. There were no records that the threaded part of the Rod had been disconnected and re-torqued after the periodical inspection performed. According to information provided by the maintenance service company involved and the manufacturer about the condition of the threaded part of the same type of rod, there were no reports that the threaded part had become loose due to flight. Therefore, the reason could not be made clear about the phenomenon why the threaded part had become loose sometime after the periodical inspection performed.



TR control system

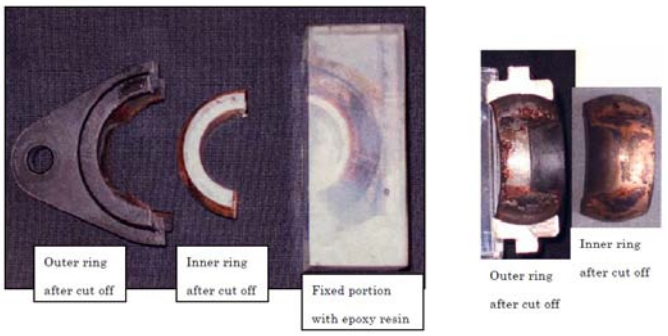
c. Troubleshooting was performed on October 20, 2007, in pursuit for the causes for the unusual feeling in the rudder pedal movement, which had been reported by several pilots. But because the inspection was not performed in accordance with the troubleshooting procedure provided in the maintenance manual, the stiffening of the ball pivot was not found. It is highly probable that after the troubleshooting, the aircraft had been flying with the threaded part of the Rod loosened.



Failed portion of the Rod

d. After the accident, it was found that the Rod had been fractured in the threaded part. In view of the result of an observation of the fracture surface, it is highly probable that the Rod had been fractured by a fatigue failure due to repetitive loads.

e. After the accident, it was found that the ball pivot had become stiff in the sliding surface due to corrosion. It is highly probable that the unusual feeling in the rudder pedal movement, which had been reported by several pilots before the occurrence of the accident, was caused by the stiffening of the ball pivot in light of remarks in the maintenance manual.



Ball pivot after cut off

f. As to the stiffening of the sliding surface of the ball pivot, it is highly probable that the phenomenon had occurred because the red rust was formed due to galvanic corrosion or crevice corrosion on the contact surface between the inner ring of copper-based alloy and the outer ring of iron-based alloy and it expanded in volume in the space between the two rings, restricting the movement of the two rings.

g. As to the failure of the Rod, it is highly probable that the repetitive bending loads in excess of the fatigue strength had been applied on the Rod because the bending loads on the Rod had increased by the operation of the rudder pedal and the movement of the yaw actuator under the condition that the joint of the Rod and the yaw actuator had beeen loosened and the ball pivot had been stiffened due to corrosion, and also because the stress concentration had occurred due to the resonance phenomenon with the airframe vibrations and the loosening of the joint.

(2)Flight control

a. It is highly probable that because the Rod was failed while the aircraft was flying, TR became uncontrollable.

b. It is highly probable that after the failure of the Rod, the input lever of the Fenestron servo actuator had been displaced to the most aft position where the TR pitch angle had gone to the minimum pitch angle due to air pressure generated in forward flight and remained at the position. It is highly probable that TR was generating the thrust deflecting the nose to the right.

c. The captain did not select a landing area with a runway that has a wide air space available for the aircraft with the failed TR, and decided to land on the heliport which was the destination aerodrome in the flight plan and was the base of the company involved. As to the geographic features in the surrounding areas, the north, the east and the west of the heliport were surrounded by hills and only the south of it was open. The aircraft approached the heliport from the south at the time of the accident.

d. The aircraft deflected the nose to the right about 20 minutes after the Rod failure and after that, while keeping the attitude unchanged, it reached a point near the accident

site about 800 m short of the heliport on its approach route.

e. The aircraft, while decelerating, gradually entered a rotation to the right. Then, its attitude became nose-down. After the rotation to the right accelerated with the altitude unchanged, the aircraft rapidly lost its altitude and crashed.

f. It is highly probable that the aircraft behaved as mentioned above because the captain tried to pitch-down by pressing the cyclic stick forward to perform a go-around and also to increase the engine power by raising the collective lever up, recognizing that the aircraft gradually entered the rotation to the right when he performed an operation for deceleration.

g. Following these operations, it is highly probable that the reactive torque by the MR rotation increased due to the increase of the engine power under the condition that the forward speed was slow and the lift of the vertical stabilizer to defect the nose to the left was limited and as a result, the aircraft became uncontrollable and its rotation to the right accelerated.

h. As a result of the flight tests and flight simulator tests performed by the manufacturer after the accident, it was found that a wide air space was necessary to perform a go-around for the aircraft with this TR failure condition.

(3) Impact at the crash

a. Because the aircraft crashed on a marsh with its landing gear first hitting the ground, it is highly probable that the impact to the aircraft was smaller than that of crashing on a hard ground.

b. The cause of the captain's death was the heart damage. It is highly probable that because the captain was not fastening his shoulder harness at the time of the accident, his body bent forward due to the impact at the time of the crash and his chest hit against the cyclic stick. The mechanic on board with the shoulder harness fastened sustained serious injuries.

3. Probable causes

It is highly probable that the failure of the Rod during flight made TR uncontrollable, and that after flying over around the accident site and decelerating, the aircraft entered a rotation to the right and then, rapidly lost its altitude, and crashed. As a result, the captain died and the mechanic on board sustained serious injuries.

As to the failure of the Rod, it is highly probable that repetitive bending loads in excess of the fatigue strength had been applied on the Rod due to the loosening of the joint of the Rod and the yaw actuator and the stiffening of the ball pivot as well as the resonance phenomenon following the stiffening.

As to the stiffening of the ball pivot, it is highly probable that the phenomenon had occurred because the red rust was formed due to the corrosion of the contact surface of the inner ring and the outer ring and it expanded in volume in the space between the two rings

restricting the movement of the two rings.

As to the crash of the aircraft, it is highly probable that because the aircraft entered the rotation to the right when the captain performed an operation for deceleration and also because he tried to increase the engine power after that in an attempt to perform a go-around, the rotation to the right accelerated and this made the aircraft uncontrollable and it rapidly lost its altitude.

As to the cause for the captain's death, it is highly probable that because the captain had not fastened his shoulder harness, his body bent forward due to the impact at the time of the crash and his heart was damaged as his chest hit against the cyclic stick.

4. Opinions

The JTSB expressed its opinions to the Minister of Land, Infrastructure, Transport and Tourism recommending that the Civil Aviation Bureau of the Ministry should give guidance once again to those in charge of maintenance of rotorcraft and small aircraft so that they will fully understand the contents of manuals and other materials provided by the aircraft manufacturers and it should also give guidance to those who operate rotorcraft and small aircraft so that they will select flight training syllabuses for emergency operations in an appropriate manner and urge them to have pilots and other personnel on board fasten their shoulder harness appropriately not only during takeoff and landing but also during other flight phases depending on the situation.

(For the details of the opinions, refer to "Chapter 1 - 2. Summary of recommendations and opinions" (Page 36).)

Aircraft 2 When the passenger aircraft landed, its tail struck the runway and the aircraft sustained damage.
(All Nippon Airways Co., Ltd. Boeing 737-800, registered JA56AN)

Full text of the investigation report : http://www.mlit.go.jp/jtsb/eng-air_report/JA56AN.pdf

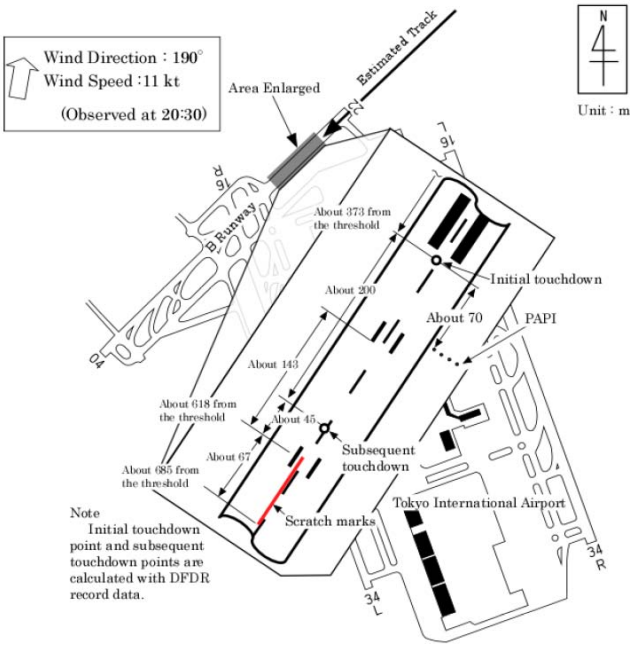
1. Summary of the accident

(1) Date and time: At around 20:23 JST, August 10 (Monday), 2009

(2) Location: Runway 22, Tokyo International Airport

(3) Outline of the accident:

A Boeing 737-800, operated by Air Nippon Co., Ltd., which was on a regularly scheduled service as All Nippon Airway's flight 298 under the agreement of joint transportation, made a tail strike with the surface of runway 22, Tokyo International Airport, upon landing at around 20:23 JST, and the aircraft sustained damage.



Scratch marks on the runway 22

A total of 153 persons consisting of the pilot in command, five crewmembers and 147 passengers were on board the aircraft, but nobody sustained injuries. The aircraft was substantially damaged, but no fire broke out.

(4) Date of publication: April 22, 2011

1. Findings

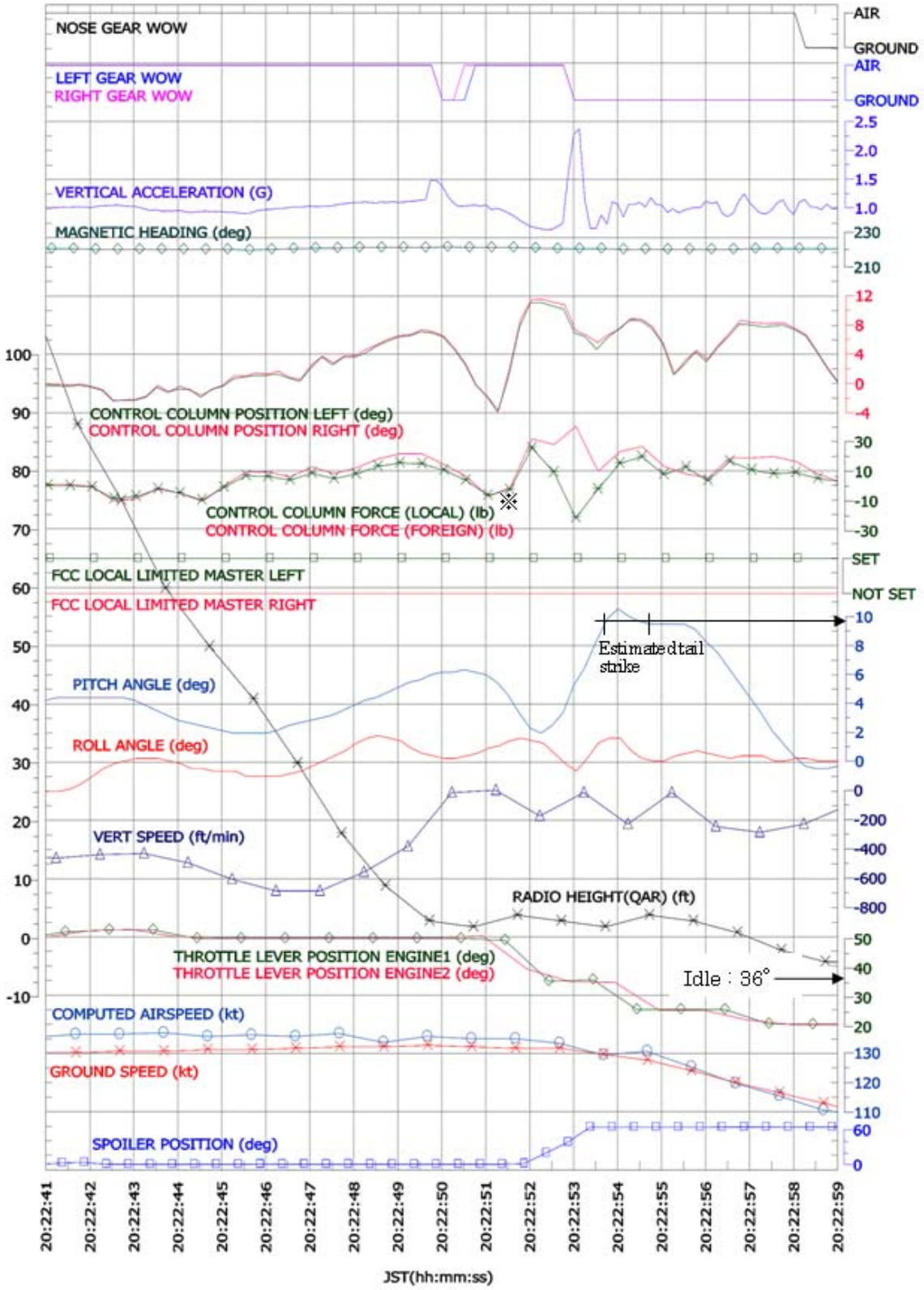
(1) Analysis of FO's flight operations

a. 200 ft to the bounce

The flight officer (FO) of the aircraft sat in the right seat while serving as the pilot-flying (PF) (mainly in charge of flying the aircraft), while the pilot in command (PIC) in the left seat as the pilot-not-flying (PNF) (mainly in charge of duties other than flying the aircraft).

The FO was correcting the glide path near 150 ft, which the PIC mentioned had been lower near 200 ft, by adding thrust and increasing the pitch angle. Then he pushed the CCP*1 after the aircraft passed 90 ft. It is highly probable that this input is linked to the decrease in the pitch angle after the aircraft flew over the runway 22 threshold at an altitude of approximately 60 ft RA and a delayed increase in the descent rate.

*1 The CCP denotes the control column position.



※ CONTROL COLUMN FORCE LOCAL applies to the left control column input while suffix FOREIGN to right control column input

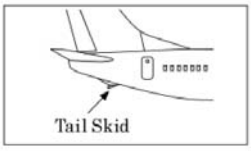
DFDR (Digital Flight Data Recorder) records

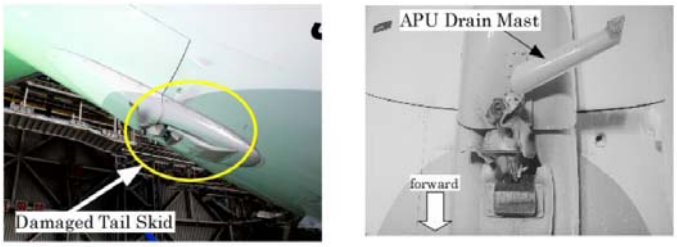
The FO stated that he felt the interval between automatic call-outs*[2] of "Fifty" and "Forty" was shorter than usual. It is probable that his statement corresponds to the

then increasing descent rate of 600 to 700 fpm.

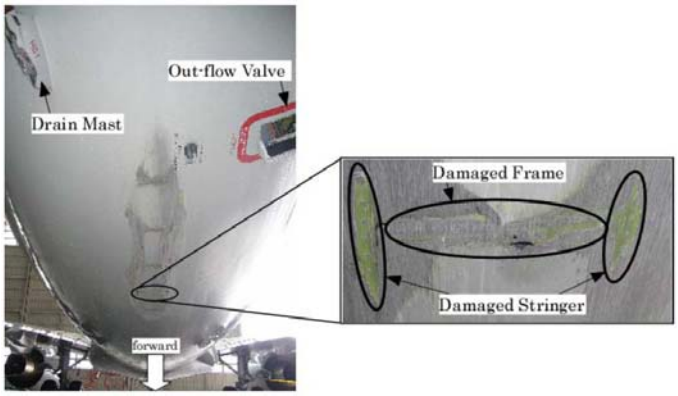
*2 The automatic call-out means a system which automatically reads out an aircraft's altitude with a synthesized voice as a reminder for the pilot. Altitude data obtained with the radio altimeter are used for the called out altitudes.

The FO stated that when he heard "Thirty", he started to flare the aircraft with an intention of maintaining the glide path. It is probable that this statement corresponds to the descent rate which started to decrease at around the time when the aircraft passed 30 ft, in terms of the DFDR records. It is probable that the flare maneuver was started approximately 3 seconds before the first touchdown, and with the control column pulled to reduce the descent rate from the earlier level of 700 fpm, it is probable that the aircraft touched down with a descent rate of approximately 100 fpm, and the pitch angle continued to increase even after the touchdown, though it was in a brief period. As for the thrust lever control, the FO stated that he retarded the thrust lever to the idle position upon hearing an automatic call-out of "Ten," but the lever remained in the approach setting, according to the DFDR records, at the time of the first touchdown. It is probable that he could not retard the lever to the idle position because if he had done so, with the descent rate still at approximately 400 fpm, the descent rate would have increased further. It is probable that the aircraft bounced because the power setting remained as it was, with the thrust lever left to be retarded to the idle position, with a pitch angle of approximately +6° at touchdown and an airspeed of approximately 135 kt, and also because the pitch angle continued to increase even after the touchdown, though it was in a brief period.





Damage on tail skid



Damage on fuselage

b. During the bounce

The FO stated that he had held the control column in preparation for the second touchdown. However, the CCP registered large push and pull movements. It is probable that he had pushed the control column (from approximately +7° to approximately -4°) to avoid further bounce, and then pulled it (from approximately -4° to approximately +11°)

to establish the landing attitude for the second touchdown. The CCP movement was reversed to decrease at around 20:22:52, approximately one second before the subsequent touchdown. However, the pitch angle conversely turned to increase.

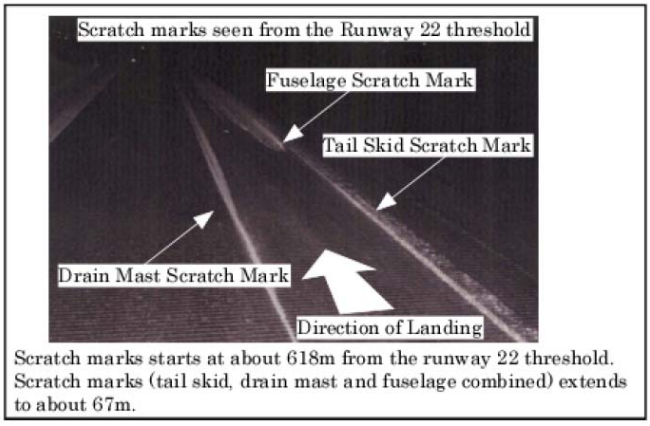
At around 20:22:51, with the thrust lever retarded to the idle position, the operating conditions for the auto speed brake had been met and at around 20:22:52 during the bounce, spoilers began to deploy.

It is somewhat likely that although the FO had been aware of the adverse outcome of retarding the thrust lever to idle during a bounce, he did so as an impulsive action.

On the other hand, the PIC's control column force had been applied as a push at around 20:22:52. It is probable that this push was the PIC's attempt to control the aircraft as he felt that the FO's control input was excessive.

c. After the subsequent touchdown

The subsequent touchdown was made with a pitch angle of approximately +6° at around 20:22:53. It is highly probable that the aircraft landed with a vertical acceleration of 2.4G after losing its lift following the deployment of spoilers. It is probable that although the CCP had decreased from 11° to 8° between 20:22:52 and 20:22:53, the pitch up attitude exceeded 9° as a result of the combined effects of a bigger CCP value and a pitch up moment generated by the deployment of spoilers which took place from 20:22:52 to past 20:22:53.



Scratch marks on the runway 22

It is highly probable that the effects of the FO's large push-pull movements with the control column during the bounce led the pitch angle, which had been earlier reduced at one time with a delay, to become large and with an added nose-up moment generated by the deployment of spoilers, the pitch angle increased to over approximately 9.7° and consequently the aircraft made a tail strike*3 with its fuselage damage.

*3 A tail strike means a situation in which an aircraft's aft fuselage touches the runway when the aircraft lands or takes off.

According to a chart inserted in the MTG*4, a tail strike occurs with compressed main gear struts*5 at a pitch angle of approximately 9°, whereas with extended struts, it occurs at approximately 11.5°. The aircraft's aft fuselage is estimated to have touched the runway with a pitch angle of approximately 9.7°. Therefore, it is highly probable that the struts had been partially compressed, not fully extended.

*4 The MTG means the Boeing 737 Maneuvers and Techniques Guide, which is used as a reference material to show guidelines for operating the 700 Series and 800 Series aircraft owned by the company involved.
*5 The struts denote landing gear struts as part of the landing system. The struts form the landing system along with a shock absorber designed to cushion impact loads on landing.

(2) PIC's takeover

The PIC stated that approach operations performed by the FO had been within allowable stabilization limits until the initial touchdown. As a result, he did not have to add his control input, and there was no advice recorded in the CVR data. Therefore, it is highly probable that he had judged that a takeover*6 was unnecessary until the first touchdown. The aircraft bounced just after the first touchdown and the resultant touchdown occurred approximately 2 seconds later. During the bounce, the FO pushed and then pulled the control column and at that time, the PIC was pushing the control column to restraint an excessive pull input, but this push did not prevent a tail strike from occurring.

*6 The takeover means an action which must be done by a PIC to take over the control of the aircraft from an FO when he judges that the FO's controlling is inappropriate.

(3) Recurrence prevention

A proper landing requires a pilot to stabilize the last portion of an approach with proper control of speed, height, descent rate and other elements. In order to achieve this, it is important to establish a stabilized approach path in its early stage and precisely maintain it with a small control input.

During the course of an approach, if a PIC judges an FO's approach is unstable, he should not hesitate to execute a takeover.

In case of a bounce where the aircraft becomes unstable, it is necessary to execute the countermeasures stipulated in the MTG.

3. Probable causes

In this accident, it is highly probable that the aircraft, under the FO's piloting, was damaged in its aft fuselage as it made a tail strike at the second touchdown following the bounce immediately after the initial touchdown, with the continued nose-up attitude in addition to the compression of main landing gear struts by the large vertical acceleration.

It is probable that the big amount of control column pull input during the bounce and the pitch-up moment generated by the deployment of auto speed brake activated by the retarded thrust levers had contributed to the continued pitch up attitude after the second touchdown.

Aircraft 3 A rescue helicopter crashed during a rescue activity in the Northern Alps Mountains as its main rotor blade hit a rock wall when it was hovering at a high altitude.

(Gifu Air Rescue Team BELL 412EP, JA96GF)

Full text of the investigation report : http://www.mlit.go.jp/jtsb/eng-air_report/JA96GF.pdf

1. Summary of the accident

(1) Date and time: At around 15:22 JST, September 11 (Friday), 2009

(2) Location: Takayama City, Gifu Prefecture (near Mt. Okuhotaka-dake of the Northern Alps Mountains)

(3) Outline of the accident:

A BELL 412EP, registered JA96GF (No. II Wakaayu), operated by the Gifu Air Rescue Team, took off from Gifu Air Base for a rescue activity at 14:09 and it crashed at around 15:22 during the rescue activity near a mountain trail at the so-called Roba-no-mimi (the donkey's ear) located near Gens d'Armes of Mt. Okuhotaka-dake of the Northern Alps Mountains in Takayama City, Gifu Prefecture.

The captain, a mechanic and a firefighter, the three of the five persons aboard the aircraft excluding the two who had descended from the aircraft at the rescue site, were fatally injured.

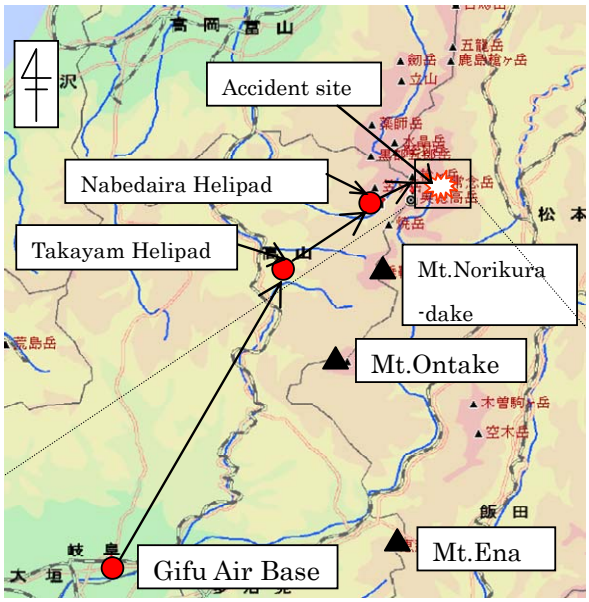
The aircraft was destroyed and a fire broke out.

(4) Date of publication: October 28, 2011

2. Findings

(1) Weather and geographical features which influenced the aircraft

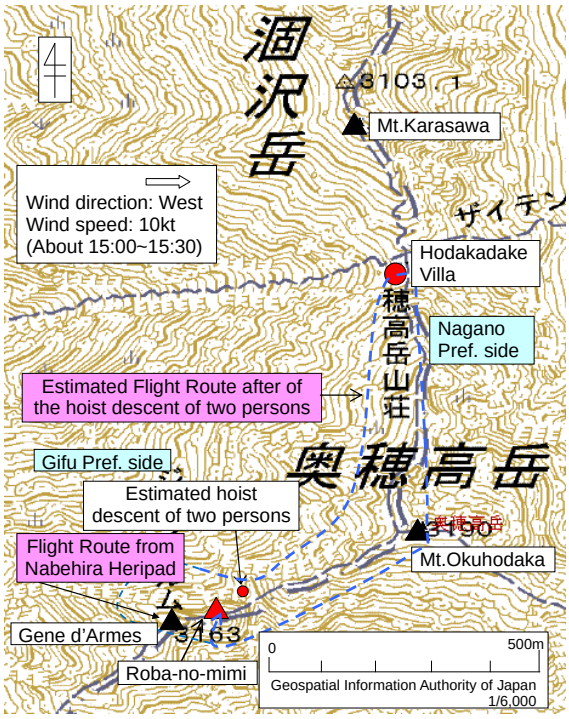
a. It is highly probable that the upward air currents in addition to the prevailing wind from the west, influenced by the complex geographical features such as steep cliffs and valleys, created a complex, quickly changing turbulence around the accident site which is typical of higher mountainous areas.



Estimated flight route

b. It is highly probable that the aircraft was receiving cross wind from the left. But, because the aircraft had been operated by a single pilot, it is probable that the captain had given priority to keeping a watch at rock walls as obstacles and securing an emergency breakaway route over stabilizing the aircraft with its heading facing the wind. It is probable that when the aircraft started hovering before the lifting at the rescue site, the captain initially tried to keep its altitude at around 80 ft. But it is probable that the captain raised its hovering altitude to around the same height as the top of Roba-no-mimi to avoid a rock wall running north and south and a rock wall running east and west (which was in the pilot's blind spot).

c. It is somewhat likely that the aircraft's altitude was suddenly lowered while it was hovering because of the influence of complex air currents typical of higher mountainous areas and when the aircraft moved backward with its altitude lowered, it became difficult for the captain to maintain the position of the aircraft relative to the mountain across the valley, which he had identified during the initial hovering, and that this made it difficult for him to precisely adjust the position and altitude of the aircraft and as a result, the aircraft moved backward and its main rotor blade (MRB) hit one of the rock walls.



Estimated flight route
(Around accident site)

Layout of accident site

The allowable maximum weight of the aircraft when it was hovering before the start of the lifting at about 15:19 was almost equal to the out of ground effect (OGE) hovering allowable maximum weight. Also because the aircraft was operating at a high altitude in an unfavorable condition in which its engine power and flight performance were likely to be influenced by changes in air currents as well as by cross winds, it is possible that the aircraft's altitude lowered due to an insufficient engine power and other reasons, making it difficult to maintain its heading, and thereby the MRB hit the rock wall. It is highly probable that when the aircraft hit the rock wall, it was about 7 m north-northwest of the rock wall where the contact marks were found, and its altitude was about 3,148 m.

d. It is probable that the downwash generated by the aircraft converged toward the valley on the northern side to create an even stronger current without dispersing due to the geographical features around the accident site. It is probable that the hoist cable and the hook of the aircraft had been swayed toward the valley in the stream of the downwash. Because the aircraft raised its altitude, the length of the hoist cable wound out became about 48 m (including the surplus length), which was more than twice as long as the usual training length (about 21 m), it is probable that the cable started swinging even more erratically, requiring a longer time for rescue personnel on the ground to catch the hook.

e. During the hovering, the captain raised the aircraft to an altitude around the top of Roba-no-mimi in order to avoid the rock wall running north and south and the rock wall

running east and west which was in his blind spot. As a result, it is somewhat likely that the captain had considered that he could have maintained a sufficient distance between the aircraft and the rock wall, which would be hit by the MRB of the aircraft later. Regarding how to watch the right side behind the aircraft, the sub-chief of the Gifu Air Rescue Team, who was the airborne safety manager at the time of the accident, is believed to have been in charge of keeping a watch on the area. But it is somewhat likely that just like the captain, he had also considered that a sufficient distance had been secured between the aircraft and the rock wall because its altitude had been raised to near the height of Roba-no-mimi.

It is highly probable that it was very difficult to relocate the rescue-requiring person to a different place at that time because the rescuers would have to pass so dangerous a place that they might slip down while carrying the person.

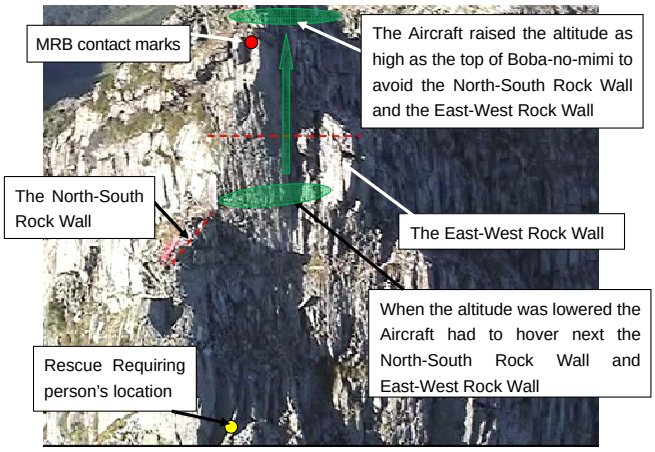
(2) Fracture and detachment of tail boom

a. It is probable that because the right side of the MRB's rotating plane hit the rock wall, the transmission leaned backward and at the same time, the MRBs were damaged, and they became unable to keep a proper rotation and hard hit the left side of the tail boom, fracturing it.

b. It is probable that the engines of the aircraft were normally operating and that there was no abnormality with the aircraft.

(3) Flight plan, decision on dispatch of the aircraft and organizational system

a. It is probable that the captain had been in effect in a position to make a judgment on whether to dispatch an aircraft at the Disaster Prevention Aviation Center (the Center) of Gifu Prefecture. It is probable that the manager of the Center made a decision to dispatch the aircraft involved simply following the captain's judgment and notified his decision to the Disaster Prevention Division of the Gifu Prefectural Government.



Viewed from the northwest Roba-no-mimi

Neither the Operation Management Rule for Gifu Prefecture rescue helicopters (the Rule) nor the Emergency Operation Guideline for these helicopters had a provision for checking the advisability of dispatching an aircraft from the Center. There was no provision, either, requiring the operation control manager and the operation control supervisor to have professional knowledge and experience related to aviation. As a result, there was no responsible person at the Center, except the captain, who could make a judgment on the dispatch of an aircraft.

Although the Rule and the Emergency Operation Guideline resembled comparable regulations established by other local governments in terms of their contents, it is probable that they lacked an appropriate provision to secure a safe

operation for the aircraft involved.

b. The captain tried to depart quickly for the rescue activity despite his failure to obtain a reply from the Prefectural Police Aviation Unit to his request for providing a copilot to assist his flight. The aircraft involved was a model which can be operated with a single pilot and it had actually been operated with only one pilot in the past. Also because the Rule and other regulations lacked a provision about the number of pilots, it is somewhat likely that the captain may have decided to use the aircraft with a single pilot aboard.

Had it been operated with two pilots, it is probable that the aircraft could have flown in a better condition and its safety would have been enhanced.

c. According to the minutes of a meeting between the prefectural police staff and the Center, it had been agreed between the two sides that rescue activities in the Northern Alps Mountains should be basically done by the police side and firefighters at the Center should not be engaged in rescue activities there. But this had not been clearly stated in the Agreement or the Operation and Management Procedure which were concluded between the two sides later.

It is somewhat likely that the Center had not clearly recognized the division of jobs in rescue activities in the Northern Alps Mountains between the Center and the Prefectural Police Aviation Unit.

It is probable that the captain had been aware that the Prefectural Police Aviation Unit was always in charge of rescue activities in the Northern Alps Mountains. But it is somewhat likely that he judged that an aircraft should be dispatched as quickly as possible from the point of view of life saving, in accordance with the Operation Management Rule for Gifu Prefecture rescue helicopters and the Operation and Management Procedure.

The captain is believed to have had general knowledge and experience of mountain rescue activities, but he had no records of training or rescue activities in the higher Northern Alps areas. Therefore, it is probable that he had not fully recognized the difficulty of flying an aircraft for rescue activity at a place very close to a rock wall, just like the rescue site in the case, in the higher mountainous areas in the Northern Alps Mountains with the elevation of over 3,000 m.

If the agreement between the Prefectural Police Aviation Unit and the Center regarding rescue activities in the Northern Alps Mountains had been clearly documented and if their job sharing and conditions for dispatching their helicopters had been clarified, it is probable that the captain would have made a judgment under these rules on whether to dispatch the aircraft involved, and it is also probable that comprehensive coordination between the Police Aviation Unit and the Center would have been made among a range of persons, including the sub-chief of the air rescue team and the manager of the Center, who might have exchanged their views not only about the Center's receipt of the rescue request and the necessity for the Center to have a pilot provided from the Police Aviation Unit but also about the fact that the Center had no team of ground personnel capable of operating in the higher mountainous areas.

d. In view of the records of dispatch for the aircraft involved and the records of training, it is highly probable that the Center had not assumed that its helicopters would be dispatched for rescue activities in the higher Northern Alps areas.

Because the Center had not assumed its personnel would operate anywhere in

the Northern Alps Mountains, it is believed to be desirable for the Center to have left rescue activities in the steep higher mountainous areas in the Northern Alps Mountains, just like the rescue site in the case, to the Prefectural Police Aviation Unit, which was well experienced in activities in those areas.

e. The captain is believed to have prepared a simplified chart which showed such data as the weight and the center of gravity (CG) of the aircraft when he prepared a flight plan for the aircraft, but the chart could not be found after the accident. As a result, his flight plan for the day of the accident could not be determined.

The aircraft was hovering with the gross weight exceeding the OGE hovering allowable maximum weight. It is probable that the captain started hovering because he could confirm in the course of the power check that the indications on the instruments were within the allowable ranges.

When a helicopter hovers with a gross weight exceeding its flight performance at a high altitude, serious problems could occur during flight. When a mission includes hovering at a high altitude, just like at the rescue site, even in the case of an emergency rescue operation, the weight at the hovering must be precisely calculated beforehand and the fuel load must be adjusted in an appropriate manner before takeoff.

f. According to the Emergency Operation Procedure and the related manual, a final decision to dispatch the aircraft involved at the Center was to be made by the manager of the Center, but the captain was in effect in charge of this job.

The Center should establish a systematic decision-making process of aircraft dispatch, upon assessing the danger of the destination and conformity of its own preparedness in accordance with the Emergency Operation Procedure and the related manual. In order to make this process effective, the Center should assure its staff to ascertain the condition of the destination before a decision is made and require each group chief to have a briefing so that a clear judgment can be made on whether the groups will be able to operate in their respective areas, before the manager of the Center confirms an agreement among the groups and it makes a decision for the dispatch.

The Northern Alps Mountains are among the areas under the jurisdiction of the Center, and an aircraft may be dispatched to places in the higher Northern Alps areas, and if its aircraft is to be dispatched to places where rescue work must be done in a very difficult situation, just like the higher mountainous areas in the Northern Alps Mountains, including the rescue site in this case, it is considered necessary for the Center to carry out not only researches and studies about geographical features, meteorological phenomena and other factors in advance but also hovering trainings at high altitudes, and furthermore a mission-oriented broad range of trainings with actual operations in mind.

As to the formation of pilots for similar rescue operations, because flight planning, a go-or-not-go decision and other preparations must be done quickly under a bustled pre-launch situation, it is desirable to dispatch a helicopter with two pilots when it has to operate in an area where rescue work must be done in a very difficult condition, such as the higher mountainous areas in the Northern Alps Mountains. The Center also needs to introduce a more appropriate system for helicopter operations by creating clear provisions about the decision making of dispatch and the coordination with the prefectural police.

3. Probable causes

It is highly probable that the aircraft crashed while it was operating for a rescue activity in the higher mountainous areas in the Northern Alps Mountains, where trainings or rescue operations had not been made, and the altitude of the aircraft declined when it was hovering near the top of Roba-no-mimi and as a result, the aircraft moved backward and consequently, its MRBs hit an adjacent rock wall.

As to the MRBs' contact with the rock wall after the decline of the aircraft's altitude, it is somewhat likely that either of the following two factors listed below or both had contributed to the consequence.

(1) Because of the influence of the turbulence typical of higher mountainous areas and the aircraft movement due to altitude loss, it became difficult for the captain to maintain his sense of distance with the target (a mountain across a valley) which is considered to have been identified during the initial hovering.

(2) The aircraft's gross weight at the time of the accident was almost equal to the OGE hovering allowable maximum weight. Also in view of the fact that the aircraft was operating at a high altitude in an unfavorable condition, in which its engine power or its flight performance might easily be influenced by cross winds and by changes in air currents typical of the higher mountainous areas, it became difficult to maintain the aircraft's heading following the altitude loss due to the insufficient engine power and other factors.

As to the rescue dispatch of the aircraft to the higher mountainous areas in the Northern Alps Mountains, where trainings or rescue operations had not been made by the Gifu Air Rescue Team, it is somewhat likely that the absence of a clear provision between the Center and the Prefectural Police Aviation Unit regarding the task sharing for mountain rescue activities in the Northern Alps Mountains contributed to the Center's lack of clear recognition about the task sharing with the police side

4. Remarks

The JTSB made its remarks to local governments which have helicopters for rescue activities regarding the need to review their own safety management systems, rules and other related matters in order to ensure the safety of helicopter operations, and also to the Fire and Disaster Management Agency regarding the need to make necessary advices for local governments concerned with regard to their reviews.

(For the details of the remarks, refer to "Appendix 8 Remarks made in 2011" (Page 14 in Appendixes).)

Aircraft 4 When an aircraft was approaching a runway which it had been cleared to use, a different aircraft entered the runway upon receiving a take-off clearance.
(Air Flight Japan Co., Ltd. Piper PA-28R-201, JA4193)
(Oriental Air Bridge Co., Ltd. Bombardier DHC-8-201, JA802B)

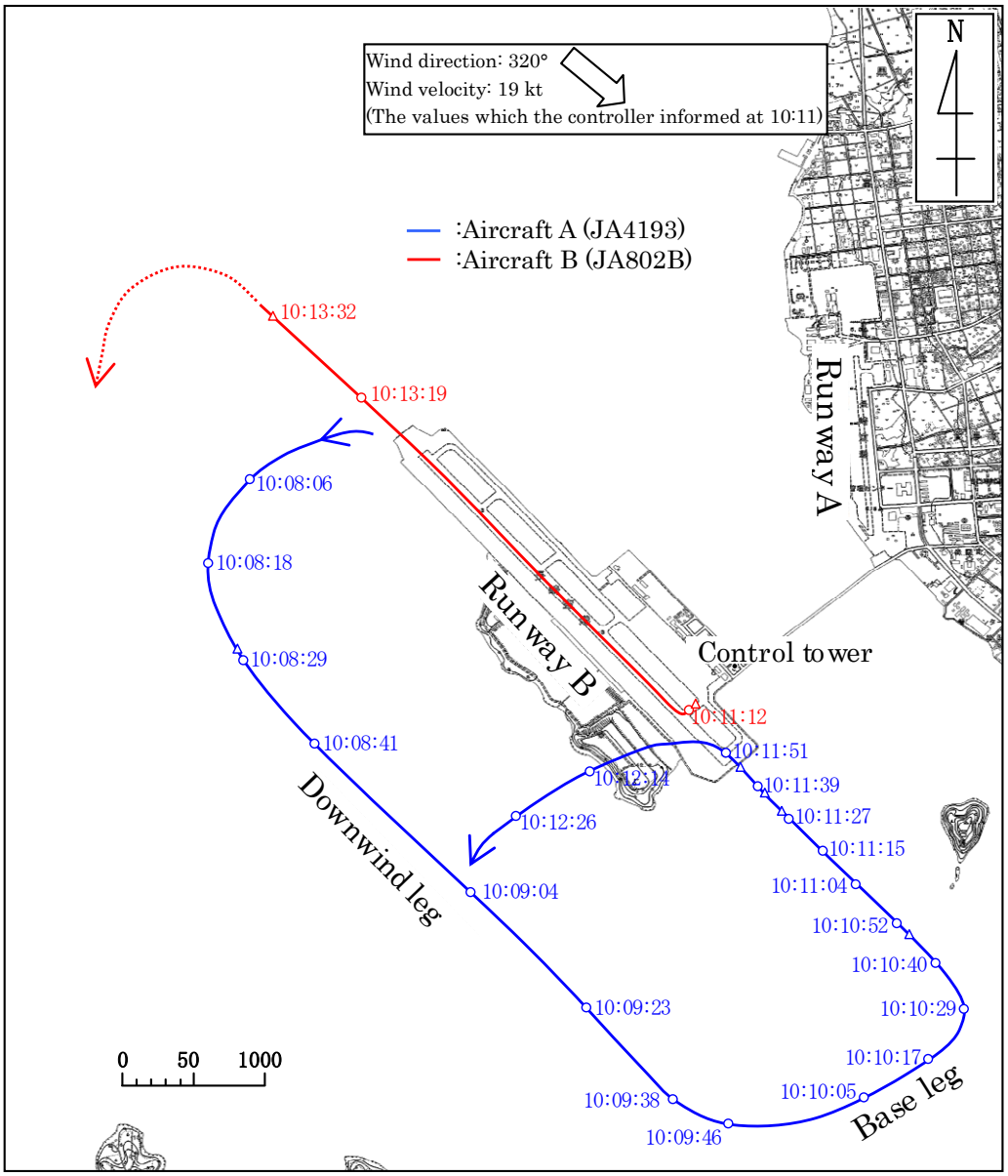
Full text of the investigation report (Japanese text only):
http://www.mlit.go.jp/jtsb/aircraft/rep-inci/AI2011-2-1-JA4193-JA802B.pdf

1. Summary of the serious incident

(1) Date and time: At around 10:11 JST, March 25 (Wednesday), 2009

(2) Location: On the final approach to runway 32, Nagasaki Airport

(3) Outline of the incident:



Estimated flight routes

A Piper PA-28R-201, registered JA4193 (the Aircraft A), operated by Air Flight Japan Co., Ltd. was approaching runway 32 (runway B) of Nagasaki Airport in Nagasaki

Prefecture upon receiving a clearance for using the runway for touch and go landing (TGL) training. Meanwhile, a Bombardier DHC-8-201, registered JA802B (the Aircraft B), operated by Oriental Air Bridge Co., Ltd. entered runway 32 via taxiway T2 after receiving a take-off clearance for Fukue Airport, also in Nagasaki Prefecture, as the company's scheduled flight 311. As the Aircraft A noticed the Aircraft B's entry into runway 32, the Aircraft A performed a go-around.

There were three persons on board the Aircraft A, consisting of an instructor, a student pilot and an observer, while 32 persons were aboard the Aircraft B, consisting of the captain, two crewmembers and 29 passengers. No one was injured. There was no damage, either, to both aircraft.

10:08:18	The Aircraft A reported to the aerodrome control air traffic controller (the Tower) that it has entered a left downwind leg toward runway 32 and requested a permission for touch and go landing (TGL)
10:08:23	The Tower cleared TGL on runway 32 for the Aircraft A.
Around 10:08:30	The Aircraft B started taxiing to runway 32 from the spot No. 3
Around 10:09:40	The Aircraft A started turning from the left downwind leg to the base leg (the base).
Around 10:10:30	The Aircraft A turned to the left from the base while maintaining an altitude of about 800 ft and entered the final approach.
10:10:42	The Aircraft B established communication with the Tower and reported "ready for take-off,"
10:10:47	The Tower issued a take-off clearance from runway 32 to the Aircraft B.
Around 10:11:00	The Aircraft A started descending from about 800 ft at a place about one nm from the runway 32 threshold.
Around 10:11:08	The Aircraft B started turning to the right from taxiway T2 to runway 32. The Aircraft A was descending at about 500 ft.
10:11:29	The Aircraft A reported a go-around to the Tower
10:11:31	The Tower issued an instruction to the Aircraft A, "Sorry, report downwind."
Around 10:11:35	The Aircraft B finished the turn to the right and aligned with runway 32. The Aircraft A started climbing from about 200 ft at a place about 0.5 nm from the Aircraft B.
10:11:42	The Tower instructed the Aircraft A to turn to the left.
10:11:47	The Aircraft B asked the Tower "confirm cleared for for take off.
10:11:49	The Tower replied to the Aircraft B "affirm."
Around 10:11:50	The Aircraft A passed near the runway 32 threshold while turning to the left westward and climbing at about 400 ft.
10:12:00	The Aircraft A got out of the area over runway 32 while flying westward.

(4) Date of publication: February 25, 2011

2. Findings

(1) Circumstances concerning the Tower's issuance of take-off clearance

a. The circumstance in which the Aircraft A was forgotten

At the time when this serious incident occurred, the Tower was having a chat with two other air traffic controllers after issuing the clearance for TGL to the Aircraft A, as the number of aircraft to be handled was small then. It is probable that the Tower, preoccupied with the conversation, was not looking at the Aircraft A and this led to a non-compliance of a provision in the air traffic control procedure standard that required air traffic controllers to make every possible effort to visibly recognize aircraft concerned continuously, rendering him, along with the other controllers, forgetful of the presence of the Aircraft A.

b. The circumstance in which the take-off clearance was issued to the Aircraft B while the Aircraft A was forgotten

It is highly probable that the Aircraft B started taxiing around when the Aircraft A read back TGL clearance. It is probable that when the Tower received a notice from the terminal control faicility for clearing a take-off standby for the Aircraft B while it

was taxiing and the Aircraft B reported to the Tower that it had finished take-off preparations, the Tower issued a take-off clearance almost reflexively for the Aircraft B, while forgetting the Aircraft A which had entered the final approach. It is probable that because the two other controllers at the control tower had also forgotten the Aircraft A, they could not correct the Tower's double issuance of clearances for the same runway.

It is somewhat likely that the Tower had customarily looked into the runway for a safety check just before he issued a take-off clearance for the Aircraft B. However, it is probable that the Tower had forgotten the presence of the Aircraft A itself, and that because the Aircraft A was far away from the area where he usually searched for traffic, the Tower could not visibly recognize the Aircraft A.

c. The circumstance in which it was realized that the Aircraft A had been forgotten

It is probable that the Tower came to realize for the first time that he had forgotten the Aircraft A when it reported a decision to perform a go-around to the Tower.

It is probable that after the Tower realized that he had forgotten the Aircraft, he instructed the Aircraft A to report its downwind and turn to the left and after that, permitted the Aircraft B to continue its take-off.

The safety of the two aircraft was actually secured, but when the Aircraft A reported to the Tower that it would perform a go-around, the Tower should have at least canceled the take-off clearance for the Aircraft B as soon as possible in order to avoid the possibility of the two aircraft coming close to each other and at the same time, should have provided information about the Aircraft A to the Aircraft B so that it could understand the situation.

(2) Circumstances from the Aircraft A's entry into the final approach to go-around

a. The situation of the Aircraft A when the take-off clearance was issued for the Aircraft B

It is probable that when the Tower issued the take-off clearance from runway 32 for the Aircraft B, the Aircraft A was in the final approach and 12 to 13 seconds before the start of its descent. At this point, the student pilot aboard the Aircraft A heard the take-off clearance for the Aircraft B in ATC communications, but it is probable that the student pilot, while suspecting the double issuance of clearances for the same runway, was not confident enough to report his suspicion to the instructor. The student pilot aboard the Aircraft A should have immediately confirmed with the Tower when he became suspicions of the issuance of the take-off clearance to the Aircraft B.

It is probable that when the Tower issued the take-off clearance to the Aircraft B, the instructor aboard the Aircraft A had been occupied with the training so that dangerous operations might not be performed by the student pilot and as a result, did not realize the issuance of the take-off clearance for the Aircraft B. Instructors should strive to monitor ATC communications even when they are training student pilots.

b. The situation at the time when the Aircraft A noticed the Aircraft B's entry into the runway and reported a go-around to the Tower

It is probable that the student pilot aboard the Aircraft A recognized the Aircraft B which had entered runway 32 but the student pilot did not execute a go-around operation immediately.

It is probable that then the instructor aboard the Aircraft A, who realized the Aircraft B's entry into runway 32, immediately confirmed the TGL clearance with the student pilot and instructed the student pilot to perform a go-around operation and after the student pilot performed operations for a go-around, the instructor reported the go-around to the Tower.

(3) Circumstances in which the Aircraft B could not visibly recognize the Aircraft A in safety check just before entry into runway

It is probable that the Aircraft B confirmed the safety in the direction of the final approach just before it entered runway 32. But the Aircraft B had not monitored the aerodrome frequency until its establishment of communication with the Tower after the completion of take-off preparations in accordance with instructions by the ground control air traffic controller (Ground), whereas the Aircraft A had not made any ATC communication from the time when it read back the issuance of permission for TGL to the time when it reported a go-around to the Tower. Therefore, it is highly probable that the Aircraft B could not recognize the presence of the Aircraft A before its entry into runway 32 by monitoring the aerodrome frequency. Meanwhile, it is probable that the Aircraft A had been far away from the area which was usually searched for traffic. In view of these findings, it is probable that the Aircraft B could not visibly recognize the Aircraft A when it checked the safety in the direction of the final approach to runway 32.

(4) Preventive actions

a. Thorough implementation of continuous visible recognition in aerodrome air traffic control

Aerodrome air traffic controllers should remind themselves of the importance of the provision in the air traffic control procedure standard that calls on air traffic controllers to make every possible effort to visibly recognize aircraft concerned continuously and at the same time, they should strive to abide by the provision without fail.

b. Mutual support with team play among air traffic controllers

In air traffic control services to be executed in team play, each of the air traffic controllers must be aware of the responsibility of duties performed at their respective positions and at the same time, it is important that air traffic controllers should perform their jobs from different points of view and mutually strive to find and correct possible errors while displaying good team work based on favorable communication among themselves. While considering the placement of personnel, area-by-area characteristics in actual operations and other matters, it is necessary to strengthen a mutually complementary system for air traffic controllers mainly by further improving the Team Resource Management (TRM) with the characteristics of specific workplaces in mind.

c. Mutual cooperation in maintenance of safety between air traffic controllers and aircraft personnel

Air traffic controllers and aircraft crewmembers need to faithfully abide by the basics in their respective jobs and at the same time, mutually confirm and remind each other whenever they have doubts about what they saw and what they heard.

(5) Severity in this serious incident

The distance between the Aircraft A and the Aircraft B was about 0.5 nm (about 0.9 km) when the Aircraft A performed a go-around and started climbing, and it is highly probable that visibility was good at the time of the incident. The ICAO manual on the Prevention of Runway Incursions (Doc9870) shows case-by-case severity classifications for runway incursions. According to the judgment tool provided by the ICAO (Please see the table at right), this serious incident can be considered to be a case which falls under Category C "An incident characterized by ample time and/or distance to avoid a collision."

Severity Classification	*Description**
A	*A serious incident in which a collision is narrowly avoided.*
B	*An incident in which separation decreases and there is significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.*
C	*An incident characterized by ample time and/or distance to avoid a collision.*
D	*An incident that meets the definition of runway incursion such as the incorrect presence of a single vehicle, person or aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.*
E	*Insufficient information or inconclusive or conflicting evidence precludes a severity assessment.*

** Refer to Annex 13 for the difinition of "incident".*

Runway incursion severity classification

3. Probable causes

It is highly probable that this serious incident occurred because when the Aircraft A was approaching runway 32 upon receiving a permission to use the runway for TGL ahead of other aircraft, the Tower issued a clearance for take-off from the same runway to the Aircraft B while forgetting the presence of the Aircraft A, and the Aircraft B entered the runway without becoming aware of the presence of the Aircraft and therefore, the Aircraft A, which had earlier obtained the permission to use the runway, attempted to land on the runway in use of the Aircraft B.

It is probable that the Tower had forgotten the presence of the Aircraft because it was the period of time in which the number of aircraft to be handled was limited and he failed to visibly recognize the aircraft continuously as he had become preoccupied with conversation with two other air traffic controllers.

Aircraft 5 The aircraft made an approach to a closed runway due to the flight crew's misunderstanding in a visual approach at night.
(Qatar Airways Boeing 777-300, A7BAE)

Full text of the investigation report : http://www.mlit.go.jp/jtsb/eng-air_report/A7BAE.pdf

1. Summary of the serious incident

(1) Date and time: At around 21:55 JST, August 30 (Monday), 2010

(2) Location: About 3.8 nm northeast of runway 24R threshold, Kansai International Airport, Japan, an altitude of about 1,000 ft

(3) Outline of the incident:

A Boeing 777-300, registered A7BAE (the Aircraft), operated by Qatar Airways, took off from Narita International Airport at 20:59. When it was approaching Kansai International Airport (the Airport) at around 21:55 for landing, the Aircraft attempted to land on runway 24R which was closed then. Thereafter, the Aircraft made a go-around and touched down on runway 24L at 22:07.

There were 124 persons on board the Aircraft, including the Captain, 16 crewmembers and 107 passengers, and no one was injured.

(4) Date of publication: September 30, 2011

2. Findings

(1) History up to the occurrence of the serious incident

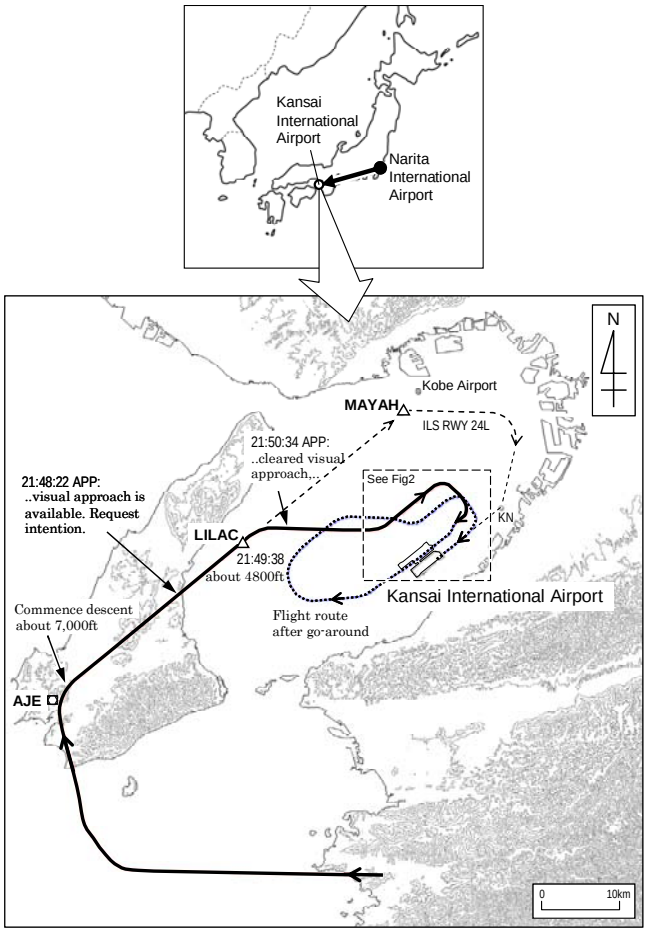
The Aircraft took off from Narita International Airport for the Airport as Qatar Airways' (the Company) regular flight 803 on August 30, 2010.

At the time of the occurrence of the serious incident, the Captain sat in the left seat as PM (Pilot Monitoring) and the First Officer in the right seat as PF (Pilot Flying).

<History of flight based on air traffic control communication records, DFDR records>

21:52:37: The precision approach lighting system (PALS), the sequenced flashing lights (SFL) and the precision approach path indicator (PAPI) of runway 24R (24R) were turned on.

21:53:11: The SFL of 24R was turned off.



Estimated flight route

21:53:35: The autopilot of the Aircraft was set to vertical speed (V/S) mode with a descent rate of 200 ft/min (fpm) selected.

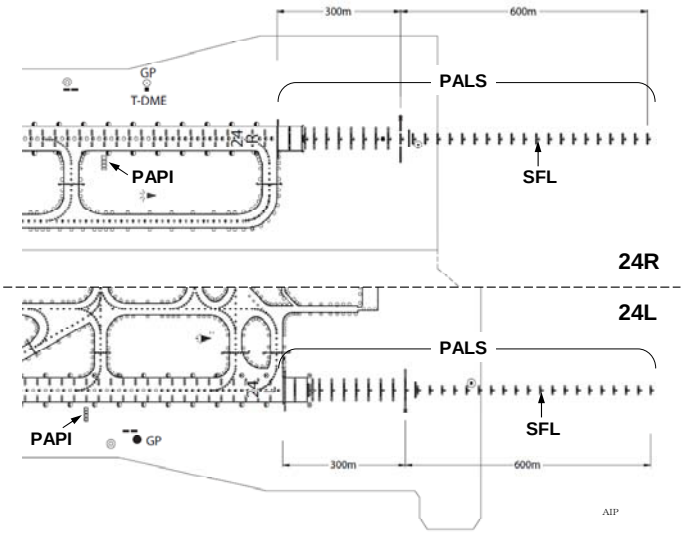
21:53:46: A descent rate of 500 fpm was selected.

21:53:55: A descent rate of 700 fpm was selected.

21:54:22: A descent rate of 900 fpm was selected.

21:54:33: The Captain said, "Three reds, one white."

21:54:35: A descent rate of 500 fpm was selected.



Lighting arrangements and its names

21:54:42: The Tower cleared the Aircraft to land on 24L and the Aircraft read back the clearance to land on 24L.

21:54:50: The autopilot of the Aircraft was disconnected manually.

21:55:08: The First Officer serving as PF, instructed the Captain to perform a landing checklist, and the Captain performed it.

21:55:11: The Tower pointed out that the Aircraft was approaching 24R, and asked whether it was possible to make a left turn to approach 24L. The Aircraft reported to the Tower that it would make a go-around because it was unable to approach 24L.

21:56:14: The PALS and PAPI on 24R were turned off.

(2) Information about the Airport and ground facilities

a. Overview of the Airport

The Airport has two runways, i.e., 06R/24L (runway A) with a length of 3,500 m and a width of 60 m on the east side of the Tower and the terminal building and 06L/24R (runway B) with a length of 4,000 m and a width of 60 m on the west side. The separation between the two runways is 2,303 m. When the serious incident occurred, runway B had been closed for maintenance work.

b. Aerodrome lighting conditions

The 24L side:

The PALS, SFL, PAPI, runway touchdown zone lights, runway edge lights and runway centerline lights had been lit normally.

The 24R side:

The SFL was lit between 21:52 and 21:53 and the PALS and PAPI were lit between 21:52 and 21:56. The runway edge lights and runway touchdown zone lights had been turned on in order to secure safety for the maintenance work, but the runway centerline lights had been turned off.

(3) Analysis of piloting by Captain and First Officer

a. It is highly probable that the Captain and the First Officer had been aware that 24R was closed.

b. The standard traffic pattern has a width of 2 nm. But it is probable that the First Officer tried to have leeway for approach and decided to take a 4 to 5 nm wide traffic pattern. However, it is probable that the First Officer had to navigate while paying greater attention than usual to timing corrections to descending and flap control because the traffic pattern was wider than usual.

c. According to the DFDR records, the autopilot was switched to V/S mode when the Aircraft started the base turn (21:53:35) and then, the Aircraft started descending. It is probable that the First Officer tried to descent slowly at a rate of 200 fpm because the runway was invisible at that point and there was no reference object visible on the sea. It is probable that the First Officer then increased the rate of descent to 500, 700 and 900 fpm gradually in order to adjust the Aircraft to an appropriate approach angle toward the runway as it became visible. At 21:54:33, the Captain uttered, "Three reds, one white." It is highly probable that this indicated the PAPI lamps had been lit red, red, red, and white (i.e., the approach altitude was slightly low), and it is highly probable that the First Officer then judged from the PAPI that the rate of descent was slightly high and he selected the rate to 500 fpm from 900 fpm.

d. It is probable that the First Officer then turned off the autopilot and approached 24R, which had been closed at that time, because the Aircraft was slightly overshooting to enter the final approach course to the runway that he misunderstood as 24L.

e. The First Officer took the traffic pattern wider than the standard width in order to have leeway to fly. It is probable that this was not a direct cause for the misunderstanding of the runway. However, the traffic pattern was made above the sea, and the visual approach was made at night with limited visual reference objects available, and the downwind leg was close to the standard traffic pattern for 24R. Therefore, it is probable that, after the runway once became invisible in the downwind leg, when the Aircraft made the base turn, the First Officer saw a runway and a PAPI close to the position where they were normally seen, and he assumed it was the right runway, and entered 24R mistakenly.

(4) Analysis of roles of and cooperation between flight crew

a. The Captain considered that the visual approach at night was difficult and asked the First Officer whether it would be all right and he did not agree when the First Officer instructed him “Flaps 30”. From these points, it is somewhat likely that the Captain had been distracted by the First Officer’s maneuvering which he felt unsure about, and could not play the role as PM sufficiently well, and that his checking did not function properly.

b. A communication gap between a Captain and a First Officer is unlikely on the timing of operation of flap and gear, descent and so on if the traffic pattern is approximately 2 nm. It is somewhat likely that the wider traffic pattern taken made it difficult for the Captain and the First Officer to share common perceptions.

c. A visual approach is an IFR approach by visual references to objects on the ground. It

is highly probable that it was not easy for the Captain and the First Officer to visually recognize the runway (24L) located beyond the bright lights around the terminal building while the Aircraft was in the traffic pattern, and that the runway (24R) located nearer was easier to see. However, the Captain and the First Officer had been aware that 24R, one of the two runways at the Airport, was closed. In addition, there was a good visibility, and the PAPI, PALS and SFL on the 24L runway, where the Aircraft was supposed to touch down, had been lit. Therefore, it is probable that the misunderstanding of the runway would have been avoided if the Captain and the First Officer had recognized the two runways in a wider field of vision.

d. The Captain stated, "24L was inputted into the navigation display (ND)." Therefore, it is probable that the Captain would have recognized earlier that the Aircraft was mistakenly approaching 24R if the Captain as PM had checked the indications on the ND along with its position against visual references to objects on the ground.

(5) Experience in landing at the Airport

The Captain and the First Officer landed at the Airport on the day before the serious incident, serving as PF and PM, respectively. But it was the Captain's first landing at the Airport in two years and the First Officer landed at the Airport as PF for the first time. In addition, it was the first visual approach to the Airport at night for both of them. It is probable that their landing experience at the Airport was not sufficient. With the circumstance considered, it would have been desirable for them to take a standard traffic pattern or make an ILS approach as originally planned instead of the visual approach.

(6) Operation of airport lighting systems

a. The lighting staff at the Airport shall notify air traffic controllers before turning on the PALS and PAPI. However, the control of the lighting console, including the operation of the PALS and PAPI, had been transferred from the controllers to the lighting staff at the time of the serious incident. Furthermore, the lighting staff had been allowed by the controllers to omit the prior notification. Therefore, it is highly probable that the lighting staff turned on the lights without notifying this to controllers in advance.

b. The PALS and PAPI on 24R had been turned on when the Aircraft was flying in the downwind leg in the traffic pattern. As the PAPI had been lit while there were no visual references on the sea, it is probable that this was a contributing factor for that the Captain and the First Officer assumed 24R as 24L.

c. The controllers pay attention to the movements of aircraft when the control of lighting the PALS and PAPI has been transferred to the lighting staff and the prior notification is omitted. The extinction of approach-related lighting systems on a closed runway, however, is an effective measure to prevent wrong approaches. Therefore, the lighting systems should have been controlled in accordance with the Agreement without omitting the prior notification.

d. The Agreement was reached in 2005, when the Airport was operating with a single runway, as safety measures for controllers following an occurrence at Tokyo

International Airport. In those days, since only a single runway had been used, there were no landing aircraft when the sole runway was closed, and this eliminated the necessity for a prior notification. Therefore, it is probable that the Agreement had not always been observed by controllers, who sometimes allowed the lighting staff to omit a prior notification. After the completion of the second runway at the Airport, it has become possible that an aircraft might mistakenly approach the closed runway when the other runway is open. Under these situational changes, it was necessary to keep controllers informed of the purpose of the Agreement thoroughly.

(7) Controller's response

When the Aircraft entered the final approach course to 24R, which its flight crew assumed to be 24L, the controller involved at the Tower realized early that the Aircraft was approaching the closed runway and asked the crew to reconfirm their approach. It is highly probable that this action contributed to preventing the Aircraft from landing on the closed runway mistakenly.

3. Probable causes

It is highly probable that this serious incident occurred because the Captain and the First Officer, who had assumed 24R to be 24L, approached 24R by mistake after the Aircraft received a landing clearance to 24L during its visual approach to the Airport.

It is probable that the Captain and the First Officer assumed 24R to be 24L because their visual recognition of the runway was insufficient and the PALS and PAPI on 24R had been turned on. It is also probable that the traffic pattern selected by the Aircraft, which was close to the standard traffic pattern for 24R, had contributed to the occurrence.

2. Summary of recommendations and opinions

There was one opinion in 2011, which is summarized below:

(1) Opinions (one case)

・ In view of the results of the investigation of All Nippon Helicopter Co., Ltd. Eurocopter EC135T2, registered JA31NH, the JTSB expressed its opinions to the Minister of Land, Infrastructure, Transport and Tourism on April 22, 2011 as follows:

1. Implementation of reliable maintenance work in accordance with manual

In this accident, the maintenance work had not necessarily been performed in accordance with the English written maintenance manual as follows.

The troubleshooting for the tail rotor control system was not performed in accordance with the trouble shooting procedure provided in the English written maintenance manual of the aircraft manufacturer. As a result, the inspection of the ball pivot was not performed and its stiffening was not found. In addition, the fact that the joint of the tail rotor control rod and the yaw actuator has a left-handed thread is provided in the English written maintenance manual of the aircraft manufacturer, but it is somewhat likely that the mechanic involved in this case, while intending to tighten the joint, actually turned the joint to the opposite direction to loosen it.

An aircraft accident other than this accident has been occurred which had been also concerned with noncompliance with the English written maintenance manual of the aircraft manufacturer. Therefore, JCAB should give guidance once again to those in charge of maintenance of rotorcraft and small aircraft so that they will fully understand the contents of manuals and other materials provided by the aircraft manufacturers.

2. Appropriate selection of flight training syllabuses for emergency operations in flight training

In this accident, it is highly probable that the captain did not perform an emergency procedure for the tail rotor failure conditions, as provided in the flight manual. It is probable that his failure to perform such an operation reflected the absence of a syllabus for tail rotor failure in the periodic training for the captain.

Therefore, JCAB should give guidance to those who operate rotorcraft and small aircraft so that they will select flight training syllabuses for emergency operations in an appropriate manner.

3. Fastening of shoulder harness

It is highly probable that the captain died in this accident because he was not fastening his shoulder harness and as a result, his body bent forward due to the impact at the time of the crash and his chest hit against the cyclic stick.

The fastening of the shoulder harness is effective for preventing injuries on impacts at crashes. Therefore, JCAB should urge those who operate rotorcraft and small aircraft to have pilots and other personnel on board fasten their shoulder harness appropriately during not only takeoff and landing but also other flight phases.

3. Statistics of investigations of aircraft accidents and serious incidents

The JTSB carried out investigations of aircraft accidents and serious incidents in 2011 as follows:

Regarding accident, 19 cases were carried over from 2010, and there were 14 cases newly launched in 2011. Of the total number, investigation reports for 12 cases were published, an interim report for one case was published, and 21 investigations were carried over to 2012.

Regarding serious incident, 15 cases were carried over from 2010, and there were six cases newly launched in 2011. Of the total number, investigation reports for eight cases were published and 13 investigations were carried over to 2012.

Among the publicized reports of 20 cases, one included opinions and two included remarks.

Investigations of aircraft accidents and serious incidents in 2011

(Cases)

Category	Carried over from 2010	Launched in 2011	Total	Publication of Investigation Report	Recommendations	Safety Recommendations	Opinions	Remarks	Carried over to 2012	Interim report
Aircraft accident	19	14	33	12	0	0	1	1	21	1
Aircraft serious incident	15	6	21	8	0	0	0	1	13	0

4. Statistics of investigations launched in 2011

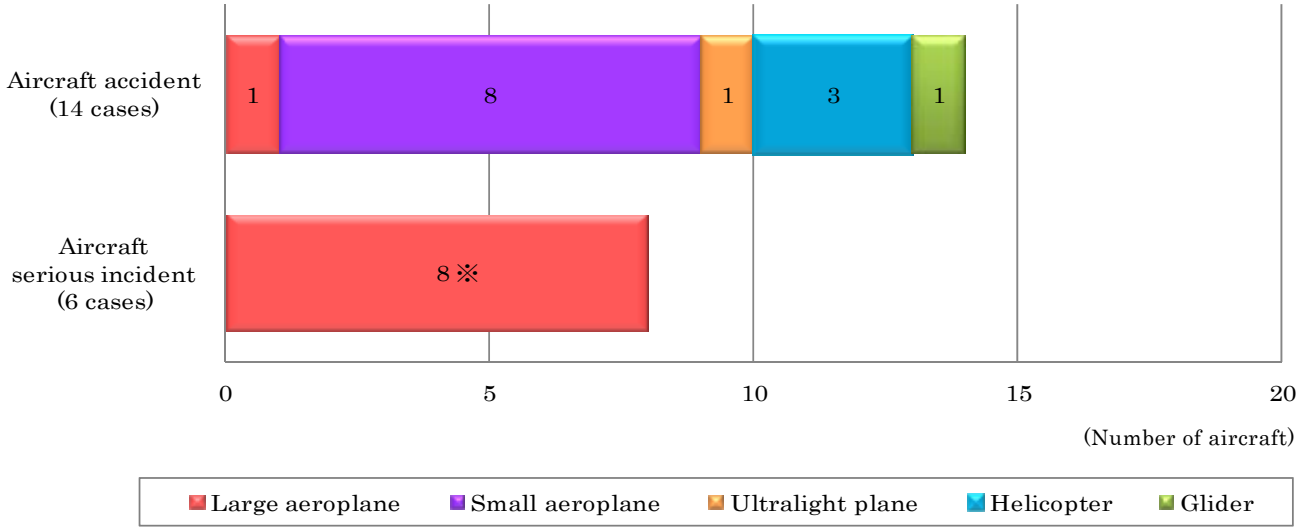
The investigations launched in 2011 included 14 accidents, up two cases from 12 cases for the previous year, and six serious incidents, down six cases from 12 cases for the previous year.

By aircraft category, one of the accidents involved one large aeroplane*1, eight other cases concerned small aeroplanes*2, while one ultralight plane, three helicopters and one glider were involved in the remaining cases. The serious incidents included six cases involving large aeroplanes (two of the six cases occurred each between two large aeroplanes).

*1 Large aeroplanes are aircrafts with a maximum take-off weight of more than 5,700kg.

*2 Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding ultralight planes.

Number of aircraft accidents and serious incidents by aircraft category



※ Two of the aircraft serious incidents which occurred each between large aeroplanes

In the 14 aircraft accidents, the number of casualties is 19, consisting of six deaths, one missing persons, and 12 injured persons. In January, 2011, a small aeroplane crashed in a mountainous area and two persons aboard the aircraft were killed. Another small aeroplane also crashed in a mountainous area during training in July, killing three persons on board.

Number of casualties (aircraft accidents)

(Persons)

2011							
Aircraft category	Dead		Missing		Injured		Total
	Crew	Passengers and Others	Crew	Passengers and Others	Crew	Passengers and Others	
Large aeroplane	0	0	0	0	3	2	5
Small aeroplane	5	0	1	0	0	1	7
Ultralight plane	0	0	0	0	1	0	1
Helicopter	1	0	0	0	1	2	4
Glider	0	0	0	0	1	1	2
Total	6	0	1	0	6	6	19
	6		1		12		

5. Publication of investigation reports

The number of investigation reports of aircraft accidents and serious incidents publicized in 2011 is 20: 12 accidents and eight serious incidents.

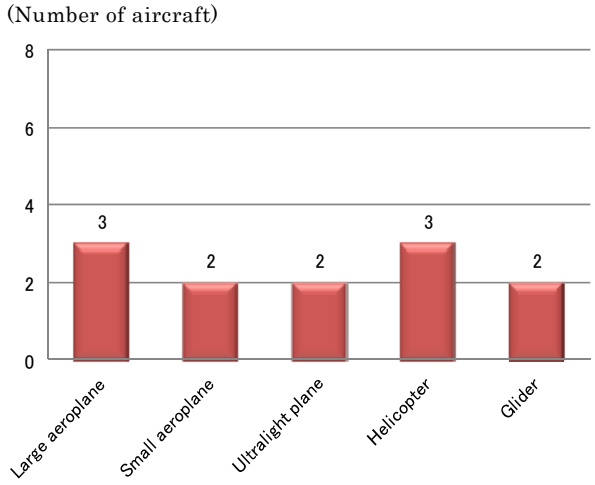
Looking those accidents and serious incidents by aircraft category, three of the accidents involved large aeroplanes. Small aeroplanes were involved in two accidents, ultralight planes in two accidents, helicopters in three accidents and gliders in two accidents. The serious incidents included four cases*3 involving large aeroplanes, three cases*3*4 involving small aeroplanes, two cases involving ultralight planes, and one case*4 involving a helicopter.

(*3 These cases include one incident involving a large aeroplane and a small aeroplane. *4 These cases include one incident involving a small aeroplane and a helicopter. For the details, see pages 44 to 45, this Chapter)

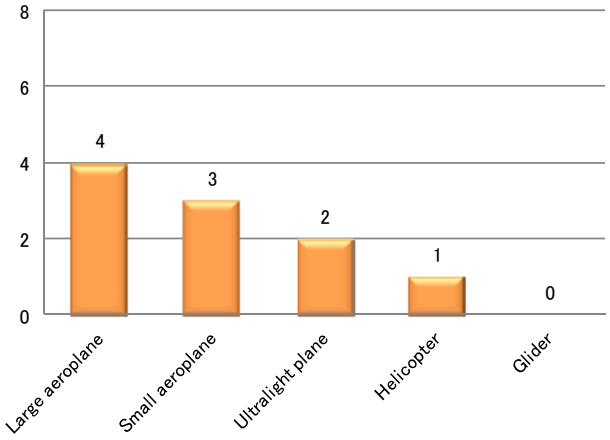
In the 12 accidents, the number of casualties is 49, consisting of seven deaths and 42 injured persons.

The investigation reports of aircraft accidents and serious incidents publicized in 2011 are summarized as follows:

Aircraft accidents (12 cases): reports publicized in 2011



Aircraft serious incidents (eight cases): reports publicized in 2011



List of publicized investigation reports on aircraft accidents (2011)

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
1	Jan.28, 2011	June 13, 2010 In the air at about 1,300 ft, about 200 m east of the southern end of Akeno Helipad in Chikusei City, Ibaraki Prefecture	Private	JX0108 Amano A-1 (ultralight plane)	The aircraft fell apart in the air while it was flying after taking off from Akeno Helipad in Chikusei Town, Ibaraki Prefecture, with one pilot on board, and it crashed on a paddy field about 200 m east of the southern end of Akeno Helipad. The pilot: dead. The aircraft: destroyed.
2	Feb.25, 2011	Oct.30, 2009 On the runway of Kagoshima Airport	Civil Aviation College	JA4165 Beechcraft A36 (small aeroplane)	The aircraft took off from Kumamoto Airport for solo flight training and when it arrived at Kagoshima Airport, the aircraft landed on its belly and stopped on the runway. The aircraft: substantial damaged.
3	Mar.25, 2011	June 24, 2010 A gliding field in Nishitakao, Hokuei Town, Tohaku District, Tottori Prefecture	Private	JA80DG DG-800B (motor glider, one-seater)	When the aircraft landed at a gliding field in Nishitakao of Hokuei Town, Tohaku District, Tottori Prefecture, after finishing familialization flight, its aft fuselage was hit against the edge of the approach end of the gliding field and the aircraft sustained damage. The aircraft: substantially damaged.
4	Mar.25, 2011	Oct.28, 2009 On runway 06L of Kansai International Airport	Asiana Airlines Inc. (the Republic of Korea)	HL7763 Airbus A321-200 (large aeroplane)	When the aircraft landed on runway 06L of Kansai International Airport after taking off from Gimpo International Airport (the Republic of Korea), its aft fuselage struck the runway and sustained damage. The aircraft: substantial damaged.
5	Apr.22, 2011	Dec.09, 2007 Minami-numagami, Aoi-ku, Shizuoka City, Shizuoka Prefecture	All Nippon Helicopter Co., Ltd.	JA31NH Eurocopter EC135T2 (rotorcraft)	The aircraft crashed in Minami-numagami, Aoi-ku, Shizuoka City, Shizuoka Prefecture, while it was flying from Tokyo Heliport, Tokyo, to Shizuoka Heliport for a ferry flight. The captain: dead a mechanic on board: seriously injured. The aircraft: destroyed.

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
6	Jan.22, 2011	Aug.10, 2009 Runway 22, Tokyo International Airport	All Nippon Airways Co., Ltd.	JA56AN Boeing 737-800 (large aeroplane)	When the aircraft landed on runway 22 of Tokyo International Airport, it made a tail strike with the runway and the aircraft sustained damage. A damaged area including fractures (about 5 m by one m) was found in the lower side of the aft fuselage. Scratch marks (in two lines about 25 m and about 7.5 m in length) were confirmed on runway B of Tokyo International Airport. The aircraft: substantially damaged.
7	Jul.29, 2011	Sep.11, 2010 A field about 113 m south-southeast of a helipad in Funatama, Chikusei City, Ibaraki Prefecture	Private	JR7423 AEROS2-R912 (ultralight plane)	The aircraft took off from a helipad with only the pilot on board, and while it was climbing, the aircraft crashed on a field about 113 m south-southeast of the southern end of the helipad. The pilot: seriously injured. The aircraft: destroyed.
8	Sep.30, 2011	Aug.01, 2010 A paddy field about 160 m north of Kamou Helipad in Miuta, Kamoto-machi, Yamaga City, Kumamoto Prefecture	Private	JA22NE Robinson R22 Beta (rotorcraft)	While approaching for landing after finishing familialization flight, the aircraft crashed in a paddy field about 160 m north of Kamou Helipad in Miuta, Kamoto-machi, Yamaga City, Kumamoto Prefecture. The captain and a passenger: dead. The aircraft: destroyed.
9	Jan.28, 2011	Sep.11, 2009 Near a mountain trail at the so-called Roba-no-mimi (the donkey's ear) located near Gens d'Armes of Mt. Okuhotaka-dake of the Northern Alps Mountains in Takayama City, Gifu Prefecture	Gifu Air Rescue Team	JA96GF BELL 412EP (rotorcraft)	The aircraft took off from Gifu Air Base for a rescue activity and crushed during the rescue activity, near a mountain trail at the so-called Roba-no-mimi located near Gens d'Armes of Mt. Okuhotaka-dake of the Northern Alps Mountains in Takayama City, Gifu Prefecture. The captain, a mechanic and a firefighter: dead. The aircraft: destroyed.
10	Oct.28, 2011	June 12, 2010 Takasu Gliding Filed, Takasu-cho, Matsuzaka City, Mie Prefecture	Private	JA2553 Valentin Taifun 17EII (motor glider, multiple seats)	The aircraft took off from Kakasu Gliding Field. After completing an approximately 30 minutes test flight above the city of Matsuzaka it made a hard landing on the grass of Runway 14 of Takasu Gliding Field, and sustained damage on the airframe. The captain and a passenger: seriously injured. The aircraft: substantial damaged.

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
11	Dec.16, 2011	Feb.20, 2009 In the air about 30,300 ft, about 174 km south-southwest of Narita International Airport,	Northwest Airlines Incorporated (the United States of America)	N676NW Boeing 747-400 (large aeroplane)	When the aircraft was flying to Narita International Airport after taking off from Manila International Airport (the Philippines), it encountered turbulence at about 30,300 ft about 174 km south-southwest of Narita International Airport (about 30 km north of Miyakejima Airport). Four passengers: seriously injured 27 other passengers:　minor injuries Seven cabin crewmembers: minor injuries. Theaircraft interia: partially damaged.
12	Dec.16, 2011	Dec.02, 2010 On runway 12 of Sendai Airport	Private	JA3891 Beechcraft A36TC (small aeroplane)	When the aircraft touched down on runway 12 of Sendai Airport, it landed on its belly and stopped on the runway. The aircraft: substantial damaged.

List of publicized investigation reports on aircraft serious incidents (2011)

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
1	Jan.28, 2011	Aug.04, 2009 A grass area near the departure edge of runway 33 of Miho Helipad, Shizuoka Prefecture	Private	JA3930 Cessna 172M Ram (small aeroplane)	Runway excursion (limited to when an aircraft is disabled to perform taxiing) The aircraft took off from Miho Helipad for an airworthiness examination, and the aircraft overran when it tried to land after performing the examination flight. The aircraft: minor damage.
2	Feb.25, 2011	Mar.25, 2009 On the final approach route to runway 32 of Nagasaki Airport	Air Flight Japan Co., Ltd. (Aircraft A)	JA4193 PA-28R-201 (small aeroplane)	An attempt to land on a runway being used by another aircraft The Aircraft A was appoaching runway 32 (runway B) of Nagasaki Airport upon receiving permission to use the runway for touch and go landing training. Meanwhile, the Aircraft B received a take-off clearance for departure for Fukue Airport as Oriental Air Bridge's scheduled flight and entered runway 32 via taxiway T2. The Aircraft A noticed the Aircraft B which entered runway 32 and performed a go-around.
			Oriental Air Bridge Co., Ltd. (Aircraft B)	JA802B Bombardier DHC-8-201 (large aeroplane)	
3	Mar.25, 2011	June 23, 2009 At of about 33,000 ft, over the vicinity of Hikari City, Yamaguchi Prefecture	Korean Air (the Republic of Korea)	HL7240 Airbus Industrie A300B4-600R (large aeroplane)	An abnormal decompression inside the aircraft The aircraft took off from Jeju International Airport for Chubu Centrair International Airport. While the aircraft was flying at about 33,000 ft over the vicinity of Hikari City, Yamaguchi Prefecture, an instrument indicated a cabin decompression and the pilot in command deployed oxygen masks in the cabin. The PIC requested priority in air traffic control and made an emergency descent. And then, the aircraft flew on and landed at Chubu Centrair International Airport.

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
4	Mar.25 2011	May 03, 2010 On the sea off Shirahama, Tahara City, Aichi Prefecture	Private	JR1423 Home Build Mikawa HA-500II-R532 L (ultralight plane, control surface type, multiple seats, seaplane)	An occurrence which falls under the category "An overrun, undershoot and deviation from a runway (limited to when an aircraft is disabled to perform taxiing) The seaplane took off from the sea surface off Shirahama, Tahara City, but just after that, it fell on the sea surface and capsized. This serious incident occurred on the sea surface in Mikawa Bay about 300 m off Shirahama, Tahara City, Aichi Prefecture.
5	Mar.25, 2011	Feb.17, 2009 In the air, about 8 nm north-norheast of Kanoya Airfield in Kanoya City, Kagoshima Prefecture	No. 211 Air Training Squadron, Japan Maritime Self-Defense Force (Aircraft A)	JN8776 Kawasaki Hughes OH-6D (rotorcraft)	Captain's report of air prox. pursuant to Article 76-2 of the Civil Aeronautics Act of Japan and Article 166-5 of the Ordinance for Enforcement of the Civil Aeronautics Act of Japan The Aircraft A was performing a flight for student training in the Kasanohara training area northeast of Kanoya Airfield. Meanwhile, the Aircraft B was flying near the Kasanohara training area for airborne picture-shooting under Kanoya City's request. The two aircraft encoutered each other about 8 nm north-northeast of Kanoya Airfield at about 2,500 ft. The Aircraft A visibly recognized the Aircraft B on the left-hand side above and performed an operation to avoid a collision downward to the right. But the Aircraft B made no operation for avoidance, because it had not visibly recognized the Aircraft A.
			New Japan Aviation Co., Ltd. (Aircraft B)	JA4061 Cessna 172P (small aeroplane)	
6	May 27, 2011	Dec.11, 2010 In the air, over Osato Town, Kurokawa County, Miyagi Prefecture	Private	JR1352 Quicksilver MXIIHP-R503 (ultralight plane, control surface type, multiple seats)	A continuous loss of power of engines in flight The aircraft took off from a helipad in Morisato of Rifu-cho, Miyagi County, Miyagi Prefecture, with one pilot on board. After flying on a traffic pattern, the aircraft directed itself to the north, but while it was flying over Midorinosato of Higashinarita, Osato Town, Kurokawa County, its engine stopped at about 590 m and the aircraft made an emergency landing on the slope of a hill nearby.

No.	Date of publication	Date and location	Operator	Aircraft registration number and type of aircraft	Summary
7	Aug.26, 2011	June 11, 2010 About 140 ft over runway A of Narita International Airport	Nippon Cargo Airlines Co., Ltd	JA01KZ Boeing 747-400F (large aeroplane)	In-Flight Shut Down (limited to major damage which occurred inside the engine) Just after the aircraft took off from Narita International Airport for Anchorage International Airport, the United States of America, an abnormal noise was heard from one of its engines and an instrument indicated a No. 1 engine failure. Therefore, the flight crew shut down the No. 1 engine after climbing to 7,000 ft. After jettisoning its fuel, the aircraft turned back and landed on Narita International Airport.
8	Sep.30, 2011	Aug.30, 2010 About 3.8 nm northeast of runway 24R threshold of Kansai International Airport, an altitude of about 1,000 ft	Qatar Airways (Qatar)	A7BAE Boeing 777-300 (large aeroplane)	An attempt of landing on a closed runway After taking off from Narita International Airport and while approaching Kansai International Airport for landing, the aircraft attempted to land on runway 24R which had been closed at that time. Later, the aircraft performed a go-around and landed on runway 24L.

Chapter 2　Railway accident and serious incident investigation

1. Summary of major investigation report

Summaries of five of the 14 investigation reports publicized in 2011 are presented below.

Railway 1　During emergency braking of a freight train, one of the container wagons derailed by the coupling force from the following wagons.
(Derailment, in the Suita signal station, the Tokaido Line, Japan Freight Railway Company)

Full text of the investigation report (Japanese text only):
http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2011-2-1.pdf

1. Summary of the accident

(1) Date and time: At around 12:03 on September 9 (Wednesday), 2009

(2) Location: The premises the Suita signal station on the Tokaido Line in Suita City, Osaka Prefecture

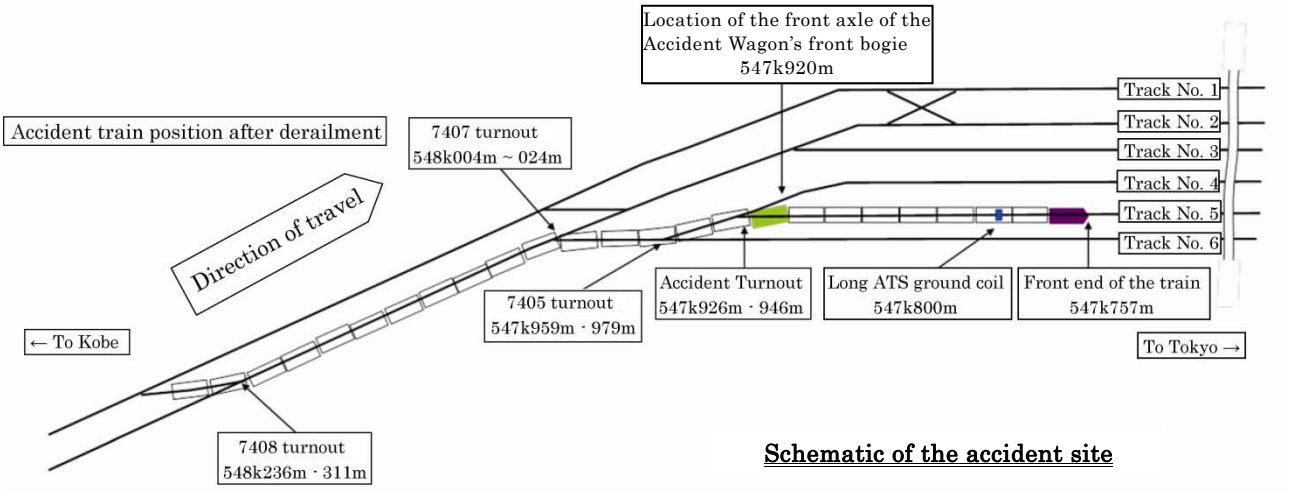
(3) Outline of the accident:

The freight train "B-1076" (consisting of a locomotive and 24 container wagons, from the Fukuoka freight terminal on the Kagoshima Line to the Utsunomiya freight terminal on the Tohoku Line), operated by the Japan Freight Railway Company (the Company), left Higashi-Kakogawa Station on schedule (at 11:01). While the train was powering at about 18 km/h through the Suita signal station, the driver saw a stop signal for the starting signal for Track No. 5. As the driver also heard an acoustic warning by the ATS *1, he took "acknowledgement action." However, the emergency brake operated and the train stopped.

After the train stopped, it was found that all four wheels of the two-axle front bogie of the 8th wagon (the Accident Wagon) had derailed to the left. The driver was not injured.

*1: ATS is the abbreviation of Automatic Train Stop system, which sound an acoustic alarm and make an emergency brake in operation if the ATS onboard device detects the ATS ground coil installed at before a signal device indicating stop signal.

(4) Date of publication: February 25, 2011



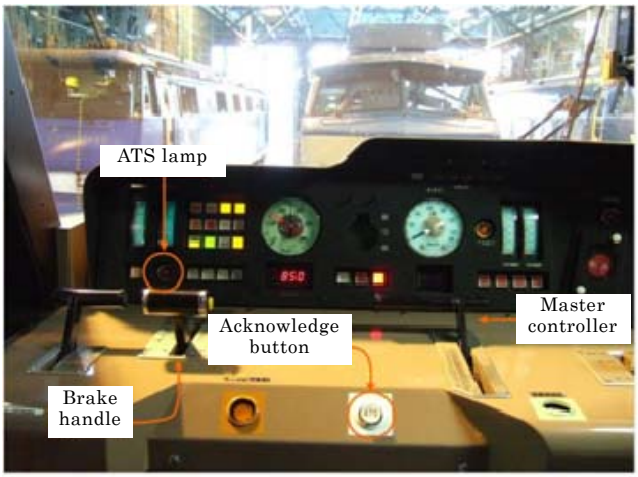
Schematic of the accident site

2. Findings

(1) Analysis of the derailment

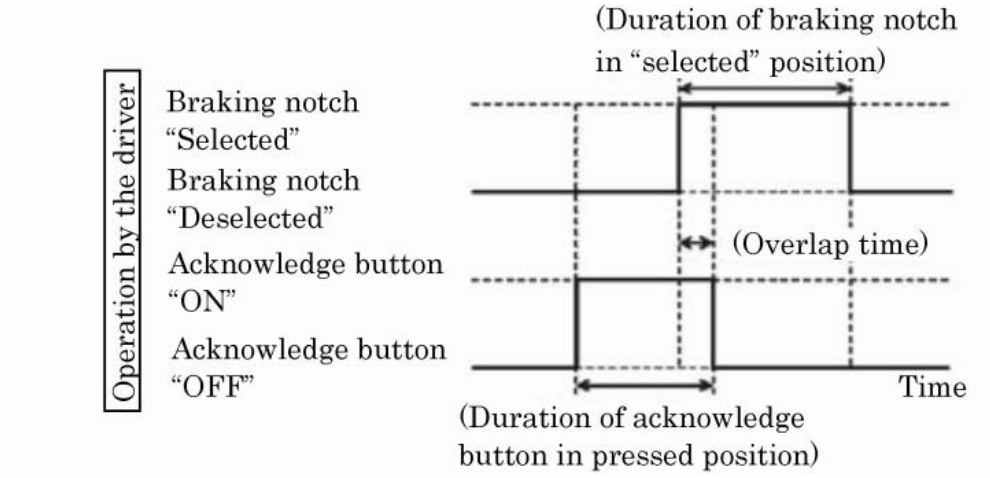
a. Analysis of the action of the emergency braking

The ATS onboard unit is designed in order that the emergency brake will not operate and the train can continue to travel if the driver took "acknowledgement action" within 5 seconds after the ATS acoustic alarm. In this case, if the overlap time when the braking notch is in selected position and acknowledge button is in pressed position, is too short, relay excitation will be insufficient. As a result, the relay ACR (the ACR), which is designed to detect the driver's "acknowledgement action," will operate instantaneously, failing to activate the relay UR, which prohibits the operation of the emergency brake. As to the reason why the emergency brake operated, it is probable that while the driver took "acknowledgement action", the overlap time was too short. It is somewhat likely that a contributing factor is that the drivers' operating standards set forth by the Company do not specify the appropriate sequence for operating the braking notch selection and the acknowledge button when the acoustic alarm is ringing. It is therefore necessary that the drivers' operating standards should be reviewed to ensure that the implementing standards are strictly followed, and to ensure a sufficient overlap time between selecting a braking notch and pressing the acknowledge button. In addition, the logic circuit should be revised so that even if the overlap time is too short, the emergency braking will not be activated immediately, and the driver can try pressing the acknowledge button again within 5 seconds after the ATS acoustic alarm.



Taken in the Suita engine depot the day after the accident

Controllers in the cab of the accident locomotive



Overlap time

ACR operation

	ACR operation	Contact "a"	Contact "b"	ATS operation
No acknowledgement action	Does not activate	Stays open	Stays closed	5-second timer completed; emergency braking operates
Acknowledgement action	Activates	Closes	Opens	5-second timer suspended; no emergency braking
Acknowledgement action too short	Activates momentarily, then fails	Stays open	Opens momentarily, then closes	5-second timer suspended; emergency braking operates

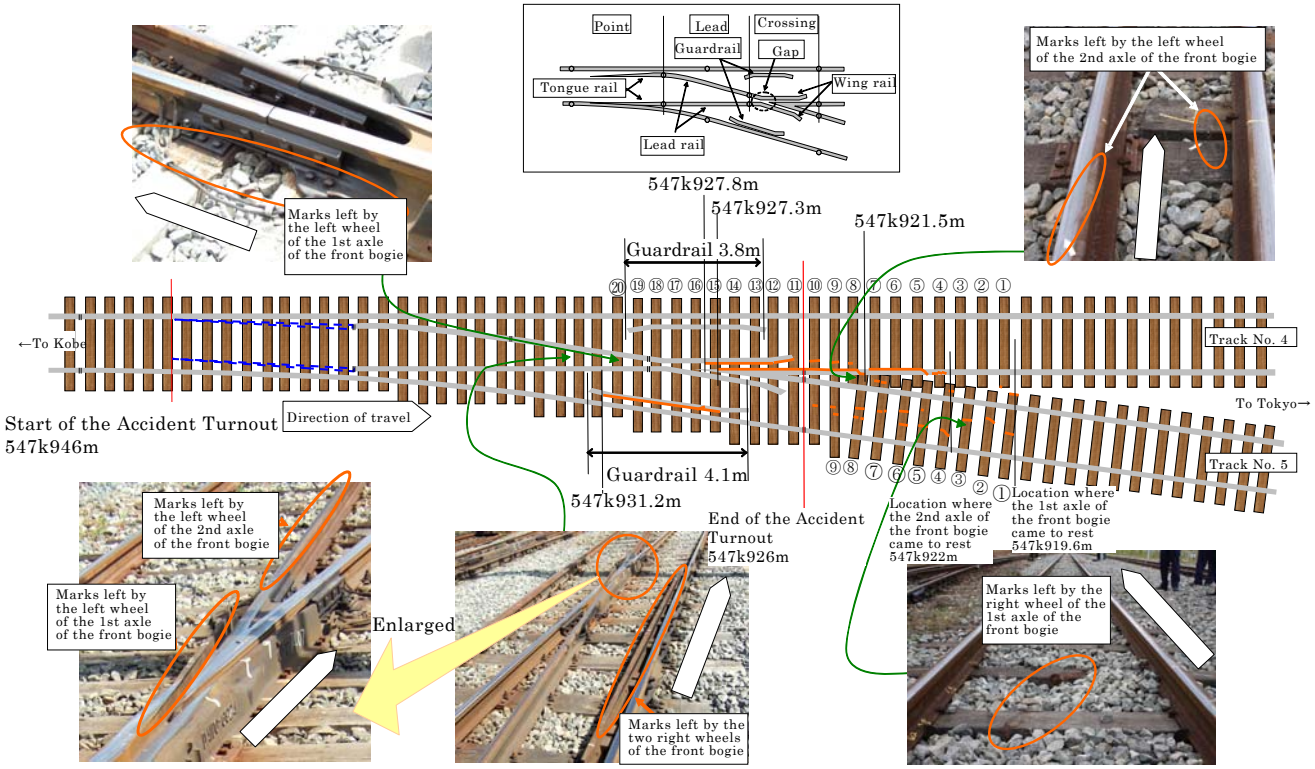
b. Analysis of how the derailment occurred

According to the findings of an analysis, which the Company committed to the Railway Technical Research Institute, it is probable that the train experienced lateral buckling*2 in the following manner: as the train run through the Accident Turnout for Track No. 5 with the emergency braking applied, and as the 1st axle of the Accident Wagon's front bogie entered the branch line (Track No. 5) at the Accident Turnout and reached a gap in the crossing*3, the backside of the inside wheel rode over a guardrail while at the same time the outside wheel entered through the gap at the crossing into a flangeway of the main line (Track No. 4).

*2: Lateral buckling occurs when massive force is applied in the longitudinal direction of a train, causing the cars to sway laterally at the couplers.
*3: A crossing is where the rails intersect in a turnout.

In addition, (a) the Accident (8th) Wagon and the 9th wagon were not carrying any containers or cargo and therefore were lighter than the leading wagons, (b) no marks were left on the rail immediately on the Kobe side from the gap at the crossing that would indicate the left wheels of the front bogie riding over the rail, and (c) the coupler had longitudinal and lateral dents on its right side. Considering these facts, it is probable that the Accident Wagon was about to enter the Accident Turnout when the driver took "acknowledgement action," which resulted to trigger the emergency braking, causing the following wagons, which had not yet braked, to apply longitudinal force to the coupler of the leading two empty wagons and making the Accident Wagon sway laterally. As a result, it is probable that both axles of the front bogie of the Accident Wagon, which was lighter than the leading wagons, were lifted off the rails and that the coupler force, which was applied in the direction of Track No. 4 (the main line of the turnout), prevented the Accident Wagon from turning right onto Track No. 5 as had been intended, and caused the wagon instead to continue moving straight ahead (in the direction of the main line) as the inner sides of the right wheels of the front bogie slid over the guardrail.

As the train set length is about 507.8 m, it is probable that the 14th, 16th and 21st wagons, which were also empty loaded, were either at the exit of the 7407 turnout or on a straight line with no turnouts when the ATS operated, and that as a result, the longitudinal force from the trailing wagons acted to the leading wagons along the rail.



Details of the derailment

(2) Analysis on how to prevent recurrence

Considering the comment by the driver, “As I was worried that the train had slowed down too much to reach the stop position, I applied additional power and take care to prevent further slowdown,” it is probable that, the driver tried to complete the “acknowledgement action” as quickly as possible within five seconds to prevent the train from stopping on a turnout, noticing that the train was going through a turnout-studded section (accident location).

It is probable that the overlap time for “acknowledgement action” was too short to prevent the emergency braking. As a contributing factor to this, it is somewhat likely that the “acknowledgement action” that the driver took based on the drivers' operating standards was not in line with the implementing standards. Therefore, it is necessary that the drivers' operating standards be revised accordingly and the Company drivers be thoroughly trained on ATS mechanism and the correct procedure to secure sufficient overlap time. In addition, the logic circuit should be revised so that, even if the overlap time is too short, the emergency brake will not activate immediately, and the driver can try pressing the acknowledge button again within 5 seconds. It is probable that longitudinal force applied by trailing wagons, a typical characteristic of the automatic air brake system equipped to the train set, played a role in the derailment. It is therefore desirable that the ongoing work to replace by the automatic electromagnetic air brake equipment to get a no-time-lag braking force on all wagons be given a further push.

3. Probable causes

It is probable that, in this accident, as the locomotive towing 24 container wagons was traveling through several turnouts, the emergency brake operated, caused to act the massive coupling force by the following wagons that were not yet braked, to the empty Accident Wagon at the Accident Turnout, and that the front bogie of the Accident Wagon was then lifted and went over the crossing towards the main line.

As to the reason why the emergency braking was applied, it is probable that the overlap time whereby the braking was set in notch 1 and the acknowledge button was pressed was too short for the emergency braking prevention relay to be activated to form an emergency braking prevention circuit.

Railway 2 While a freight train was running along a 300-m radius curved track at about 60 km/h, both wheelsets of the rear bogie of one of the container wagons derailed.
(Derailment, between Sotaro Station and Ichitana Station (single line), the Nippo Line, Japan Freight Railway Company)

Full text of the investigation report (Japanese text only): http://www.mlit.go.jp/jtsb/railway/rep-acci/RA2011-1-1.pdf

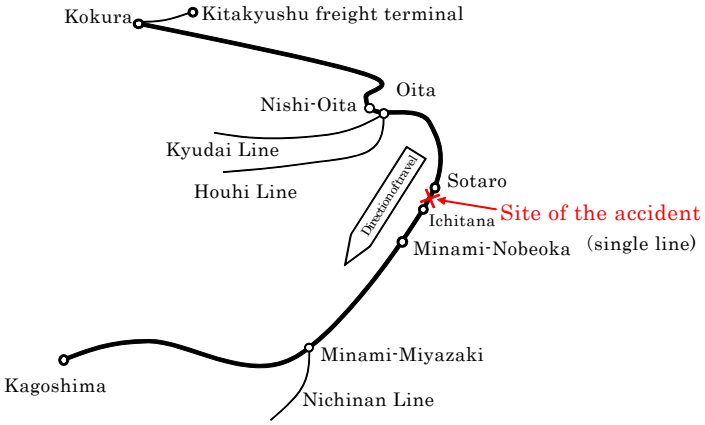
1. Summary of the accident

(1) Date and time: At around 13:19 on December 19 (Saturday), 2009

(2) Location: Between Sotaro Station and Ichitana Station (single line) on the Nippo Line in Nobeoka City, Miyazaki Prefecture

(3) Outline of the accident:

The freight down train "4075" (11-car train set, from Kitakyushu freight terminal to Minami-Nobeoka Station), operated by Japan Freight Railway Company, passed Sotaro Station on schedule (at 13:12).



Map of Nippo Line

When the driver saw a speed limit indication for the repeating signal for Ichitana Station's down line home signal, he started to slow down the train, which was running at about 60 km/h, to stop it at the station. However, the train slowed down much faster than it normally would and therefore the driver released up on the brake. Nonetheless, the train stopped about 170 m short of the stop sign.

Both wheelsets of the rear bogie of the 10th wagon were found to have derailed to the left.

The driver, who was the only person on board, was not injured.

(4) Date of publication: January 28, 2011

2. Findings

(1) Analysis on track irregularity

a. Influence due to alignment[*1]

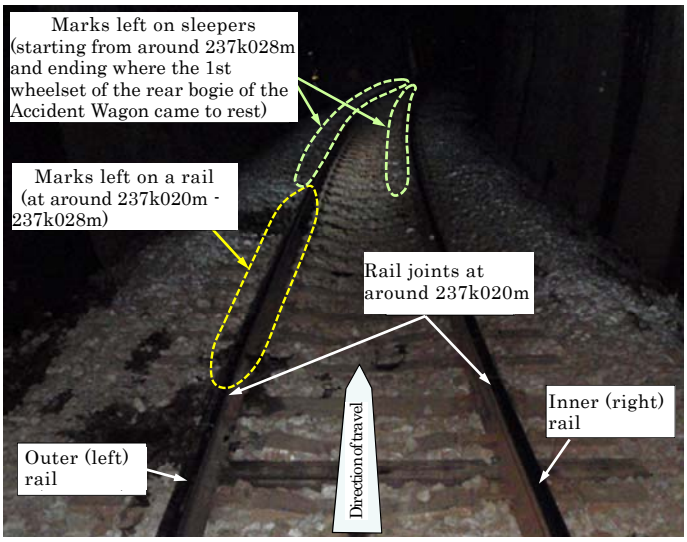
At around 237k020m, relatively large alignment is observed which will act in such a way that the curve radius is reduced. Considering this, it is probable that the outside (left) wheel of the 1st wheelset of the Accident Wagon's rear bogie had a large angle of attack[*2]. It is therefore somewhat likely that the equivalent friction coefficient[*3] between the wheel flange and the rail also increased.

At around 237k020m, there are rail joints, and some of the bolts and spring clips for the rail fasteners in the area were missing. It is probable that this played a role in increasing the alignment in the area.

*1: "Alignment" is the horizontal distance (versine) between the rail and the center of a chord connecting two longitudinally separated points on the rail. The alignment for a curved track is obtained as the horizontal distance between the measured versine and the circular arc of the designed curve radius.
*2: "Angle of attack" is the relative angle between a rail and a wheel as it is rolling on the rail. As the angle of attack increases, the safety margin against flange climb derailment decreases.
*3: "Equivalent friction coefficient" is the ratio of lateral force between a wheel flange and a rail to the normal force. It increases as the friction coefficient between a wheel and a rail and the angle of attack increase. The maximum value is the friction coefficient.

b. Influence due to twist*4

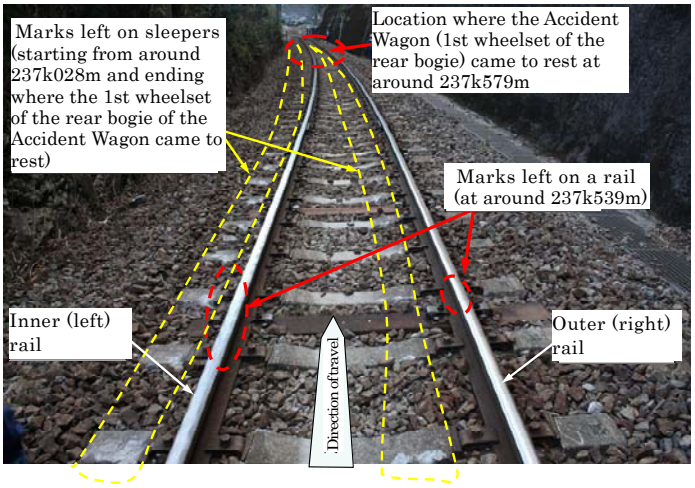
In the last regular inspection prior to the accident, the 5-m twist at around 237k022m was -24 mm (loaded value). In the measurement taken on December 15, 2009, the maximum twist (unloaded value) was -9 mm. In the measurement after the accident, the 5-m twist at around 237k020m was -27 mm (unloaded value), indicating a significant left-frontward down twist.



Site of the accident (circular curve A in the Ichitana tunnel (at around 237k020m))

It is probable that this significant twist caused the wheel load of the outside (left) wheel of the 1st wheelset of the rear bogie to be reduced as the Accident Wagon passed 237k020m.

The cross level (unloaded value) measured at 237k020m after the replacement of wooden sleepers on October 22, 2009, was 56 mm. The cross level (unloaded value) at 237k020m measured during the regular inspection on October 12, 2009, was 61 mm. The cross level at 237k015m, 5 m in front of 237k020m, was 75 mm. Given this, it is somewhat likely that the 5-m twist at around 237k020m increased by about 5 mm after the replacement of wooden sleepers.



Marks left on sleepers (starting from around 237k539m and ending where the 1st wheelset of the rear bogie of the Accident Wagon came to rest)

*4: "Twist" is the difference in cross level between two longitudinally separated points on a rail, and indicates the twist of the track relative to a plane. Twist irregularity measured between two points 5 m apart is referred to as 5-m twist irregularity. With the track inspection car, the cross level and twist are measured using different methods and because of this, the two measurements may be slightly different from each other. In this accident report, right-frontward down twist is represented with positive values.

c. Influence due to the combination of alignment and cross levels *5

The combination of alignment and cross levels at around 237k016m and 231k025m were in the direction to roll the body in clockwise (CW). In contrast, the distance between front and rear bogie center is 8.9m. Then, it is probable that, when the front bogie was passing at around 237k025m, the body rolls in CW caused by the combination of alignment and cross levels of the track, and at the same time, CW rolling force also act to the body from the rear bogie passing at around 237k016m.

It is probable that, due to the above, the load of the outside (left) wheels of the Accident Wagon's rear bogie decreased while the load of the inside (right) wheels increased, causing the inside wheels to push the wheelset to the left, thus increasing the lateral wheelset load of the outside wheels.

*5: "Combination of alignment and cross levels" is one of the parameters of track irregularity maintenance. When a cross level occurs in which the track surface tilts according to alignment of the track, a value 1.5 times the size of the cross level is subtracted from or added to the alignment to increase the absolute value of the combination of alignment and cross levels. As the combination of alignment and cross levels increases, freight wagons can roll or hunt more easily.

(2) Analysis of the derailment

It is probable that at around 237k020m, the derailment coefficient for the outside (left) wheel of the 1st wheelset of the Accident Wagon's rear bogie increased while the critical derailment coefficient*6 of the wheel decreased and that the outside (left) wheel started to ride up the outside (left) rail.

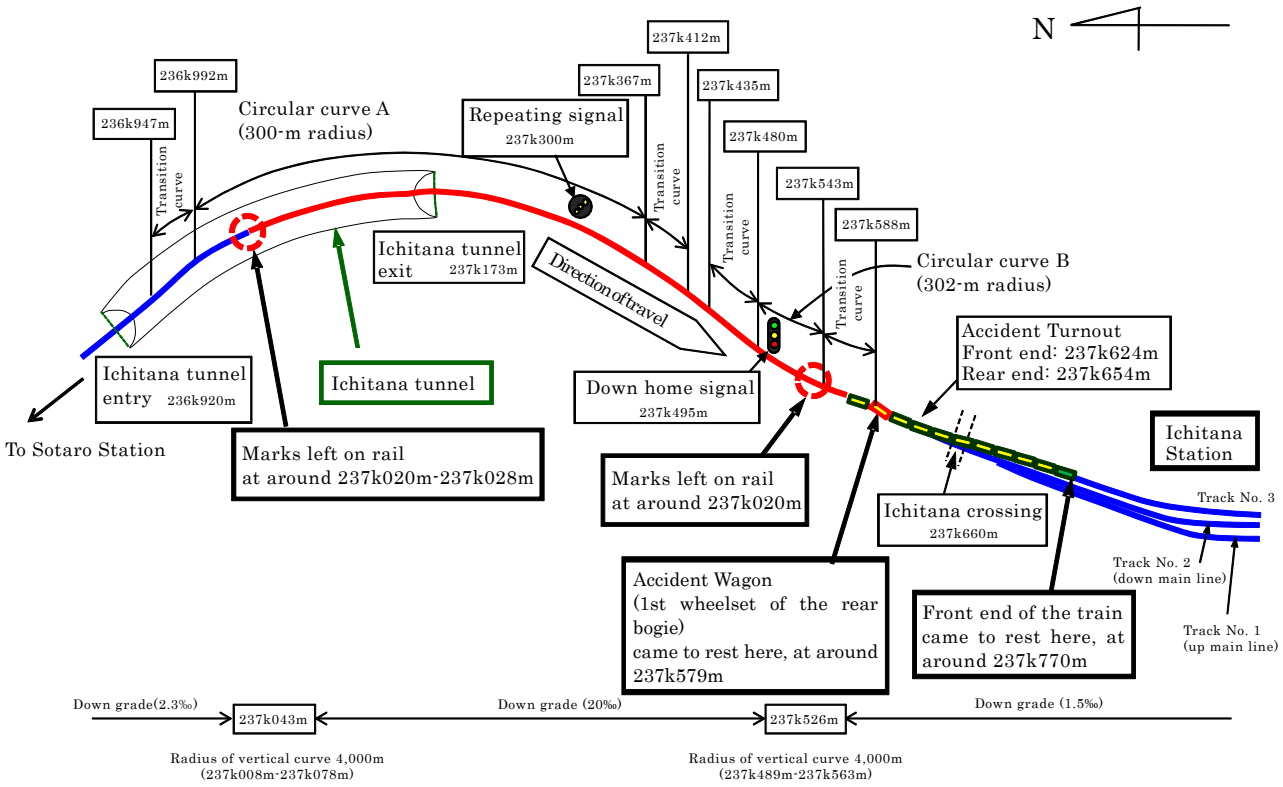
It is probable that the train was subsequently running with the 1st wheelset of the rear bogie derailed and that at around 237k539km in the 302-m-radius circular curve B, the 2nd wheelset of the rear bogie derailed to the left. As to the reason why the 2nd wheelset of the rear bogie derailed in the circular curve B, it is somewhat likely that the relatively large cant in that area and the effect of the derailed 1st wheelset to generate greater leftward force to the rear bobie.

*6: "Critical derailment coefficient" is the limit value of the derailment coefficient (lateral force divided by wheel load) that is obtained using an equation of equilibrium for wheel load and lateral force at the contact of a rail and a wheel flange riding up the rail. As the friction coefficient increases, the critical derailment coefficient decreases. As the angle of contact (wheel flange angle) decreases, the marginal derailment coefficient decreases. Derailment is possible when the derailment coefficient exceeds the critical derailment coefficient.

Judging from the marks left on the right side of the rear coupler of the Accident Wagon and on the left side of the front coupler of the rearmost wagon that in both cases would suggest contact with the centering rod, it is probable that after the 2nd wheelset of the Accident Wagon's rear bogie derailed, the wagon tilted steeply to the left.

Considering the dents left on the underframe and cable conduit near the left wheel of the 2nd wheelset of the Accident Wagon's rear bogie that appeared to have been caused by

the wheel, it is somewhat likely that following the derailment of the 2nd wheelset of the rear bogie, the Accident Wagon sank deeply, allowing its rear coupler to slide down and come off the front coupler of the rearmost wagon. Considering that the damage on the right side of the rear coupler of the Accident Wagon extended upward while the damage on the left side of the front coupler of the rearmost wagon extended downward and that the top surface of the front coupler of the rearmost wagon had marks apparently caused during contact with the underframe, it is somewhat likely that the rear coupler of the Accident Wagon pushed up the front coupler of the rearmost wagon.



Schematic of the accident site

(3) Analysis on how to prevent recurrence

A regular inspection conducted prior to the accident showed track irregularity surpassing the limit specified in the instructions for track maintenance. With this in mind, Kyushu Railway Company, owner and in charge of maintenance of the track of Nippo line, had scheduled track repair in accordance with the facilities maintenance instructions and related details. However, the accident occurred prior to the scheduled repair. The regular inspection conducted on December 11, 2009 found twist and the combination of alignment and cross levels, both exceeding the relevant limits. These parameters significantly affect running safety and must be monitored closely. It is therefore desirable that appropriate action be taken, such as advancing the repair timing, in areas such as those in tunnels subject to a leakage of groundwater where track irregularity may be accelerated.

In track maintenance beyond regular inspection, careful attention must be paid to any change in track irregularity that may occur after maintenance work. This is especially important in cases of large twist in small-radius curved track: post-maintenance check is inevitable even when only one sleeper is replaced.

It is probable that the alignment may be deformed at any area where rail fasters are missing in a tightly curved track. In such areas, repair must be carried out as soon as possible.

3. Probable causes

In this accident, it is probable that as the Accident Train was running along a 300-m-radius right circular curved track at about 60 km/h, the derailment coefficient increased while the critical derailment coefficient decreased, causing the outside (left) wheel of the 1st wheelset of the Accident Wagon's rear bogie to ride up the outside (left) rail and the wagon to derail.

As to the reason why the derailment coefficient increased, it is somewhat likely that significant left-frontward down twist and rolling of the Accident Wagon caused by the increase of the combination of alignment and cross levels.

As to the decrease in the critical derailment coefficient, it is somewhat likely that contributing factors are that there were relatively large alignment in such a way that the curve radius was reduced, resulting in a large angle of attack of the outside (left) wheel and increasing the equivalent friction coefficient between the wheel flange and the rail.

As to the reason why the twist and the combination of alignment and cross levels increased, it is somewhat likely that the previous track maintenance work failed to sufficiently prevent further deterioration of track irregularity.

Railway 3 A train passed through the work section of the line where the work was initiated despite the day's train operations had not yet ended, and workers were on the site.
(Railway serious incident, between Nishitetsu-Wataze Station and Nishitetsu-Ginsui Station, the Tenjin-Omuta Line, Nishi-Nippon Railroad Co., Ltd.,)

Full text of the investigation report (Japanese text only): http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2011-3-1.pdf

1. Summary of the serious incident

(1) Date and time: At around 00:43 on June 17 (Thursday), 2010

(2) Location: Between Nishitetsu-Wataze Station and Nishitetsu-Ginsui Station on the Tenjin-Omuta Line in Omuta City, Fukuoka Prefecture

(3) Outline of the serious incident:

At around 00:28, a train dispatcher (in charge of approval of track closing) of Nishi-Nippon Railroad Co., Ltd. (the Company) approved the start of work on the closed track (i.e., work carried out in a specific section of a line, which is closed to prevent entry of operating trains) between Nishitetsu-Wataze Station and Nishitetsu-Ginsui Station (the Work on the Closed Track) after receiving a request for work approval from the chief of the work unit.

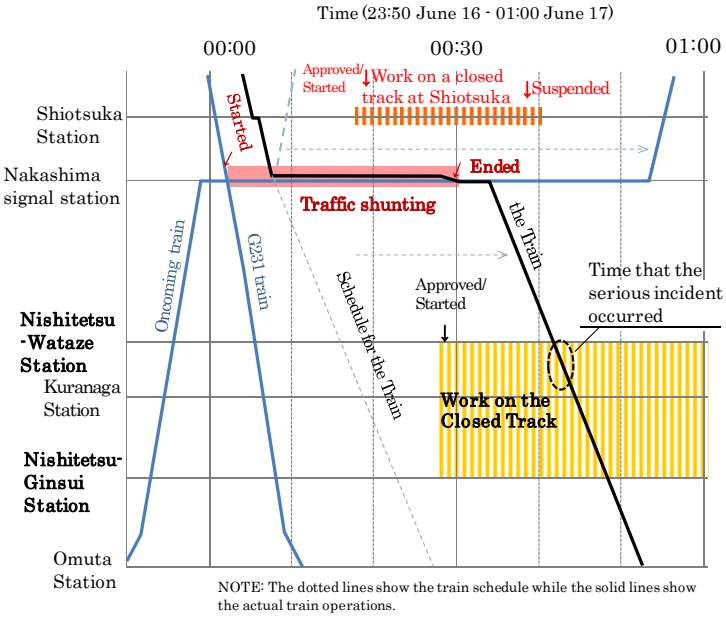
The one-man-operated down local train "7623" (the Train: 2-car train set, from Amagi Station to Omuta Station) departed Nishitetsu-Wataze Station about 26 minutes behind schedule (scheduled to depart at 00:15) due to a transport disorder at Nakashima signal station, and subsequently passed through the section of the Work on the Closed Track where workers had already started working.

(4) Date of publication: September 30, 2011

2. Findings

(1) Procedure for approving work on the closed track

While the Company's track closing regulations specify the procedures for not allowing trains, onto the track closed for work, it is probable that in actual application of the regulations, the train dispatchers had been no doubt that a manual operation to indicate stop signal for the signal devices relevant to work on the closed track, because a stop signal is automatically indicated when train operations on the day have ended, by the train operation control

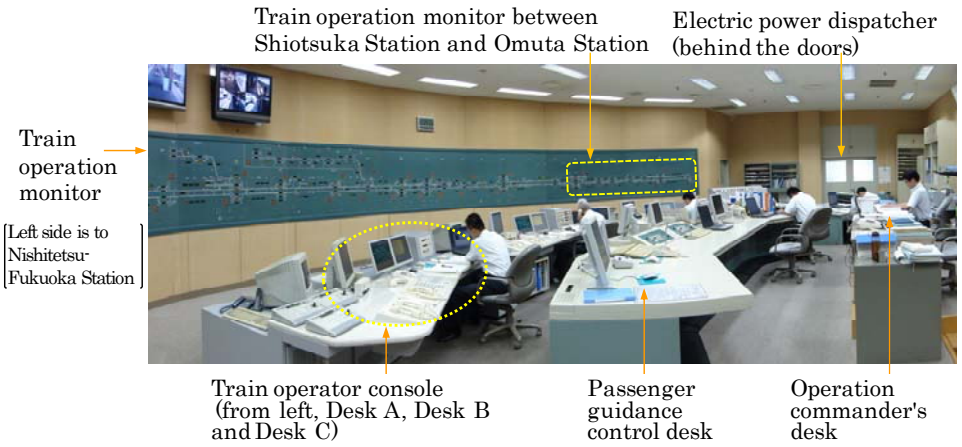


Train schedules for the time around the serious incident

apparatus.

However, it is probable that the train operation control apparatus will indicate green signal if train operations of the day have not yet ended, and it is therefore incomplete and inappropriate in the context of track closing.

It is probable that this on-the-job site interpretation has been taken for granted; with the result that no one had recognized the intrinsic problems with the interpretation.

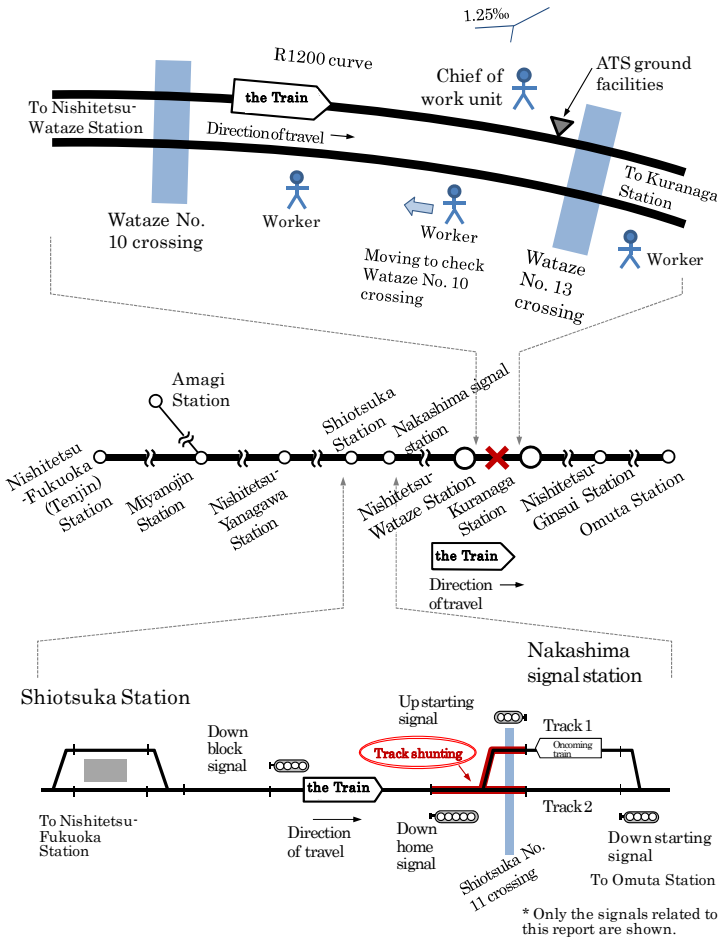


Operation center

(2) How this serious incident occurred

In this serious incident, it is highly probable that approval to start the Work on the Closed Track was issued by the train dispatcher without thorough confirmation of the traffic conditions at that time and without double-checking with other relevant train dispatchers, allowing the work to start even though the day's train operations had not yet ended.

At that time, it is highly probable that, as the Train, the day's last train, had not yet passed the section of the Work on the Closed Track and the train operation control apparatus could indicate entry approval, namely no specific action was taken to prevent the Train from entering the work section.



Facilities related to this serious incident

(3) How to prevent recurrence

It is probable that while the workers, having noticed the alarm of the road warning device (at a level crossing), escaped to safety places to let the Train pass. However, if the road warning device at the crossing been disabled as the work progressed to that stage, the workers would not have been able to notice the approaching Train until the last moment, possibly resulting in a railway accident with casualty. While it is probable that this serious incident was apparently the result of a series of human errors made by the train dispatchers, the root cause was that, despite the specific regulations set forth on how to use hardware for correct issuance of approval to start work on a closed track, in actual application of the regulations, the customary practice that had been followed came with insufficient measures to stop trains, from entering the work section. On prevention of recurrence, it is probable that thorough study should have been done on the validity and the feasibility of not only revised procedures and systems but also of the possible impact on upstream and downstream operations and systems.

Given the above, to prevent the recurrence of similar serious incidents, the Company should establish the following environment without delay to prevent any human errors from developing into a serious event, by not only providing education and training as well as raising awareness among those concerned, but also by putting in place the following measures:

a. In issuing approval to start work on the closed track, the related regulations, especially the basic rules, must be strictly practiced while paying close attention to the following points, whether during or after completion of the day's train operations.
  - Check on the last train of the day and make sure that the train has passed the work section.
  - Double-check among the train dispatchers.
  - Indicate a stop signal on the relevant signal devices to keep trains, out of the work section of the closed track.
  - Clearly indicate the work section of the closed track after issuing approval so that other train dispatchers will know that work is in progress.

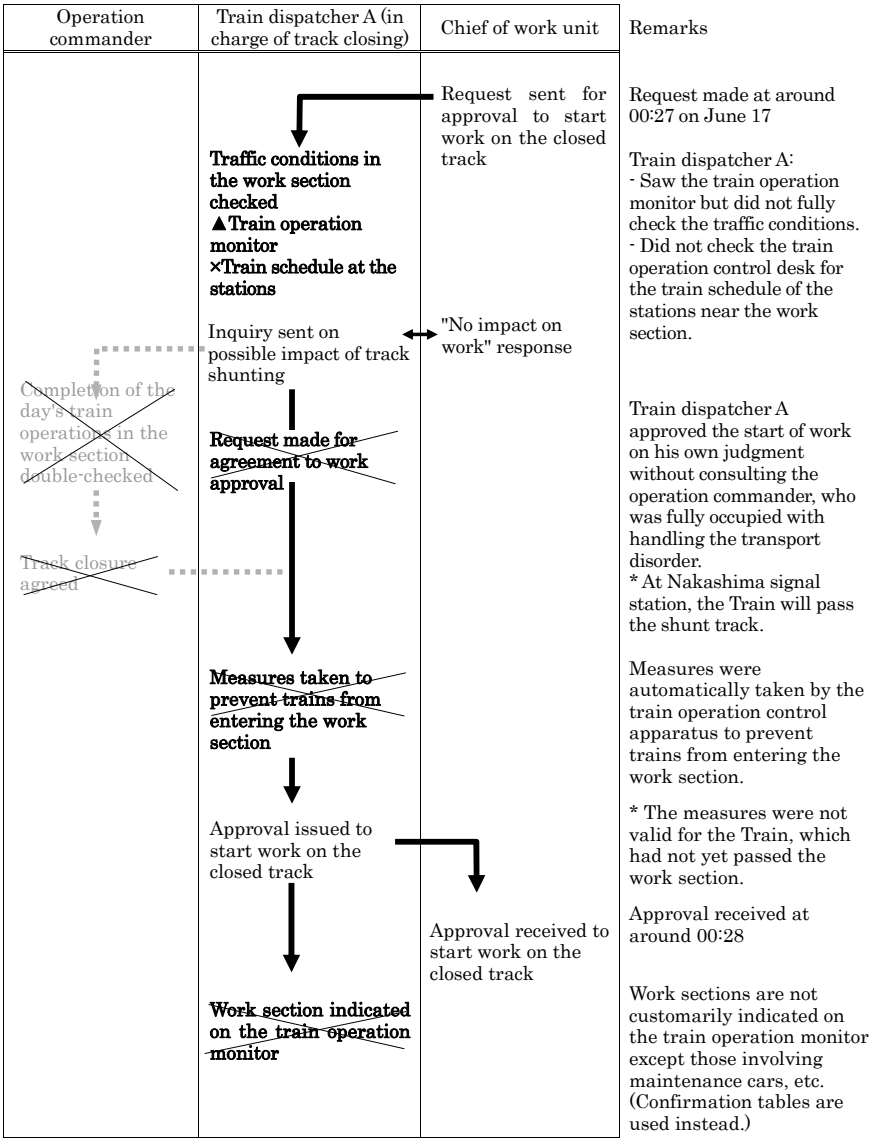
b. Evaluate the workload on train dispatchers during the hours of the last trains and, based on the results, establish a system that can appropriately handle emergencies and still enable correct approval for starting work on closed tracks. One possible option may be prioritization, if needed, of train dispatcher during unusual circumstance (such as holding the issuance of the approval of works on the closed tracks).

c. Any discrepancy found between the regulations on procedures for approval to start work on the closed track and the actual application of the regulations must be corrected without delay. More fundamentally, the regulations and related systems currently in place must be thoroughly reviewed against the principles of track closing for possible revision.

d. The actions put in place as above must be strictly monitored to ensure correct implementation.

3. Probable causes

In this serious incident, it is highly probable that approval to start the work on the closed track was issued by the train dispatcher without thorough confirmation of the traffic conditions at that time and without double-checking with other relevant train dispatchers, allowing the Train, which had been running behind schedule due to a transport disorder at a nearby signal station, to pass through the section of track where the work was in progress.



NOTE: "×" indicates that action was not taken. "▲" indicates that action was not thoroughly taken.

Procedures for approval to start the Work on the Closed Track

It is probable that a contributing factor to the erroneous issuance of the work approval was that train dispatchers were busily approving a number of work orders on closed tracks during the hours of the last trains, when the abovementioned transport disorder happened, preventing the train dispatcher in charge of track closing from paying enough attention to follow the correct procedure for approving the start of Work on the Closed Track. It is probable that a contributing factor to the Train being allowed to pass through the work section is that the Company did not realize that the measures currently in place to stop trains from entering work sections were inappropriate and not thorough, and had allowed an unsuitable customary practice to be followed.

Railway 4 A tram car entered a single track section on which there was already an oncoming tram car, while the tablet and ticket block system was functioning in place of the automatic block system.
(Railway serious incident, between Oura-kaigan-dori Stop and Oura-tenshudo-shita tram Stop, the Oura Branch Line, Nagasaki Electric Tramway Co., Ltd.,)

Full text of the investigation report (Japanese text only): http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2011-3-2.pdf

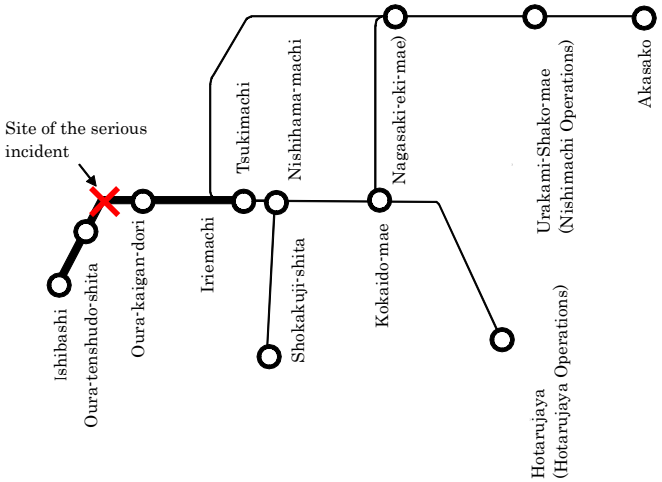
1. Summary of the serious incident

(1) Date and time: At around 14:15 on October 21 (Thursday), 2010

(2) Location: Between Oura-kaigan-dori tram Stop and Oura-tenshudo-shita tram Stop (single track) on the Oura Branch Line, in Nagasaki City, Nagasaki Prefecture

(3) Outline of the railway serious incident:

At around 14:15 on October 21, 2010, the driver of Tram No. 1505 (1-car tram set, from Hotarujaya tram Stop to Ishibashi tram Stop), operated by Nagasaki Electric Tramway Co., Ltd. (the Company), while operating under a tablet and ticket block system*1 on a single track section (between the Oura-kaigan-dori tram Stop and Ishibashi tram Stop) started the tram from the Oura-kaigan-dori tram Stop (Kaigan-dori tram Stop) after confirming that Tram No. 503 had come out of the single track section. When the driver stopped the tram at the stop line for Ishibashi at the Matsugaebashi intersection, he saw Tram No. 1203 (1-car tram set, from Ishibashi tram Stop to Hotarujaya tram Stop) stopped at the No. 1 stop line at the opposite side of the intersection. The distance at that time between Tram No. 1505 and Tram No. 1203 was about 46 m.



Map of Oura Branch Line

(4) Date of publication: September 30, 2011

*1: "Tablet and ticket block system" is one of the safety block system for a single track tramway section, and the safety is ensured by allowing only the tram carrying a tablet or ticket, in this case the following car indication panel, to run in the single track section.

2. Findings

(1) Analysis on the occurrence of this serious incident

It is somewhat likely that the driver of Tram No. 1505 (Driver A) based his decision to depart Kaigan-dori tram Stop not on instructions from the staff who was posted at the Stop to ensure correct implementation of the tablet instrument block system (the Tablet System Staff), but on the number of trams coming out of the single track section. In addition, it is

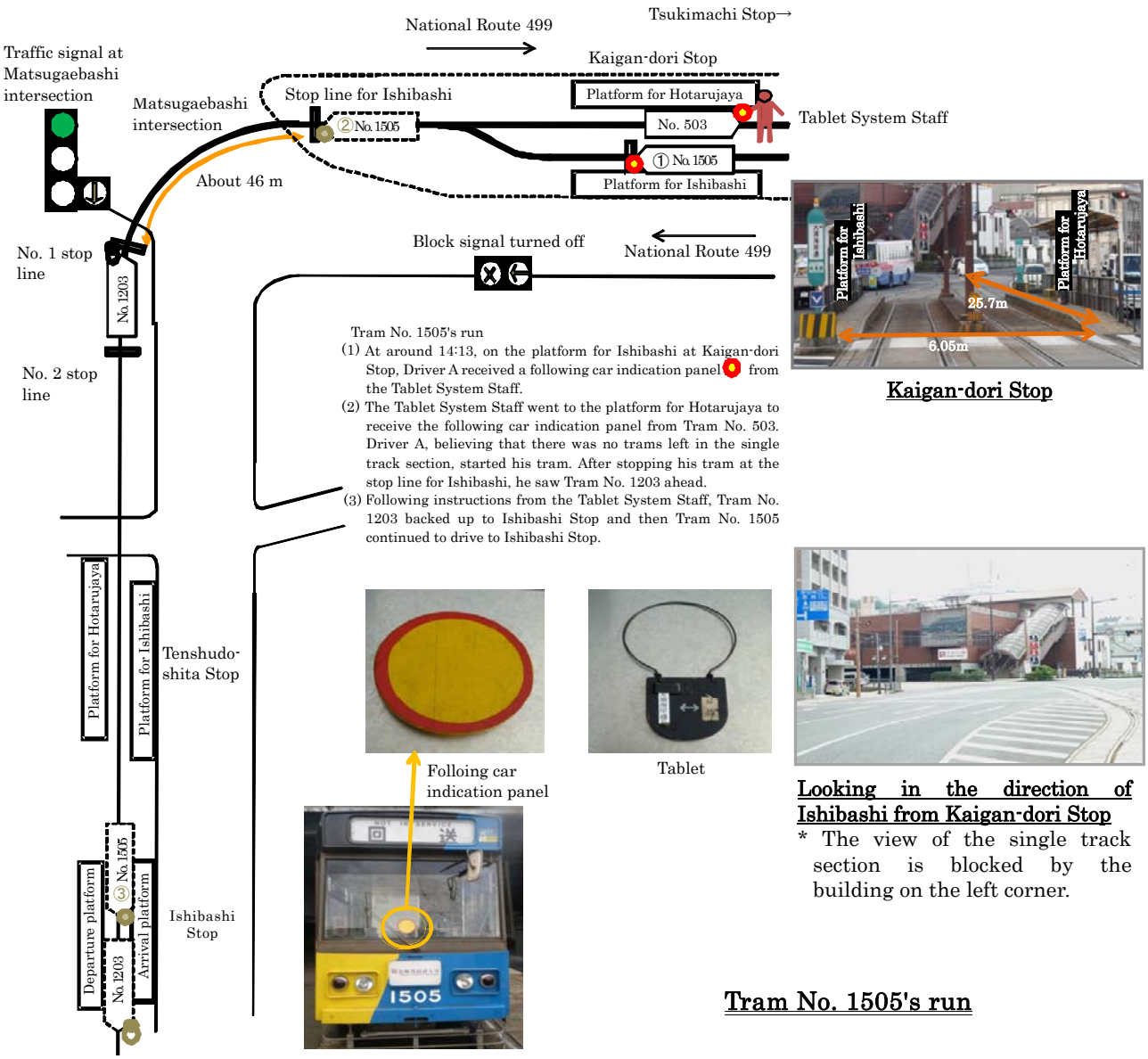
probable that Driver A started his tram believing that two trams had entered the single track section (actually three trams entered) since his tram arrived at Kaigan-dori tram Stop and that, having seen the second tram, Tram No. 503, came out of the single track section, there were now no trams in the single track section.

(2) Analysis on the background contributing to the occurrence of this serious incident

a. Confirmation of the tablet

It is probable that, at the Company, tablet system staffs have customarily posted a ticket, i.e., the following car indication panel, to the tram without checking if its driver possesses a tablet, and that drivers have started their trams without questioning this practice. It is somewhat likely that some of the drivers and tablet system staffs at the Company do not fully understand the procedures stipulated in the operating standards or understand them but have carried out operations differently.

It is somewhat likely that, tablet system staff and drivers worried about keeping passengers waiting for long time by following the tablet system procedure, they have customarily turned to different procedures.



Kaigan-dori Stop

Looking in the direction of Ishibashi from Kaigan-dori Stop

* The view of the single track section is blocked by the building on the left corner.

b. Long-time stop at Kaigan-dori tram Stop

It is somewhat likely that a contributing factor to Driver A not remembering having been told by the Tablet System Staff that there were three trams in the single track section, which is the priority safety information, was that Driver A, who worried about keeping the passengers waiting for long time in the crowded tram, concentrated his attention on the guidance to passengers.

It is somewhat likely that a contributing factor to driver and the tablet system staff not strictly observing the Company's operating standards related to the handling of the tablet and ticket, which was used about 80 days each year, was that their concern about not keeping passengers waiting a long time at traffic signal and others, prompted trams to start early.

c. Education and guidance

It is somewhat likely that tablet system staffs, and drivers with more than 3 years of experience, have been assigned to operations without the Company being fully aware of how much they have learned from the education programs and how well they can put their knowledge into practice.

For the past several years at the Company, the drivers have been instructed not to make judgments by themselves but to contact traffic controllers for instructions and guidance if there is an emergency during operation. However, there are cases when the drivers will need to quickly make the best possible decision based on their knowledge and skills. It is somewhat likely that the sort of company policy mentioned above can make drivers passive and dependent on advisers for resolutions to any emergency that may crop up and is reducing their motivation to improve their knowledge and skills and to be in charge of securing transport safety.

(3) Analysis on safety management

In August 2007, the Company set up a various safety committees on safety in an effort to firmly establish a safety management system. However, it was not long before more incidents occurred one after another. Therefore, it is somewhat likely that there was not enough communication between the head office and those in the field and that a “safety culture” did not fully grow within the Company, such as a corporate environment that keeps close watch on any deviation from the rules and motivation among the staff to maintain a safety record.

3. Probable causes

In this serious incident, it is highly probable that Driver A started moving his tram into the single track section where a tablet and ticket block system was in place, without checking for a tablet despite the fact that Tram No. 1203 was already in the single track section.

As to the reason why Driver A started moving his tram into the single track section, it

is probable that he did not check for a tablet prior to starting as stipulated in the Company's operating standards and that he erroneously believed that there were no trams left in the single track section.

As to the reason why Driver A did not check for a tablet, it is probable that a contributing factor was that the Tablet System Staff handed a ticket to Driver A before he got a tablet from the tram No.1203.

As to the reason why this serious incident occurred, it is probable that the contributing factors were that deviation from the operating standards had been allowed to continue for many years and, more broadly, that the Company failed to properly manage the knowledge level among staff in the field and the procedure in which they actually operated.

As to the background for the above, it is somewhat likely that contributing factors were that the effort by the head office of the Company to establish a safety management system left much to be desired and that those in the field tended to lose their drive to improve their knowledge and skills and be in charge of securing transport safety by themselves.

4. Recommendations

The JTSB recommended to the Company on staff education on the company's regulations and standards, improvement in the safety management system and effective promotion and implementation of measures.

(For the details of the recommendations, refer to "Chapter 2 - 2. Summary of recommendations and opinions" (Page 71).)

5. Remarks

The JTSB expressed its remarks regarding consideration on the prevention of recurrence by facilities improvement, support and cooperation from local public bodies and other relevant government authorities and others.

(For the details of the remarks, refer to "Appendix 15　Remarks made in 2011" (Page 32 in Appendixes).)

Railway 5 A train with a failed ATC system was allowed to continue to operate without the substitute block system applied, and entered a route on which another train had been stopped.
(Railway serious incident, within the Kadoma-minami Station premises,
Osaka Municipal Transportation Bureau Subway Line 7 (Nagahori Tsurumi-ryokuchi Line))

Full text of the investigation report (Japanese text only): http://www.mlit.go.jp/jtsb/railway/rep-inci/RI2011-4-2.pdf

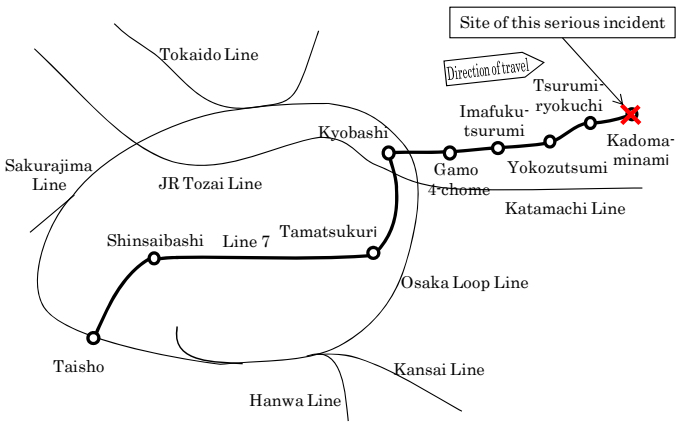
1. Summary of the serious incident

(1) Date and time: At around 05:46 on March 15 (Monday), 2010

(2) Location: Within the Kadoma-minami Station premises of Osaka Municipal Transportation Bureau Subway Line 7 (Nagahori Tsurumi-ryokuchi Line) in Kadoma City, Osaka Prefecture

(3) Outline of the railway serious incident:

The train "B0504" (Line 7), a 4-car train set, from Taisho Station to Kadoma-minami Station (the Train), operated by the Osaka Municipal Transportation Bureau (the Bureau), departed Kyobashi Station at 05:27. Soon after departure, the ATC*1 service brake operated, causing the train to stop at about 17 m from where it had started. The driver of the Train disengaged the ATC system as instructed by a train dispatcher and resumed operation without changing the block system. At Kadoma-minami Station, the Train entered the route to Track No. 2 on which a substitute train, A0504 (the Substitute Train), had been stopped. The driver applied the emergency brake and the Train stopped about 60 m before the Substitute Train.



Site of this serious incident

(4) Date of publication: October 28, 2011

*1: ATC, abbreviation of the Automatic Train Control, has functions to decelerate trains below the restricted velocity according to information about signal and its position obtained from ground facilities.

2. Findings

(1) Analysis on the occurrence of this serious incident

It is probable that the following factors contributed to the Train entering Kadoma-minami Station where blocking had not been completed, and entering a route to Track No. 2 on which the Substitute Train had been stopped.

a. The Substitute Train had entered Track No. 2 of Kadoma-minami Station prior to the Train and points 1S-a and 1S-b at the station were both open to Track No. 2.

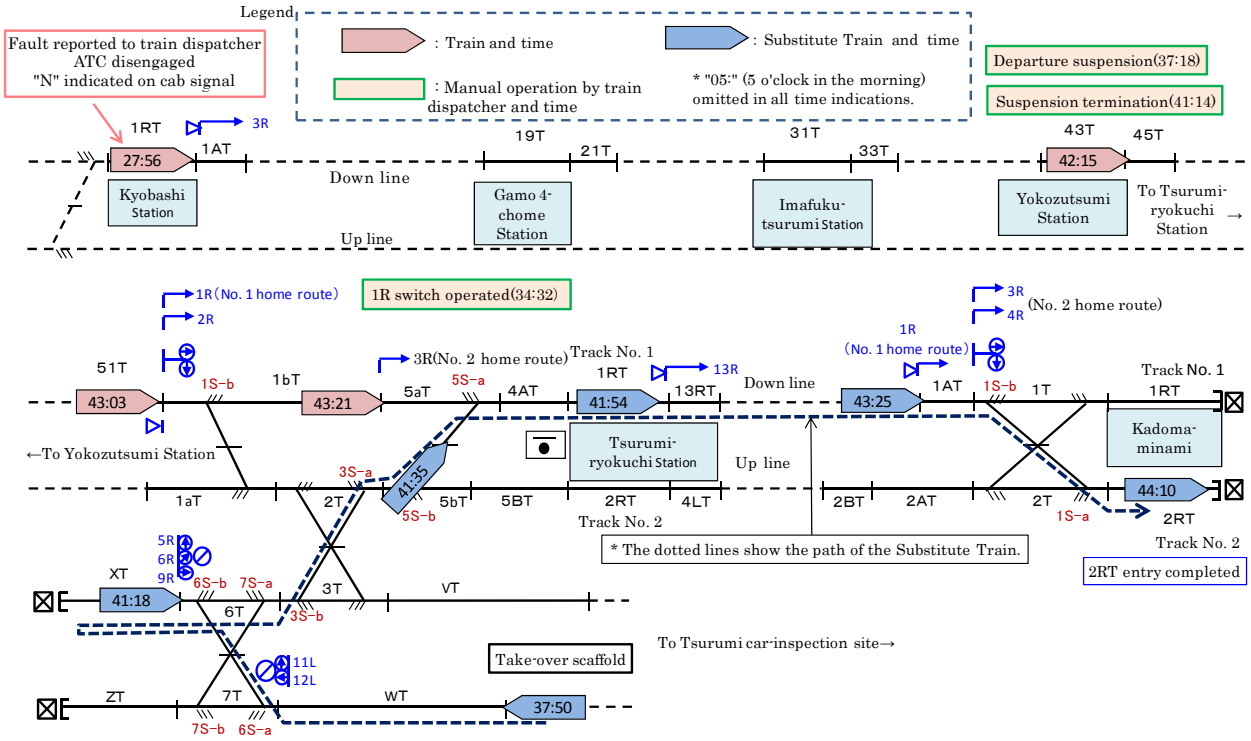
b. It is probable that as the Train continued to run without the substitute block system

applied, the train dispatcher did not check the route clear status for Kadoma-minami Station.

c. It is probable that although the Train was running in an abnormal circumstance with the ATC system disengaged and the cab signal showing "N"*2, the driver did not check the opening direction of point 1S-b at Kadoma-minami Station.

d. The Train lost its train number at Tsurumi-ryokuchi Station and no programmed route control was made at the home signal Kadoma-minami 1R and 3R.

*2: N signal is displayed when the speed limit signal is not being received from the ground. The speed limit then is 0 km/h.



Operations of the Train and the Substitute Train (1)

(2) Background contributing to the occurrence of this serious incident

{1} Analysis on the action of the train dispatcher

a. Reasons why the substitute block system was not applied after ATC system disengagement

As to the reason why the Train was allowed to run after the ATC system was disengaged without the substitute block system applied, it is probable that the train dispatcher (Train Dispatcher A), although familiar with the substitute block system, was so anxious not to delay the Train, the first train of the day, and to prepare a substitute train as quickly as possible, that he could not think about the need to change the block system for the Train.

b. On the response to the illegal track-shunting alert*2

As to the inquiry by an electric power dispatcher about the illegal track-shunting alert,

it is probable that Train Dispatcher A did not understand what was going on. It is probable that the dispatcher's confusion was magnified by the pressure to maintain punctuality and therefore he could not make a proper judgment.

As to the reason why another train dispatcher responded to Train Dispatcher A without confirming the content of the alert, it is somewhat likely that this dispatcher was devoted himself to input control data to set the route for the substitute train into a computer, and stop the irritating alert without careful confirmation.

c. Analysis on the handling of the contingency by train dispatcher

In any contingency, it is necessary to remind the basic concept of the rules and take action in accordance with the rules and regulations. In this abnormal event, however, it is highly probable that, considering that the substitute block system was not applied after the ATC system was disengaged and that appropriate action was not taken to respond the illegal track-shunting alert.

*2: Illegal track-shunting alert indicates non-continuous passing of a train through track circuits or passing of a train through a point set in the incorrect direction.

{2} Analysis on the action of the driver

a. Analysis on why the driver followed the train dispatcher's instructions after disengaging the ATC system

As to the train operations after the ATC system was disengaged, it is somewhat likely that the driver felt doubtful about the instructions of the train dispatcher and it is probable that the driver, while the instructions were not in line with the regulations, did not mention his doubts to the train dispatcher. It is somewhat likely that this was due to the driver's strong belief that he must obey the instructions of train dispatchers even if the ATC system is disengaged.

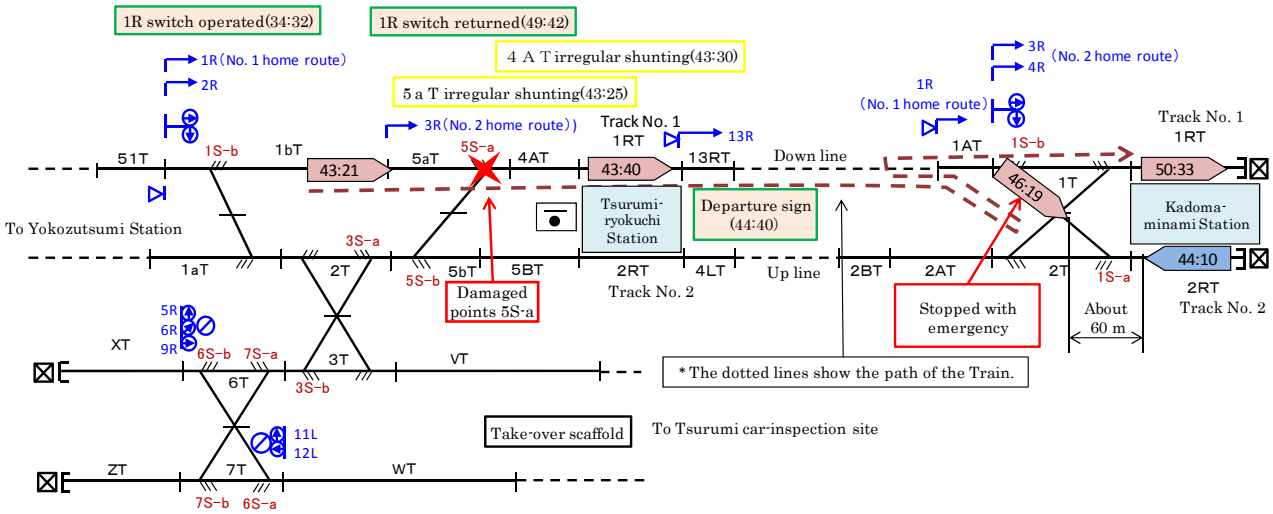
b. Analysis on the train operations and others during the contingency

Considering that before the serious incident occurred, the ATC system was disengaged and the cab signal was showing "N," which indicates an abnormal situation, and that a substitute apparatus for hand signals was not used, although it should have been, it is probable that the driver should have checked the switched status of the point to the correct route. While another two drivers were in the driver's cab of the Train, no one appeared to have been aware of the need to check the switched status of the point to the correct route. It is somewhat likely that all drivers in the cab lost the sense to recognize what they are looking is abnormal, in which the Train is running with the ATC system disengaged and the cab signal showing "N."

It is somewhat likely that some of the drivers at the Bureau have not retained the basic knowledge on train operation in a contingency or are no longer capable of putting that knowledge into practice.

{3} Analysis on the safety management system in the Bureau

It is somewhat likely that the Bureau has failed to maintain a fully effective safety management system among the staff, including how to ensure safety in a contingency and how to retain the knowledge and skills they have learned in training. Especially regarding train dispatchers, it is somewhat likely that they have not been fully trained to make the most basic safety decisions when they are at a loss about what to do. Also for the drivers, it is somewhat likely that they have not been fully trained to enhance their sense of mission to implement safe train operation.



Operations of the Train and the Substitute Train (2)

(3) Analysis on the prevention of recurrence

It is probable that those involved in train operation in this section of the line did not have sufficient knowledge or skills to competently handle any contingency. It is somewhat likely that the Bureau has failed to put in place a safety management system that can thoroughly handle any abnormal circumstances.

Therefore, for the prevention of the recurrence of this type of serious incident, the Bureau should promote measures to maintain and improve staff knowledge and skills and to improve its safety management system for abnormal circumstances.

It is somewhat likely that train dispatcher failed to take some of the most basic actions needed to put safety first in a contingency, meaning that the dispatcher had not been fully trained to make the most basic judgments on safety even when he cannot recognize the current situation. It is therefore necessary for dispatchers to be thoroughly trained on issuing appropriate instructions for train operation during any abnormal circumstances.

It is necessary for the drivers to be given training to maintain and improve their basic knowledge and skills on train operation in abnormal circumstances and to go through programs to enhance their awareness of safety and commitment to ensuring the safe operation of their train.

In its effort to improve its safety management system for emergencies as recommended above, the Bureau should also pay attention to the following:

a. Reeducation of train dispatchers and drivers on the rules and regulations regarding train operation and instructions during a failure in the onboard ATC system and have them strictly obey the rules and regulations.

b. Improvement of the training programs for train dispatchers and drivers covering a range of abnormal cases including train failures requiring train replacement and failures from complex causes.

c. Reeducation of train dispatchers on the input of train numbers*3 into the Programmed Traffic Control (PTC) system, issuing of warnings, the use of switches for controlling signals, points and other relevant subjects.

d. Improvement of communication and information sharing among train dispatchers.

e. It is probable that as the Train was instructed to run in reverse at Kadoma-minami Station, there was no prior check on the traffic conditions in the direction the Train was going (reversing). Therefore, the Bureau must consider appropriate ways for train operation in similar contingencies in the future.

f. It is probable that the cab signal failure of the Train was caused by damage due to aging of the electrolytic capacitor of the detector in the ATC receiver. Therefore, the Bureau must pay closer attention to aging when conducting future maintenance on its fleet.

g. In the event of a failure in the PTC, the train dispatcher and the driver may have to change to manual operation. Therefore, they must be regularly trained on possible failures and appropriate handling of these failures.

*3: Train numbers must be inputted into the PTC system for traffic control.

3. Probable causes

In this serious incident, it is probable that the Train with a failed ATC system and without the substitute block system applied, was then allowed to enter Kadoma-minami Station without any check of the station's blocking status, so that the driver of the Train, on which the ATC system had been disengaged and the cab signal was showing an abnormal indication, did not check the point change to the correct route before entering the station, and that as a result, the Train was allowed to enter a course on which the Substitute Train had been stopped.

As to the reason why the Train was allowed to run without the substitute block system applied, it is probable that the train dispatcher, although familiar with the substitute block system, was so anxious not to delay the Train, the first train of the day, and to prepare a substitute train as quickly as possible, that he could not think about the need to change the block system for the Train.

As to the reason why the driver did not check the status of the point indication, it is somewhat likely that he had lost the sense to identify what is abnormal, which in this case is

the Train running with the ATC system disengaged and the cab signal showing an abnormal sign.

As to the background of this, it is somewhat likely that the Bureau has failed to maintain a fully effective safety management system among the staff, including how to ensure safety in a contingency and to retain the knowledge and skills they have learned in training.

4. Remarks

The JTSB expressed its remarks to the Osaka Municipal Transportation Bureau regarding the need to improve its safety management system for abnormal circumstances including training programs to ensure that everyone involved in train operation is capable of taking appropriate actions in any contingency.

(For the details of the remarks, refer to “Appendix 15 Remarks made in 2011” (Page 33 in Appendixes).)

2. Summary of recommendations and opinions

There was one recommendation in 2011, which is summarized below:

(1)Recommendations (one case)

・ Based on the results of the investigation into the serious incident on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd., the following recommendations were made to the company on September 30, 2011.

1. Staff education on the company's regulations and standards

(1) Nagasaki Electric Tramway should verify whether the current operations standards, etc., related to the implementation of the safety system (safety blocks) are appropriate and in line with the reality including the competency of those directly involved in train operation.

(2) Appropriate education and training should be provided to the relevant employees in ways that ensure that what they have learned can be fully put into practice and that their knowledge and skills level should be monitored regularly.

(3) The relevant employees should understand the relevant laws, the company regulations and standards, etc., and strictly observe these rules.

2. Improvement of the company's safety management system and effective promotion of related measures

(1) The current safety management measures should be reviewed for their effectiveness and those systems and measures that are found to be dysfunctional should be abolished or reviewed for improvement.

(2) The top-down, head-office-led safety management system should be reviewed so as to end up with measures that can help the field personnel address any issues seriously and proactively improve their capabilities.

3. Statistics of investigations of railway accidents and serious incidents

The JTSB carried out investigations of railway accidents and serious incidents in 2011 as follows:

Regarding accident, 10 cases were carried over from 2010, and there were 14 cases newly launched in 2011. Of the total number, investigation reports for eight cases were published and 16 investigations were carried over to 2012.

Regarding serious incident, six cases were carried over from 2010, and there were two cases newly launched in 2011. Of the total number, investigation reports for six cases were published and two investigations were carried over to 2012.

Among the publicized reports of 14 cases, one included recommendations and two included remarks.

Investigations of railway accidents and serious incidents in 2011

(Cases)

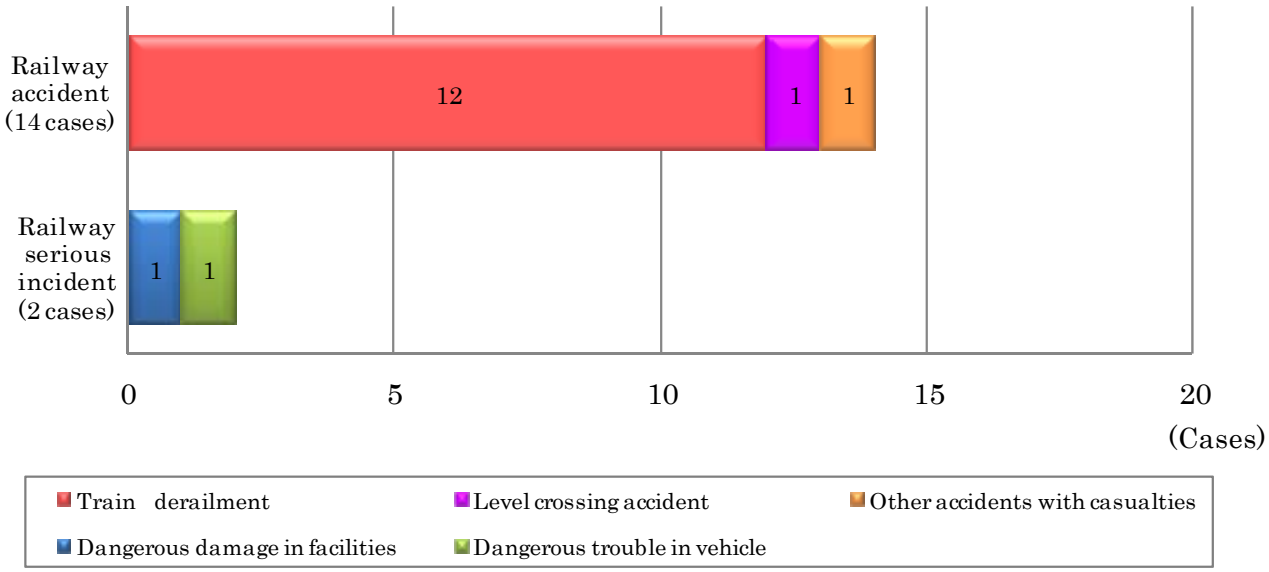
Category	Carried over from 2010	Launched in 2011	Total	Publication of investigation report	Recommendations	Safety recommendations	Opinions	Remarks	Carried over to 2012
Railway accident	10	14	24	8	0	0	0	0	16
Railway serious incident	6	2	8	6	1	0	2	0	2

4. Statistics of investigations launched in 2011

The investigations launched in 2011 included 14 accidents, up five cases from nine cases for the previous year, and two serious incidents, down five cases from seven cases for the previous year.

With regard to railway accident cases, there were 12 cases of train derailment (including due to two accidents of level crossing), one case of level crossing accident and one case of other accidents with casualties. With regard to railway serious incidents, there were one case of dangerous damage in facilities and one case of dangerous trouble in vehicle.

Number of railway accidents and serious incidents by Type



In the 14 railway accidents, the number of casualties is 86, consisting of one death and 85 injured persons. These accidents include one accident killing the driver of the vehicle in February 2011, in which a crossing rod that had been stuck in the lowered position was raised by an employee of the railway company, leading to a train colliding with a vehicle that had entered into the crossing, and another accident injuring passengers and crewmembers while escaping on foot in May 2011, in which white smoke billowed from a train that had stopped in a tunnel.

Number of casualties (railway accidents)

(Person)

2011							
Category	Dead			Injured			Total
	Crew	Passenger	Others	Crew	Passenger	Others	
Casualties	0	0	1	2	83	0	86
Total	1			85			

5. Publication of investigation reports

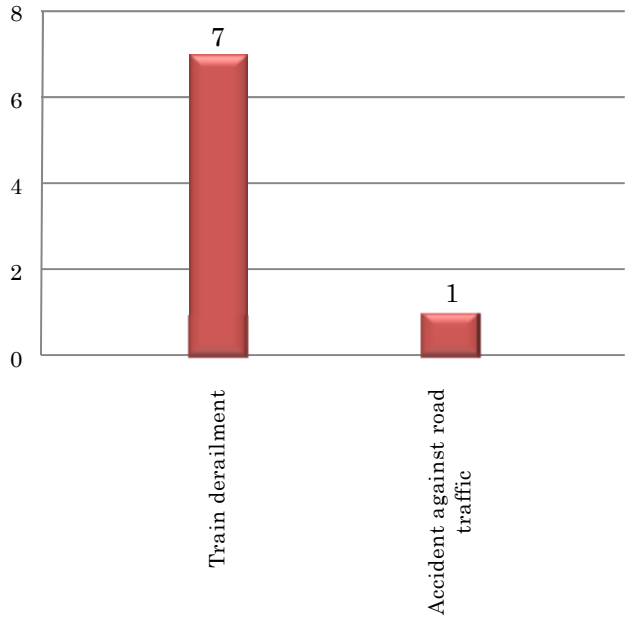
The number of investigation reports of railway accidents and serious incidents publicized in 2011 is 14: eight accidents and six serious incidents.

Looking those accidents and serious incidents by type, there were seven cases of train derailment (including due to two accidents of level crossing) and one case of accident against road traffic in railway accidents. Whereas in serious incidents, there were one case of incorrect

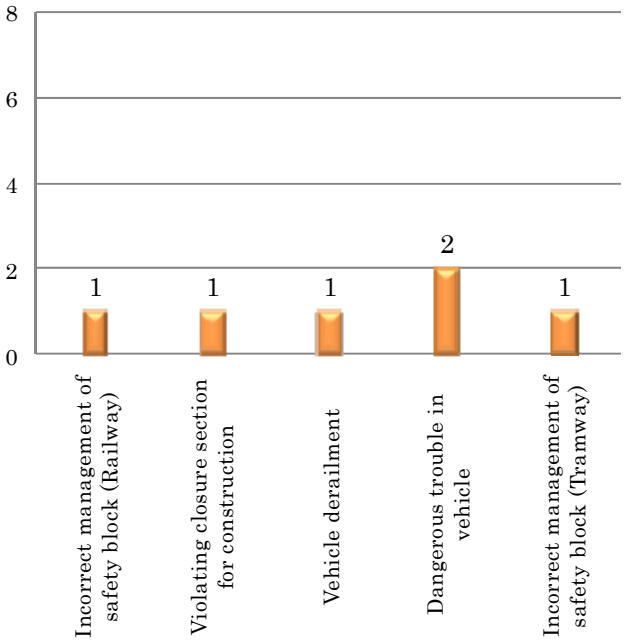
management of safety block (Railway), one case of violating closure section for construction, one case of vehicle derailment, two cases of dangerous trouble in vehicle and one case of incorrect management of safety block (Tramway).

In the eight accidents, the number of casualties is 57, consisting of one death and 56 injured persons.

Railway accidents (eight cases): reports publicized in 2011



Railway serious incidents (six cases): reports publicized in 2011



The investigation reports of railway accidents and serious incidents publicized in 2011 are summarized as follows:

List of publicized investigation reports on railway accidents (2011)

No.	Date of publication	Date and location	Operator	Type	Deaths/Injuries
1	Jan. 28, 2011	Dec. 19, 2009 Between Sotaro Station and Ichitana Station, Nippo Line, Miyazaki Prefecture	Japan Freight Railway Company	Train derailment	None
2	Feb. 25, 2011	Sept. 9, 2009 In Suita signal station premises, Tokaido Line, Osaka Prefecture	Japan Freight Railway Company	Train derailment	None
3	Mar. 25, 2011	Jan. 17, 2010 Between Echigo-kawaguchi Station and Ojiya Station, Joetsu Line, Niigata Prefecture	East Japan Railway Company	Train derailment	None

No.	Date of publication	Date and location	Operator	Type	Deaths/Injuries
4	Mar. 25, 2011	Jan. 29, 2010 Between Fukagawa Station and Moseushi Station, Hakodate Line, Hokkaido	Hokkaido Railway Company	Train derailment (Level crossing accidents)	44 slightly injured (42 passengers, a conductor and a dump truck driver) and one seriously injured (a train driver)
5	May 27, 2011	Dec. 9, 2010 Between Zasshonokuma Station and Kasugabaru Station, Tenjin-Omuta Line, Fukuoka Prefecture	Nishi-Nippon Railroad Co., Ltd.	Train derailment (Level crossing accidents)	One dead (an automobile driver)
6	Sept. 30, 2011	May 21, 2010 Between Kumanomae Stop and Miyanomae Stop, Toei Streetcar Arakawa Line, Tokyo	Bureau of Transportation, Tokyo Metropolitan Government	Accident against road traffic	6 slightly injured (3 passengers, the driver and 2 passengers of a truck)
7	Sept. 30, 2011	June 19, 2010 In Higashi-mizushima Station premises, Koto Line, Okayama Prefecture	Mizushima Rinkai Railway	Train derailment	None
8	Dec. 16, 2011	July 31, 2010 Between Oshikado Station and Iwate-Okawa Station, Iwaizumi Line, Iwate Prefecture	East Japan Railway Company	Train derailment	One seriously injured (a passenger) and 4 slightly injured (2 passengers and 2 crewmembers)

List of publicized investigation reports on railway serious incidents (2011)

No.	Date of publication	Date and location	Operator	Type
1	Apr. 22, 2011	June 29, 2010 In Tomida Station premises, Sangi Line, Mie Prefecture	Sangi Railway Co., Ltd.	Vehicle derailment
2	June 24, 2011	May 29, 2010 Between Inazumi-koen Station and Teine Station, Hakodate Line, Hokkaido	Hokkaido Railway Company	Dangerous trouble in vehicle
3	Sept. 30, 2011	June 17, 2010 Between Nishitetsu-Wataze Station and Nishitetsu-Ginsui Station, Tenjin-Omuta Line, Fukuoka Prefecture	Nishi-Nippon Railroad Co., Ltd.	Violating closure section for construction
4	Sept. 30, 2011	Oct. 21, 2010 Between Oura-kaigan-dori Stop and Oura-tenshudo-shita Stop, Oura Branch Line, Nagasaki Prefecture	Nagasaki Electric Tramway Co., Ltd.	Incorrect management of safety block
5	Oct. 28, 2011	Oct. 29, 2010 Between Yaga Station and Hesaka Station, Geibi Line, Hiroshima Prefecture	Nishi-Nippon Railroad Co., Ltd.	Dangerous trouble in vehicle
6	Oct. 28, 2011	Mar. 15, 2010 Kadoma-minami Station premises, Subway Line 7 (Nagahori Tsurumi-ryokuchi Line), Osaka Prefecture	Osaka Municipal Transportation Bureau	Incorrect management of safety block

Chapter 3 Marine accident and incident investigation

1. Summary of major investigation report

Summaries of five of the 1,165 investigation reports publicized in 2011 are presented below.

Marine 1 While a ship was proceeding in the North East Offing of Iriomote Shima, she pitched, and two passengers each suffered a compression fracture in the lumbar spine
(Passenger ship AN-EI GO No. 98, Casualties of passengers)
[investigated by Tokyo Office]

Full text of the investigation report (Japanese text only):
http://www.mlit.go.jp/jtsb/ship/rep-acci/2011/MA2011-3-3_2010tk0025.pdf

1. Summary of the accident

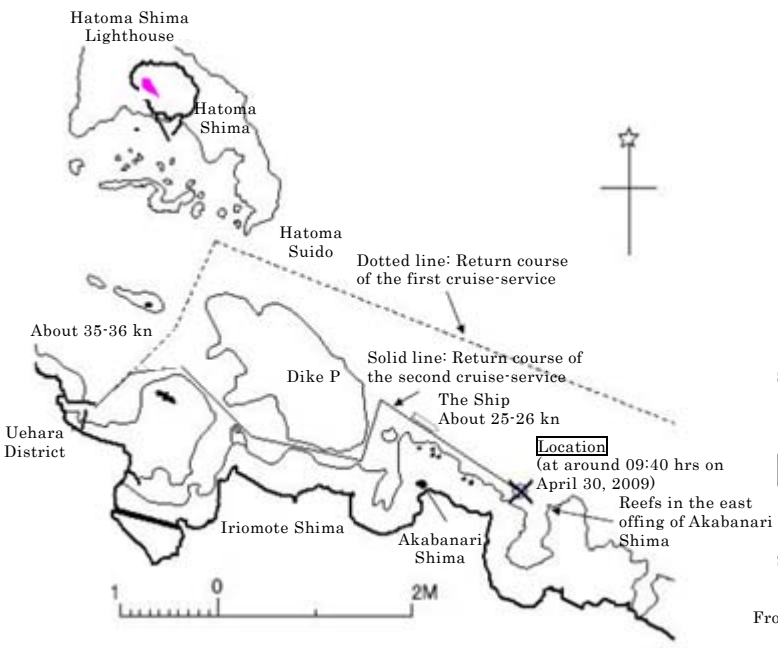
(1) Date and time: At around 09:40 hrs, April 30 (Thursday), 2009

(2) Location: North East Offing of Iriomote Shima, Taketomi Town, Okinawa Prefecture

(3) Outline of the accident:

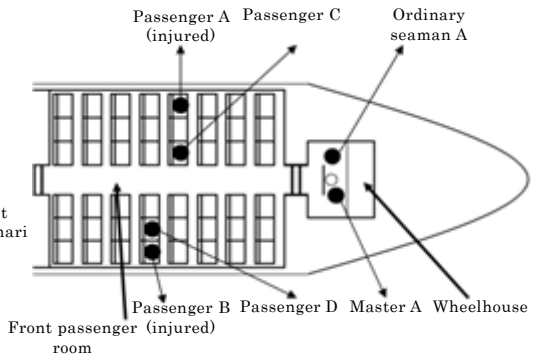
Passenger ship AN-EI GO No. 98 (the Ship), owned by limited private company An-ei Kanko (Company A), was boarded by the master with an ordinary seaman, and had 28 passengers on board. While the Ship was proceeding from Iriomote Shima (Iriomote Island), Taketomi Town, Okinawa Prefecture, to Ishigaki Shima (Ishigaki Island), Ishigaki City, two passengers (Passenger A and Passenger B) suffered injuries when the hull pitched at the north east offing of Iriomote Shima.

(4) Date of publication: March 25, 2011



Plots of estimated positions of the Ship

AN-EI GO No. 98



Seat positions in the front passenger room of the injured passengers, and other persons

2. Findings

(1) It is probable as follows:

The Ship was proceeding off the regular course east-southeast ward along the reefs in the north east offing of Iriomote Shima, and, near the east offing of Akabanari Shima (Akabanari Island), she was hit by consecutive waves about 1.5 to 2 meters high from east-northeast on the port bow. Just before the occurrence of the accident, the master recognized the high wave approaching; however, the master kept the Ship proceeding at the original speed, so the Ship's bow rode on the wave crest and then fell down onto the wave bottom; at that time, two passengers, sitting in the front passenger room, were lifted up off their seats and then dropped down onto the seats, causing each of them to suffer a compression fracture in the lumbar spine due to the free fall shock.

(2) It is probable that, although from Akabanari Shima to the reefs in the east of Akabanari Shima the master had reduced the speed or changed the course in order to reduce the pitch when a big wave approached, the master had proceeded after that at the original speed and with the original course.

(3) It is probable that the master, when approaching the point of turn near the reefs in the east of Akabanari Shima at the original speed, looking in the starboard bow direction in order to monitor the Ship's distance to the reefs in the bow and starboard side, failed to recognize the big wave approaching from the port bow direction.

(4) It is probable that the master had lost the chance to reduce the speed due to having failed to recognize the approaching wave until just before its arrival.

(5) It is somewhat likely that the master took the course for the following two reasons: the master, remembering a suggestion made by other masters of Company A that wave effects are cancelled by the reefs along the courses closer to the reefs in the north east offing of Iriomote Shima, thought that, along a course close to the reefs, the Ship would suffer smaller hull motions by waves than that experienced at the return course of the first cruise-service; the master, having no chance to look into the regular courses shown in the safety management regulations, wrongly thought that the round-trip course of the first cruise-service and the course was the regular course.

(6) It is somewhat likely that the following two facts contributed to the occurrence of the accident: the master and the ordinary seaman failed to provide directions or guidance by public address system to the passengers to sit in the rear passenger room because the hull motions would be smaller there; and the master failed to provide the passengers with guidance to wear seat belts.

(7) It is somewhat likely that the following fact contributed to the occurrence of the accident: Company A had not provided its crew with proper safety education in accordance with its safety management regulations concerning standard operations and so forth.

3. Probable causes

It is probable that the accident occurred when the two passengers, sitting in the front passenger room, were lifted up and then dropped onto their seats, each suffering a compression fracture in the lumbar spine due to the free fall shock when the Ship's bow rode on the big wave crest and fell down to the wave bottom, because the master, proceeding east-southeast ward along the reefs in the north east offing of Iriomote Shima while hitting consecutive waves of about 1.5 to 2 meter high from east-northeast on the port bow and failing to recognize the big wave approaching until just before its arrival, kept the Ship proceeding at the original speed.

It is probable that the reason why the Ship was proceeding at the original speed is that, although the master tried to reduce the pitch by reducing the speed and changing the course when a big wave was approaching, the master reverted to the original speed when the wave passed the Ship.

It is probable that the reason why the master failed to recognize the big wave approaching until just before its arrival is that the master was looking in the starboard bow direction in order to monitor the Ship's distance to the reefs in the bow and starboard side when approaching the point of turn near the reefs in the east of Akabanari Shima.

It is somewhat likely that the reason why the master navigated the Ship off the regular course along the reefs in the north east offing of Iriomote Shima is that, remembering a suggestion by other masters of Company A that, along a course closer to the reefs in the north east offing of Iriomote Shima, the reefs cancel wave effects, the master thought that navigating there would reduce the hull motions in comparison with those experienced in the first cruise-service, and that, having no chance to look into the regular courses shown in the safety management regulations, the master wrongly thought that the course was the regular course.

It is somewhat likely that the following facts contributed to the occurrence of the accident: the master and the ordinary seaman failed to provide passengers by public address system with directions or guidance to sit in the rear passenger room where hull motions are smaller; and the master failed to advise the passengers to wear seat belts.

It is somewhat likely that the following fact contributed to the occurrence of the accident: Company A failed to provide their crew with proper safety education in accordance with its safety management regulations concerning standard operations and so forth.

4. Recommendations, opinions, and remarks

The JTSB recommended Company A to provide safety education in accordance with their safety management regulations and so forth, prepare a safety operation manual in heavy weather applicable to the actual situation of their cruise services, and ensure compliance with the manual.

(For the details of the recommendations, refer to "Chapter 3 - 2. Summary of recommendations and opinions" (Page 97).)

The JTSB expressed its opinions to the Minister of Land, Infrastructure, Transport and Tourism with regard to the guidance of the high speed boat passenger transport business operators to prepare passenger-safety measures, such as ship handling in heavy weather.
(For the details of the opinions, refer to "Chapter 3 - 2. Summary of recommendations and opinions" (Page 98).)

The JTSB made its remarks to the Okinawa Passenger Boat Association to guide the passenger boat service operators in Yaeyama Retto (Yaeyama Islands) in order to firmly execute their safety management regulations.
(For the details of the remarks, refer to "Appendix 28　Remarks made in 2011" (Page 56 in Appendixes).)

Marine 2 A container ship, while proceeding eastward in Kanmon Passage and trying to overtake a cargo ship proceeding ahead, proceeded ahead of a JMSDF destroyer proceeding westward and collided with it; a fire broke out
(Collision of Container ship CARINA STAR and JMSDF Destroyer KURAMA)
[Investigated by the Tokyo Office]

Full text of the investigation report: http://www.mlit.go.jp/jtsb/eng-mar_report/Carina_Kurama.pdf

1. Summary of the accident

(1) Date and time: 19:56:09-12 hrs, October 27 (Tuesday), 2009

(2) Location: Vicinity of Moji Saki, Kanmon Passage, Kanmon Port

(3) Outline of the accident:

Container ship CARINA STAR (Ship A), boarded by a master (Master A) with 15 crew members, was proceeding eastward toward Hanshin Port through the Kanmon Passage in Kanmon Port. Destroyer of Japan Maritime Self-Defense Force (JMSDF) KURAMA (Ship B), boarded by a master (Master B) with 295 crew members, was proceeding westward through Kanmon Passage toward Sasebo Port, Sasebo City, Nagasaki Prefecture. The ships collided in the vicinity of Moji Saki, Kita-Kyushu City, Fukuoka Prefecture. Ship A sustained a fracture opening on the starboard bow outer-plate shell plate, and Ship B sustained substantial damage on the bow, which caused fire to break out on the damaged parts of both ships. Six crew members of Ship B suffered injuries during the fire-fighting operations; however, there were no injuries among the crew of Ship A.

Situation of Ship A

Situation of Ship B

(4) Date of publication: June 24, 2011

2. Findings

(1) Situations where Ship A, trying to overtake cargo ship QUEEN ORCHID (SHIP C), proceeded ahead of Ship B

a. It is probable that Ship A, while navigating eastward in Kanmon Passage, was approaching the starboard side of Ship C thinking that it would be possible to overtake Ship C at the west of Kanmon Bridge due to the speed difference between both ships.

b. Ship A received a message from the Kanmon-Kaikyo Vessel Traffic Service Center (Kanmon MARTIS), “Overtake on Ship C’s port side, Ship C is moving to the starboard side, but 1 mile (M) ahead of you, Ship B is coming. Pay attention. Over,” and replied

that they were going to overtake on the port side. However, a voice said "Do we have to overtake on her port side? A head-on vessel is getting closer to us," which suggests a possibility that they had doubts about the message from Kanmon MARTIS telling them to overtake Ship C on the port side.

c. It is somewhat likely that Master A took the message to have enforcement power instead of just provision of information. It is probable that Ship A decided to overtake Ship C on the port side in the situation where Ship A had approached the starboard side of Ship C; reduced the speed to slow ahead in the vicinity of Hayatomo Seto, west of Kanmon Bridge, put the helm 10° to port and then eventually hard to port because Ship A came close to Ship C, and passed about 70 m astern of Ship C.

d. It is probable that Ship A, due to the port-swinging inertia of the helm hard-a-port and the port-side rotational moment caused by the tidal stream, swung widely to port, advanced to the center of Kanmon Passage, and proceeded ahead of Ship B.

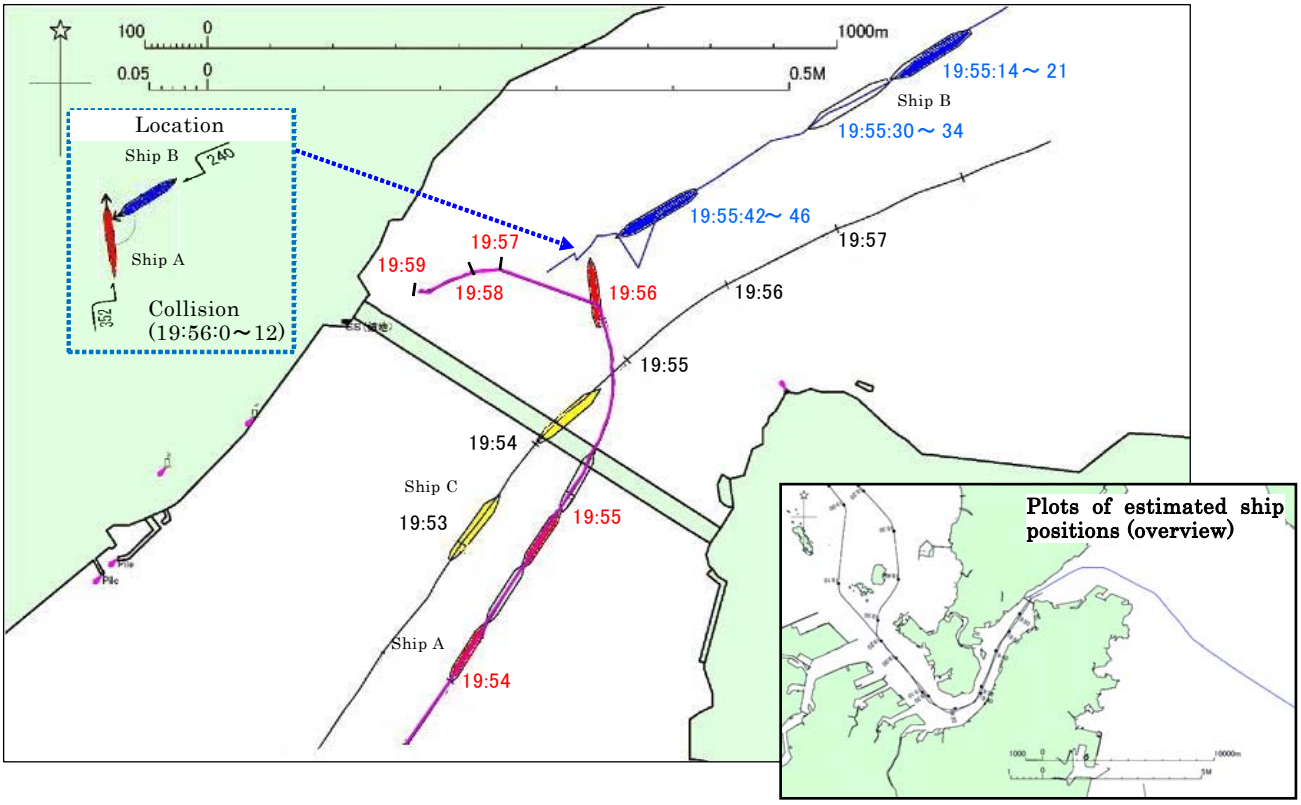
e. It is probable that Master A did not pay attention to the movement of Ship B because he was concentrating on clearing Ship C, and furthermore, Master A made no Overtaking Signals either.

f. It is probable that Ship A, which had tried to overtake Ship C in Kanmon Passage, overtook it even though it should not have according to Article 38, Paragraph 2 of the Ordinance for Enforcement of Act on Port Regulations, because the overtaking position was near Kanmon Bridge, the starboard-side clearance of Ship C would decrease as Ship C put the helm to starboard along Kanmon Passage, the port-side clearance would decrease as Ship B was coming on the opposite course, and as a conclusion, it was difficult to overtake Ship C on the starboard side and on the port side.

g. It is probable that the safety management of the owner/management company of Ship A (Company A) in navigating Ship A through the Kanmon Strait was improper because the check list for navigation through narrow channels included no specific descriptions of what to be noted, such as measures to follow the Overtaking Rule or to keep close communications with Kanmon MARTIS.

(2) Situations in Ship B proceeding at a speed of about 17 knots (kn) until just before the collision

a. It is probable that although Ship B's navigation plan for the Kanmon Strait had prescribed the speed through the water at about 12 kn, Ship B, while navigating westward by Kanmon Passage, was navigating at a speed of about 17 kn at the Tanoura Offing due to the effects of the tidal stream, faster than the full speed through the water of about 15 kn, which had been set before entering Kanmon Passage based on the judgment on the situations where there were no vessels on the same course ahead except for a small vessel and also due to the intention to pass through the Kanmon Strait quickly so as to have sufficient time for scheduled work.



Plots of estimated ship positions

b. It is probable as follows: Master B, having visual contact with Ship C, judged Ship C as a large vessel on the opposite course proceeding along the Kanmon Passage with its rudder to the starboard; then, having visual contact with Ship A, Master B judged Ship A as a large vessel similar to Ship C proceeding along the passage in a similar way to Ship C; in addition, Officer B thought that vessels would not try to overtake near the Kanmon Bridge.

c. It is probable that Master B's decision to maintain the full speed through the water at about 15 kn, which meant that Ship B was navigating at a speed of about 17 kn due to the effects of the tidal stream, was based on his judgment that Ship C would come close to Ship B but pass by it because Ship A was following close behind Ship C, and would also pass Ship B by putting the helm to starboard in a similar manner to Ship C.

d. It is probable that the higher commander of Ship B had not provided proper safety management for passing through the Kanmon Strait because the higher commander of Ship B had not provided Ship B with sufficient guidance, including obtaining movements of passing vessels with the Automatic Identification System (AIS), monitoring VHF communication, and using the service provided by Kanmon MARTIS or applying a safe speed in accordance with the situation.

(3) Collision avoidance maneuvers taken by Ship A and Ship B

a. It is probable that, although Master A had cleared the stern of Ship C, put the helm amidships, advanced Ship A to the center of Kanmon Passage, and put the helm hard to

starboard being aware of a risk of collision with Ship B, Ship A collided with Ship B before Ship A obtained a rudder effect.

b. It is probable that Master A sent no overtaking signal to Ship C when it overtook Ship C on Ship A's port side.

c. It is probable as follows: due to Ship A's starboard light that Master B saw and the aspect of Ship A's mast lights, Master B was afraid that Ship A was taking its rudder to port contrary to Master B's expectation that it would pass with its rudder to starboard; however, Master B kept proceeding at about 17kn and took no action of giving warning signals.

d. It is probable that the chief officer of Ship B (Officer B), because the attitude of Ship A had not shown changes, wondered why Ship A was not putting the helm to starboard, and upon being warned by Master B that Ship A might have put the helm to port, set both engines to stop and then to full astern.

e. It is probable that, although Master B put the helm hard to starboard while the rudder angle was changing to port due to the helm hard-a-port operation of Officer B, Ship B collided with Ship A.

(4) Guidance provided by the Kanmon MARTIS

a. It is probable that, according to the information obtained through the radar, the operator thought that Ship A proceeding eastward in Kanmon Passage would overtake Ship C in the east of the east side exit of Hayatomo Seto waterway.

Operation room of Kanmon MARTIS

b. It is probable that the operator, contacting Ship C, which was ahead of Ship A, and Ship A, which was overtaking Ship C, finally told Ship A as a provision of information to overtake Ship C on the port side and pay attention to Ship B coming 1 M ahead in addition to Ship C shifting to the starboard side, and received the reply from Ship A that Ship A would overtake Ship C on the port side.

It is somewhat likely that Master A took the messages from the Kanmon MARTIS as not simple information provisions but legally-enforced instructions because they were in an English imperative form and the IMO Standard Communication Phrases, which the Kanmon MARTIS had not regularly used, were not used

c. It is probable that the operator was required to guide Ship A in accordance with the Kanmon MARTIS Operation Manual in such a way that Ship A should not overtake Ship

C because, while Ship A and Ship C were approaching the Kanmon Bridge, Ship A would catch up with Ship C in the vicinity of Hayatomo Seto, where Ship B was proceeding on the opposite course, and because the operator received the message that Ship A would overtake Ship C.

It is probable that the operator did not give such guidance for the following reasons: the operator thought that, because of the tidal current influences on Ship A and Ship B, Ship B would complete passing before Ship A would overtake Ship C, and that the overtaking would occur in the east of the eastern side exit of Hayatomo Seto waterway; in addition, the operator thought that Ship A would never take improper actions before the completion of safety confirmations required for overtaking.

d. It is probable that the operator did not fully grasp the situation where Ship A would overtake Ship C or how Ship B would pass that position.

e. It is probable that Kanmon MARTIS did not give Ship B guidance to proceed under a speed limit of 15 kn imposed on a large ship or a ferry over a gross tonnage of 10,000 tons for protecting the safety of vessels moored at berths, because Ship B was not included in such category.

f. It is probable that the Kanmon MARTIS, for the following reasons, did not inform Ship B that Ship A would overtake Ship C on the port: the Kanmon MARTIS thought that Ship A would catch up with Ship C in the vicinity of Hayatomo Seto, that Ship B would complete passing before Ship A would overtake Ship C, and that the overtaking would occur in the east of the eastern side exit of Hayatomo Seto waterway; Ship A was not taking a course for initiating such overtaking; finally, Ship B was proceeding off-center of Kanmon Passage.

3. Probable causes

It is probable that the accident occurred in the vicinity of Hayatomo Seto in Kanmon Passage, at night and under the current condition of about 1.3 to 2.7 kn SW, by the collision of Ship A proceeding eastward and Ship B proceeding westward, in the following situations: Ship A approaching ahead of Ship B proceeding in the right lane of Kanmon Passage, when Ship A tired to overtake Ship C on the port in the situation where Ship A was approaching the starboard side of Ship C proceeding ahead of Ship A.

It is somewhat likely that Ship A tried to overtake Ship C on the port side in a situation where Ship A was approaching the starboard side of Ship C proceeding ahead of Ship A due to the following reason: Master A took the messages from Kanmon MARTIS for information provision as something legally-enforced, not as simple information provision.

It is probable that Master A, trying to overtake Ship C, proceeded ahead of Ship B, because, when Master A, reducing the speed, tried to overtake Ship C on the port side in a situation where Ship A was approaching Ship C's starboard side, Ship A turned to port excessively because of the port-swinging inertia caused by Ship A's steering of hard-a-port, and

the rotational moment caused by the tidal current.

It is somewhat likely that the following fact contributed to the occurrence of the accident: the operator in Kanmon MARTIS did not have precise knowledge on the position of Ship A's overtaking of Ship C or on the situations of Ship B approaching the overtake position.

It is somewhat likely that the following fact contributed to the occurrence of the accident: Ship B was proceeding at a speed of about 17 kn.

4. Opinions

The JTSB expressed its opinions to the Commandant of the Japan Coast Guard as follows: the operation manuals used by Kanmon MARTIS should be enhanced and revised; vessels passing Kanmon Straits should be firmly informed of overtaking navigation and speed; finally, the enhancement of the surveillance capability of Kanmon MARTIS should be considered.

In addition, the JTSB expressed its opinions to the Ministry of Defense as follows: the navigation manuals for passing Kanmon Straits should be enhanced; the MSDF ships navigating in narrow channels, including Kanmon Straits, should make sure to transmit their AIS information.

(For the details of the opinions, refer to "Chapter 3 - 2. Summary of recommendations and opinions" (Page 99).)

5. Safety recommendations

In view of the results of this accident investigation, the JTSB recommended Company A to take necessary actions to establish directions for practicing the overtaking navigation rule in the Kanmon Strait, keeping close communication with Kanmon MARTIS, and using AIS information appropriately, and then to train the crew members to be familiarized with them. Company A should also train the crew members in order for them to have accurate knowledge of message markers and the master's relationship with the VTS*1, taking into account the amendments of the Act on Port Regulation on July 1, 2010.

(For the details of the safety recommendations, refer to "Chapter 3 - 2. Summary of recommendations and opinions" (Page 103))

*1: VTS (Vessel Traffic Services, Annex V Regulation 12 to the SOLAS Convention)

Marine 3 A ferry heavily listed while proceeding south-westward in Kumanonada to starboard and grounded off Mihama Town.
(Listing of Ferry ARIAKE) [Investigated by the Tokyo office]

Full text of the investigation report (Japanese text only): http://www.mlit.go.jp/jtsb/ship/rep-acci/2011/MA2011-2-2_2009tk0012.pdf

1. Summary of the accident

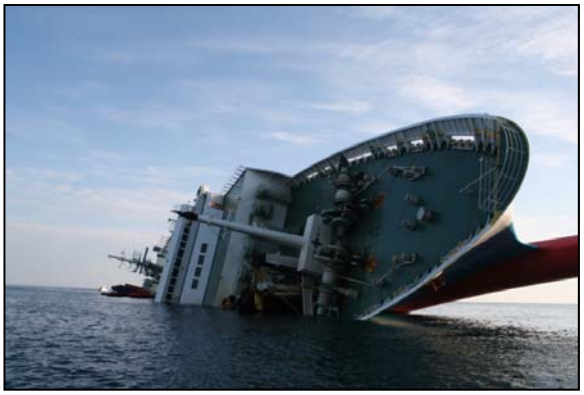
(1) Date and time: At around 05:06 hrs, November 13 (Friday), 2009

(2) Location: South-east off Kiho Town, Mie Prefecture (Kumanonada)

(3) Outline of the accident:

Ferry ARIAKE, operated by Maruei Ferry, Co. Ltd. (Company A), was boarded by a master with 20 crew members. It had 7 passengers, and was loaded with 150 containers and other items. At around 05:06 hrs, while proceeding south-westward in Kumanonada, ARIAKE heavily listed to starboard and grounded on its side off Mihama Town, Mie Prefecture.

Two of the passengers and one of the crew members were injured.



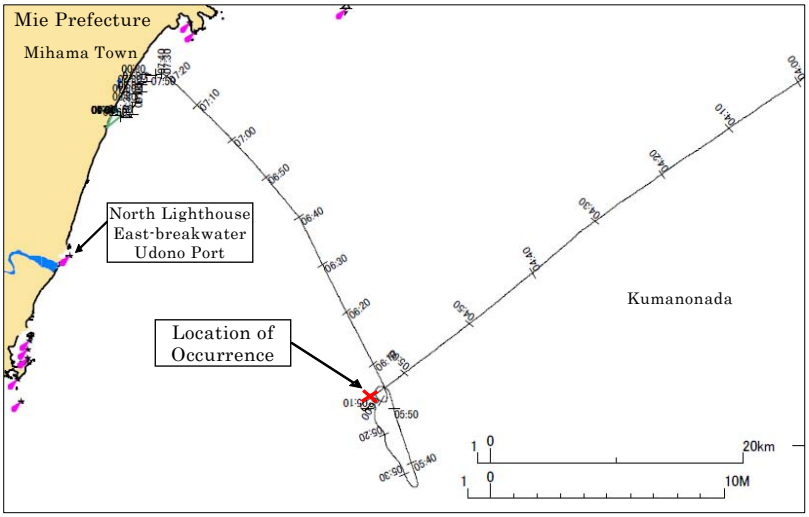
ARIAKE, listing and grounding on its side

(4) Date of publication: February 25, 2011

2. Findings

(1) Events leading to the occurrence of the accident

It is probable that: the ship, carrying 7 passengers, containers and trailers*1, was sailing south-westward in Kumanonada with the waves on the port quarter; the ship encountered a wave (the first wave) and listed to starboard by about 25°, which triggered the cargo shifting; the ship, when encountered by the second wave, listed further.



Plots of estimated ship positions

In addition, it is probable that: the listing, although once reduced by shifting ballast waters, grew larger while the ship was sailing north-westward toward the shore; the ship grounded and fell on its side near the shore of Mihama Town; before the grounding, the

passengers and crew members were rescued.

*1: A "trailer" refers to a vehicle towed by a truck to transport cargos.

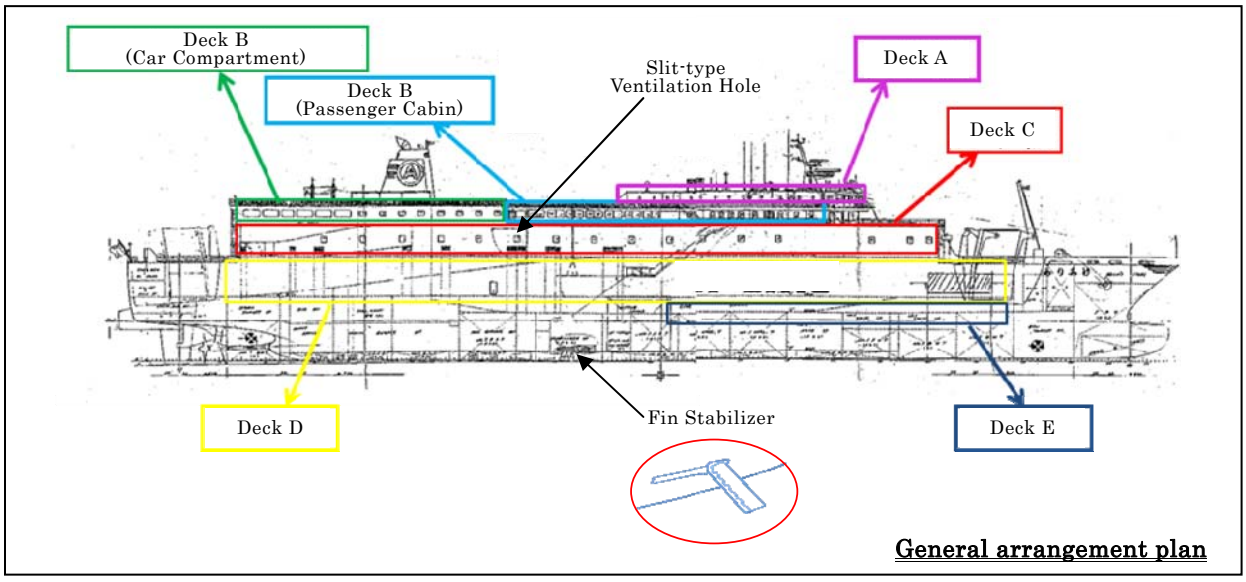
(2) Listing of about 25° caused by the first wave

It is probable that the ship, sailing in quartering sea with the waves with a length of about the ship's hull-length, a period of about 10 sec, and a significant height of about 4.6 m, listed to starboard by about 25° and rapidly turned to port when the ship encountered the first wave about 6.9 m high on the port stern from about 40° and was situated on the steep forefront of the wave, because the static balance point of the list angle was about 25° when the midship was on the forefront of a wave with the height of 1.5 times the significant wave height (about 6.9 m).

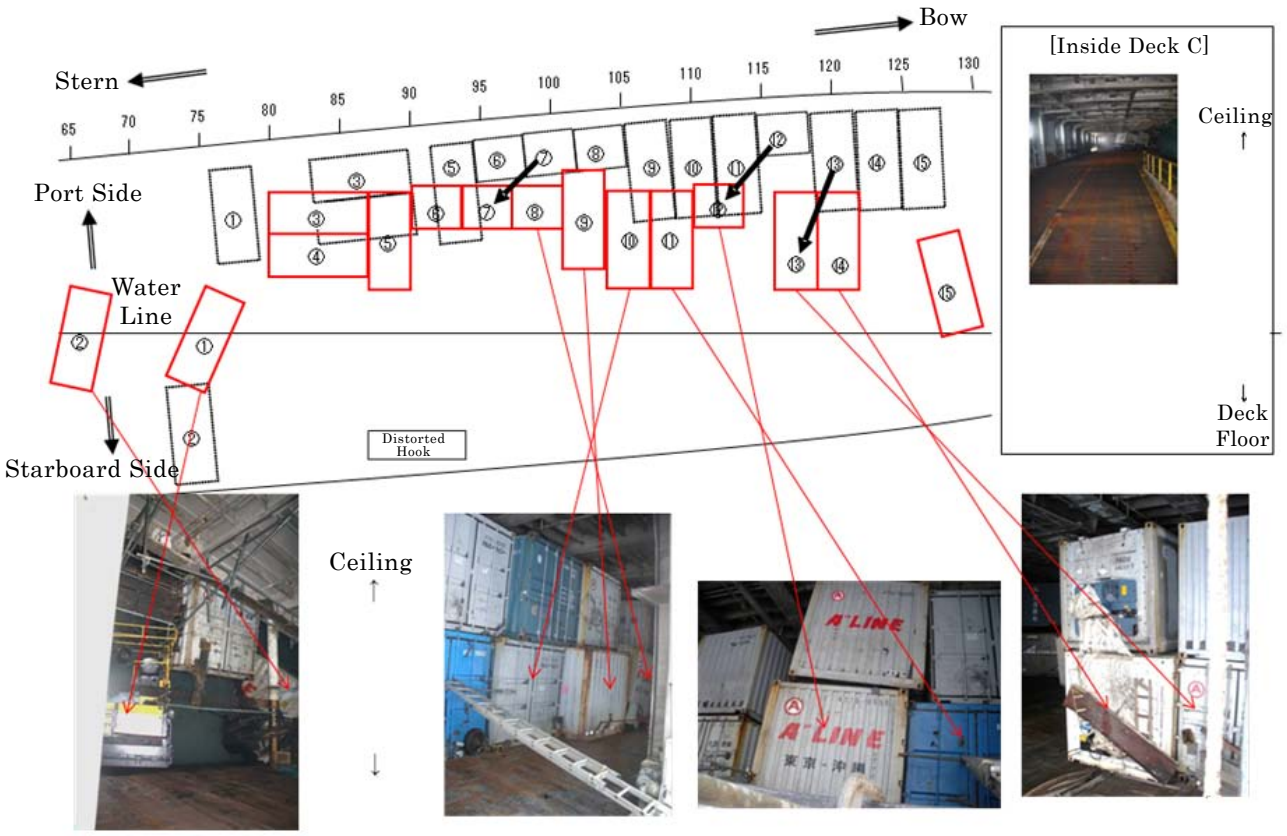
(3) Cargo shifting and the listing caused by the second wave

It is probable as follows:

a. Company A, although having installed lashing gear and equipment on the ship, had not considered specific lashing-procedures for containers or trailers, and had not prepared manuals for effective lashing procedures to prevent excessive shifting of cargo. In addition, the maximum coefficient of static friction between the deck and the containers, the supporting pads and the racks was approximately 0.4, corresponding to the coefficient of static friction between steel and steel, judging from the fact that: the car deck was not coated with paint compatible with the car ferry construction standards at the time of the accident; there was another incident of container shifting occurred prior to the accident; and the non-slip deck coating had abraded away.



General arrangement plan



Shifting of containers and trailers

b. Most of the containers were double-stacked and placed in rows in the across-the width direction and approximately one row of every three rows was lashed with lashing chains; the lashing chains were just about 0.4 m longer than the container-stack height, so those chains stood approximately straight from the floor; therefore, the way of lashing was not effective for preventing excessive shifting.

c. Most of the trailers were loaded on Deck C; the seven trailers in the front row and the three trailers in the back row were lashed with six-point-lashing (lashed with two additional lashing chains to the four regular chains); the other 34 trailers were lashed with four-point-lashing (the regular way of lashing with four lashing chains).

d. The containers began to slide when the ship listed to starboard by 25°.

e. A chain used for trailer lashing was broken down when the list angle reaches 27° because the tension exceeded the breaking load; therefore, when the chain was broken down, the other chains were consecutively broken down, causing the trailers to slide.

f. When the ship encountered the second wave about 4.6 m high in the port quartering sea by about 55° and was situated on the steep forefront of the wave, the ship listed to starboard by about 40° because of the shifting of cargo and the outward heeling*2 caused by the port turn.

*2: "Outward heel" refers to a phenomena whereby a turning ship heels due to centrifugal force in the direction opposite to the rotation center.

(4) Rescuing of passengers and crew

All the seven passengers on board and fourteen of the crew members were rescued by a Japan Coast Guard helicopter that came to assist; the master and the six crew members launched an inflatable life raft and abandoned the ship, and were rescued by a rescue craft.

3. Probable causes

It is probable that the ship listed to starboard by about 25° and the cargo shifting happened when the ship was encountered the wave with about 6.9m high at the port quarter by about 40° while sailing in Kumanonada at night as the ship was situated in the dangerous zone of successive high wave attack in quartering seas.

It is probable that the ship was sailing in the dangerous zone in the high quartering waves, because: neither the master nor the first officer had knowledge of the dangerous zone; and the master thought that the ship would not be greatly influenced by quartering waves because he had not experienced a significant pitch or roll on the ship even in quartering seas.

It is probable that the cargos slid because Company A had not taken measures to prevent an excessive shifting of cargo in accordance with the car ferry construction standards.

4. Remarks

The JTSB made its remarks urging the ship operators to describe, in their safety management manuals, the danger that would be posed by sailing in rough sea with quartering waves, and provide safety education to those who serve in navigation in order to ensure they recognize such danger.

(For the details of the remarks, refer to “Appendix 28　Remarks made in 2011” (Page 55 in Appendixes).)

Marine 4 Two workmen died from being hit by a mooring line broken and snapped-back while their mooring work.
(Fatality to workmen involved with container ship KUO CHANG)
[Investigated and processed by the Tokyo Office]

Full text of the investigation report : http://www.mlit.go.jp/jtsb/eng-mar_report/KuoChang.pdf

1. Summary of the accident

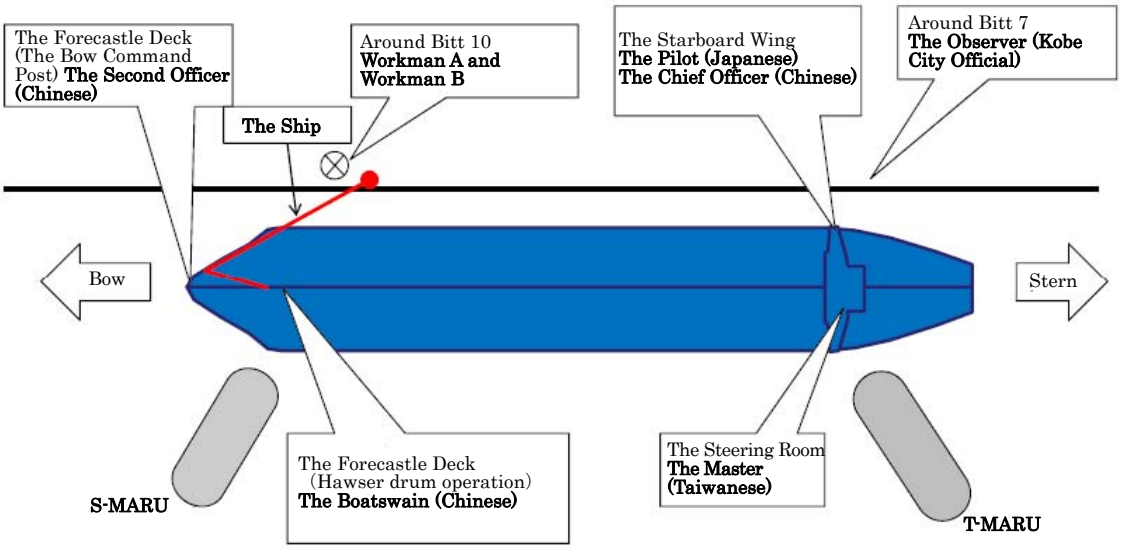
(1) Date and time: At about 07:36 hrs, March 20 (Sunday), 2009

(2) Location: Port Island Container Berth 18, Kobe District, Hanshin Port

(3) Outline of the accident:

At about 07:36 hrs, while the container ship KUO CHANG (the Ship) was docking at Port Island Container Berth 18 (the Berth), a mooring rope moored onto a bitt on the Berth broke, snapped back and hit two workmen (Workman A and Workman B) who were engaged in mooring work. Both of the workmen died.

(4) Date of publication: April 22, 2011



Positions of the parties concerned at the time of the accident

2. Findings

(1) It is probable that, on docking at the Berth, the pilot was actually in command of the vessel and the master and the chief officer at the bridge gave order to the second officer on the bow and the third officer on the stern under the pilot's advice.

Forward spring line of the Ship

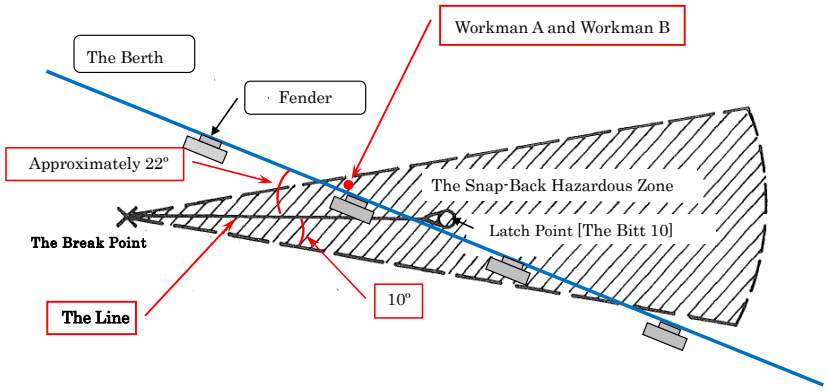
(2) It is probable that the broken mooring line (the Line) was a synthetic fiber rope used for less than a year, but it was worn due to repetitive use while touching a bend point where the sheer strake and outside plating

touched at almost a right angle (the Bend Point).

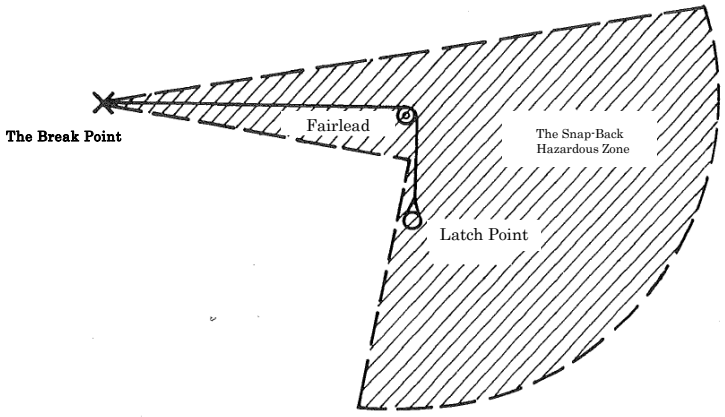
(3) It is probable that the master, in the situation where the Ship was running over the designated berthing point, ordered the second officer to heave the Line moored onto the bitt on the Berth in order to reduce the forward headway by using the Line.

(4) It is probable that the Second Officer gave order to heave the Line without knowing that the Line was touching the Bend Point, as he was commanding on the bow commanding post, from where the Bend Point was not visible.

(1) The Situation of the accident



(2) Snap-back hazardous zone in case of break of a mooring line bent at a fairlead



The Situation of the accident and the snap-back hazardous zone

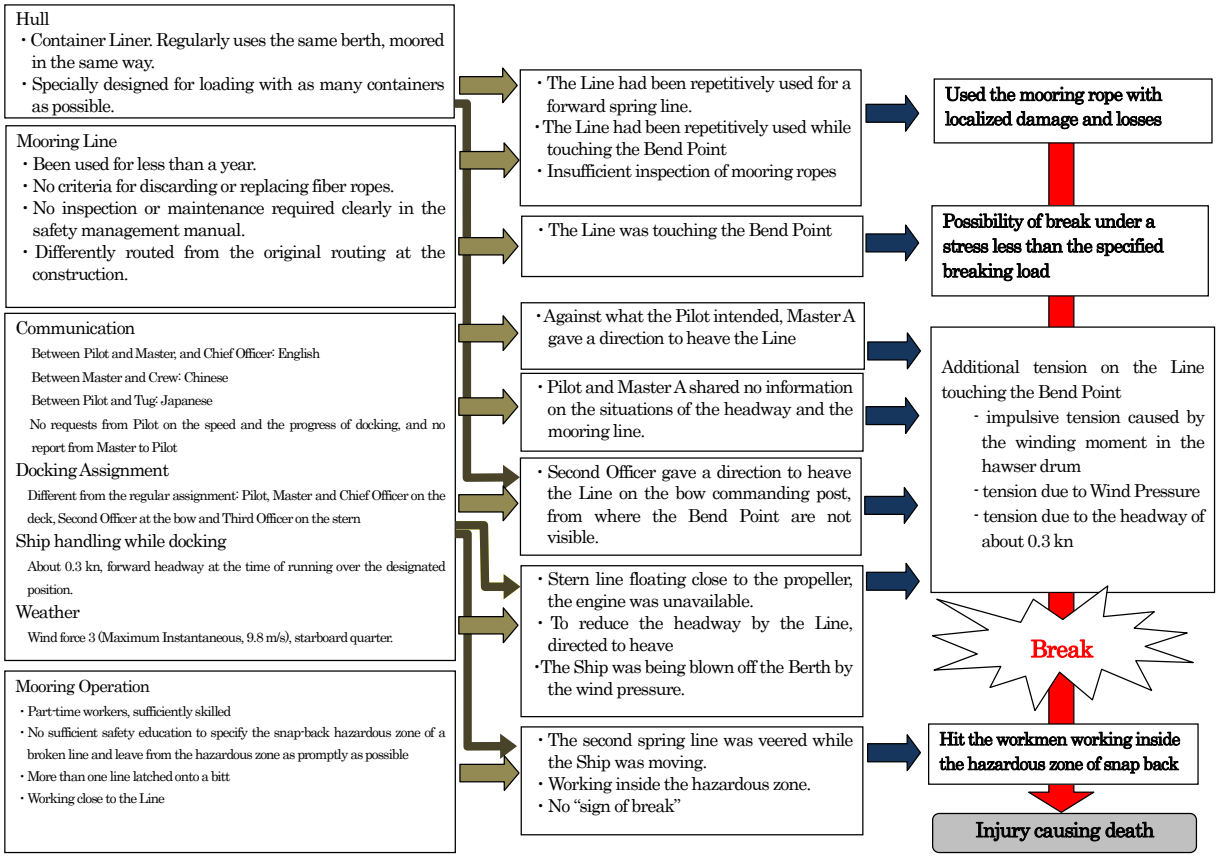
(5) It is probable that the Line, while touching the Bend Point, broke due to the combined tensions: an impulsive tension due to the winding moment in the hawser drum*1; tensions due to the forward headway of about 0.3 kn; the wind pressure.

The Broken part of the Line

(6) It is highly probable that Workman A and Workman B were hit by the Line which had snapped-back at the moment of breaking, as they were working inside the hazardous zone of snap back*2.

*1: A "hawser drum" is a rotating drum that can wind up a rope about 200 m in length, and is used for heaving or veering a mooring rope.

*2: "Snap back" is the sudden release of the static energy stored in the stretched synthetic line when it breaks



Cause and effect relationship of causal factors

(7) It is probable that the line handling service company had not provided the workman with safety instructions to complete the work swiftly and leave from the snap-back hazardous zone as promptly as possible in case of operations close to a mooring rope under tension, showing the extent of the snap-back hazardous zone of a broken rope under tension.

It is not found to what extent the fact described above related to the occurrence of the accident.

3. Probable causes

It is probable that the accident occurred because the Line broke, snapped back and hit Workman A and Workman B, who were working inside the hazardous zone of snap-back, while the Ship was docking at the Berth.

It is probable that the Line was broken due to the wear it had incurred and by the combined tensions on the Line touching the Bend Point: the impulsive tension due to the winding moment in the hawser drum; the tensions due to the forward headway of the Ship; the wind pressure.

4. Safety recommendations and remarks

The JTSB recommended the ship management company to make necessary revisions of their safety management manuals, and also recommended the Marine Department, the

Government of Hong Kong, People's Republic of China to supervise the company.
(For the details of the safety recommendations, refer to "Chapter 3 - 2. Summary of recommendations and opinions" (Page 102).)

The JTSB made its remarks to manufactures of mooring ropes regarding the need to establish guidelines in order to replace or discard their products by examining their appearance and provide users of the ropes with the guidelines, and also to line handling service providers regarding the need to provide their mooring workers with information on the extent of the snap-back hazardous zones of ropes when broken under tension, and give them instructions such as to avoid working inside the zone unless necessary.
(For the details of the remarks, refer to "Appendix 28　Remarks made in 2011" (Page 59 in Appendixes).)

Marine 5 A round-haul-net fishery boat capsized while drifting in a fishing area; 17 of the crew members died or went missing
(Capsize of fishing vessel SUWA MARU No. 58) [investigated by the Tokyo Office]

Full text of the investigation report (Japanese text only):
http://www.mlit.go.jp/jtsb/ship/rep-acci/2011/MA2011-4-2_2008tk0002.pdf

1. Summary of the accident

(1) Date and time: At about 13:50 hrs, June 23 (Monday), 2008

(2) Location: Around 350 km off the east of Inubo-saki, Choshi City, Chiba Prefecture

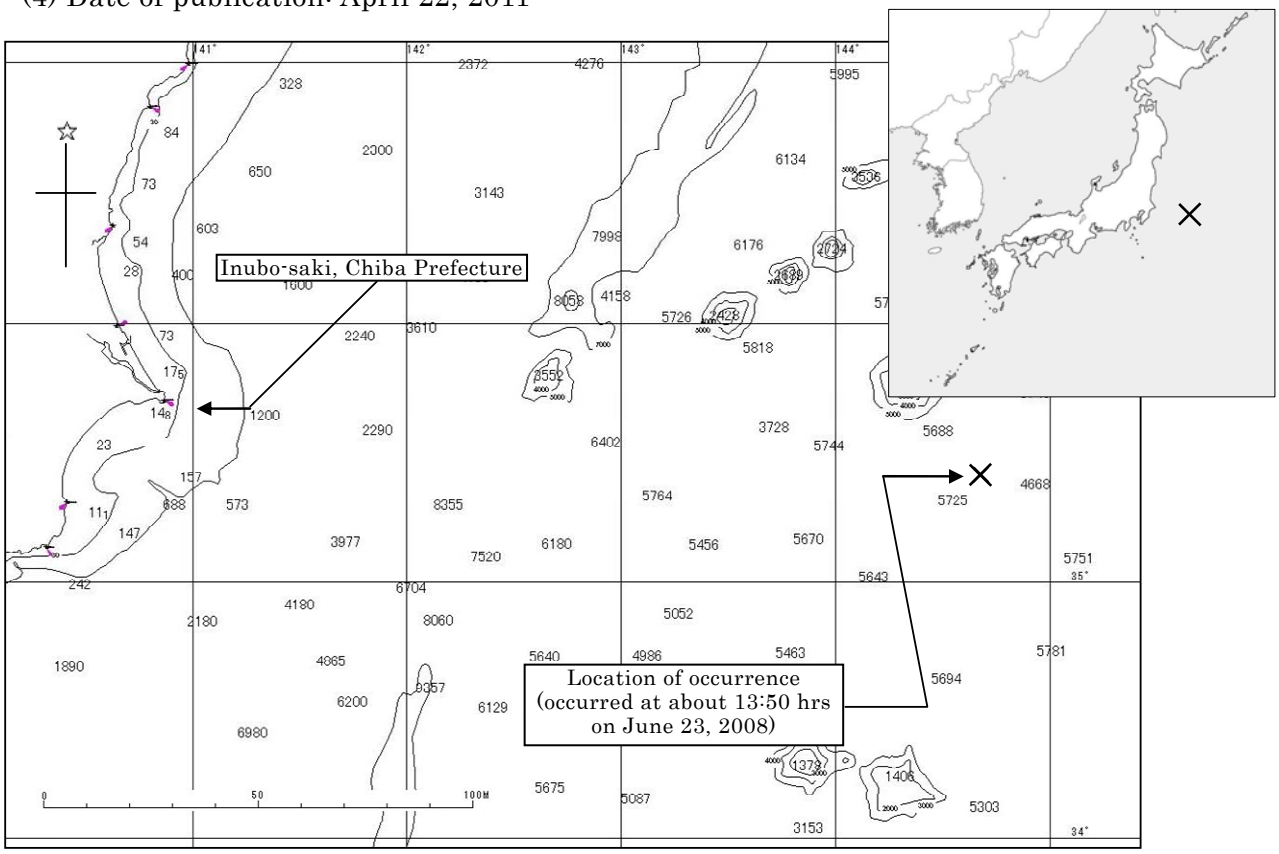
(3) Outline of the accident:

SUWA MARU No. 58 (the boat), a towing-net boat of a round-haul-net fishing fleet, was boarded by a skipper with a chief fisherman and 18 other crew members. While drifting in the fishing area off the east of Inubo-saki, Chiba Prefecture, the boat listed to starboard and turned over, sinking in the vicinity of 350 km off the east of Inubo-saki Lighthouse.

SUWA MARU No. 58

Out of the twenty crew members, four died and thirteen went missing.

(4) Date of publication: April 22, 2011



Location of occurrence

2. Findings

(1) Events leading to the occurrence of the accident

It is probable that the boat, a member of a fishing fleet consisting of eight boats in two groups, had an impact twice on the starboard bow section, turned over on the starboard side, wend down bow first, and then sank at about 13:50 hrs, while drifting by a parachute anchor (parachute drifting) at around 350 km off the east of Inubo-saki under a sea condition of southwest-to-south winds and southwest-to-south waves on June 23, 2008, when the fleet was off from fishing activities.

(2) Situations of capsizing and sinking

It is probable that the boat, while parachute drifting, had an impact twice on the starboard bow section, listed further to starboard as the starboard bow was sinking by seawater coming in, and turned over in about a minute after the second impact.

It is probable that the boat turned over with its bow to south-south-west, started foundering from its bow, and then sank bow first in about 40 minutes after turning over.

(3) Factors of the occurrence of the accident

a. It is somewhat likely that: the boat had higher center of gravity than that in the normal state and an initial list to starboard while parachute drifting; a big wave (a wave with a different height and a different length to those of waves that determine the rolls and pitches of the boat) hit the boat on its starboard bow section, and seawater flooded into the boat from the starboard mid section; the flooded water accumulated on the bow deck, causing the bow to drop down and the boat to list further to starboard; the starboard bow freeboard became so small that water flooded from the starboard side by consecutive waves; the list increased, and the top of the starboard side went under water; the boat turned over losing its stability.

b. It is somewhat likely that: the boat's total weight increased by the fishing nets which had been soaked with water and patched for repair; the boat's center of gravity shifted higher than that in the normal state because fishing gear, ropes and other items were loaded on the wheelhouse's canopy; the transverse weight distribution was imbalanced because heavy chains, fishing nets and floats were loaded in that order from the starboard side; and, the initial listing to starboard occurred due to the shift of the fishing nets toward the heavy chains as the boat rolled.

c. It is somewhat likely that the structure around the scupper hampered water drainage through the scupper, and that contributed to the water accumulation on the bow deck.

3. Probable causes

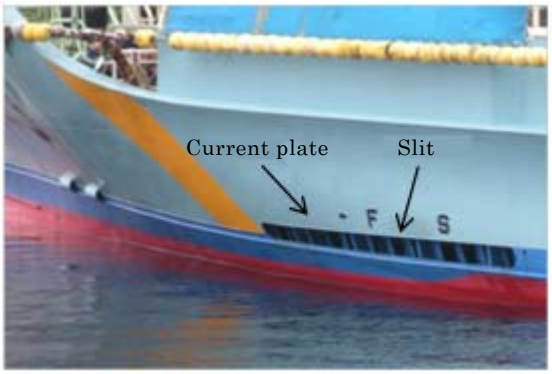
It is somewhat likely that the accident occurred as follows: the boat was parachute drifting at around 350 km off the east of Inubo-saki under a sea condition of southwest-to-south winds and southwest-to-south waves; the boat had higher center of gravity shifted than that in

the normal state and had an initial list to starboard; the boat was hit by the big waves at the starboard bow and seawater flooded in at the starboard mid section; the boat listed to starboard as the bow sank down due to the accumulation of water on the bow deck; the starboard bow's freeboard was so small that waves repeatedly came onboard from the starboard side and the boat listed further; and, the boat turned over losing its stability as the top of the starboard side went under water.

It is somewhat likely that the causes of the higher center of gravity than that in a normal state and the initial listing to starboard were as follows: the fishing nets gained weight because they had been soaked with water and been patched for repair; the fishing gear, ropes and other items were loaded on the wheelhouse's canopy; the imbalance in the transverse weight distribution was caused by the loading of the heavy chains, the fishing nets and the floats in that order from the starboard side; and, the fishing nets shifted toward the heavy chains as the boat rolled.

It is somewhat likely that the structure around the scupper contributed to hampering water drainage.

Loading situation of fishing nets



Structure of scupper
(photo of similar type of boat)

4. Remarks

The JTSB made its remarks on safety measures about fishing nets, scupper, and parachute drifting to the Fisheries Agency and other organizations concerned and owners of net-fishery boats.

(For the details of the remarks, refer to "Appendix 28　Remarks made in 2011" (Page 58 in Appendixes).)

2. Summary of recommendations and opinions

There were two recommendations, five opinions, and nine safety recommendations in 2011, which is summarized below:

(1) Recommendations (two cases)

1. In view of the results of the investigation on the passenger-injury accident on the passenger ship AN-EI GO No. 98, the JTSB, in order to ensure passengers' safety, made the following recommendations to the An-ei Kanko Co., Ltd. on March 25, 2011:
1. Safety education on safety management manual The company should regularly provide its crew with proper safety education on the company's operation standards, putting emphasis on measures for safe operation while underway on rough seas, and ensure their compliance with the standards. 2. Development of and compliance with safety manual for navigation on rough seas taking into account actual operation In order to ensure implementation of its safety management manual, the company should review its safety measures on rough seas in terms of route, speed, use of seatbelt, instruction for passengers to move to a place with less ship motion, and so forth, taking into account the size and the cabin arrangement of the ships in service, to develop a safety manual for navigation on rough seas, provide education to its crew about the manual, and ensure their compliance with it.

2. In view of the results of the investigation of the capsizing of recreational fishing vessel SHIBUSAKI No. 10, the JTSB, in order to ensure passengers' safety, made the following recommendations to Shibusaki Co., Ltd. on September 30, 2011:
The company should enhance the awareness throughout the company of ensuring the safety of passengers and vessels, maintain the seaworthiness of the vessels they own by properly having ship inspections, and take safety measures for passengers by instructing them to surely wear life jackets.

(2) Opinions (five cases)

1. In view of the results of the investigation of the capsizing of the motor boat NO FIGHT, the JTSB expressed its opinions to the Minister of Land, Infrastructure, Transport and Tourism on January 28, 2011 as follows:

Efforts have been made to disseminate information and raise awareness about what should be complied with in vessel operation and to what attention should be paid for safe operation for boat operators and owners on the occasions of issuing or revalidating a license. The Minister should continue the efforts of informing them of the following items and making sure of their compliance:

1. Collection and utilization of the latest information of weather and sea conditions, and characteristics of navigation areas

Boat operators should collect information of weather and sea conditions, and characteristics of navigation areas (such as presence or absence of breakwaters and off-limit areas) before departure. In addition, they should collect updated information of weather and sea conditions by mobile phone or other devices while underway and navigate in a proper way taking into account the specific conditions of navigation areas, such as high waves expected near breakwaters.

2. No overloading beyond the maximum number of persons onboard

No boat should be boarded with persons in excess of its capacity, because keeping sufficient freeboard is critical to safe navigation.

2. In view of the results of the investigation of the passenger-injury accident on passenger ship AN-EI GO No. 98, the JTSB expressed its opinions to the Minister of Land, Infrastructure, Transport and Tourism on March 25, 2011 as follows:

Since 2005, eight similar accidents have occurred on passenger ships or commuter boats, and twelve passengers have suffered from lumbar compression fractures. The causes of those accidents were as follows: while underway on rough seas where the vessel severely went up and down due to winds or waves, proper routes or courses were not taken or the speed was not reduced properly; measures for ensuring passengers' safety, such as guiding passengers on the stern section where vessel motion was relatively small and instructing passengers to wear seat belts, were not sufficient. Therefore, the Minister of Land, Infrastructure, Transport and Tourism should direct the concerned parties of

passenger ferry operators with high speed craft to develop safety measures for ensuring passengers' safety such as safe operation on rough seas (speed, course and so forth), inform their crew and other persons concerned of such measures, and make sure they are taken.

3. In view of the results of the investigation of the collision of container ship CARINA STAR and JMSDF destroyer KURAMA, the JTSB expressed its opinions to the Commandant of the Japan Coast Guard on June 24, 2011 as follows:

1. Revising the Kanmon MARTIS Operation Manual and others

It is desirable that the Kanmon MARTIS Operation Manuals should be revised according to the following items, and at the same time, that they should be practiced properly:

(1) Revising the Kanmon MARTIS Operation Manual

In order to ensure proper implementation of the Overtaking Rule in the Kanmon Strait in accordance with the Act on Port Regulations, criteria to decide which action should be taken, information provision, guidance or correction of navigation-rule violation, and messages to be delivered should be prescribed for Hayatomo Seto and its vicinity.

(2) Implementation of the Overtaking Rule

In order to ensure proper implementation of the Overtaking Rule in Kanmon Passage in accordance with the Act on Port Regulations, information should be provided to vessels in advance to inform that overtaking in Hayatomo Seto and its vicinity should be avoided because it is dangerous when there is a vessel on the opposite course.

(3) Public announcement of the use of the international standard communication procedures

The Kanmon MARTIS should inform vessels passing the Kanmon Strait that Kanmon MARTIS use message markers when giving information, advice or instruction based on the international standards.

2. Notification of the Overtaking Rule and Navigation Speed

It is desirable that Kanmon MARTIS should make public notifications on specific situations in which overtaking in the Kanmon Strait should be avoided, as well as the area where a speed of 15 knots or less is recommended in order to ensure the safety of ships moored at berths.

3. Reinforcement of Surveillance Arrangement

It is desirable that, in order to reinforce the surveillance arrangement, Kanmon MARTIS should consider the following:

(1) Establishment of qualification system for Operators

Kanmon MARTIS should establish a qualification system for Operators in order to ensure the supply of competent Operators, in addition to the training sessions for Operators that have been held.

(2) Monitoring by Operators

a. Reinforcement of monitoring

Monitoring should be reinforced, for example, by more than one Operator, when overtaking is going to take place while there is a vessel on the opposite course. In addition, handover operation should take place after the overtaking is completed and safety is secured.

b. Night vision systems

Night vision systems which enable the Operators to monitor vessels passing by at night time should be installed in addition to the cameras which have been installed for monitoring in day time.

4. In view of the results of the investigation of the collision of container ship CARINA STAR and JMSDF destroyer KURAMA, the JTSB expressed its opinions to the Minister of Defense on June 24, 2011 as follows:

1. Revising the Navigation Manual for passing through the Kanmon Strait

It is desirable that the related items in the Navigation Manual should be revised so as to include the following:

(1) Collection of information on the movements of other vessels through the AIS, monitoring ship VHF communication and use of the services provided by Kanmon MARTIS

(2) Safe speed for navigation in the Kanmon Strait

2. The application of the AIS

It is desirable that the JMSDF ships should make sure to transmit AIS information when navigating narrow channels, including the Kanmon Strait, because such information helps reception vessels.

5. In view of the results of the investigation of the passenger injury accident on the recreational fishing vessel HANABUSA, the JTSB expressed its opinions to the Director General of the Fisheries Agency on September 30, 2011 as follows:

The Fisheries Agency should advise the governors of prefectures to inform recreational-fishing-vessel service operators or recreational-fishing-vessel operation managers of the occurrence of the passenger-injury accident and to include the following items in the operation manuals developed by the recreational-fishing-vessel service operators to ensure passengers' safety:

1. Instruction of what passengers should comply with

As a recreational fishing vessel sometimes severely goes up and down due to waves while underway, passengers should be boarded on the stern section, where vessel motion would be relatively small.

2. Items which recreational-fishing-vessel service operators and their crew should comply with

(1) In a situation where a recreational fishing vessel is severely going up and down due to waves while underway, the crew should keep lookout properly on the waves and take measures to reduce the vessel motion by changing the relative course to the direction of waves or slowing the vessel down to a safe speed.

(2) In a situation where vessel motion due to waves may create a danger while underway, the crew should guide the passengers to board on the stern section, where vessel motion would be relatively small.

(2) Safety recommendations (nine cases)

1. In view of the results of the investigation of the fatality to workmen involved with container ship KUO CHANG, the JTSB made the following recommendations to CHENG LIE NAVIGATION Co., Ltd. and the Marine Department, the Government of Hong Kong, People's Republic of China on April 22, 2011:

The accident occurred when the mooring line with wear broke due to the additional tensions on the mooring line, which was touching the Bend Point, including the impulsive tension due to the winding moment in the hawser drum, the tension caused by the forward headway of the Ship and that caused by the wind pressure, and hit the two mooring workmen, causing them to die.

The safety management manual prepared by CHENG LIE NAVIGATION Co., Ltd. requires inspections on the mooring equipment at berthing to confirm that such equipment is in good condition. In the case of the accident, judging from the state of wear to the forward spring line, it is highly unlikely that the line was in a "good condition," as stated in the manual mentioned above.

Therefore, it is recommended to clearly state and require to pay attention to the route of mooring ropes and the bitts to moor the ropes onto in order to prevent mooring ropes from touching corners such as the Bend Point to the extent possible and obtain safe and effective mooring forces, and to place a person in charge to take command of operations in such a position from where the person can acquire the knowledge of the overall conditions of mooring ropes. At the same time, it is recommended to make all the ships under management comply with such requirements.

2. In view of the results of the investigation of the death and injury of workmen involving cargo ship RICKMERS JAKARTA and barge SHINEI-MARU No. 18, the JTSB, in order to prevent the recurrence of similar casualties, made the following recommendations to Crane manufacturers on June 24, 2011:

It is somewhat likely that this accident was caused in the following sequence. While Crane No.3 of RICKMERS JAKARTA was hoisting the Cargo, the rim of Main Sheave C at the extremity of the jib fractured, causing the Main Wire's precipitous drop into the gap caused by fracture. This caused a break in the Main Wire, and also, finally, the fall of the Cargo, Main Hook Block, and grommet onto SHIN EI- MARU No.18.

This accident occurred in spite of the fact that Crane No.3 passed a load test three weeks earlier, and later investigation revealed the occurrence of brittle fracture on the fractured surface of Main Sheave C and various sized cracks were observed on Main Sheave

E's surface. In the face of these findings, Crane manufacturers should, when they produce a rim that requires strong bending and shaping processes as a part of a weld construction sheave, perform proper control of manufacturing processes, including the selection of materials.

3. In view of the results of the investigation of the collision of container ship CARINA STAR and JMSDF destroyer KURAMA, the JTSB made the following recommendations to NAM SUNG SHIPPING CO., LTD. on June 24, 2011:

It is probable that the accident occurred at night in the vicinity of Hayatomo Seto in Kanmon Passage with a tidal stream of about 1.3–2.7 kn SW, while CARINA STAR (Ship A) was proceeding eastward and KURAMA (Ship B) was proceeding westward, and that the vessels collided with each other in the situation where Ship A had approached QUEEN ORCHID's (Ship C) starboard side and then tried to overtake Ship C on her port side, which, as a result, made Ship A proceed ahead of Ship B, which was proceeding on the right side of Kanmon Passage.

It is somewhat likely that the reason for Ship A's action of trying to overtake Ship C on her port side in the situation where Ship A had approached the starboard side of Ship C was that Master A had taken the message sent by the Kanmon-Kaikyo Vessel Traffic Service Center (Kanmon MARTIS) for just a provision of information as an enforcement power because they were in the imperative form in English without message markers on the message, which were not adopted by Kanmon MARTIS.

NAM SUNG SHIPPING CO., LTD. should establish directions for practicing the overtaking navigation rule in the Kanmon Strait, keeping close communication with Kanmon MARTIS, and using AIS information appropriately, and then should train the crewmembers to be familiarized with them. The company also should train the crewmembers in order for them to have accurate knowledge of message markers and the master's relationship with the VTS, taking into account the amendments of the Act on Port Regulation on July 1, 2010.

4. In view of the results of the investigation of the collision of cargo ship MARINE STAR and container ship TAKASAGO, the JTSB made the following recommendations to the Panama Maritime Authority, the ASIA SHIPPING NAVIGATION S.A. as the owner of MARINE STAR and the BLUE MARINE MANAGEMENT CORP. as the management company of the ship on October 28, 2011:

The Panama Maritime Authority should guide the ASIA SHIPPING NAVIGATION S.A. to have the BLUE MARINE MANAGEMENT CORP. execute proper ship management to secure safe operation.

The ASIA SHIPPING NAVIGATION S.A. should instruct the BLUE MARINE MANAGEMENT CORP. to follow the navigation rules of the state where vessel call, prepare a proper watchkeeping arrangement and ensure the safety of navigation.

The BLUE MARINE MANAGEMENT CORP. should provide clear and specific instructions on the rules that must be obeyed to the ships that navigate in this sea area, and at the same time guide the ships to ensure safety by reinforcing watchkeeping arrangements on the bridge through the measures including the increase of the number of crew on bridge watchkeeping duty.

5. In view of the results of the investigation of the collision of car carrier CYGNUS ACE and multi-purpose cargo ship ORCHID PIA, the JTSB made the following recommendations to the Panama Maritime Authority and RCL SHIP MANAGEMENT PTE LTD as the management company of CYGNUS ACE on November 25, 2011:

The accident was caused by the two vessels, CYGNUS ACE and ORCHID PIA, colliding with each other while proceeding on intersecting courses at eastward offshore Oshima at night. In this accident, CYGNUS ACE did not maintain proper lookout for ORCHID PIA and attempted to avoid collision with ORCHID PIA by successions of small alterations of course to port using the autopilot, which constituted the cause of the collision.

The Panama Maritime Authority should direct RCL SHIP MANAGEMENT PTE LTD to instruct the masters and crew members under its management to comply with the provisions of "the Safety Management Manual" established in accordance with the International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention.

RCL SHIP MANAGEMENT PTE LTD should make sure to instruct the masters and crew members under its management to operate vessels strictly in accordance with "the Safety Management Manual."

3. Statistics of investigations of marine accidents and incidents

The JTSB carried out investigations of marine accidents and incidents in 2011 as follows:

Regarding accident, 825 cases were carried over from 2010, and there were 998 cases newly launched in 2011. Of the total number, investigation reports for 1,027 cases were published, an interim report for 1 case was published, and 790 investigations were carried over to 2012.

Regarding incident, 101 cases were carried over from 2010, and there were 142 cases newly launched in 2011. Of the total number, investigation reports for 138 cases were published, and 103 investigations were carried over to 2012.

Among the publicized reports of 1,165 cases, two included recommendations, nine included safety recommendations, five included opinions, and forty-six included remarks.

Investigations of marine accidents and incidents in 2011

(cases)

Category	Carried over from 2010	Launched in 2011	Not applicable	Transferred to Tokyo Office	Total	Publication of investigation report	Recommendations	Safety recommendations	Opinions	Remarks	Carried over to 2012	Interim report
Marine accident	825	998	-6	0	1,817	1,027	2	9	5	46	790	1
Tokyo Office (Serious cases)	27	12		28	67	43	2	9	5	39	24	1
Regional Offices (Non-serious cases)	798	986	-6	-28	1,750	984				7	766	
Marine incident	101	142	-2	0	241	138	0	0	0	0	103	0
Tokyo Office (Serious cases)	1	0			1	1					0	
Regional Offices (Non-serious cases)	100	142	-2		240	137					103	
Total	926	1,140	-8	0	2,058	1,165	2	9	5	46	893	1

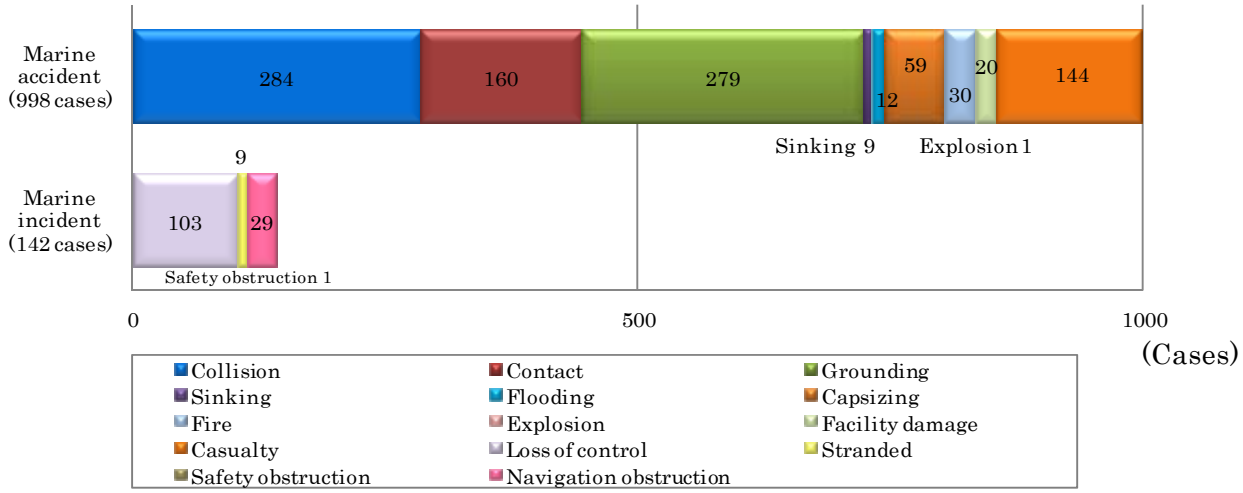
Note 1: The column “Not applicable” shows the number of cases which did not come under the category of accident or incident as defined in Article 2 of the Act for Establishment of the Japan Transport Safety Board.
Note 2: The column “Transferred to Tokyo Office” shows the number of cases where the investigation found out that it was serious and the jurisdiction was transferred from the regional office to the Tokyo Office.

4. Statistics of investigations launched in 2011

(1) Types of accidents and incidents

The 1,140 investigations launched in 2011 are classified by type as follows: With regard to marine accident cases, there were 284 cases of collision, 279 cases of grounding, 160 cases of contact, and 144 cases involving casualty. With regard to marine incidents, there were 103 cases of loss of control, including 61 cases of engine failure and 5 cases of out-of-fuel, 29 cases of navigation obstruction, and 9 cases of stranded. With regard to the objects of contact, they were quays in 41 cases, breakwaters in 24 cases, and piers in 15 cases.

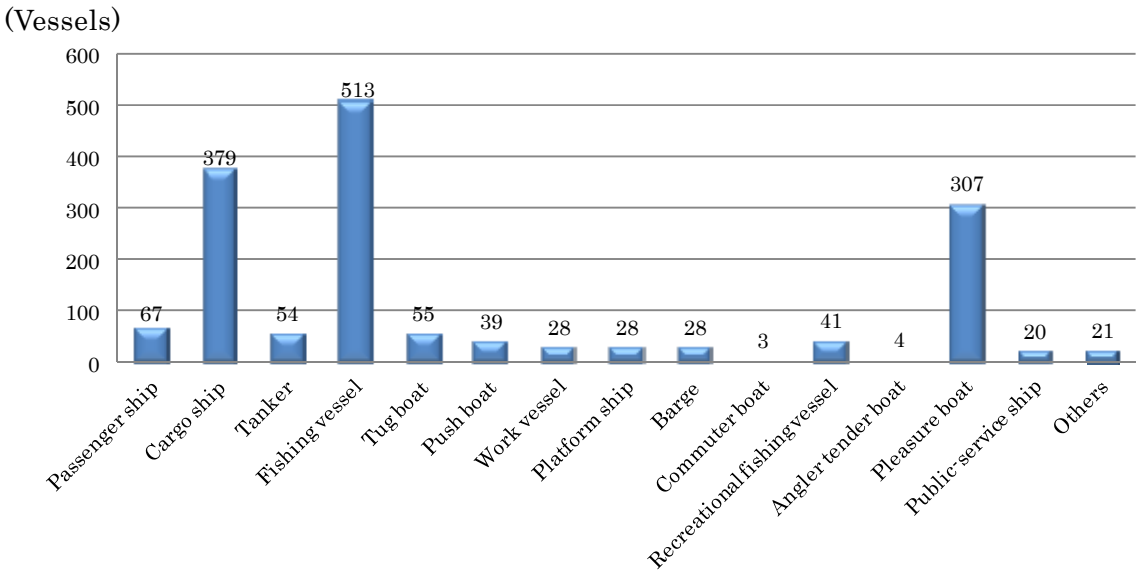
Number of marine accidents and incidents by type



(2) Types of vessels

The number of vessels involved in marine accidents and incidents is 1,587. Those vessels are classified by type as follows: 513 fishing vessels, 378 cargo ships, 307 pleasure boats, 67 passenger ships, and 55 tug boats. The total of the three categories of fishing vessels, cargo ships, and pleasure boats is 1,199, accounting for nearly 80 % of all the accidents and incidents.

Number of vessels involved in marine accidents and incidents by type



The number of foreign-registered vessels involved in marine accidents and incidents is 108, and they are classified by accident type as follows: 56 vessels in collisions, 21 vessels in contacts, and 17 vessels in groundings. As for the nationality of vessels, 34 vessels were registered in Panama, 16 vessels were in South Korea, 13 vessels were in Cambodia, and 6 vessels were in Singapore and Belize. The number of vessels registered in Asian countries or regions is 46, accounting for about 43 %.

Number of foreign-registered vessels by nationality

(Vessels)

Panama	34	Belize	6	Bahamas	3	Vietnam	2
South Korea	16	Hong Kong	5	Liberia	3	Netherlands	2
Cambodia	13	Malta	4	Antigua and Barbuda	3	Others	6
Singapore	6	China	3	Sierra Leone	2	Total	108

(3) Number of casualties

The number of casualties is 470, consisting of 137 deaths, 33 missing persons, and 300 injured persons. By type of vessel, 177 persons in fishing vessels and 171 persons in pleasure boats. By type of accident, 169 persons in casualties (not involved in other types of accidents), 143 persons in collision, 66 persons in sinking or capsizing, 52 persons in contact.

With regard to persons dead or missing, 97 persons were involved in fishing vessel accidents, 38 persons in pleasure-boat accidents, and 12 persons in cargo-ship accidents; it indicates that dead or missing cases have occurred more frequently in fishing vessel accidents.

Tragic accidents that occurred with loss of many human lives include: the disappearance of a fishing vessel off Hachinohe, Aomori Prefecture in April resulting in 3 deaths and 3 missing persons; the capsizing of a passenger boat on a river-cruise tour in Tenryu River in Hamamatsu City in August, resulting in 5 deaths; and a fire on a fishing vessel off Hachijo Shima (Hachijo Island), Tokyo, in November, resulting in 2 deaths and 2 missing persons.

Number of casualties (marine accident)

(Persons)

2011										
Vessel Type	Dead			Missing			Injured			Total
	Crew	Passenger	Others	Crew	Passenger	Others	Crew	Passenger	Others	
Passenger ship	4	3	0	0	0	0	6	17	0	30
Cargo ship	9	0	2	1	0	0	16	0	0	28
Tanker	2	0	0	0	0	0	3	0	0	5
Fishing vessel	69	0	0	28	0	0	79	0	1	177
Recreational fishing vessel	2	1	0	1	0	0	3	21	3	31
Pleasure boat	17	0	18	1	0	2	42	0	91	171
Others	9	1	0	0	0	0	12	5	1	28
Total	112	5	20	31	0	2	161	43	96	470
	137			33			300			

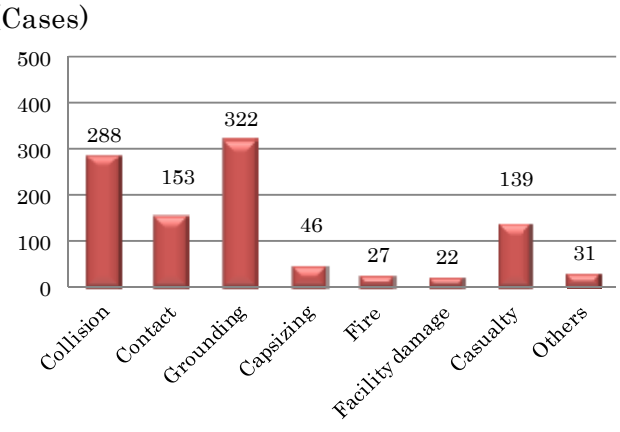
5. Publication of investigation reports

The number of investigation reports of marine accidents and incidents publicized in 2011 is 1,165 (the actual number of accidents and incidents is 1,166 because there is one report dealing with more than one accident): 1,028 marine accidents (among them, 43 are serious), and 138 marine incidents (among them, one is serious).

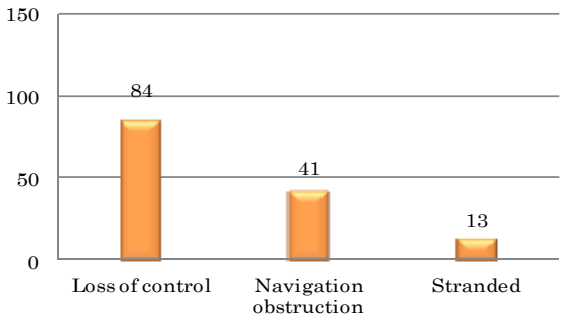
Looking those accidents and incidents by type, there were 322 cases of grounding, 288 cases of collision, 153 cases of contact, and 139 cases of casualty in marine accidents. Whereas in marine incidents, there were 84 cases of losses of control, including 60 cases of engine failure, 5 cases of rudder failure, and 3 cases of out-of-fuel, 41 cases of navigation obstruction, and 13 cases of stranded.

As for the objects of contact, 47 were quays, 20 were breakwaters, and 15 were piers.

Marine accidents (1,028 cases): reports publicized in 2011



Marine incidents (138 cases): reports publicized in 2011



The number of vessels involved in marine accidents and incidents is 1,570 vessels. Looking those vessels by type, the vessels involved in marine accidents were 429 fishing vessels, 344 cargo ships, 268 pleasure boats, 60 tug boats, and 56 passenger ships. The vessels involved in marine incidents were 49 fishing vessels, 39 pleasure boats, 19 cargo ships, and 18 passenger ships. The sum of fishing vessels, cargo ships, and pleasure ships involved in accidents or incidents is 1,148, accounting for over 70 % of all the vessels involved in accidents or incidents.

Number of vessels involved in marine accidents and incidents by type

(Vessels)

Type	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat	Push boat	Work vessel	Barge	Lighter	Commuter boat	Recreational fishing vessel	Angler tender boat	Pleasure boat	Public-service ship	Others	Total
Marine accident	56	344	47	429	60	29	31	28	32	4	48	5	268	24	18	1,423
Marine incident	18	19	2	49	5	3	1	1	4	0	1	0	39	1	4	147
Total	74	363	49	478	65	32	32	29	36	4	49	5	307	25	22	1,570
%	4.7 %	23. 1%	3.1 %	30. 5%	4.1 %	2.0 %	2.0 %	1.9 %	2.3 %	0.3 %	3.1 %	0.3 %	19. 6%	1.6 %	1.4 %	100.0 %

The serious marine accidents for which investigation reports were publicized in 2011 are listed in the table below.

List of publicized investigation reports on serious accidents (2011)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
1	Jan. 28, 2011	Oct. 25, 2009	Recreational fishing vessel TAIKAI MARU Contact with a rock	West of Misumi Lighthouse, Kamiamakusa City, Kumamoto Prefecture Around 272° true, 480m from Misumi Lighthouse	1 fatality (Angler) 2 injured (1 skipper, 1 angler)
2	Jan. 28, 2011	Dec. 11, 2009	Motorboat NO FIGHT Capsizing	Vicinity of Break Water (B) in East Port Area, Tomakomai Port, Tomakomai City, Hokkaido Prefecture Around 001° true, 2,530m from Break Water Lighthouse, East Port Area, Tomakomai Port	6 fatalities (1 operator and 5 other occupants)
3	Jan. 28, 2011	May 29, 2010	Fishing vessel NIKKO MARU Grounding	North east coast of Tajiri Port, Iwami Town, Tottori Prefecture Around 232° true, 800m from Obaneo Lighthouse	1 injured (Deckhand)
4	Jan. 28, 2011	Jun. 7, 2010	Passenger ferry ORANGE 8 Fishing vessel HOSEI MARU Collision	Off southeast of Jizousaki, Shoudoshima Town, Kagawa Prefecture Around 176° true, 1.3 nautical mile from Jizousaki Lighthouse	1 injured (Skipper of HOSEI MARU)
5	Jan. 28, 2011	Jun. 25, 2010	Recreational fishing vessel SANKO MARU Capsizing	Motonuwa Port, Nuwajima Island, Matsuyama City, Ehime Prefecture Around 167° true, 1,300m from Okozeiwa Light Beacon	None
6	Feb. 25, 2011	Nov. 13, 2009	Ferry ARIAKE Listing	Off the southeast of Kiho Town, Mie Prefecture (Kumanonada) Around 115.5° true, 14.0 nautical miles from East Break Water North Lighthouse, Udono Port	3 injured (1 crewmember, 2 passengers)
7	Feb. 25, 2011	Jul. 28, 2010	Chemical tanker SANSHUN MARU Cargo ship SHIN KISSHO Collision	Bisan Seto North Passage Around 256° true, 2,000m from Ushijima Light Beacon, Marugame City, Kagawa Prefecture	None
8	Mar. 25, 2011	Apr. 30, 2009	Passenger ship AN-EI GO No.98 Injury to passengers	Off the northeast of the Iriomote Shima (Iriomote Island), Taketomi Town, Okinawa Prefecture Around 137° true, 5.6 nautical miles from Hatomajima Lighthouse	2 injured (Passengers)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
9	Mar. 25, 2011	Aug. 11, 2009	Cement carrier FUYO MARU No.3 Fishing vessel SHOFUKU MARU No.18 Collision	Off the west of Esashi Port, Esashi Town, Hokkaido Prefecture Around 278° true, 13.7 nautical miles from Kamomejima Lighthouse	None
10	Mar. 25, 2011	Oct. 24, 2009	Fishing vessel KOFUKU MARU No.1 Capsizing	Off the south-southwest of Kozu Shima (Kozu Island), Izu Syoto (Izu Islands) Around 195° true, 39 nautical miles from Kozu Shima Island Lighthouse, Kozu Shima Village, Tokyo	1 fatality (Skipper) 4 missing (Crewmembers) 3 injured (Crewmembers)
11	Apr. 22, 2011	Jun. 23, 2008	Fishing vessel SUWA MARU No.58 Sinking	Around 350km east from Inubosaki, Choshi City, Chiba Prefecture	4 fatalities (1 boatswain, 3 crewmembers) 13 missing (1 master, 1 chief fisher, 1 chief engineer, 1 chief radio officer, 1 chief oiler, 8 crewmembers) 3 injured (Crewmembers)
12	Apr. 22, 2011	Mar. 20, 2009	Container ship KUO CHANG (Hong Kong) Fatality to mooring workmen	Container Berth 18, Kobe District, Hanshin Port Around 236° true, 1,150m from the Kobe No. 6 Break Water Lighthouse, Kobe City, Hyogo Prefecture	2 fatalities (Workmen)
13	Apr. 22, 2011	Jul. 16, 2010	Cargo ship SENEI MARU Fishing vessel TOSHI MARU No.2 Fishing vessel TOSHI MARU No.3 Collision (with Fishing net)	Off Kamegakubi, Kurahashi Shima (Kurahashi Island), Kure City, Hiroshima Prefecture Around 034° true, 3.3 nautical miles from Akisengai-iwa Light Beacon	None
14	Jun. 24, 2011	Sep. 1, 2008	Cargo ship RICKMERS JAKARTA (Republic of the Marshall Islands) Barge SHINEI MARU No.18 Fatality and injury to workers	No. 3 pier of Yamashita Wharf in Section 1 of Yokohama Quarter, Keihin Port Around 266° true, 1,400m from Yokohama Bay Bridge Light (P1), Yokohama City, Kanagawa Prefecture	1 fatality (Stevedore) 3 injured (Stevedores)
15	Jun. 24, 2011	Oct. 27, 2009	Container ship CARINA STAR (Republic of Korea) Destroyer KURAMA Collision	Vicinity of Moji Saki, Kanmon Passage, Kanmon Port Around 294° true, 330m from Moji Saki Lighthouse, Kitakyushu City, Fukuoka Prefecture	6 injured (Crew of KURAMA)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
16	Jun. 24, 2011	Jul. 29, 2010	Container ship SKY LOVE (Republic of Korea) Cargo ship HAEJIN (Republic of Korea) Collision	Off the east-northeast of Okinoshima Island, Munakata City, Fukuoka Prefecture Around 069° true, 15.5 nautical miles from Okinoshima Lighthouse	None
17	Jul. 29, 2011	Nov. 16, 2009	Dive boat STYLE Fatality to a diver	Agonoura Port, Zamami Village, Okinawa Prefecture Around 290° true, 1,100m from Ushinoshima Lighthouse, Zamami Village	1 fatality (Instructor)
18	Jul. 29, 2011	Dec. 21, 2009	Tanker EISHIN MARU No.17 Chemical tanker COSMO BUSAN (Republic of Korea) Collision	Crossing of Bisan Seto North Passage and Mizushima Passage Around 262° true, 1.1 nautical miles from Nabeshima Lighthouse, Sakaide City, Kagawa Prefecture	None
19	Jul. 29, 2011	Sep. 8, 2010	Chemical tanker KINYO MARU Tugboat KAIRYU Barge MARUSEN 2 Collision	Bisan Seto East Passage in the north west of Ogi Shima (Ogi island), Takamatsu City, Kagawa Prefecture Around 303° true, 1,700m from Ogishima Lighthouse	None
20	Aug. 26, 2011	Oct. 11, 2010	Tugboat FUMI MARU No.28 Barge YAMAKA 57SD103 Fishing vessel NANKAI MARU Collision	West Entrance of Kurushima Strait Around 225° true, 1.8 nautical miles from Ogeshima Lighthouse, Imabari City, Ehime Prefecture	1 fatality (Skipper of NANKAI MARU)
21	Sep. 30, 2011	Nov. 1, 2009	Passenger ship RYUGUJO Fatality to a crew member	Toba Port, Toba City, Mie Prefecture Around 213° true, 300m from East Break Water Lighthouse, Toba Port	1 fatality (Engine-room rating)
22	Sep. 30, 2011	Nov. 28, 2009	Recreational fishing vessel SHIBUSAKI No.10 Sinking	Off the east coast of Suwa Lake, Suwa City, Nagano Prefecture Around 231° true, 460m from Nanatsugama Triangulation Point, Suwa City	3 injured (Anglers)
23	Sep. 30, 2011	Jul. 11, 2010	Recreational fishing vessel HANABUSA Injury to an angler	Off the southwest of Rukan Reef in the west of Itoman City, Okinawa Prefecture Around 221° true, 8 nautical miles from Rukan Reef Lighthouse, Itoman City	1 injured (Angler)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
24	Sep. 30, 2011	Jul. 19, 2010	Motorboat KAISER Contact with a mooring dolphin	Tokushima Section 1 of Tokushima Komatsushima Port, Tokushima Prefecture Around 184° true, 740m from Tokushima Okinosu Training Wall Lighthouse, Tokushima City	6 injured (Occupants)
25	Sep. 30, 2011	Jul. 24, 2010	Fishing vessel WAKAEI MARU Small combined-use boat FUKUJU MARU Collision	Nagasu Port, Usa City, Oita Prefecture Around 203° true, 500m from Training Wall Lighthouse, Buzen-nagasu Port in Usa City	6 injured (Occupants of WAKAEI MARU)
26	Sep. 30, 2011	Jul. 30, 2010	Pleasure boat KAIKYO MARU Pleasure boat KOKURA MARU Collision	Vicinity of Tokomasari Reef, Kyan Port, Itoman City, Okinawa Prefecture Around 297° true, 970m from Tokomasari Reef Light Beacon	None
27	Sep. 30, 2011	Sep. 17, 2010	Recreational fishing vessel ICHIFUKU MARU Motorboat KANA MARU Collision	Off Ibusuki Port, Ibusuki City, Kagoshima Prefecture Around 071° true, 1,320m from East Break Water Lighthouse, Ibusuki Port	None
28	Oct. 28, 2011	Oct. 14, 2008	Car carrier PYXIS (Republic of Panama) Fire	Off the east of Kinkasan, Ishinomaki City, Miyagi Prefecture Around 089° true, 340 nautical miles from Kinkasan Lighthouse	1 fatality (Chief engineer)
29	Oct. 28, 2011	Feb. 20, 2009	Cargo ship MARINE STAR (Republic of Panama) Container ship TAKASAGO Collision	On the Bisan Seto East Traffic Route (off Sakaide Port, Sakaide City, Kagawa Prefecture) Around 062° true, 2,300m from Koseijima Lighthouse	None
30	Oct. 28, 2011	Mar. 21, 2010	Cargo ship DONG PHONG (Vietnam) Grounding	Northeast coast of Ishikari-Wan Port, Hokkaido Prefecture Around 101° true, 1.2 nautical miles from Ishikari-Wan Port North Break Water North Lighthouse	None
31	Oct. 28, 2011	Apr. 29, 2010	Oil tanker TAIYO MARU No.32 Gravel carrier KATSU MARU No.38 Collision	Irago Channel Traffic Route Around 183° true, 2,640m from Irago Cape Lighthouse, Tahara City, Aichi Prefecture	None
32	Oct. 28, 2011	Oct. 4, 2010	Motorboat NIKKO MARU No.2 Capsizing	Vicinity of Estuary of Omono River, Akita City, Akita Prefecture Around 167° true, 7.7km from Akita Old South Break Water Lighthouse	1 fatality (Operator) 1 injured (Occupant)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
33	Nov. 25, 2011	Mar. 10, 2009	Car carrier CYGNUS ACE (Republic of Panama) Multi-purpose cargo ship ORCHID PIA (Republic of Korea) Collision	Off the east of Oshima Island, Oshima-cho, Tokyo 087° true, 7.6 nautical miles from Ryuosaki Lighthouse	16 missing (Crew of ORCHID PIA)
34	Nov. 25, 2011	Jan. 12, 2010	Fishing vessel YAMADA MARU No.2 Sinking	Off the west-northwest of Osezaki, Fukue Shima (Fukue Island), Goto City, Nagasaki Prefecture Around 301° true, 46 nautical miles from Osezaki Lighthouse	10 fatalities (1 master, 1 chief engineer, 1 boatswain, 7 deckhands)
35	Nov. 25, 2011	May 5, 2010	Personal watercraft RED PEARL Fatality and injury to riders	Near the Regulating Gate on Chiba Prefecture Side, Upper Stream Side of Estuary Barrage of Tone River, Tounosho Town, Chiba Prefecture Around 078° true, 1,875m from Kanoko Triangulation Point	3 fatalities (1 rider, 2 rescuers) 1 injured (Operator)
36	Nov. 25, 2011	May 6, 2010	Personal watercraft MINPA Fatality to a rider	Estuary of Sagami River, Hiratsuka City, Kanagawa Prefecture Around 076° true, 4,400m from West Break Water Lighthouse, Oiso Port, Oiso Town	1 fatality (Rider)
37	Nov. 25, 2011	May 10, 2010	Oil tanker SHINSUI MARU No.8 Fishing vessel SUMIYOSHI MARU No.8 Collision	West-southwest of Kanazawa Port, Kanazawa City, Ishikawa Prefecture Around 264° true, 15.3 nautical miles from West Break Water Lighthouse, Kanazawa Port	1 missing (Ordinary seaman of SUMIYOSHI MARU No.8) 1 injured (Master of SUMIYOSHI MARU No.8)
38	Nov. 25, 2011	May 23, 2010	Cargo ship KATSU MARU No.8 Grounding	Vicinity of the eastern end of Hososhimasaki, Hososhima Port, Hyuga City, Miyazaki Prefecture Around 323° true, 860m from Hososhima Lighthouse in Hyuga City	4 fatalities (1 master, 3 crew members)
39	Nov. 25, 2011	Jun. 24, 2010	Passenger ship EIKYU MARU No.8 Contact with a light buoy	Ofunase South Light Buoy in the south of Amakusakamishima Island, Amakusa City, Kumamoto Prefecture Around 233° true, 660m from Nishinohara South Break Water Lighthouse, Miyada Port in Amakusakamishima Island	1 injured (Ordinary seaman)

No.	Date of publication	Date of the accident	Vessel type and name accident type	Location	Deaths/Injuries
40	Nov. 25, 2011	Sep. 18, 2010	Dive boat SOUTHWARD PASSAGE II Grounding	Southeast end of Inanbise, off the south of Toya Port, Yomitan Village, Okinawa Prefecture Around 178° true, 1.2 nautical miles from Dai-ni Oki Break Water South Lighthouse, Toya Port	None
41	Nov. 25, 2011	Feb. 22, 2011	Angler tender boat SETO MARU Capsizing	Vicinity of Suzu Shima (Suzu Island), off the west of Azashi Port, Kushimoto Town, Wakayama Prefecture Around 302° true, 5.6 nautical miles from Shionomisaki Lighthouse	1 fatality (Skipper) 6 injured (1 crew member, 5 anglers)
42	Dec. 16, 2011	Apr. 27, 2010	Fishing vessel FUDO MARU No.3 Fatality to a crew member	Off the northeast of Choshi Port, Choshi City, Chiba Prefecture Around 034° true, 11.0 nautical miles from Inubosaki Lighthouse	1 fatality (Deckhand)
43	Dec. 16, 2011	Jul. 27, 2010	Cargo ship OCEAN SEAGULL (Republic of Panama) Cement carrier SUMISE MARU No.2 Collision	Yokohama District 5, Keihin Port Around 097° true, 1,180m from Light A at Yokohama Honmoku Fishing Piers, Yokohama City, Kanagawa Prefecture	None

List of publicized investigation reports on serious incidents (2011)

No.	Date of publication	Date of the incident	Name of the incident	Location	
1	Dec. 16, 2011	Aug. 11, 2010	Passenger ferry OSADO MARU Navigation obstruction	Approximately 13.5 nautical miles off the east of Sadogashima, Sado City, Niigata Prefecture Around 097° true, 13.5 nautical miles from North Break Water Lighthouse, Suizu Port in Sado City, Niigata Prefecture	

Chapter 4 International efforts in accident prevention

1. Objectives and significance of international cooperation

Aircraft and marine accidents have an international characteristic and their investigations are standardized internationally by international organizations, requiring cooperation and coordination with the accident investigation authorities of States involved in the investigation process.

In aircraft accidents, the relevant States involved are: the State where the accident occurred, the State of registry, the State of the operator, the State of the design and the State of manufacture. The Annex to the convention of the International Civil Aviation of the International Civil Aviation Organization (ICAO) stipulates that while the State where the accident occurred has the responsibility of initiating and conducting an investigation, other relevant States have the authority to appoint representatives to participate in the investigation. This requires adequate coordination between the accident investigation authorities during the process.

In marine accidents, the International Convention for the Safety of Life at Sea (SOLAS) of the International Maritime Organization (IMO) sets out a common approach of accident investigation, which mandates that the flag State has the obligation to investigate certain vessels and allows the interested States such as the coastal State and nationals of that State lost their lives or received serious injuries to be involved in the investigation. The flag State and other interested States are supposed to cooperate in exchanging information during the conduct of the accident investigation.

2. International cooperation in accident investigation

(1) Providing information to investigation authorities and manufacturers

In aircraft accident investigations, the State of occurrence shall notify the State of registry, design and manufacture, and the operator. The relevant States then invited to appoint Accredited Representatives (AR) to participate in the investigation in accordance with ICAO Annex 13. Also, a draft final report as results of the investigation is sent to the relevant States for inviting their comments. Safety information is provided to accident investigation authorities and manufacturers of other States through such an arrangement.

In the helicopter accident which occurred in December 2007, the investigation report was published in April 2011, information was provided to a manufacturer through the accident investigation authority of Germany (BFU). Subsequently, the European Aviation Safety Agency issued Airworthiness Directives which instructed to inspect and replace certain parts in the flight control system and this led the issuance of manufacturer's service bulletin. In addition, in the helicopter fire accident which occurred in September 2011, the progress of the investigation was published in October 2011, information was provided to a manufacturer through the accident investigation authority of France (BEA). Subsequently, the European Aviation Safety Agency issued Airworthiness Directives

which instructed to inspect the strobe light system and this led the issuance of manufacturer's service bulletin.

(2) Cooperation with investigation authorities in individual cases

The JTSB Aircraft Accident Investigators were appointed as the AR for five aircraft accident investigations that were commenced in 2011 by foreign authorities and in which Japan was the relevant States.

In the accident where a passenger fell on and was injured in a Japanese airliner descending towards Honolulu Airport in February 2011, the JTSB cooperated with the accident investigation authority of the United States of America (NTSB) in sending interview summaries for the crew and passengers, photographs taken during the aircraft examination, and the DFDR data. In the accident involving a cargo aircraft of a Korean airline which crashed off Cheju Island in July 2011, the JTSB cooperated with the investigation authority of Republic of Korea (ARAIB) regarding the cargo originating from Japan. In the helicopter crash which occurred in Australia in August 2011, the JTSB cooperated with the Australian investigation authority (ATSB) in restoring the records in the onboard video camera which was made in Japan.

In marine accident 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) requires the flag State and the coastal State of the accident to cooperate in accident investigation. When a marine accident involving multiple States occurs, the JTSB conducts the accident investigation jointly in cooperation with the accident investigation authorities of the relevant States.

The following are some major cooperation cases where the JTSB commenced investigations in 2011:

a. In the case of the cargo ship SCSC WEALTH, a longshoreman wedged between hatch covers and bulkhead died on May 10, 2011 when the hatch covers piled up in the hold moved during cargo handling. With the cooperation of Hong Kong, the flag State of the SCSC WEALTH, the JTSB received the ship's drawings, relevant certificates, and manuals.

b. In the case of the Japanese registered cargo ship NSS ADVANCE which ran ashore off Liaodong, China on June 30, 2011, the AIS data of the NSS ADVANCE and other vessels sailing near the point were obtained with the cooperation of China, the coastal State.

c. In the case of a collision between the cargo ship MARUKA registered in Republic of Korea and the Japanese registered fishing vessel Kairyo Maru No. 18 where a person went missing on November 27, 2011, relevant certificates of MARUKA and the AIS data were obtained from Republic of Korea.

The JTSB also provides useful information to accident investigations conducted by other investigation authorities, and cooperates with them. The following is one such

example in 2011:

a. When the passenger ship WINDU KARSA sank in Indonesia waters on August 27, 2011, JTSB provided the ship's drawings, routes in service and operational conditions of the ship in Japan to the Indonesian investigation authority (NTSC), since the ship was built and operated in Japan before it was sold to Indonesia.

3. Participation in overseas training

In order to conduct a proper accident investigation, the JTSB strives to improve the qualification of its investigators through training and information exchange with foreign organizations, as well as active participation in accident investigation training conducted abroad.

In 2011, aircraft and marine accident investigators were sent to Cranfield University in the UK and the NTSB Training Center for training, both of which are well-known in this field. The curriculum ranges from the basics of accident investigation to specialized knowledge. After the training, the participating investigators fed-back what they have learned to the other investigators, thereby helping to improve the capabilities of the investigators as a whole.

Chapter 5 Other efforts toward accident prevention

1. Publications

The JTSB has issued publications in addition to the investigation reports.

(1) Issuance of JTSB Newsletter

The first JTSB Newsletter was issued in January 2009 to foster transportation safety by introducing the frontline activities of the Board. It has been published as a quarterly journal containing summaries of published reports and explanations of analysis results in an easy-to-understand manner.

Each issue has specific topics, and includes case studies of a latest investigation in each transport mode as a lesson subject for accident prevention; diagrams and charts are used for easier understanding by the readers.

Sometimes not regularly, special issues covering similar cases in a particular transport mode under a common theme are published at the request of experts.

In 2011, in addition to the quarterlies, a special issue was published, featuring railway serious incidents involving the inadvertent opening of train doors while the trains were running (all issues in Japanese text only).

(2) Issuance of JTSB Annual Report

In September 2011, the JTSB Annual Report 2011 was published to highlight the JTSB activities in 2010 and share lessons learned from accidents (in Japanese text only).

2. Dispatch of lecturers to seminars

The JTSB uses accident case studies and analysis results in accident prevention activities to impart knowledge and accident prevention measures to concerned parties.

JTSB lecturers were dispatched to conduct seminars and training organized by organizations and companies. We select a topic suitable for the audience and explain case studies, prevention measures and lessons learned from past accident investigations in an easy-to-understand manner.

The following is a list of some of the seminars JTSB lecturers were dispatched in 2011.

Safety manager and operation manager training seminar

Major seminars JTSB lecturers were dispatched (2011)

Date	Name / Sponsor	Participants	Theme	Lecturer
Jan. 19	Third GNSS Seminar / Japan Radio Air Navigation Systems Association	32 airline maintenance personnel	Trends of recent aircraft accidents and safety measures	Aircraft Accident Investigator
Jan. 28	Ship Technology Administration Training / College of Land, Infractructure, Transport and Tourism	12 maritime technology experts	JTSB Accident Investigation	Marine Accident Investigator

Date	Name / Sponsor	Participants	Theme	Lecturer
Feb. 9	2010 JICA Group Seminar on Marine Transport Administration / Japan International Cooperation Agency	7 maritime administrators from ASEAN member states	Roles of marine accident investigation and the JTSB	Marine Accident Investigator
Feb. 18	8th Small Aircraft Safety Seminar / Japan Aircraft Pilot Association	150 pilots of small aircraft	Accident Statistics and Analysis of Recent Accidents	Aircraft Accident Investigator
Mar. 8	Rolling Stock Seminar / Japan Association of Rolling Stock Industries	50 rolling stock managers	Summary of accident investigation reports on rolling stock	Railway Accident Investigator
Jul. 7	Railway Technology Training (Onsite Inspection) / College of Land, Infractructure, Transport and Tourism	22 onsite inspectors	Roles of Railway Accident Investigation	Railway Accident Investigator
Oct. 26	2011 Marine Safety Manager and Ship Operation Manager Training Seminar / Chugoku District Transport Bureau	210 safety managers and operation managers	Lessons on Safe Operations learned from Marine Accident Case Studies	Railway Accident Investigator
Nov. 8	2011 Ship Operation Manager Training Seminar / Kyushu District Transport Bureau	70 safety managers and operation managers	Presentation of Cargo Ship Accidents and others	Railway Accident Investigator
Dec. 6	2011 Special Training for Aviation Safety and Disaster Prevention Personnel / Aviation Safety Dept., Civil Aviation Bureau	13 aviation safety disaster prevention personnel	Case Studies of Aircraft Accidents	Aircraft Accident Investigator
Dec. 14	2011 Building Guidance and Elevator Safety and Accident Training in Special Course / College of Land, Infractructure, Transport and Tourism	86 building guidance and elevator accident personnel	Investigations of Railway Accidents	Railway Accident Investigator

3. Explanatory guide on accident investigation report on the crash of JAL flight 123 in Osutakayama

(http://www.mlit.go.jp/jtsb/kaisetsu/nikkou123.html : Japanese text only)

The aircraft accident investigation report (JAL flight 123) published in June 1987 by the Aircraft Accident Investigation Commission did not necessarily provide sufficient explanations to the bereaved families, and did not address concerns raised by them. When the JTSB was established, the Act for Establishment of the JTSB stipulates that information shall be provided to the victims and their families in a timely and appropriate manner. In an attempt to clarify the points raised by the bereaved families, explanatory guide on the JAL flight 123 accident report were given with the cooperation of Ms. Kuniko Miyajima and Ms. Mariko Kawaguchi, both of whom are members of the bereaved families; Mr. Akira Motoe, Chief Researcher for the Japan Institute of Human Factors and Mr. Shinobu Kobayashi, a former employee of JAL as the technical advisors. Mr. Kunio Yanagida, Writer, endorsed the significance of the guide by saying, “This plays a role of opening the door to accident investigations widely for the victims and general public."

Board Members

Members of the Japan Transport Safety Board

As of December 31, 2011

Title		Name	Main specialized field	Committee in charge
Chairman	Full-time	Norihiro Goto	Aeronautical engineering Mechanical engineering	Aircraft Committee, Railway Committee, Marine Committee
Member	Full-time	Toshiyuki Ishikawa	Legislation	Aircraft Committee, Railway Committee, Marine Committee, Marine Special Committee
Member	Full-time	Shinsuke Endoh	Operation and maintenance of aircraft	Aircraft Committee
Member	Full-time	Sadao Tamura	Maneuvering of aircraft	Aircraft Committee
Member	Full-time	Akira Matsumoto	Railway engineering Safety engineering	Railway Committee
Member	Full-time	Teruo Azukizawa	Electrical engineering	Railway Committee
Member	Full-time	Tetsuo Yokoyama	Maneuvering of ship	Marine Committee, Marine Special Committee
Member	Full-time	Kuniaki Shoji	Marine engineering Naval architecture	Marine Committee, Marine Special Committee
Member	Part-time	Yuki Shuto	Ergonomics (Human factors)	Aircraft Committee
Member	Part-time	Toshiaki Shinagawa	Maneuvering of aircraft	Aircraft Committee
Member	Part-time	Norio Tomii	Railway operation	Railway Committee
Member	Part-time	Miyoshi Okamura	Structural engineering	Railway Committee
Member	Part-time	Mina Nemoto	Ergonomics (Human factors)	Marine Committee, Marine Special Committee

Appendixes

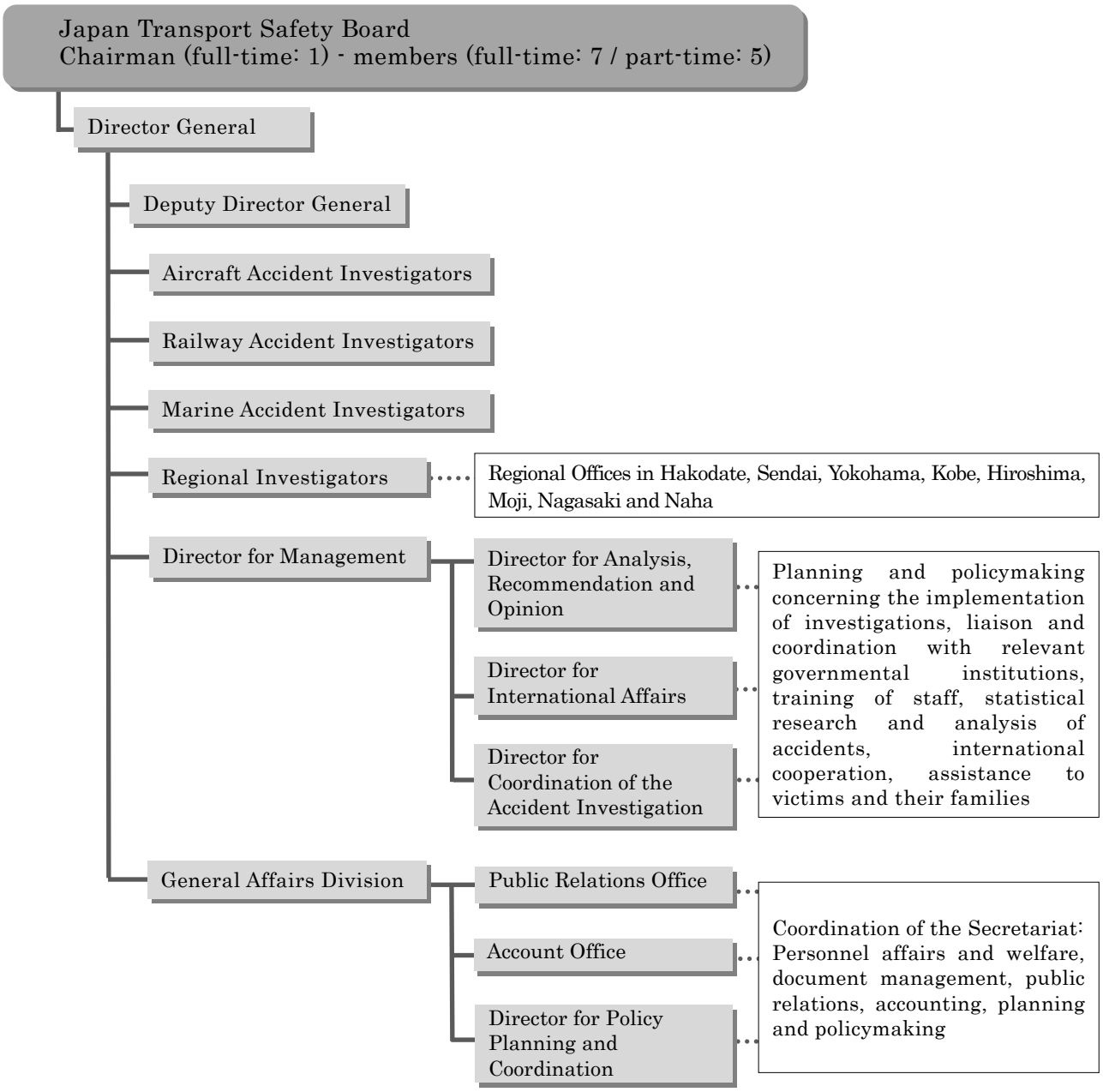
Japan Transport Safety Board
Annual Report 2012

Appendixes

Appendix 1 Outline of the organization

The Japan Transport Safety Board consists of the Chairman, 12 members, and 177 secretariat staff (as of December 2011). 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.

Organization Chart



Appendix 2 Deliberation items of Board and each Committee

After accident investigators prepare a draft investigation report, the draft report will be deliberated at the Board or Committees. In general, the committee which set up in each mode: Aircraft, Railway, Marine and Marine Special Committees will deliberate on the draft reports while particularly serious accidents will be deliberated at the General Committee, and extremely serious accidents at the Board.

The Board (Committee) is convened by the Chairman (or the Director of Committee), and attended by the members from the respective disciplines. Any matters shall be decided by a majority of the members present. A meeting cannot be convened and a decision cannot be made unless more than half of the members are present.

The Board (Committee) meeting is also attended by the Director General, Deputy Director General, Director for Management, Investigators concerned from the Secretariat.

Deliberation items of Board and each Committee

Board and Committees	Matters to be deliberated
Board	・Matters that the Board considers as extremely serious accidents based on the scale of damage and other matters including social impact
General Committee	・Matters related to particularly serious accidents (i) An accident involving ten or more persons killed or missing (ii) An accident involving twenty or more persons killed, missing or seriously injured (With regard to aircraft accidents and a marine accidents, (i) and (ii) are limited to passenger transport services.) ・Any other matters deemed to be necessary by the Board
Aircraft Committee	・Matters related to aircraft accidents and aircraft serious incidents (excluding the accidents to be handled by the General Committee)
Railway Committee	・Matters related to railway accidents and railway serious incidents (excluding the accidents to be handled by the General Committee)
Marine Committee	・Matters related to marine accidents and marine incidents as may be deemed serious by the Board (excluding the accidents to be handled by the General Committee and the Marine Special Committee)
Marine Special Committee	・Matters related to marine accidents and marine incidents (excluding the accidents to be handled by the General Committee and the Marine Committee)

Appendix 3 Aircraft accidents and serious incidents to be investigated

<Aircraft accidents to be investigated>

◎ Paragraph 1, Article 2 of the Act for Establishment of the Japan Transport Safety Board (Definition of aircraft accident)

The term "Aircraft Accident" as used in this Act shall mean the accident listed in each of the items in paragraph 1 of Article 76 of the Civil Aeronautics Act.

◎ Paragraph 1, Article 76 of the Civil Aeronautics Act (Obligation to report)

1. Crash, collision or fire of aircraft;
2. Injury or death of any person, or destruction of any object caused by aircraft;
3. Death (except those specified in Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism) or disappearance of any person on board the aircraft;
4. Contact with other aircraft; and
5. Other accidents relating to aircraft specified in Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism.

◎ Article 165-3 of the Ordinance for Enforcement of the Civil Aeronautics Act (Accidents related to aircraft prescribed in the Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism under item 5 of the paragraph1 of the Article 76 of the Act)

The cases (excluding cases where the repair of a subject aircraft does not correspond to the major repair work) where navigating aircraft is damaged (except the sole damage of engine, cowling, engine accessory, propeller, wing tip, antenna, tire, brake or fairing).

<Aircraft serious incidents to be investigated>

◎ Item 2, Paragraph 2, Article 2 of the Act for Establishment of the Japan Transport Safety Board (Definition of aircraft serious incident)

A situation where a pilot in command of an aircraft during flight recognized a risk of collision or contact with any other aircraft, or any other situations prescribed by the Ordinances of Ministry of Land, Infrastructure, Transport and Tourism under Article 76-2 of the Civil Aeronautics Act.

◎ Article 76-2 of the Civil Aeronautics Act

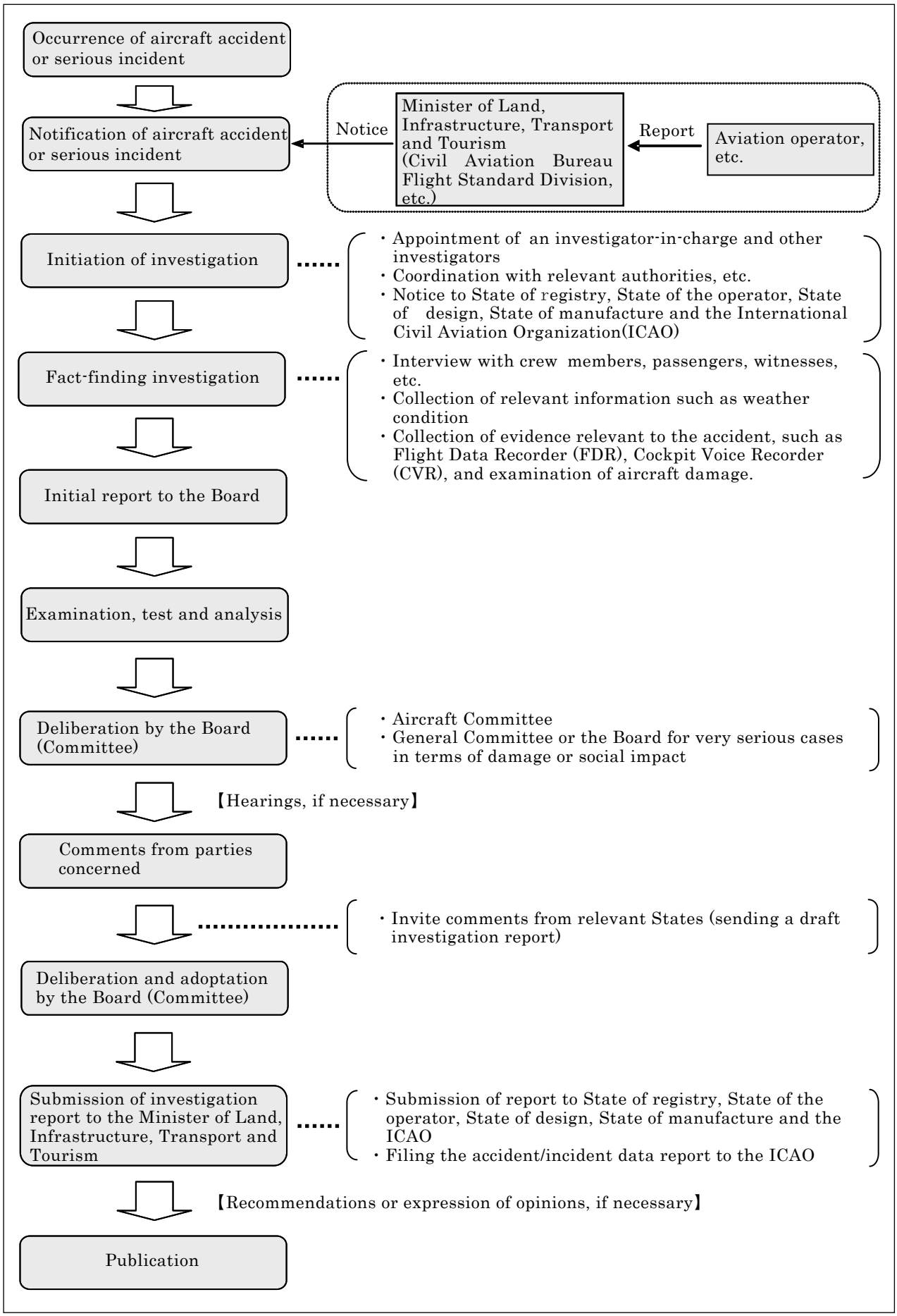
・When the pilot in command has recognized during flight that there was a danger of collision or contact with any other aircraft.

・When the pilot in command has recognized during flight that there is a danger of causing any of accidents listed in each item of paragraph 1, article 76 of the Civil Aeronautics Act, specified by Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism.

◎ Article 166-4 of the Ordinance for Enforcement of the Civil Aeronautics Act (The case prescribed in the Ordinances of the Ministry of Land, Infrastructure, Transport and Tourism under Article 76-2 of the Civil Aeronautics Act)

1. Take-off from a closed runway or a runway being used by other aircraft or aborted take off
2. Landing on a closed runway or a runway being used by other aircraft or attempt of landing
3. Overrun, undershoot and deviation from a runway (limited to when an aircraft is disabled to perform taxiing)
4. Case where emergency evacuation was conducted with the use for emergency evacuation slide
5. Case where aircraft crew executed an emergency operation during navigation in order to avoid crash into water or contact on the ground
6. Damage of engine (limited to such a case where fragments penetrated the casing of subject engine or a major damage occurred inside the engine)
7. Continued halt or loss of power or thrust (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, 2 or more engines) in flight
8. Case where any of aircraft propeller, rotary wing, landing gear, rudder, elevator, aileron or flap is damaged and thus flight of the subject aircraft could be continued
9. Multiple malfunctions in one or more systems equipped on aircraft impeding the safe flight of aircraft
10. Occurrence of fire or smoke inside an aircraft and occurrence of fire within an engine fire-prevention area
11. Abnormal decompression inside an aircraft
12. Shortage of fuel requiring urgent measures
13. 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
14. Case where aircraft crew became unable to perform services normally due to injury or disease
15. Case where parts dropped from aircraft collided with one or more persons
16. Case equivalent to those listed in the preceding items

Appendix 4 Procedure of aircraft accident/incident investigation



Appendix 5 Number of occurrence by aircraft category (aircraft accidents)

(Cases)

Category / Year of occurrence	Aircraft			Rotor craft		Glider	Airship	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

Category / Year of occurrence	Aircraft			Rotor craft		Glider	Airship	Total
	Large aeroplane	Small aeroplane	Ultralight plane	Helicopter	Gyroplane			
2006	3	3	4	2	1	5	0	18
2007	5	3	4	7	0	4	0	23
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
Total	147	356	153	415	23	181	2	1,277

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accident Investigation Commission.
2. Large aeroplanes are aircrafts with a maximum take-off weight of more than 5,700kg.
3. Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding Ultralight planes.

Appendix 6 Number of occurrence by aircraft category (aircraft serious incidents)

(Cases)

Category / Year of occurrence	Aircraft			Rotor craft		Glider	Airship	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
Total	54	19	16	10	0	3	0	102

(Note) 1. The figures include the cases handled by the Aircraft and Railway Accident Investigation Commission.
2. Large aeroplanes are aircrafts with a maximum take-off weight of more than 5,700kg.
3. Small aeroplanes are aircrafts with a maximum take-off weight of 5,700kg or less, excluding Ultralight planes.
4. The number of cases for 2001 represents those that occurred from October onward.

Appendix 7 Summary of aircraft accidents and serious incidents in 2011

The summary is based on the information at the time of launching investigation and may be modified as the investigations or deliberations progress.

(Aircraft accidents)

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
1	Jan. 03, 2011	About 1.3 km south-southeast of Yagoyama mountain, Otsumachi, Kikuchi-gun, Kumamoto Prefecture	Private	JA701M Piper PA-46-350P (small aeroplane)	The aircraft took off from Kumamoto Airport but did not arrive at Kita-kyushu Airport at the estimated time of arrival, and went missing. A search conducted subsequently found that the aircraft has crashed. Two persons on board died.
2	Feb. 18, 2011	On the runway of Yao Airport	Showa Aviation Co., Ltd.	JA8828 Fairchild Swearingen SA226-AT (small aeroplane)	The aircraft had its airframe damaged when it landed at Yao Airport. A captain, co-pilot and two passengers were on board, but nobody was injured. The aircraft sustained substantial damage.
3	Mar. 24, 2011	On the runway of Kumamoto Airport	Honda Airline Ltd.	JA33UK Cessna 172S (small aeroplane)	The aircraft took off from Kumamoto Airport for flight training. When the aircraft touched the runway for landing, it bounced, then, performed a go-around. After that, the aircraft landed at the airport.
4	Apr. 27, 2011	At an altitude of about 25,000 ft, about 27 nm east-southeast of Kushimoto	All Nippon Airways Co., Ltd.	JA8569 Boeing 767-300 (large aeroplane)	The aircraft took off from Miyazaki Airport for Tokyo International Airport. While flying at about 25,000 ft, about 27 nm east-southeast of Kushimoto, the aircraft encountered turbulence and one cabin attendant was seriously injured in front of the left aft lavatory. Four other passengers and cabin attendants were slightly injured. There were 119 people on board; a PIC, seven crew members and 111 passengers. The aircraft was not damaged.
5	June 12, 2011	Shinshinotsu gliding field, Shinshinotsu-mura, Ishikari-gun, Hokkaido	Private	JA2168 Sportabia SF25C (motor glider, two-seater)	The motor glider sustained damage upon landing at Shinshinotsu gliding field at the end of a familiarization flight. A captain and one passenger were on board the aircraft. The captain was seriously injured while the passenger was slightly injured. The aircraft sustained substantial damage, but there was no outbreak of fire.

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
6	July 10, 2011	Saitama Prefecture In the air, about 11,000ft above Honda Airport	Tokyo Skydiving Club	JA55DZ Cessna 208B (small aeroplane)	The aircraft took off from Honda Airport for a skydiving flight with 20 people on board, consisting of the captain, a passenger and skydivers. The 18 divers jumped out of the aircraft into the airspace over the airport and the aircraft landed at Honda Airport. After landing, the Captain inspected the aircraft and found it to be damaged. The aircraft sustained substantial damage and one skydiver was injured due to the collision with the aircraft frame.
7	July 14, 2011	Sabaekoizumi temporary helipad, Sabae-city Koizumi, Fukui Prefecture	Private	JA007J Robinson R22Beta (rotorcraft)	The aircraft rolled over and sustained damage upon landing at Sabaekoizumi temporary helipad after finishing a familiarization flight. A captain and a passenger were on board the aircraft and the captain was seriously injured while the passenger was slightly injured. The aircraft sustained substantial damage, but no fire broke out.
8	July 24, 2011	At the apron of Tajima Airport, Hyogo Prefecture	Private	JA4123 Sokata TB21 (small aeroplane)	When the aircraft was taxiing at the apron for take-off from Tajima airport, the left main landing gear was retracted. The lower surface of the left wing contacted the pavement surface, and the aircraft stopped, causing structural damage and deformation to part of the left wing. Two persons were on board the aircraft but no one was injured.
9	July 26, 2011	On the sea about 8 km east of Miho, Shimizu-ku, Shimizu-City, Shizuoka Prefecture	Private	JA22DB Extra EA300/200 (small aeroplane)	The aircraft took off from Fujikawa glider field but did not return to the field at the estimated time of arrival. A search for the aircraft found part of the airframe on the sea surface about 8 km east of Miho, Shimizu-ku, Shizuoka-City, Shizuoka Prefecture. One person on board was missing.

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
10	July 28, 2011	Over the mountains of Tsurugiyama, Memuro-cho, Kasai-gun, Hokkaido	Civil Aviation College	JA4215 Beechcraft A36 (small aeroplane)	After taking off from Obihiro Airport for training, the aircraft notified the air traffic control tower of its entry into the civil training and test airspace. Contact was lost after the aircraft sent out an automatic MAYDAY signal. A search found the aircraft crashed in the mountains of Tsurugiyama, Memuro-cho, Kasai-gun, Hokkaido. Three persons on board died while one was injured. The aircraft was destroyed and fire broke out.
11	Aug. 31, 2011	In the irrigation channel at Takahama, Ishioka-City, Ibaraki Prefecture	Private	JR1417 Sports aviation Aircraft Avenger R447L (ultralight plane, one-seater)	The aircraft with one pilot on board took off from the Chiyoda temporary airfield, Kasumigaura City, Ibaraki Prefecture. While flying for Kasumigaura, the aircraft lost engine power, causing it to contact a power distribution line and crashed into an irrigation channel at Takahama, Ishioka-City. The pilot was slightly injured.
12	Sep. 22, 2011	Hikita baseball field, Higashi-Kagawa-City, Kagawa Prefecture	Shikoku Air Service Co., Ltd.	JA6522 Eurocopter AS350B3 (Rotor craft)	The aircraft with a pilot and two employees from the power company on board took off from Takamatsu Airport to check the power line in the aftermath of Typhoon Roke(#15). During the flight, they were aware of the smell of a burnt odor and then saw white smoke inside the aircraft. So they made an emergency landing on the baseball field at Hikita, Higashi-Kagawa-City. After landing, all passengers evacuated from the aircraft and no one was injured. But the aircraft was damaged seriously by fire.

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
13	Oct. 03, 2011	On the runway of Chofu Airport	Kyoritsu Air Co., Ltd.	JA3959 Cessna TU206G (small aeroplane)	The airplane took off from Chofu Airport to take pictures of the Yatsugatake area, but returned to Chofu Airport because it was too cloudy to take any pictures. When landing, the aircraft bounced several times, and it is assumed that the aircraft had been put in the porpoise. The nose landing gear and the fuselage structure near it was damaged and the propeller tip and tail section of the fuselage came into contact with the runway. The captain and photographer on board the aircraft but no one was injured.
14	Oct. 03, 2011	Chojayashiki camp site, 1649-1 Miyagase, Kiyokawa-mura, Aiko-gun, Kanagawa Prefecture	Toho Air Service Co., Ltd.	JA508A Eurocopter AS350B3 (rotor craft)	The aircraft took off from the temporary helipad in Kiyokawa-mura, Aiko-gun, Kanagawa Prefecture for cargo shipment purposes. The tail (including the tail rotor) was damaged during the flight, causing it to crash into the Chojayashiki camp site. A fire broke out when crashed, and most of the aircraft was burst down. One person died and another was injured. The aircraft was destroyed.

(Aircraft serious incidents)

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
1	May 10, 2011	About 3 km north west of Fukuoka Airport	Japan Air Commuter Co., Ltd. (Aircraft A)	JA844C Bombardier DHC-8-402 (large aeroplane)	Aircraft A was approaching Fukuoka Airport after receiving the landing clearance from the air traffic controller. In the meantime, Aircraft B entered runway 16 via taxiway E2 after receiving the takeoff clearance. Aircraft A confirmed the landing clearance with the air traffic controller, and the controller instructed go-around to it. There were 79 persons on board the Aircraft A, consisting of PIC, three other crewmembers and 75 passengers, while 129 persons on board the Aircraft B, consisting of the PIC, seven other crewmembers and 121 passengers, but there were no dead or injured and no damage on both aircrafts.
			All Nippon Airways Co., Ltd. (Aircraft B)	JA602A Boeing 767-300 (large aeroplane)	
2	June 04, 2011	Over Okushiri Airport, Hokkaido	Hokkaido Air System Co., Ltd.	JA03HC Saab SAAB340B (large aeroplane)	The aircraft took off from Hakodate Airport and approached Okushiri Airport. But when the aircraft performed a missed approach due to a bad weather, the Ground Proximity Warning System issued a warning over Okushiri Airport. The aircraft climbed according to the warning and, headed back to Hakodate Airport and landed at the airport.
3	June 27, 2011	At an altitude of about 2,000m, about 50km southeast of Osaka International Airport	ANA Wings Co., Ltd.	JA805K Bombardier DHC-8-314 (large aeroplane)	The aircraft took off from Osaka International Airport and while climbing, abnormal sounds came from the No.1 engine and the turbine temperature exceeded the limit at about 2,000 m about 50 km southwest of Osaka International Airport. The PIC stopped the relevant engine; requested priority in air traffic control, returned to the airport and landed.

No.	Date of occurrence	Location of occurrence	Operator	Aircraft registration number and type of aircraft	Summary
4	July 08, 2011	At an altitude of about 9,200m, about 120km northwest of Tokyo International Airport	All Nippon Airways Co., Ltd.	JA8674 Boeing 767-300 (large aeroplane)	The aircraft took off from Tokyo International Airport and while climbing, abnormal sounds and vibration occurred at the No.1 engine at about 9,200m about 120km northwest of Tokyo International Airport. The PIC stopped the relevant engine; requested priority in air traffic control, returned to the airport and landed.
5	Sep. 06, 2011	At about 41,000ft pressure altitude, about 43km south of Hamamatsu-City, Shizuoka Prefecture	Air Nippon Co., Ltd.	JA16AN Boeing 737-700 (large aeroplane)	The aircraft took off from Naha airport and while flying, the PIC left his seat for a while. It is highly probable that when the PIC returned to the cockpit, the FO inadvertently operated the rudder trim control switch instead of the door switch. This caused the aircraft to have an unusual attitude, descended about 6,300 ft (about 1,900 m), and exceeding the speed limit. Two cabin attendants sustained minor injuries out of the 117 persons on board the aircraft, consisting of the PIC, FO, three cabin attendants and 112 passengers.
6	Oct. 12, 2011	On Runway A of Kansai International Airport and about 6.5km southwest of Kansai International Airport	Hawaiian Airlines (Aircraft A)	N588HA Boeing 767-300 (large aeroplane)	While an air traffic controller instructed Aircraft A, which was waiting to depart for Honolulu before Runway A, to remain waiting due to the continuous landing of several arriving aircraft, Aircraft A entered Runway A. Therefore, Aircraft B which had received the landing clearance had to perform a go-around as instructed by the air traffic controller.
			All Nippon Airways Co., Ltd. (Aircraft B)	JA8356 Boeing 767-300 (large aeroplane)	

Appendix 8 Remarks made in 2011

The JTSB provided two remarks (one for aircraft accident and the other for aircraft serious incident), summarized as follows:

1. Aircraft serious incident involving JN8776, Kawasaki Hughes OH-6D (Rotorcraft), operated by No.211 Air Training Squadron of Japan Maritime Self-Defense Force and JA4061 Cessna 172P operated by New Japan Aviation Co., Ltd.

(publicized on March 25, 2011)

Safety impeding flight maneuvers and rapid changes in aircraft attitudes and altitude executed as part of pilot training may affect the flights of other aircrafts. In addition, aircrafts passing-by might be overlooked more often than in ordinary flights. Moreover, once this sort of training starts, it may sometimes be difficult to change the heading or altitude mid-way even if other aircrafts are observed.

Based on the above, the Civil Aviation Bureau should allow training that involves such safety impeding flight maneuvers and rapid changes in aircraft attitude and altitude only in training/testing airspace that has been noticed.

For the JSDF training/testing airspace, it is also preferable that safety precautions similar to those in the civil aviation sector be applied in their training airspace, including those that are stipulated under the following acts: "Enforcement of prior coordination (Article 95-3 of Civil Aeronautics Act and Article 198-13 of Ordinance for Enforcement of the Civil Aeronautics Act)", "Obtaining of air traffic information (Article 96-2 paragraph (1) of Civil Aeronautics Act and Article 202-4 of Ordinance for Enforcement of the Civil Aeronautics Act)", "Listening of air traffic information (Article 96-2 paragraph (2) of Civil Aeronautics Act) ", and "Equipping of wireless telephone (Article 60 of Civil Aeronautics Act and Clause 3, Article 146 of Ordinance for Enforcement of the Civil Aeronautics Act) ".

2. Aircraft accident involving JA96GF, BELL 412EP (Rotorcraft), operated by Gifu Air Rescue Team

(publicized on October 28, 2011)

This accident occurred when the disaster prevention helicopter of Gifu Prefecture (hereinafter referred to as “the Aircraft”) was operating for a mountain rescue activity. Following the results of the accident investigation, points listed below are believed to have been inappropriate in terms of the operation of the Aircraft.

- In making a decision to dispatch the Aircraft, there was no provision that requires the Operation Control Manager to examine whether the dispatch of the Aircraft is appropriate or not, nor were there a provision that requires the Operation Control Manager and the Operation Control Supervisor to have professional knowledge and experience related to aviation, and a provision regarding the number of pilots aboard an aircraft to be dispatched.

- A final decision at the Disaster Prevention Aviation Center of Gifu Prefecture (hereinafter referred to as "the Center") to dispatch the Aircraft for an emergency activity had been in effect made by the captain. Therefore, the Center lacked a systematic process in which the Manager of the Center can make a decision for the dispatch after confirming an agreement from each group toward the dispatch.
- There was no clear provision between the Center and the Gifu Prefectural Police Aviation Unit regarding the division of jobs for mountain rescue activities in the Northern Alps. It is somewhat likely that the Center lacked a clear recognition about this burden sharing.
- Judging from the rescue activity and training records for the Aircraft, it is highly probable that the Center had not assumed that it would be dispatched for a rescue operation in the higher Northern Alps areas, but nevertheless, the Center dispatched the Aircraft for the rescue mission.

The urgent necessity to begin a rescue operation for the purpose of life saving as quickly as possible is fully understandable. However, many difficult factors are involved in rescue activities in Higher Mountainous Areas by helicopter. Therefore, in order to prevent subsequent accidents and ensure safety in such activities, efforts must be made not only to acquire high levels of techniques for helicopter operations and rescue activities but also to establish a safety management system under which the dispatch of a helicopter can be decided in a swift and appropriate manner.

Consequently local governments which use helicopters for rescue activities, while keeping in mind the points above, are strongly desired to review their own safety management systems, rules and other related matters to ensure the safety of helicopter operations. It is also desirable that the Fire and Disaster Management Agency, which has given recommendations to local governments up until now, will do so regarding their review.

Appendix 9 Information provision during an investigation in 2011

There were two cases (one for aircraft accident and the other for aircraft serious incident) of information provision in 2011, which are summarized below:

1. Aircraft serious incident involving Saab SAAB340B operated by Hokkaido Air System Co., Ltd.

(provided on September 22, 2011)

The JTSB provided the following information on a serious incident "emergency operation (ground proximity) involving a Saab SAAB340B, operated by Hokkaido Air System Co., Ltd., occurred on June 4, 2011, to the Civil Aviation Bureau of Ministry of Land, Infrastructure, Transport and Tourism. Information on the following two points was provided.

(1) It is possible that when the go-around switch is pressed without setting the missed approach altitude in APA, the mode in the vertical direction may not have changed to the go-around mode.

It is therefore critical to set the appropriate missed approach altitude in APA first before commencing operation.

(2) If the APA altitude setting is changed with the vertical mode in the ALTS Capture mode, the vertical mode is changed to the VS mode.

If the VS mode is engaged with the Autopilot System ON during descent, the aircraft will control to maintain the rate of descent at that time and continue descending.

When the APA altitude setting is changed in the ALTS Capture mode, attention must be paid to the change in the mode.

2. Aircraft accident involving Beechcraft A36 operated by Civil Aviation College

(provided on September 22, 2011)

The JTSB provided the following information on a crash accident involving a Beechcraft A36, operated by Civil Aviation College, occurred on July 28 2011, to the Civil Aviation Bureau of Ministry of Land, Infrastructure, Transport and Tourism.

The latest investigation results revealed the following issues on the captain's aviation medical examination.

(1) The captain's regular medicine

A hospital in Obihiro has prescribed the captain "ONON 112.5mg", a leukotriene receptor antagonist, to treat his allergic rhinitis. The captain has been taking a total of four capsules a day, two in the morning and evening each.

(2) Issuance of Class 1 Aviation Medical Certificate to the captain

When applying for the Medical Certificate, the captain indicated that he was taking ONON on a regular basis when he submitted his application form on January 24, 2011. He subsequently underwent a medical examination conducted by a designated doctor at Obihiro Kosei Hospital which is run by the Federation of Agricultural Cooperation Associations in Hokkaido. The captain was judged to have conformed to the requirements on January 31 of the same year, and the medical certificate was then issued.

Appendix 10 Railway accidents and serious incidents to be investigated

<Railway accidents to be investigated>

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

The term "Railway Accident" as used in this Act shall mean a serious accident prescribed by the Ordinance of Ministry of Land, Infrastructure, Transport and Tourism among those of the following kinds of accidents; an accident that occurs during the operation of trains or vehicles as provided in Article 19 of the Railway Business Act, collision or fire involving trains or any other accidents that occur during the operation of trains or vehicles on a dedicated railway, collision or fire involving vehicles or any other accidents that occur during the operation of vehicles on a tramway.

◎ Article 1 of Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (Serious accidents prescribed by the Ordinance of Ministry of Land, Infrastructure, Transport and Tourism, stipulated in paragraph 3, Article 2 of the Act for Establishment of the Japan Transport Safety Board)

1. The accidents specified in items 1 to 3 inclusive of paragraph 1 of Article 3 of the Ordinance on Report on Railway Accidents, etc. (the Ordinance);
2. From among the accidents specified in items 4 to 6 inclusive of paragraph 1 of Article 3 of the Ordinance, that which falls under any of the following sub-items:
   (a) an accident involving any passenger, crew, etc. killed;
   (b) an accident involving five or more persons killed or injured;
   (c) an accident found to be likely to have been caused owing to a railway officer's error in handling or owing to malfunction, injury, destruction, etc. of the vehicles or railway facilities, which resulted in the death of any person;
3. The accidents specified in items 4 to 7 inclusive of paragraph 1, Article 3 of the Ordinance which are found to be particularly rare and exceptional;
4. The accidents equivalent to those specified in items 1 to 7 inclusive of paragraph 1, Article 3 of the Ordinance which have occurred relevant to dedicated railways and which are found to be particularly rare and exceptional; and
5. The accidents equivalent to those specified in items 1 to 3 inclusive which have occurred relevant to a tramway, as specified by a public notice issued by the Japan Transport Safety Board.

[Reference] The accidents listed in each of the items of paragraph 1, Article 3 of the Ordinance on Reporting on Railway Accidents, etc.

Item 1: Train collision

Item 2: Train derailment
Item 3: Train fire
Item 4: Level crossing accident
Item 5: Accident against road traffic
Item 6: Other accidents with casualties
Item 7: Heavy property loss without casualties

◎ Article 1 of the Public Notice of the Japan Transport Safety Board (Accidents specified by the public notice stipulated in item 5, Article 1 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board)

1. From among the accidents specified in items 1 to 6 inclusive of paragraph 1 of Article 1 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), that which falls under any of the following sub-items:
   (a) an accident that causes the death of a passenger, crewmember, etc.;
   (b) an accident that causes five or more casualties;
2. The accidents specified in items 1 to 7 inclusive of paragraph 1 Article 1 of the Ordinance which are found to be particularly rare and exceptional; and
3. From among the accidents occurring on a tramway operated under the application of the Ministerial Ordinances to Provide Technical Regulatory Standards Railways mutatis mutandis as specified in paragraph 1 of Article 3 of the Ordinance on Tramway Operations, the accidents equivalent to those specified in items 1 to 3 of Article 1 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

[Reference] The accidents specified in the items of paragraph 1, Article 1 of the Ordinance on Reporting on Tramway Accidents, etc.

Item 1: Vehicle collision
Item 2: Vehicle derailment
Item 3: Vehicle fire
Item 4: Level crossing accident
Item 5: Accidents against road traffic
Item 6: Other accidents with casualties
Item 7: Heavy property loss without casualties

Railway accidents to be investigated

<table>
<tr><th>Category</th><th>Train collision</th><th>Train derailment</th><th>Train fire</th><th>Level crossing accident</th><th>Accident against road traffic</th><th>Other accidents with casualties</th><th>Heavy property loss without casualties</th></tr>
<tr><td rowspan="2">Railway (including tramway operated as equivalent to railway)

[Notice 1-3]</td><td colspan="3" rowspan="2">All accidents
(These refer to train accidents and do not include vehicle accidents on railways.*1)
[Ordinance 1-1]</td><td colspan="3">・Accidents involving the death of a passenger, crew member, etc.
・Accidents involving five or more casualties
・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 1-2]</td><td></td></tr>
<tr><td colspan="4">Accidents that are particularly rare and exceptional [Ordinance 1-3]</td></tr>
<tr><td>Dedicated railway</td><td colspan="7">Accidents that are particularly rare and exceptional [Ordinance 1-4]</td></tr>
<tr><td rowspan="2">Tramway
[Ordinance 1-5]</td><td colspan="6">Accidents involving the death of a passenger, crewmember, etc., and accidents involving five or more casualties
[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: Among vehicle collisions, derailments, and fires on railways, accidents that fall under the category of level crossing accident, accidents against road traffics , or other accidents with casualties and which involve the death of a passenger, crewmember, etc. [Ordinance 1-2] or which are particularly rare and exceptional [Ordinance 1-3] are to be investigated.

(Note) "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 paragraph numbers.

< Railway serious incidents to be investigated>

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

A situation, prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism (Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board), deemed to bear a risk of accident occurrence.

◎ **Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board** (A situation prescribed by the Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism, stipulated in item 2, paragraph 4, Article 2 of the Act for Establishment of the Japan Transport Safety Board.)

1. The situation specified in item 1 of paragraph 1 of Article 4 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), wherein another train or vehicle had existed in the zone specified in said item;
   [A situation where a train starts moving for the purpose of operating in the relevant block section before completion of the block procedure: Referred to as "Incorrect management of safety block."]
2. The situation specified in item 2 of paragraph 1 of Article 4 of the Ordinance, wherein a train had entered into the route as specified in said item;
   [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: Referred to as "Incorrect indication of signal."]
3. The situation specified in item 3 of paragraph 1 of Article 4 of the Ordinance, wherein another train or vehicle had entered into the protected area of the signal which protects the zone of the route as specified in said item;
   [A situation where a train proceeds regardless of a stop signal, thereby obstructing the route of another train or vehicle: Referred to as "Violating red signal."]
4. The situation specified in item 7 of paragraph 1 of Article 4 of the Ordinance, which caused malfunction, injury, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train;
   [A situation that causes a malfunction, etc., of facilities: Referred to as "Dangerous damage in facilities."]
5. The situation specified in item 8 of paragraph 1 of Article 4 the Ordinance, which caused malfunction, injury, destruction, etc. bearing particularly serious risk of collision or derailment of or fire in a train;
   [A situation that causes a malfunction, etc., of a vehicle: Referred to as "Dangerous trouble in vehicle."]
6. The situation specified in items 1 to 10 inclusive of paragraph 1 of Article 4 of the

Ordinance which is found to be particularly rare and exceptional; and

[These are referred to as: item 4 “Main track overrun”; item 5 “Violating closure section for construction”; item 6 “vehicle derailment”; item 9 “Heavy leakage of dangerous object”; and item 10 “others,” respectively.]

7. The situations occurred relevant to the tramway as specified by a public notice of the Japan Transport Safety Board as being equivalent to the situations specified in the in preceding items.

◎ Article 2 of the Public Notice of the Japan Transport Safety Board

(A situation prescribed by the public notice stipulated in item 7, Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board (Serious incident on a tramway))

1. The situation specified in item 1 of Article 2 of the Ordinance on Reporting on Tramway Accidents, etc. (the Ordinance), wherein another vehicle operating on the main track had existed in the zone specified in said item;

   [A situation where a vehicle is operating on the main track for the purpose of operating in the relevant safety zone before the completion of safety system procedures: Referred to as “Incorrect management of safety block.”]

2. The situation specified in item 4 of Article 2 of the Ordinance, which caused malfunction, injury, destruction, etc., bearing a particularly serious risk of collision, derailment of or fire in a vehicle operating on the main track;

   [A situation that causes a malfunction, etc., of facilities: Referred to as “Dangerous damage in facilities.”]

3. The situation specified in item 5 of Article 2 of the Ordinance, which caused malfunction, injury, destruction, etc., bearing a particularly serious risk of collision, derailment of or fire in a vehicle operating on the main track;

   [A situation that causes a malfunction, etc., of a vehicle: Referred to as “Dangerous trouble in vehicle.”]

4. The situation specified in items 1 to 7 inclusive of Article 2 of the Ordinance which is found to be particularly rare and exceptional; and

   [These are referred to as: item 2 “Violating red signal;” item 3 “Main track overrun;” item 6 “Heavy leakage of dangerous object;” and item 7 “others,” respectively.]

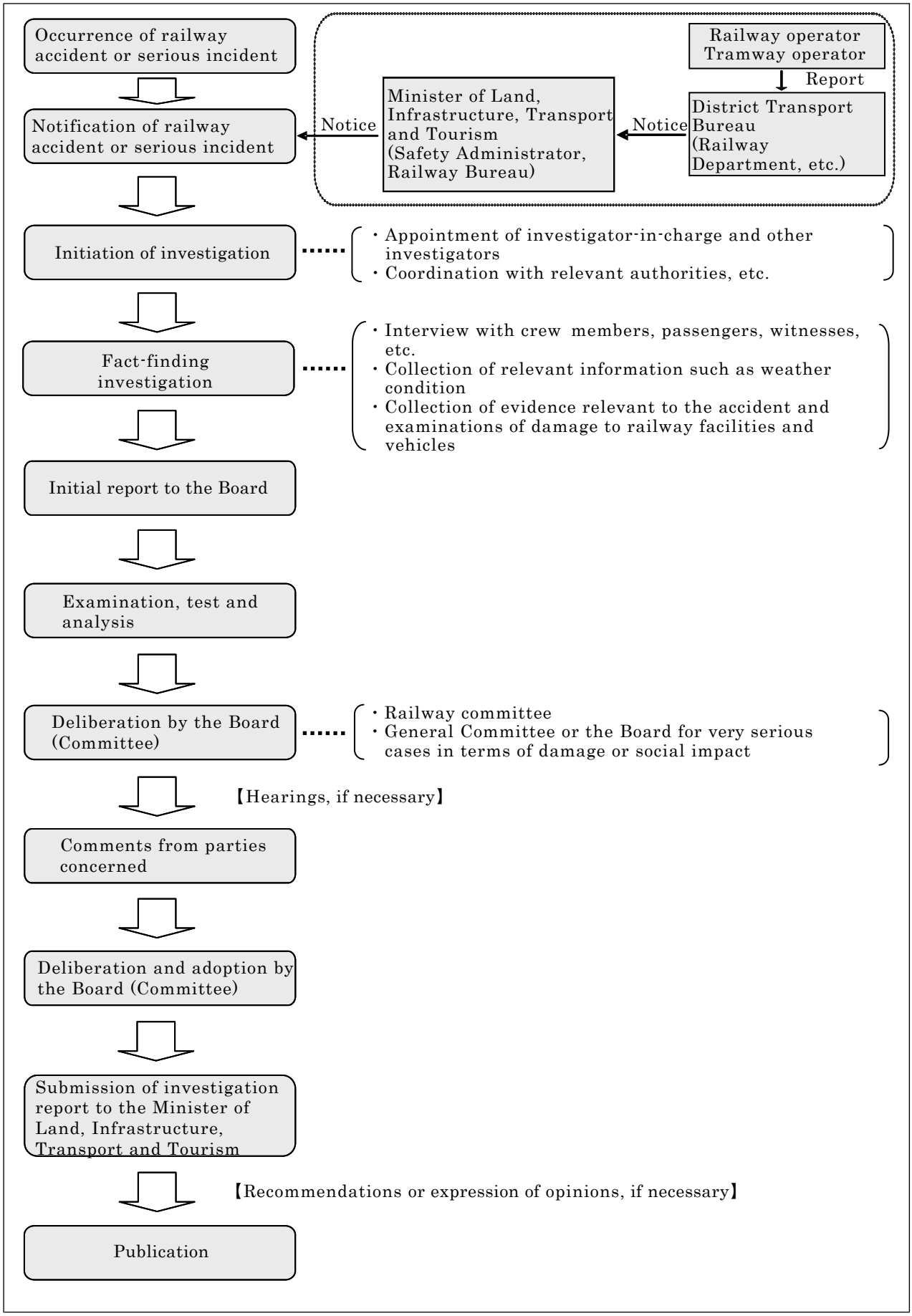
5. From among the situations occurring on a tramway operated under the application of the Ministerial Ordinances to Provide Technical Regulatory Standards Railways mutatis mutandis as specified in paragraph 1 of Article 3 of the Ordinance on Tramway Operations, the situations equivalent to those specified in items 1 to 6 of Article 2 of the Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board.

Serious incidents to be investigated

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

(Note) “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 paragraph numbers.

Appendix 11　Procedure of railway accident/incident investigation



Appendix 12 Number of occurrence by type (railway accidents)

(Cases)

Year of occurrence \ Type	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
Total	5	131	9	12	0	8	2	1	4	0	0	2	0	0	174

(Notes) 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.

Appendix 13 Number of occurrence by type (railway serious incidents)

(Cases)

Year of occurrence \ Type	Railway										Tramway							Total
	Incorrect management of safety block	Incorrect indication of signal	Violating red signal	Main track overrun	Violating closure section for construction	Vehicle derailment	Dangerous damage in facilities	Dangerous trouble in vehicle	Heavy leakage of dangerous object	Others	Incorrect management of safety block	Violating red signal	Main track overrun	Dangerous damage in facilities	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
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
Total	1	7	0	0	5	1	1	16	0	1	1	1	0	0	0	0	0	34

(Notes) 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.

Appendix 14 Summary of railway accidents and serious incidents in 2011

The summary is based on the information at the time of launching investigation and may be modified as the investigations or deliberations progress.

(Railway accidents)

No.	Date of occurrence	Operator	Line section	Type	Summary
1	Jan. 01, 2011	West Japan Railway Company	Between Higashiyama Koen and Houkidaisen Stations, San-in Line, Tottori Prefecture	Train derailment	The up-going single-car snow plow train left the Yonago Station behind schedule to rescue a limited express train that had stopped due to fallen trees between Shimoichi and Mikuriya Stations. When the driver was operating the snow plow train by power running at about 10 km/h between Higashiyama Koen and Houkidaisen Stations, he saw a stop signal indicated on the obstruction warning indicator at a Level crossing, and stopped the train before the indicator. Then, he tried to advance the train closer to the Level crossing in order to confirm the safety at the Level crossing, but the train did not move. When the snow removal crew who were on board to rescue the limited express train removed the snow from around the plow head, they found that the first axle of the head was derailed to the left. The driver and four snow removal crew members were on board the train, but there were no deaths or injuries.
2	Jan. 27, 2011	West Japan Railway Company	On the premises of Nagahara Station, Kosei Line, Shiga Prefecture	Train derailment	The down-going 8-car train arrived at Nagahara Station almost on schedule. When the train arrived, there was a snow bank on the rails at the train stop position target, so the driver stopped the train before the target. Then, the driver started up the train to depart on time and shuttle back to Kyoto Station, but the train did not move. He reported the situation to the traffic control center. When the personnel who were contacted by the center arrived and removed snow from the train, it was found that the two axles of the 8th (rearmost) car's rear truck were derailed to the left. Four passengers and two crew members were on board the train, but there were no deaths or injuries.

No.	Date of occurrence	Operator	Line section	Type	Summary
3	Feb. 01, 2011	East Japan Railway Company	Between Morimiyanohara and Ashidaki Stations, Iiyama Line, Niigata Prefecture	Level crossing accident	The down-going single-car local train left Morimiyanohara Station behind schedule. When the train was coasting at a speed of about 60 km/h, the driver of the train noticed a small truck approaching the Oonehara Level crossing from the left. The driver immediately applied the emergency brake and blew the horn, but it was too late. The train struck the truck and came to a halt at about 75 meters past the Level crossing. Seven passengers, one driver, and two trackmen were on board the train, but there were no deaths or injuries on the part of the train. The only person in the truck was the driver, who was killed in the accident. The train suffered damage to the bottom cover plate, but did not derail. The truck was severely damaged but no fire occurred.
4	Mar. 10, 2011	Japan Freight Railway Company	Between Kuzumi and Namegawa Stations, Narita Line, Chiba Prefecture	Train derailment	The down-going 10-car train passed Kuzumi Station on time. When the driver let the train coast onto the premises of Namegawa Station, the train's emergency brake operated and the train stopped on the premises of the station. As the emergency brake could not be released after the train stopped, the train was inspected on the orders of the traffic control center. It was found that the train's 8th and 9th freight cars were separated from each other, that the 9th freight car had derailed and tipped over to the left, and that the 10th freight car was derailed to the right. The train was scheduled to pass an up-going passenger train at that station. There were marks on the sleepers, etc., indicating that the train was running with derailed cars before it had entered the station. One driver was on board the train, but there were no injuries.
5	Mar. 11, 2011	East Japan Railway Company	On the premises of Sendai Station, Tohoku Shinkansen Line, Miyagi Prefecture	Train derailment	When the train was entering Sendai Station, the driver felt a strong shaking and the cab signal indicated a stop signal. The driver immediately applied the emergency brake to stop the train. When the train was checked after stopping, it was found that the two axles of the front truck of the 4th car from the front were derailed.
6	Mar. 11, 2011	Japan Freight Railway Company	Between Hamayoshida and Yamashita Stations, Joban Line, Miyagi Prefecture	Train derailment	When the train was running between Hamayoshida and Yamashita Stations, the train protection radio issued a warning signal. The driver of the train felt a strong shaking while he was stopping the train. Then, several tsunami waves struck the train. The driver checked the rear of the train and found that some of the freight cars had derailed and washed away.

No.	Date of occurrence	Operator	Line section	Type	Summary
7	Mar. 11, 2011	Japan Freight Railway Company	On the premises of Nagamachi Station, Tohoku Line, Miyagi Prefecture	Train derailment	The up-going 21-car high-speed freight train left Miyagino Station on time. When the train was passing Nagamachi Station at a speed of about 45 km/h, the train protection radio issued a warning signal and an emergency stop order was received. At the same time, the driver of the train felt a shaking. He stopped the train using the service brake. After that, he inspected the train on an order from the traffic control center. It was found that the second axle of the 14th freight car's front truck was derailed to the right. One driver was on board the train, but there were no injuries.
8	May 27, 2011	Hokkaido Railway Company	In the No. 1 Niniu Tunnel on the premises of Seifuzan Signal Station (between Shin-Yubari and Shimukappu Stations), Sekisho Line, Hokkaido	Train derailment	When the train was running near Seifuzan Signal Station, the driver received a call from the conductor who had heard an abnormal sound and felt a vibration in the conductor's room in the 4th car. The driver immediately carried out the emergency stop procedure. The train stopped inside the No. 1 Niniu Tunnel and white smoke billowed from the train, forcing the 248 passengers, one driver, one conductor and two cabin crewmembers to escape from the tunnel on foot. One axle of the 5th car's rear truck was derailed, and all six cars were burnt. Seventy-eight passengers and one crewmember were injured.
9	Jun. 17, 2011	Nishi-Nippon Railroad Co., Ltd.	Between Shimoori and Tofuromae Stations, Tenjin-Omuta Line, Fukuoka Prefecture	Other accidents with casualties	While the train was running, a hole opened up in the roof near the pantograph on the 3rd car from the front of the train and molten metal spattered inside the car. One passenger was injured.
10	Jul. 14, 2011	East Japan Railway Company	On the premises of Tokuzawa Station, Ban'etsu Saisen Line, Fukushima Prefecture	Train derailment	The up-going 3-car local train left Kanose Station on time. When the train was coasting in the Nishikawa tunnel on the premises of Tokuzawa Station at about 35 km/h, the driver of the train noticed a chunk of rock between the rails at about 27 meters ahead of the tunnel's exit. He immediately applied the emergency brake, but it was too late and the train ran onto the rock. Both axles of the first car's front truck were derailed to the right and both axles of the rear truck were derailed to the left. Twelve passengers and two crew members (driver and conductor) were on board the train, but there were no injuries.

No.	Date of occurrence	Operator	Line section	Type	Summary
11	Nov. 01, 2011	Chichibu Railway Co., Ltd.	Between Higuchi and Nogami Stations, Chichibu Honsen Line, Saitama Prefecture	Train derailment	After leaving Nogami Station, at around the exit of the right curve, the driver of the train noticed a dump truck at Higuchi #3 Level crossing. He immediately applied the emergency brake and blew the horn, but it was too late. The train struck the dump truck. The two axles of the front car's front truck were derailed to the right and the two axles of the rear truck were derailed to the left. The dump truck almost tipped over. Four passengers and one driver on board the train were injured.
12	Nov. 29, 2011	West Japan Railway Company	Between Kaga Onsen and Daishoji Stations, Hokuriku Line, Ishikawa Prefecture	Train derailment	The driver of the train noticed an automobile at the Shinkannami Level crossing. He immediately applied the emergency brake, but it was too late. The train struck the passenger car, and stopped after traveling about 300 meters. The front axle of the front car's front truck was derailed to the left. About ninety passengers, one driver and three conductors were on board the train, but there were no injuries.
13	Dec. 24, 2011	Seibu Railway Co., Ltd.	On the premises of Higashi-murayama Station, Seibuen Line, Tokyo	Train derailment	The train left Seibuen Station on time. Around when the train passed turnout #66 where the line crosses the down-going Shinjuku Line, the driver felt as if the train were being pulled backward. When he looked at the instrument panel, the door closure light momentarily went out, so he carried out the emergency stop procedure. When the train was inspected after stopping, it was found that the first and second axles of truck #1 of the second car from the end were derailed to the right. About 450 passengers and two crewmembers were on board the train, but there were no injuries.
14	Dec. 27, 2011	Japan Freight Railway Company	On the premises of Gifu Kamotsu Terminal Station, Tokaido Line, Gifu Prefecture	Train derailment	At Gifu Kamotsu Terminal Station, loading/unloading of containers was performed on the 10th to 14th freight cars from the front of the train. After completion of the loading/unloading work, the driver of the train operated the power running handle to the 1st through 4th notch, and then to the serial position. When the train was running at about 30 km/h, the emergency brake operated and the train stopped. The train was separated between the 12th and 13th cars. The two axles of the 12th car's rear truck and the two axles of the 13th car's front truck were derailed by about 1 meter to the left.

(Railway serious incident)

No.	Date of Occurrence	Operator	Line Section	Type	Summary
1	Jun. 15, 2011	Hokkaido Railway Company	On the premises of Oiwake Station, Sekisho Line, Hokkaido	Dangerous damage in facilities	A train started to leave Oiwake Station with the "Go" indication on the departure signal. When the train passed the departure signal, an official noticed that the signal was still showing the "Go" indication when it should have changed to the "Stop" indication.
2	Aug. 09, 2011	Tenryu Hamanako Railroad Co., Ltd.	Between Hamamatsu Daigaku-mae and Miyakoda Stations, Tenryu-Hamanako Line, Shizuoka Prefecture	Danderous trouble in vehicle	When the train was braking to stop at Miyakoda Station, the door at the right front side of the vehicle opened. The driver therefore stopped the train when the rear end of the vehicle reached the platform. The train was inspected after stopping and it was found that the right front door was fully opened. After that, on the orders of the traffic control center, the train operation was continued with all doors locked, and the vehicle was exchanged at Tenryu Futamata Station. More than ten passengers were on board the train, but there were no injuries due to falling, etc.

Appendix 15　Remarks made in 2011

The JTSB provided two remarks (two for railway serious incident), summarized as follows:

1. Railway serious incident (Incorrect management of safety block) between Oura Kaigan-dori and Oura Tenshudo-shita Stops on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd.

(publicized on August 29, 2011)

It is highly probable that this serious incident occurred because, at the single track section where the Tablet and ticket block system was in place, the driver of Tram No. 1505 did not check for a tablet and started moving his tram into the single track section despite the fact that Tram No. 1203 was already in that section.

As it is somewhat likely that one of the factors behind this serious incident was the limitations of the operation facilities between Kaigan-dori and Ishibashi Stops and its influence on the behavior and mentality of the drivers and tablet system staffs, it is desirable that the following actions be taken with regard to the improvement of the operation facilities.

1. Consideration of measures to prevent similar incidents by improving facilities
   (1) Consideration of the feasibility of facilities improvements including changing the signal cycle, introduction of tram interchange facilities, tram turning facilities at Kaigan-dori Stop.
   (2) Consideration of the introduction of a device that indicates the presence of a tram in a single track section and a communication means that allows direct communication between drivers or tablet system staffs and traffic controllers.
2. Support and cooperation from local public bodies and other relevant government authorities and others

   Support and cooperation from local public bodies and other relevant government authorities as required from the stage at which the Company starts considering facilities improvements.

2. Railway serious incident (Incorrect management of safety block) on the premises of Kadoma-minami Station on Line 7 (Nagahori Tsurumi-ryokuchi Line) of the Osaka Municipal Transportation Bureau

(publicized on October 17, 2011)

As a number of inappropriate practices concerning actions and procedures in the event of an abnormal situation were revealed in this serious incident, it is probable that personnel related to the operation in the line section concerned failed to take sufficient measures to cope with the abnormal situation. In addition, it is somewhat likely that a safety management system for coping with abnormal situations was not well established at the Bureau.

For this reason, it is desirable that, in order to prevent similar serious incidents from occurring again, the Bureau should improve its safety management system to cope with abnormal situations by enhancing and thoroughly implementing education and training so that all personnel related to operation are capable of taking the appropriate action in the event of an abnormal situation. At the same time, it is desirable to review the measures against abnormal situations by taking into full consideration the workings of the systems related to train operations such as automatic train operation, automatic train protection and programmed traffic control.

Appendix 16　Actions taken in response to recommendations in 2011

Actions taken in response to recommendations were reported with regard to one railway serious incident in 2011. Summary of this report is as follows:

- Railway serious incident (Incorrect management of safety block) between Oura Kaigan-dori and Oura Tenshudo-shita tram Stops on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd.

(recommended on September 30, 2011)

As a result of the investigation of a railway serious incident that occurred between Oura Kaigan-dori and Oura Tenshudo-shita tram Stops on the Oura Branch Line of Nagasaki Electric Tramway Co., Ltd. on October 21, 2010, the JTSB published an investigation report and made recommendations to the Company as one of the parties relevant to the cause of the accident, on September 30, 2011. The Board received the following report on the implementation status of measures (implementation plan) in response to the recommendations:

<Summary of accident>

On October 21 (Thursday), 2010, at about 14:15, when the tablet and ticket system was in place in a single track section between Oura Kaigan-dori and Oura Tenshudo-shita tram Stops, the driver of tram No. 1505 started the tram from Oura Kaigan-dori tram Stop after confirming that tram No. 503 had come out of the single track section. When the driver stopped the tram at the stop line for the track leading to Ishibashi at the Matsugaebashi intersection, he saw that a 1-car tram, No. 1203 from Ishibashi Stop bound for Hotarujaya tram Stop, was stopped at No.1 stop line at the Matsugaebashi intersection. At this time, the distance between tram No. 1505 and tram No. 1203 was about 46 m.

Subsequently, upon orders from a staff dispatched to Oura Kaigan-dori tram Stop for operating the tablet and ticket system, tram No. 1203 backed up to Ishibashi tram Stop, and then tram No. 1505 continued to Ishibashi tram Stop.

< Recommendations made by the JTSB and the status of measures taken in response to the recommendations>

1. Recommendations made by the JTSB

Based on the results of the investigation into this serious incident, the JTSB issues the following recommendations to Nagasaki Electric Tramway Co., Ltd. pursuant to paragraph 1, Article 27 of the Act for Establishment of the Japan Transport Safety

Board in order to ensure transportation safety:

1. Concerning the education on regulations, standards, etc.

1) Examine whether the work standards, etc., related to the operation of the safety system are appropriate and check the actual state of the operators including their response capability, etc.

2) Conduct appropriate education and training for the relevant employees, and periodically and continuously check the progress level to ensure that the education and training are put into practice.

3) Ensure that the relevant employees thoroughly understand and comply with the regulations, internal standards, etc.

2. Concerning the enhancement of the safety management system and the promotion of effective measures

1) Verify the effectiveness of current measures for safety management, and abolish or review systems and/or measures that are no longer effective.

2) Review the safety management system driven by the head office, and implement measures to establish an organization where field personnel are motivated to learn and make improvements on their own without ignoring problems.

2. Status of measures (implementation plan) taken in response to recommendations, reported by Nagasaki Electric Tramway Co., Ltd. (December 14, 2011) (The Summary and Causes sections of the plan are omitted.*)

1. Concerning the education on regulations, standards, etc.

1) Examine whether the work standards, etc., related to the operation of the safety system are appropriate and check the actual state of the operators including their response capability, etc.

[Actions]

Since the implementation of the safety system (safety blocks) related to the work standards is not beyond the adaptation level of staffs, we will review the contents and method of education and work to raise awareness among training-course participants.

Specifically, we will pursue a bottom-up approach by a questioning method instead of one-way teaching and guidance, and also work to create an environment where trainers and training-course participants can exchange opinions on the safety system(safety blocks) by having participants describe the procedures of the safety system(safety blocks).

In addition, we will create a tablet and ticket system operation manual and training method implementation manual (with details specified) to supplement the work standards, and implement sufficient education to ensure that procedures do not

differ among staffs.

2) Conduct appropriate education and training for the relevant employees, and periodically and continuously check the progress level to ensure that the education and training are put into practice.

[Actions]

To check the progress level of staffs, we will conduct yearly education for personnel and individual interview-type education.

For other training workshops, we will create an annual training plan and establish the basic training contents, and continuously implement the basic training items.

We will make sure that the level of understanding is checked through written tests, etc., after conducting a training workshop so that workshops will not become merely a formality.

In addition, we will have an examiner on board a train for each crewmember twice a year to check if the contents of education and training are understood and put into practice in the field.

Furthermore, we will review the check sheet items used by examiners on board a train to make sure that the basic actions are consistently and correctly performed.

3) Ensure that the relevant employees thoroughly understand and comply with the regulations, internal standards, etc.

[Actions]

In biannual training workshops, we will make sure that our employees fully understand the meaning of laws, regulations, etc., using past cases of accidents as references in order to raise awareness of what is required to fulfill their duties.

To alleviate the pressure on drivers from passengers and reduce the mental burden on drivers during the wait time at Oura Kaigan-dori tram Stop when the tablet and ticket system is under operation, we will instruct station personnel at Oura Tenshudo-shita tram Stop to collect fares at the center door (or rear door) when the tablet and ticket system is in operation so that the stopping time is reduced and the time required to operate in the single track section is reduced. Also, in terms of facilities, we have provided a traffic signal control button at the end of the up-going Oura Kaigan-dori tram Stop (by installing a control box) so that the signal for trams (proceed signal) can be indicated by field staffs in addition to trolley contactor control, thus eliminating wasted time due to traffic signals.

By taking these measures, we are working to ensure smooth operation when the tablet and ticket system is in operation.

In addition, with regard to the change in operation procedures due to the relocation of the tram signal and the elimination of the confirmation stop signal for tram, which are some of the facilities measures at Oura Kaigan-dori tram Stop, we will conduct individual-based education to raise staff awareness of compliance.

Furthermore, in order to confirm that safe operation practices are followed, we will utilize the eyes of passengers who make daily contact with crewmembers. To this end, we have installed a customer survey box. Based on this information, we will educate the crewmembers on compliance and pursue the enhancement of their capabilities.

2. Concerning the enhancement of the safety management system and the promotion of effective measures

1) Verify the effectiveness of current measures for safety management, and abolish or review systems and/or measures that are no longer effective.

[Actions]

In order to foster a safety culture, we will encourage field personnel to actively participate in their respective management systems, including making suggestions. In addition to this approach for familiarizing all employees with various measures, we will work to eliminate the gap in safety awareness between management and field personnel.

In addition, we have examined the effectiveness of each of the measures, and eliminated or reviewed them as required. As a result, we now hold an accident prevention workshop every two months for the purpose of investigating the factors and causes of accidents by focusing on the persons whose actions resulted in an accident, as well as enhancing the awareness of defensive operation.

Furthermore, in order to improve safety when the safety system(safety blocks) is in operation, we will install a monitoring system at Oura Kaigan-dori tram Stop and take necessary measures so that the presence of a tram in the single track section can be confirmed.

2) Review the safety management system driven by the head office, and implement measures to establish an organization where field personnel are motivated to learn and make improvements on their own without ignoring problems.

[Actions]

To establish a system where drivers ask themselves, “Why is it so?” we will hold a drivers-only meeting every two months, thereby enhancing their awareness of compliance and safety and improving our corporate culture. In addition, we will have the field management staff recognize and review the themes and results of these

meetings, in order to help create future education policies and improve communication among management staff.

With regard to operation in cases of abnormal situations, we will conduct education and training for developing the necessary knowledge and judgment capability of the staffs, and create an environment where staffs and drivers feel free to point out erroneous operation to each other.

Implementation plan regarding measures to be taken

Recommendations	Specific actions	Completion report (deadline)
1-(1)	1. Implement safety system (safety blocks) education in training workshops. 2. Review the tablet and ticket system operation manual. 3. Create a training method implementation manual.	1. To be reported from Oct. 2010 to Dec. 2012 2. To be reported in May 2012 3. To be reported in May 2012
1-(2)	1. Hold training workshops by creating an annual training plan. 2. Carry out written tests, etc., to check the level of understanding. 3. Conduct personnel training workshops and individual interviews to check the progress level. 4. Have an examiner on board a tram for each crewmember twice a year. 5. Review the check sheet used by examiners on board.	1. To be reported from Apr. 2011 to Dec. 2012 2. To be reported from Oct. 2010 to Dec. 2012 3. To be reported from Apr. 2011 to Dec. 2012 4. To be reported in Dec. 2012 5. To be completed in Aug. 2011 To be reported in May 2012
1-(3)	1. Conduct a survey of customers 2. Implement education based on past accident cases at regular training workshops 3. Conduct individual-based education for the operation procedure that was changed due to the relocation of the Oura block signal and the elimination of the confirmation stop signal for tram.	1. To be reported from Oct. 2010 to Dec. 2012 2. To be reported from Dec. 2011 to Dec. 2012 3. To be reported in May 2012

2-(1)	1. Participation of field personnel in the near-accident review committee and accident prevention committee. 2. Establish an accident prevention workshop by elimination or review of various measures. 3. Install a monitoring system at Oura Kaigan-dori tram Stop.	1. To be reported from Apr. 2011 to Dec. 2012 2. To be reported from Apr. 2011 to Dec. 2012 3. To be implemented in Jan. 2012 To be reported in May 2012
2-(2)	1. Conduct safety meetings 2. Conduct operation training in cases of abnormal situations.	1. To be reported from Sep. 2011 to Dec. 2012 2. To be reported in Dec. 2012

Appendix 17 Information provision during an investigation in 2011

There was one case (for railway accident) of information provision in 2011, which is summarized below:

- Other accidents with casualties at Maiko Station on the Sanyo Line of West Japan Railway Company

(provided on November 15, 2011)

The JTSB provided the Railway Bureau, Ministry of Land, Infrastructure, Transport and Tourism with the following information on Other accidents with casualties that occurred at Maiko Station on the Sanyo Line of West Japan Railway Company on December 17, 2010:

(Information):

At Maiko Station on the Sanyo Line, where this incident occurred, emergency buttons are installed on the platform to alert station staff and the entering train about abnormal conditions. If an emergency button is pressed, the emergency alarm light for restraining an entering train flashes, the yellow rotating light closest to the emergency button comes on, and the buzzer sounds.

In the case of this accident, the emergency button was pressed immediately after a train started, and the above devices operated normally. However, no staff were posted to the platform at that station, and the yellow rotating light and the sound of the buzzer did not convey the fact to the train crewmembers that the emergency button was pressed, and thus the system failed to immediately stop the starting train.

Appendix 18　Marine accidents and incidents to be investigated

<Marine accidents to be investigated>

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

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

1. Damage to a ship or facilities other than a ship related to the operations of a ship.
2. Death or injury of the people concerned with the construction, equipment or operation of a ship.

<Marine incidents to be investigated>

◎ **Item2, paragraph 6, Article 2 of the Act for Establishment of the Japan Transport Safety Board** (Definition of marine incident)

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

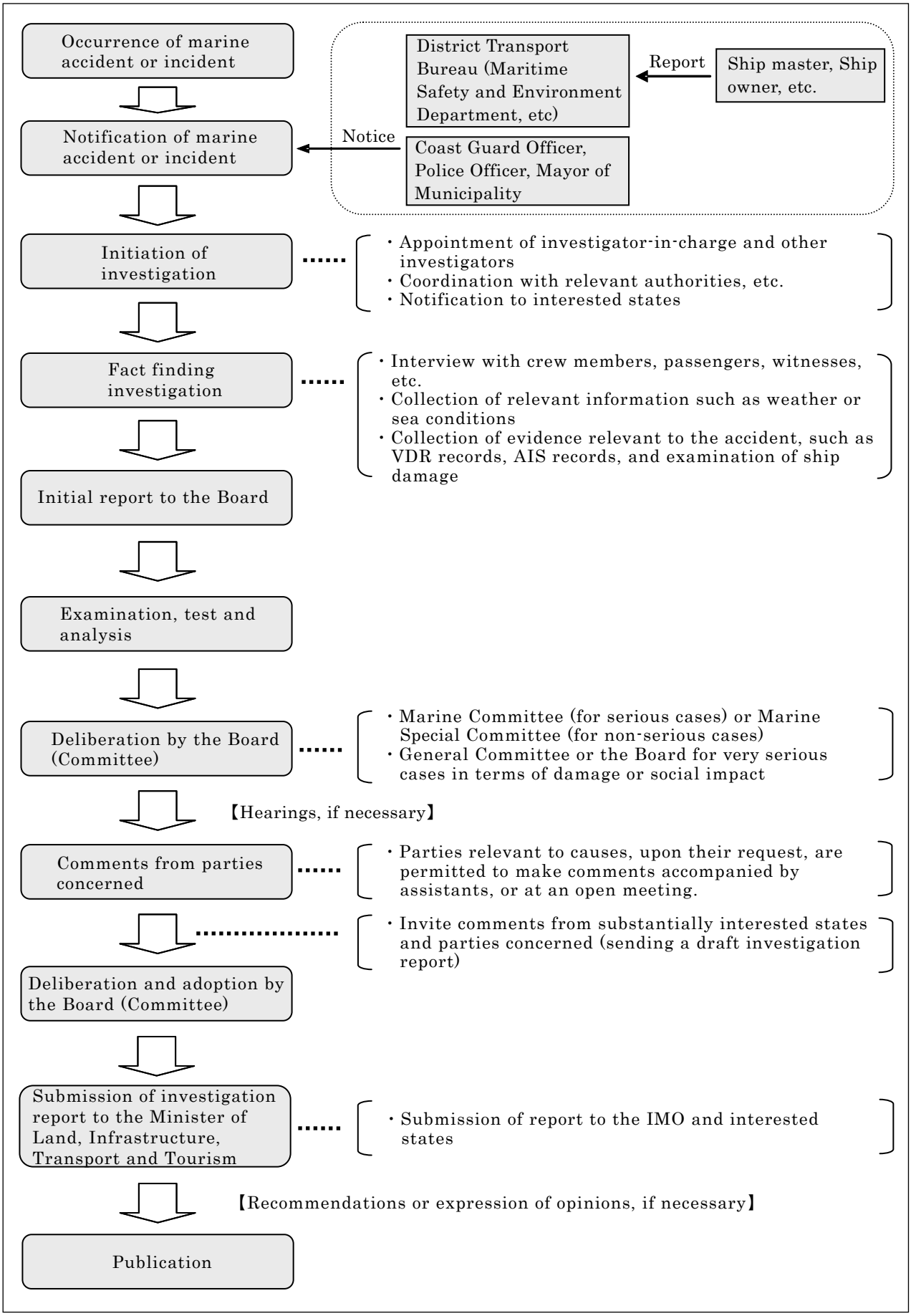
◎ **Article 3 of Ordinance for Enforcement of the Act for Establishment of the Japan Transport Safety Board** (A situation, prescribed by Ordinance of the Ministry of Land, Infrastructure, Transport and Tourism, stipulated in item 2, paragraph 6, Article 2 of the the Act for Establishment of the Japan Transport Safety Board)

1. The situation wherein a ship became a loss of control due to any of the following reasons:
   (a) navigational equipment failure;
   (b) listing of a ship; or
   (c) short of fuel or fresh water required for engine operation.
2. The situation where a ship grounded without any damage to the hull; and
3. In addition to what is provided for in the preceding two items, the situation where safety or navigation of a ship was obstructed.

＜Category of marine accident and incident＞

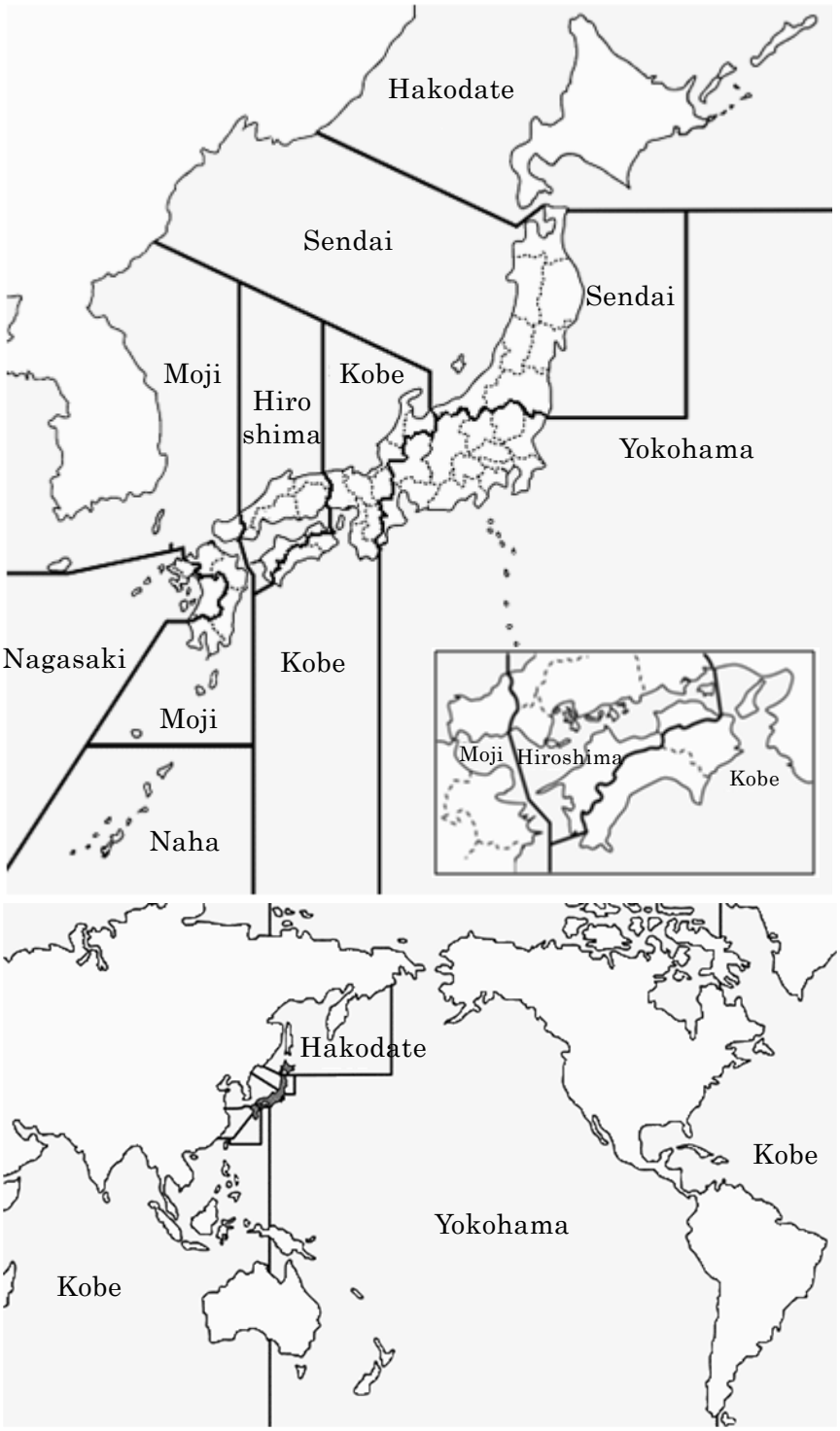
Marine accident and incident to be investigated		Type of marine accident and incident
Marine accident	Damage to ships or other facilities involved in ship operation	Collision, Grounding, Sinking, Flooding, Capsizing, Fire, Explosion, Missing, Damage to facilities
	Casualty related to ship structures, equipment or operations	Death, Death 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

Appendix 19 Procedure of marine accident/incident investigation



Appendix 20　Jurisdiction of the Offices over marine accidents and incidents

For the investigation of marine accidents and incidents regional investigators are stationed in the regional offices (8 offices). Our jurisdiction covers marine accidents and incidents in the waters around the world, including rivers and lakes in Japan. The regional offices are in charge of investigations in the respective areas shown in the following map. Marine accident investigators in the Tokyo Office (Headquarters) are in charge of serious marine accidents and incidents.



Jurisdiction map

Appendix 21 Role of the Offices and Committees according to category of accident and incident

Serious marine accidents and incidents are investigated by the marine accident investigators in the Headquarters, and are deliberated in the Marine Committee.

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

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

Appendix 22 Number of accidents and incidents by area

(Cases)

Year \ Area	In Japanese waters			Outside Japanese waters	Total
	In ports specified by the Cabinet Order	Within 12 nautical miles	In lakes or rivers		
2007		3			3
2008	224	579	15	56	874
2009	340	1,067	34	82	1,523
2010	305	908	38	82	1,333
2011	229	789	26	65	1,109
Total	1,098	3,346	113	285	4,842

Note: The above table shows the number of accidents and incidents into which the JTSB launched an investigation from October 1, 2008, to the end of December 2011 (including those carried over from the former Marine Accident Inquiry Agency).

Appendix 23 Number of accidents and incidents by type

(Cases)

Year \ Type	Types of marine accident											Type of marine incident				Total
	Collision	Contact	Grounding	Sinking	Flooding	Capsizing	Fire	Explosion	Facility damage	Casualty	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
2007		1	2													3
2008	181	101	255	12	4	28	15	3	30	61		54	34	8	88	874
2009	326	174	431	16	19	57	42	3	39	218	1	105	33		59	1,523
2010	356	180	369	15	18	51	34	2	26	145		83	16		38	1,333
2011	279	145	259	10	17	56	33	1	23	139	1	103	10	1	32	1,109
Total	1,142	601	1,316	53	58	192	124	9	118	563	2	345	93	9	217	4,842

Note 1: The above table shows the number of accidents and incidents into which the JTSB launched an investigation from October 1, 2008, to the end of December 2011 (including those carried over from the former Marine Accident Inquiry Agency).

Note 2: The figures in the column "Casualty" are the number of cases involving death, death and injury, missing persons, or injury.

Appendix 24 Number of vessels involved in accidents and incidents by type of vessel

(Vessels)

Type of Vessel / Year	Passenger ship	Cargo ship	Tanker	Fishing vessel	Tug boat	Push boat	Work vessel	Barge	Lighter	Commuter boat	Recreational fishing vessel	Angler tender boat	Pleasure boat	Public-service ship	Others	Total
2007	2	1														3
2008	48	324	49	308	50	48	25	28	32	4	28	6	158	11	10	1,129
2009	89	500	64	605	86	77	35	51	53	8	39	6	320	41	22	1,996
2010	90	441	61	554	73	48	45	37	45	4	53	6	323	26	21	1,827
2011	61	334	51	491	46	39	31	23	24	7	38	5	291	16	23	1,480
Total	290	1,600	225	1,958	255	212	136	139	154	23	158	23	1,092	94	76	6,435

Note: The above table shows the number of vessels involved in accidents and incidents into which the JTSB launched an investigation from October 1, 2008, to the end of December 2011 (including those carried over from the former Marine Accident Inquiry Agency).

Appendix 25 Number of vessels involved in accidents and incidents by gross tonnage

(Vessels)

Gross tonnage / Year	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			1							1	3
2008	486	52	139	216	77	24	16	17	10	15	77	1,129
2009	904	89	231	289	116	41	34	49	29	14	200	1,996
2010	895	86	175	261	128	36	37	39	25	24	121	1,827
2011	711	56	140	190	94	37	16	32	23	17	164	1,480
Total	2,997	283	685	957	415	138	103	137	87	70	563	6,435

Note: The above table shows the number of vessels involved in accidents and incidents into which the JTSB launched an investigation from October 1, 2008, to the end of December 2011 (including those carried over from the former Marine Accident Inquiry Agency).

Appendix 26 Number of vessels involved in accidents and incidents in 2011 by type of accident/incident and type of vessel

(Vessels)

Type of accident/incident / Type of vessel	Marine accident											Marine incident				Total
	Collision	Contact	Grounding	Sinking	Flooding	Capsizing	Fire	Explosion	Facility damage	Casualty	Others	Loss of control	Stranded	Safety obstruction	Navigation obstruction	
Passenger ship	9	16	8		1	1	1			6		6			13	61
Cargo ship	113	68	98	1	3	2	5		7	17		14	3		3	334
Tanker	16	10	8		1					5		9	1		1	51
Fishing vessel	227	18	53	2	10	29	24		7	70	1	43	1		6	491
Tug boat	18	4	13			6				1		2			2	46
Push boat	6	3	21	1		1			3	3		1				39
Work vessel	7	3	10	3		5				1		2				31
Barge	10		9						1	1		2				23
Lighter	8		12						3	1						24
Commuter boat	2	2	2									1				7
Recreational fishing vessel	30	2	1				1			2		1	1			38
Angler tender boat		1	1			1				2						5
Pleasure boat	118	19	47	3	2	16	2	1	8	39		24	4	1	7	291
Public-service ship	6	2	5			2				1						16
Others	14	3	3			2			1							23
Total	584	151	291	10	17	65	33	1	30	149	1	105	10	1	32	1,480

Note 1: The above table shows the number of vessels involved in accidents and incidents into which the JTSB launched an investigation from October 1, 2008, to the end of December 2011 (including those carried over from the former Marine Accident Inquiry Agency).

Note 2: The figures in the column "Casualty" are the number of cases involving death, death and injury, missing persons, or injury.

Appendix 27 Summary of serious marine accidents and incidents in 2011

The summary is based on the information at the time of launching investigation and may be modified as the investigations or deliberations progress.

(Marine accidents)

No.	Date of the accident	Vessel type and name, accident type	Location	Deaths/Injuries
1	Jan. 4, 2011	Liquefied gas carrier RYOAN MARU Contact with a light beacon	Nakanose, Tokyo-wan Nakanose Passage Light Beacon No. 1	None
2	Jan. 9, 2011	Chemical tanker SEIYO Sinking	Off Sawasakihana, Sado City, Niigata Prefecture (Around 14.8 km southwest from Sado Sawasakihana Lighthouse)	1 fatality (Chief engineer) 1 missing (Master)
3	Jan. 11, 2011	Cargo ship EN KAI (China) Fatality to a crew member	South Berth A, Funabashi Chuo Wharf, Funabashi City, Chiba Prefecture	1 fatality (Boatswain)
4	Feb. 22, 2011	Angler tender boat SETO MARU Capsizing	Vicinity of Suzu Shima (Suzu Island), located off the west of Azashi Port, Kushimoto Town, Wakayama Prefecture Around 302° true, 5.6 nautical miles from Shionomisaki Lighthouse	1 fatality (Master) 6 injured (Crew, 5 anglers)
5	Apr. 5, 2011	Fishing vessel RYOEI MARU No.18 Missing vessel	Around 40 km east-southeast from Samekado Lighthouse, Hachinohe City, Aomori Prefecture	3 fatalities (Crew) 3 missing (Crew)
6	Apr. 5, 2011	Recreational fishing vessel KAIRIN MARU Fatality to a crew member and an angler	Off the west-southwest of Hinomisaki, Mihama Town, Wakayama Prefecture Around 252° true, 4.5 nautical miles from Kiihinomisaki Lighthouse	2 fatalities (Master, angler)
7	Apr. 9, 2011	Cargo ship RYUNAN Ⅱ Recreational fishing vessel KOYO MARU Collision	Around 32 km southwest from Kabashima Lighthouse, Nomozaki, Nagasaki City, Nagasaki Prefecture	1 fatality (Master of KOYO MARU) 1 missing (Angler of KOYO MARU)
8	May 10, 2011	Cargo ship SCSC WEALTH (Hong Kong) Fatality to a workman	Hibi Port, Tamano City, Okayama Prefecture	1 fatality (Workman)
9	Jun. 12, 2011	Cargo ship DAISENZAN MARU Recreational fishing vessel HISA MARU Collision	Northwest of Oshima Island, Oshima Town, Tokyo Around 305° true, 4.5 nautical miles from Izu-oshima Lighthouse	1 injured (Angler of HISA MARU)
10	Jun. 28, 2011	Chemical tanker NISSHO MARU Fatality and injury to crew members	Near North Passage Light Buoy No. 3, Nagoya Port, Aichi Prefecture	2 fatalities (Crew) 2 injured (Crew)

No.	Date of the accident	Vessel type and name, accident type	Location	Deaths/Injuries
11	Jul. 2, 2011	Recreational fishing vessel KAMOME MARU Contact with break water	Nakaminato Port Outer East Breakwater, Hitachinaka City, Ibaraki Prefecture Around 011° true, 70m from Nakaminato Port Outer East Breakwater Lighthouse	12 injured (Crew, 11 anglers)
12	Jul. 6, 2011	Cargo ship AQUAMARINE (Vietnam) Fishing vessel HIRASHIN MARU Collision	Around 143°, 3,300m from the Yokohama Daikoku Break Water Lighthouse, Yokohama City	1 fatality (Master of HIRASHIN MARU) 1 injured (Deckhand of HIRASHIN MARU)
13	Jul. 17, 2011	Cargo ship YUSHO SEVEN (Republic of Panama) Fatality to a workman	Berth R, Port Island, Chuo District, Kobe City	1 fatality (Workman)
14	Aug. 17, 2011	Passenger ship TENRYU MARU No.11 Capsizing	Tenryu River near Futamata, Tenryu District, Hamamatsu City, Shizuoka Prefecture	5 fatalities (Boatman, 4 passengers) 5 injured (Passengers)
15	Sep. 19, 2011	Tugboat KITA MARU No.12 Capsizing	Wajima Port, Ishikawa Prefecture	2 fatalities (Crew)
16	Nov. 18, 2011	Passenger ferry MANYO Injury to passenger	Off the east of Fukue Shima (Fukue Island), Goto City, Nagasaki Prefecture	3 injured (Passengers)
17	Nov. 27, 2011	Cargo ship MARUKA (Republic of Korea) Fishing vessel KAIRYO MARU No.18 Collision	About 27 km off the north of Okinoshima Lighthouse in Munakata City, Fukuoka Prefecture	1 missing (Chief engineer of KAIRYO MARU No.18)

Appendix 28　Remarks made in 2011

The JTSB provided 46 remarks (45 for marine accidents, and one for marine incident), summarized as follows:

1. Collision between cargo ship TAKASAGO MARU and cargo ship LINGAYEN STAR (publicized in January 28, 2011)
It is probable that this accident took place at night in the Singapore Strait, when TAKASAGO MARU (Ship A) going west bound and LINGAYEN STAR (Ship B) proceeding south bound collided with each other while sailing based on the information that each Vessel was receiving from the VTIS. For the maintenance of safety of navigation in the Singapore Strait, Ship A must abide by the M/S Rules and other relevant procedure manuals and making warning signals when she becomes unable to understand the intention or behaviors of other vessels. As for Ship B, she should follow the advices from the VTIS and forthwith respond to the calls from VHF.

2. Collision between cargo ship PADRE and cargo ship KYOKAI MARU No.30 (publicized in January 28, 2011)
It is probable that the accident occurred near the anchorage area of Fukuyama Port, when PADRE (Ship A), proceeding south-eastward after heaving up her anchor, collided with KYOKAI MARU No.30 (Ship B), proceeding south-westward. It is desirable that both ships comply with and promote the following: 1. Ship A The master and the pilot should communicate and clarify the timing of the ship command hand-over. 2. Ship B The bridge watchkeeper should, with regard to vessels near the anchorage area, confirm with much care, by using binoculars or radars, the existence or non-existence of a black ball, the situation of deck work, and the state of bow and stern waves. On the handover of watchkeeping, the predecessor and the successor ensure the passing on the information about the movement of the vessels in close range around the ship.

3. Contact with a rock by recreational fishing vessel TAIKAI MARU

(publicized in January 28, 2011)

It is probable that, when the vessel collided at almost a right angle with the rock reel in the west of Misumi Lighthouse, two of the passengers lying flat on their backs in the cabin, with their heads toward the bow, were thrown forward by the collision impact. They were injured when their head or neck hit the wooden rack; one of them died after the accident.

It is desirable that recreational fishing vessel service business operators, in order to prevent passengers from suffering from severe damage by a big impact to the head when an unexpected situation such as a collision occurs, take measures for mitigating harm to passengers as much as possible, such as by utilizing shock absorbing gear if necessary or providing passengers with guidance to take a proper boarding posture through paying attention while proceeding at sea to passenger boarding positions, postures, and structures around them.

It is desirable that the Fisheries Agency advise prefectural governors to inform recreational fishing vessel service business operators of the occurrence of the harm to passengers caused by this accident and request them to pay attention to the measures for mitigating such harm.

4. Capsizing of motorboat NO FIGHT

(publicized in January 28, 2011)

1. Obtaining weather information and sea conditions

It is somewhat likely that the accident would have been avoided if the master had collected weather information through MICS (Maritime Information and Communication System) by a mobile phone, etc. before or after departure, and decided to cancel the departure or cut short the fishing to return promptly before the weather worsened.

It is desirable that small-boat operators and others conducting sea-activities collect, also during navigation as well as before departure, the latest weather information and sea conditions via mobile phones, etc. through MICS—the utilization of which has been proven helpful for the safe operation of small boats—and take such actions as returning early in a situation where the weather is expected to worsen, in order to avoid the occurrence of an accident.

2. Accident notification by an emergency call

The accident occurred in winter, when the air and sea temperatures are low. In such a situation, prompt rescue operations are essential.

It is desirable that, because the emergency call system, having precise sender-location-identification features, is expected to make prompt rescue operations possible, the persons involved in an accident and needing assistance make an emergency call through a mobile phone with GPS features to the relief agencies.

It is desirable, although the emergency call-system on 118 has been recognized by pleasure boat crews and passengers, marine-leisure lovers and staffs of fishery-cooperative associations, that the Japan Coast Guard continues to enhance its activities to provide information of 118-call utilization, nationwide, not only to fishers.

5. Collision between cargo ship CROSSANDRA and fishing vessel EISHIN MARU

(publicized in January 28 , 2011)

It is probable that the accident occurred in the west offing of Tsuru shima (Tsuru Island), while CROSSANDRA (Ship A) was proceeding north-eastward toward the west exit of Tsuru shima Channel and Ship B was proceeding north-westward to the fishing ground in the north west of Tsuru shima, when the vessels collided because Ship A proceeded without avoiding Ship B's course and Ship B failed to keep lookouts.

The operators of the vessels in order to prevent a reoccurrence of such an accident should take the following measures:

1. Ship A

Ship A should comply with the navigation rules stipulated in the Act on Preventing Collision at Sea.

2. Ship B

Although Ship B failed to become aware of Ship A's approaching and its whistle blasts because the crew members were on preparations for net-casting on the stern deck, Ship B should at all times maintain a proper lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions.

6. Grounding of fishing vessel NIKKO MARU

(publicized in January 28 , 2011)

It is probable that the accident occurred while the vessel was proceeding in the west offing of Tajiri Fishing Port on the way back to the port early in the morning, when the vessel, passing the scheduled course-change point, proceeding toward the shore in the

north east of the port, grounded on the shore, because the master, a lone watchstander on bridge, fell asleep.

It is probable that the crew members of the vessel were in a state of accumulated fatigue due to consecutive fishing operation and lack of sleep because they were only able to have short sleeps off and on.

When on bridge watch-keeping in a condition of insufficient sleep, the crew should have taken care not to fall asleep, because, in the hours between midnight and early morning, they were in a dark and quiet environment with few vessels nearby, and the possibility of falling into rhythmic temporary drowsiness was high. It is somewhat likely, on the other hand, that if the watch alarm system installed in the steering room had been operative, it could have woken the lone bridge watch-keeper on duty, who had fallen asleep, and then the accident could have been avoided.

It is desirable, therefore, that fishing vessels equipped with the watch alarm system keep such equipment operative, and its timer setting properly controlled because the equipment is effective for the prevention of accidents.

7. Collision between passenger ferry ORANGE 8 and fishing vessel HOSEI MARU

(publicized on January 28, 2011)

It is probable that both vessels, having the other in sight, crossing the other's course, approaching in a situation where a collision was expected, although having visual contact with the other to know the relative positional relation to the other at an early stage, proceeded without keeping proper lookouts and collided. It is probable that, if both vessels had kept proper lookouts, the accident could have been avoided because they had a chance to take the give-way actions and best coordinated actions for avoiding collisions required by the Act on Prevention Collision at Sea, and to use whistle signals.

Therefore, both vessels should comply with the rules stipulated in the Act on Preventing Collision at Sea to prevent a reoccurrence of such an accident as follows:

1. ORANGE 8 (Ship A)

(1) Ship A should at all times maintain a proper lookout to make a full appraisal of the risk of collision with HOSEI MARU (Ship B), because each vessel was crossing the other's course when Ship A had first visual contact with Ship B.

(2) Ship A should use warning signals promptly when Ship B is taking no collision-avoidance actions.

(3) When Ship A, a stand-on vessel, find herself so close to Ship B that collision cannot be avoided by the action of Ship B alone, she should take such action as will best aid to avoid collision.

2. Ship B

(1) Ship B should at all times maintain a proper lookout to make a full appraisal of the risk of collision with Ship A, because each vessel was crossing the other's course when Ship B had first visual contact with Ship A.

(2) Ship B, a give-way vessel, should, so far as possible, take early and substantial action to keep well clear from Ship A.

8. Capsizing of recreational fishing vessel SANKO MARU

(publicized on January 28, 2011)

It is probable that the accident occurred in Motonuwa Fishing Port when the vessel, while on recreational fishing service with the engine stopped, capsized due to the accumulation of water in the hull's starboard side, which entered the PVC (Polyvinyl Chloride) pipe through the exhaust port and leaked through a crack into the hull and increased in volume as the water flow into the hull when the stern draft went up.

It is somewhat likely that, because, in a wet-exhaust system, where an exhaust pipe runs through compartments in the hull, unlike an exhaust system using a funnel, the temperature of exhaust gas must be sufficiently lowered through effective generation of a steam-water mixture, and that if the temperature is not sufficiently lowered, the exhaust pipe will crack due to material-degradation, leading to water-leaks or ignition of rubber joints causing a fire in a case where inflammable material is nearby.

It is desirable that, in view of the facts that, if the temperature of PVC pipes is sufficiently low, heat-insulating materials or protection covers are not necessary and, in addition, structures for convenient inspections, such as visual or hands-on inspections, are allowed, the owners and the operators of the vessels equipped with a wet-exhaust system take the following measures, in order to prevent similar accidents and fires related to such accidents:

1. Vessel operators should, before departure, confirm that the exhaust pipes have no abnormalities, such as deformations or cracks, and during navigation, check whether there is no water around the exhaust gas outlets, whether the surface temperature of the exhaust pipes is normal, and whether no water is leaking out of the exhaust pipes.
2. Vessel owners should, on a scheduled basis, inspect cooling water pump and exhaust pipes, and in addition, periodically replace key parts, such as pump impellers.

Furthermore, it is desirable that vessel builders consider taking safety measures, such as installing warning devices activated when the surface temperature of exhaust

pipes increases.

9. Contact with breakwater by cargo ship TOFUKU MARU

(publicized on February 25, 2011)

It is probable that, in the night hours, while the ship was proceeding south-eastward in Kaminoseki Port toward Kaminoseki Kaikyo (Kaminoseki strait), the accident occurred when the ship continued to proceed to and collided with the breakwater, because Officer B, a lone watchstander on bridge, fell asleep. It is somewhat likely, however, that, if the watch alarm system installed in the ship had been operative, the equipment's alarm would have woken Officer B and the accident would have been avoided.

The ship did not routinely use the watch alarm system, and Company A, although knowing that the equipment had been turned off, did not provide guidance to the crew members to keep the equipment operative.

It is desirable that vessels equipped with the watch alarm system keep it operative and its timer setting it properly controlled, because the equipment is effective for the prevention of accidents.

10. Listing of ferry ARIAKE

(publicized on February 25, 2011)

It is probable that the accident occurred, while the ship was proceeding and being hit by following waves, when the ship listed about 25° and cargos collapsed.

It is desirable that the ship operator reaffirm the mission appointed to it to ensure the safety of human life and transport at sea, describe, in its safety management regulations (operational standards), risks of navigation while being hit by following waves, which had been described in its operational guidance in heavy weather, and provides safety education to the persons who engage in shipping operation in order to inform them of risks of navigation in such a situation. It is desirable, furthermore, that in order to prevent the container from sliding due to hull listing, the company should consider effective cargo-lashing measures, and at the same time consider painting the car-compartment deck-floor with slip-proof paint and installing slip-protection gear, such as beams and removable cones.

11. Collision between chemical tanker SANSHUN MARU and cargo ship SHIN KISSHO

(publicized on February 25, 2011)

It is probable that, in the night hours, the accident occurred in the North Traffic Route west of Ushi Shima (Ushi Island), while SANSHUN MARU (Ship A) and SHIN KISSHO (Ship B) were proceeding west south-westward one after another, when Ship A, trying to overtake Ship B on Ship B's portside, proceeded ahead, approached and collided with Ship B, because Officer A, failing to keep proper lookouts, let Ship A proceed without noticing that Ship A was close to Ship B.

The accident occurred because, although the bridge watch keepers of both ships had recognized the other ship, no proper lookouts were executed on either ship after such recognition; they should at all times maintain a proper lookout by utilizing radar with ARPA features and others in addition to visual lookouts, and they should use signals for overtaking when a vessel is overtaking another vessel in the passage.

Furthermore, the accident occurred, while both the ships were proceeding in the passage designated by the Maritime Traffic Safety Act, after both the masters handed over the bridge watch-keeping and left the bridge during navigation. The masters should take command during navigation in the route, keeping in mind the purpose of the Mariners Act, because Bisan-Seto was congested with vessel traffic at midnight when the accident occurred, and, in addition, fishing vessels were fishing inside the route.

12. Injury to passengers on passenger ship AN-EI GO No.98

(publicized on March 25, 2011)

It is probable that the accident occurred when the two passengers, sitting in the front passenger room, were lifted up and then dropped onto their seats, each suffering a compression fracture in the lumbar spine due to the free-fall shock when the Ship's bow rode on the wave crest and fell down to the wave bottom, because the master, proceeding east-south-east ward along the reefs in the north east offing of Iriomote Shima (Iriomote Island) while hitting consecutive waves of about 1.5 to 2 meters high from east-north-east on the port bow and failing to recognize the big wave approaching until just before its arrival kept her proceeding at the original speed.

It is somewhat likely that Company A's failure to provide its seamen with proper safety education on Company A's safety management regulations contributed to the occurrence of the accident.

It is desirable, therefore, that the Okinawa Passenger Boat Association keeps informed and guides in training courses, the association hosts, the passenger boat service

operators in Yaeyama Retto (Yaeyama Islands) to firmly execute their safety management regulations.

13. Collision between cement carrier FUYO MARU No.3 and fishing vessel SHOFUKU MARU No.18

(publicized on March 25, 2011)

It is probable that the accident was caused by SHOFUKU MARU No.18 (Ship B), that is, due to the fact that the Master, on lone bridge watch keeping, fell asleep.

Many of the fishing vessel accidents caused by navigation during drowsiness are accompanied by casualties of crew members in addition to hull damage. Although fishing vessels, sometimes forced to fish for a long duration in order to get a sufficient catch and to have a single crew member do bridge watch keeping, effective sleep-prevention measures have not been taken in such fishing vessels. On the other hand, in cargo ships, watch alarm system has been installed, and their effectiveness has been proven. It is desirable, therefore, that, in fishing vessels, such watch alarm system should be installed.

14. Capsizing of fishing vessel KOFUKU MARU No.1

(publicized on March 25, 2011)

It is somewhat likely that the accidents occurred as follows: the vessel, in a situation where the stability was lower than that when the stern trim is smaller and the bulwark submerge angle is small, was hit by wind and high waves in the starboard abeam; the vessel listed to portside at an angle exceeding the bulwark submerge-angle, causing a lot of water to flood onto the deck; the accumulated water and the port bulwark submerged in water caused resistance to reduce the stability; in such a situation, the vessel was hit by more wind and waves, and capsized.

It is desirable, therefore, that, in order to preserve the safe navigation of fishing vessels of similar types operating in the waters where this accident occurred, the following measures, which are fundamental requirements for capsize-protection, should be taken: vessels should return to port when the weather is expected to worsen: heavy gear or materials such as a large amount of sinkers should be stored as low as possible under the deck; taking a large rudder angle and unreasonable steering should be avoided. It is desirable, in addition, that the vessel owners of similar types maintain their vessels and supervise their seamen, and that the fishing vessel crew members navigate and load the

fishing gear, taking the following into account:

1. A vessel lists to the greatest extent when proceeding while being hit by wind and waves abeam, and when hit by a high wave in such a situation, the vessel is likely to list severely and becoming difficult to stabilize due to water coming over the bulwark and flooding the deck.
2. A fishing vessel, with fishing gear loaded unevenly on the stern or with fuel left unconsumed in the stern fuel tank, due to the increased stern trim, decreases stability and is likely, due to the reduced bulwark submerge-angle, to let water come over the bulwark and flood the deck. Therefore, it is necessary to pay attention in order to prevent a vessel from having an excessive stern-trim.

15. Sinking of fishing vessel SUWA MARU No.58

(publicized on April 22, 2011)

It is somewhat likely that the accident occurred in the following sequence: while in a situation where the vessel's center of gravity was high, the vessel, after initial heel to the starboard side, was hit by a big wave on the starboard bow side, enabling water to flood the deck from the starboard midship and accumulate on the bow deck, causing the bow to go down; the vessel then listed further when hit by consecutive waves at the starboard side; the starboard side submerged, stability was lost, and the vessel tumbled over.

It is desirable, therefore, that the Fisheries Agency and other authorities concerned provide guidance to net-fishery vessel owners and crew of the following; in addition, taking the following into consideration, the owners should manage their vessels and supervise their crew; also, the crew should operate a vessel and carry out maintenance, taking the following into consideration:

1. A vessel's weight increases when fishing nets are repaired or soaked with water, and the hull's center of gravity climbs higher when fishing gear, ropes, and other items are loaded on the steering-room canopy.
2. Initial heel occurs because the unevenly loaded fishing gear slides due to hull's rolling or pitching.
3. In order to prevent scuppers capacity from being degraded, pay attention to the arrangement or structure of wood deck-panels or brace members for pipes, and keep fishing nets, ropes, and other items away from around the scuppers.
4. In a situation where a vessel has to drift using a parachute anchor when the fishing operation has been cancelled due to heavy weather, a seaman, such as the master, with plenty of navigation knowledge and experience, should stand on bridge

to look out for water flooding, hull list, and wind or waves, and keep the main engine in its stand-by state so that prompt attitude adjustment is possible so as to prevent water from flooding in. Furthermore, in a situation where such hull-attitude-adjustment is difficult or the weather or sea conditions are expected to worsen, the vessel should suspend parachute drifting and take refuge in a safe area.

16. Fatality to workmen involved with container ship KUO CHANG

(publicized on April 22, 2011)

It is desirable that manufactures of mooring ropes establish guidelines to replace or discard their products by examining their appearance and provide users of the ropes with the guidelines.

It is desirable that line handling service providers provide their mooring workers with information on extension of the snap-back hazardous zones of ropes when broken under tension, and give them instructions such as to avoid working inside the zone unless necessary and to complete the work swiftly and leave from the snap-back hazardous zones as promptly as possible.

17. Collision between cargo ship SENEI MARU and fishing net of fishing vessels TOSHI MARU No.2 and TOSHI MARU No.3

(publicized on April 22, 2011)

It is probable that, in the offing of Kamegakubi, Kurahashi Shima (Kurahashi Island), the accident occurred when SENEI MARU (Ship A), thinking wrongly that TOSHI MARU No.3 (Ship C) was alone on trawl fishing and failing, because of not keeping proper lookouts, to recognize that TOSHI MARU No.2 (Ship B) and Ship C were trawl fishing, proceeded forward in between Ship B and Ship C and collided with the fishing gear.

It is desirable that, although a vessel navigates far enough as possible away from a group of fishing vessels that are fishing, in a situation where the vessel has no other way but to approach a group of fishing vessels, a bridge watch-keeper on the vessel—required to judge whether the group of fishing vessels are on operation in a coordinated way, from sufficiently far away from the group, by confirming the vessels' positions and behavior, the fishing-gear buoys, and the fishing methods that the vessels are using, as well as the vessels' shapes or lights—should at all times maintain a proper lookout by binoculars,

radars and others.

It is desirable, in addition, that bridge watch-keepers should, on a regular basis, try to get knowledge on fishing methods and the vessels' behavior, because, in the waters around Japan, fishing vessels use different fishing methods according to the season or region, such as the two-boat trawling fishery of this case, where two vessels, in order to catch fish in the upper layer of water, were trawling a fishing net close to the sea surface unlike the generally known fishing method of bottom trawling.

18. Fatality to operator on personal water craft SHIBUZO No.2

(publicized on June 24, 2011)

It is probable that the accident occurred, while the personal watercraft was on a recreational cruise on Lake Inawashiro, when the operator and passengers dropped in water. It is somewhat likely, however, that the fact that the personal watercraft was equipped with a stern pole contributed to the occurrence of the accident. It is somewhat likely, in addition, that the operator and passengers, taking too long to raise the personal watercraft, let too much water flood in to resume the cruise, because they had no proper communication measures, and were thus unable to request rescue. Therefore the following is desirable:

1. The operator of a personal watercraft or a motor-boat carries a water-proof mobile phone or a mobile phone in a water-proof bag.
2. The operator of a personal watercraft cruises with any stern pole dismantled, except in the case of towing a wake-board or others.

19. Collision between container ship SKY LOVE and cargo ship HAEJIN

(publicized on June 24, 2011)

It is probable that the accident occurred, while both the vessels were proceeding, although each of the vessels once had made visual contact with the other vessel, without recognizing that the other vessel was approaching because both of the vessels failed to keep proper lookouts on the other's movements.

It is desirable that a bridge watch keeper, in order to have sufficient time to assess the risk of collision with other vessels, keeps proper lookouts for ensuring safe navigation.

20. Fatality to a diver on dive boat STYLE

(publicized on July 29, 2011)

It is probable that the accident occurred, while the vessel was on anchoring operation at the second point in Agono-Ura Port, when a diving instructor, who dove in the water off the port stern to hold the anchor on the sea bed, had her upper left arm cut by the blades of the propeller rotating in reverse due to the master's failure to set the clutch-lever of the engines on both sides in the neutral position.

It is desirable that, because 15 accidents causing death or injury due to a diver's accidental contact with a diving cruise boats occurred between 1991 and 2008, the parties concerned take the following safety measures to prevent a reoccurrence of similar accidents:

1. Diving-cruise-service business-operators should have a dedicated watch-stander on board in addition to a ship-operator to confirm divers' positions and behavior.
2. Owners of diving-cruise boats should install protection equipment, such as a propeller guard on a hull to prevent divers from accidentally making easy contact with the propeller blades.
3. Operators of diving-cruise boats should stop the engines while divers are close to the propellers.

21. Collision between oil tanker EISHIN MARU No.17 and chemical tanker COSMO BUSAN

(publicized on July 29, 2011)

It is probable that the accident occurred at the crossing of North Passage and Mizushima Passage at night due to the collision of EISHIN MARU No.17 (Ship A), proceeding southward in Mizushima Passage, with COSMO BUSAN (Ship B), proceeding westward in North Passage, in a situation where the vessels were in sight of one another and approached each other in an attitude which would lead to the risk of collision.

It is probable that Master A, although intending to pass Ship B on her stern by turning to port because Ship A was the give-way vessel, when it became difficult for Ship A to turn to port due to the movements of Ship D, which had begun to proceed northward toward Mizushima Passage to get into a situation where either Ship A or Ship D would pass the other on the port side, judging from the radar information at the time of the first sight of Ship B, thought that it would be possible to cross the course of Ship B on her bow, and did not give way to Ship B, but rather tried to cross the course of Ship B on her bow.

The Act on Preventing Collisions at Sea, Article 5 (Lookout), requests vessels to

always maintain a proper lookout so as to make a full appraisal of the risk of collision with other vessels, and Article 8 of the Act (Action to avoid collision) requests that any action taken to avoid collision shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

It is probable that, if Ship A, when it had become difficult to turn to port to pass Ship B on her stern, had made judgments in accordance with the rules described above and based on the latest information obtained by continuous and proper lookouts instead of the radar information obtained at the time of the first sight of Ship B, Ship A would have noticed that, judging from the extent of navigable water, the only action to prevent the collision would be reducing speed or stopping, and also that Ship A would have noticed that such actions were required promptly in the situations where the ships had approached each other, and as a consequence the occurrence of the accident would have been avoided.

Therefore, it is desirable that vessels should at all times maintain a proper lookout so as to make a full appraisal of the risk of collision and that any action taken to avoid collision with other vessels should be made in ample time and the proper action be positive.

22. Fatality to crew members on chemical tanker KYOKUHO MARU No.2

(publicized on July 29, 2011)

It is probable that the accident occurred, while the ship was unloading TBA (Tertiary Butyl Alcohol), when a crew member died of suffocation due to oxygen deficiency because the crew member entered the cargo tank without measuring the oxygen density in the tank even though the tank had been filled with nitrogen gas.

Therefore, ship owners, etc. need to provide crew members of chemical tankers with safety education on the risk of occurrence of oxygen deficiency depending on the cargo characteristics or cargo-handling procedures, and guidance to make sure to measure the oxygen density prior to entering cargo tanks in a situation where the risk of oxygen deficiency is expected.

It is desirable, because, at the time of the occurrence of the accident, the crew members other than the chief officer and the chief engineer had no recognition that the cargo tank was filled with nitrogen gas while unloading, and furthermore the chief officer likely failed to remember such fact, that cargo-handling service providers surely inform chemical tanker crew members of the fact that when filling cargo tanks with gasses that cause oxygen density to decrease.

23. Collision between chemical tanker KINYO MARU and barge MARUSEN 2 towed by tug boat KAIRYU

(publicized on July 29, 2011)

It is probable that, in the East Traffic Route in the west of Ogi Shima (Ogi Island), the accident occurred when Ship A, proceeding along the route, collided with a tug, Ship B, towing a barge (Ship B Train) entering the route from outside.

It is probable that Ship A, assuming that Ship B Train would never enter the East Traffic Route and hence making no further lookouts for Ship B Train, should have kept proper lookouts to properly judge other vessels' movement.

It is probable that Ship B Train, because it was a give-way vessel to Ship A proceeding in the route, when entering the East Traffic Route, not expecting Ship A's cooperative actions, such as reducing the speed, should have properly judged the risk of collision, and promptly taken give-way actions if the risk of collision could be expected.

It is desirable, because it is somewhat likely that the accident could have been avoided if both vessels had shared each other's intension of ship handling via VHF communications, that vessels equipped with VHF effectively utilize such equipment.

24. Collision between barge YAMAKA 57SD103 towed by tug boat FUMI MARU No.28 and fishing vessel NANKAI MARU

(publicized on August 26, 2011)

It is probable that the accident occurred, in the west exit of Kurushima Kaikyo (Kurushima Strait), while YAMAKA 57SD103 (Ship A), towing a Ship B (Ship A Train) was proceeding north-eastward, and NANKAI MARU (Ship C) was proceeding north-westward, when Ship B collided with Ship C. It is also probable that, although Ship A had two-minutes before collision, visual contact with Ship C approaching at about 500 m and causing fear of collision and pushed the whistle button, the whistle made no blasts because the power switch was off. It is somewhat likely, judging from the fact that Ship A recognized the silhouette of a person sitting on Ship C's stern deck facing rearward when Ship C approached 200 to 250 m from Ship A's starboard beam, that, if the whistle had been successfully sounded when the fear of collision arose, Ship C could have recognized the existence of Ship A Train, and the accident could have been avoided.

It is required, therefore, that vessels equipped with whistles should keep them in sound conditions by making maintenance routinely, and furthermore make it sure to inspect them prior to departure to keep them operable during navigation.

25. Fatality to a crew member on passenger ship RYUGUJO

(publicized on September 30, 2011)

It is probable that the accident occurred when Engineer A fell overboard and died while applying detergent to the passenger-cabin windows on the second floor, because Company A, not recognizing the danger of such work which was routinely executed, and failing to take safety measures required by laws and regulations for outboard-work, ordered Engineer A to do the cleaning work.

It is desirable that Company A examines the danger of the routine work on the vessels they own, reconfirms the safety measures required by laws and regulations for such work, and takes necessary measures to enhance the safety of their seamen.

26. Injury to an angler on recreational fishing vessel HANABUSA

(publicized on September 30, 2011)

It is probable that the accident occurred, while the vessel was proceeding south-southwestward by auto pilot in the southwest offing of Rukan Reef in the west of Itoman City toward a payao (floating fish reef) 20 M south of Tokashiki Shima (Tokashiki Island), and being hit by south to south-west consecutive waves about 1.5 to 2.0 m high at the bow, when, in spite of the master's action to reduce the speed upon recognizing a big wave about 2.5 m high coming just in front of the vessel, the vessel's bow rode on the big-wave's crest before the vessel was decelerated to the safety speed from about 8 to 10 kn, causing the hull to move up and down, a passenger, sitting in the front part of the bow deck, was lifted up in the air off the deck, dropped on the deck, and hit by the deck.

Similar accidents in recreational fishing vessels occurred between April 2002 and January 2010, in 11 small recreational fishing vessels, resulting in spine-compression fractures on 12 passengers, each of whom suffered on a deck while the vessel was proceeding.

It is somewhat likely, therefore, that, on small recreational fishing vessels while having passengers on the foredeck, accidents involving passengers suffering from spine-compression fractures occur because of hull oscillations, depending on the wave situation.

It is probable, judging from the results of the analysis on the accident, that, in small recreational fishing vessels, the midship or rear part is safer than the bow deck because pitch motions are smaller there.

It is required, therefore, that the master of a small recreational fishing vessel recognizes the risk of passengers suffering from lumbar spinal injuries, and, in a situation where the hull oscillates due to waves, makes sure to execute the following to preserve

passenger safety:

1. The master of a recreational fishing vessel, while proceeding, should have the passengers boarded in the mid-to-rear compartment while the vessel is proceeding in a situation where the hull oscillates because of the impacts of waves where the center of gravity of the vessel is in the rear part.
2. The master of a recreational fishing vessel while proceeding in a situation where the hull oscillates because of the impacts of waves, should alter the course to the waves in order to reduce the hull oscillation, and in addition substantially reduce the speed to the safe speed.
3. The master, in a situation where the vessel, while proceeding, is being hit by consecutive waves at the bow, should keep proper lookouts of the waves because high waves hit the vessel periodically.

27. Contact with mooring dolphin by motorboat KAISER

(publicized in September 30, 2011)

It is probable that, in night hours, the accident occurred in Section 1, Tokushima-Komatsushima Port, when the vessel, while proceeding on the way to return, collided with a mooring pile due to the master's failure to notice that the vessel was approaching the pile.

It is somewhat likely that the master's alcohol ingestion prior to the return voyage contributed to the inability of normal ship handling through affecting the master's ability of situational judgment. In addition, none of the persons on board, including the master and the eight passengers, one of which was a child under 12 and as such was required to wear a life jacket by laws and regulations, wore a life jacket, and all of them boarded on the exposed deck.

It is required that the master, in order to prevent a reoccurrence of the accident, follow the regulations in the Act on Ship's Officers and Boats' Operators with regards to the following:

1. A boat operator should avoid alcohol ingestion in a situation where he/she has to steer a boat, because alcohol ingestion could hamper the normal ship handling through its influence on mobility function, vision, concentration, and situational judgment.
2. A boat operator should instruct a child under 12 years of age on board to wear a life jacket.
3. A boat operator of a small boat should recommend the passengers on board on the exposed deck to wear life jackets.

28. Collision between fishing vessel WAKAEI MARU and small combined-use boat FUKUJU MARU

(publicized on September 30, 2011)

It is probable that, in the night hours, the accident occurred in Nagasu Fishing Port, while WAKAEI MARU (Ship A) was at anchor and FUKUJU MARU (Ship B) was proceeding south-eastward, when Ship B, while the Master B was making a port turn with an intention of passing through between Ship A and Breakwater No. 1, collided with Ship A, because of Master B's failure to keep proper lookouts.

It is probable that Master B, having thought that the water is shallow around the breakwater, intending to avoid approaching Breakwater No. 1, and paying much attention to visually confirm Ship B's approaching Breakwater No. 1 because it was not easy to see Breakwater No. 1 due to worsened visibility or worsened distance perspective, judged wrongly that Ship A had already moved away backwards and failed to keep proper lookouts.

It is probable, on the other hand, that Ship A, having no ship inspections, was not properly equipped with life saving appliances, Ship B had more passengers on board than the maximum capacity and was not equipped with sufficient life jackets, and in addition, no one on board Ship A or Ship B wore life jackets.

It is somewhat likely that, if, in such a situation, a boat had capsized or a person had fallen overboard, severe damage, such as a death, could have happened.

It is desirable, therefore, that, in order to prevent similar accidents from occurring or to mitigate damage in a case of an accident, the following measures be taken:

1. Lookouts by proper means in the night hours

   A boat operator on steering, while keeping lookouts on navigational obstructs (objects), should take into consideration that, in the night hours, the outline of an object with less contrast to the background becomes unclear and visibility decreases, and in a dark field of view containing an object, the distance to the object is hard to measure by sight due to a loss of sense of distance, and should utilize additional measures, such as a radar.

2. Preservation of passengers' safety through having boat inspection, and safety guidance

   (1) A fishing vessel used for purposes other than fishing and having passengers on board, through receiving vessel inspections, should make sure not to have passengers over its capacity and to be equipped with a sufficient number of life-preservation equipments.

   (2) The master should comply with the passenger capacity limit, and take safety

measures such as guiding passengers to wear life jackets.

(3) A fishers cooperative-association, in view of the situation where fishing vessels are used for purposes other than fishing, should provide its members with guidance effectively, for example by holding safety orientations on the occasions of fire-work festivals, etc, in order to have them surely receive vessel inspections if necessary, to have them comply with passenger-capacity limitation, and to have them preserve passengers' safety by installing required life saving appliances and wearing life jackets.

29. Collision between pleasure boat KAIKYO MARU and pleasure boat KOKURA MARU

(publicized on September 30, 2011)

It is probable that, in the west-north-west offing of Tokomasari Reef, the accident occurred, while KAIKYO MARU (Ship A) was preparing fishing gear and proceeding, failed to recognize KOKURA MARU (Ship B) in drift, and collided with Ship B, because Ship A was not keeping lookouts.

The waters around Tokomasari Reef, which is a good fishing ground, are congested with small boats fishing.

It is somewhat likely that, at the time of the occurrence of the accident, because it was difficult to detect by sight from far away Ship B, which generated no white waves to the stern because of drifting and seen off and on among the waves of about 2 m high, a single surveillance by sight would overlook the Ship B.

Therefore, the boat operators are required to keep proper lookouts not to overlook the small boats through dedicating themselves to watch-keeping.

30. Collision between recreational fishing vessel ICHIFUKU MARU and motorboat KANA MARU

(publicized on September 30, 2011)

It is probable that, near the occurrence of the accident, ICHIFUKU MARU (Ship A), although proceeding in a situation where it was difficult to detect a radar image around the center of the radar screen due to the surface reflection caused by waves, taking no visual lookouts for proceeding, failed to recognize KANA MARU (Ship B) in drift.

Near the time of the accident, Master A, wrongly thinking that there were no vessels around, made no visual lookouts by peering through the lookout-opening opened on the

steering room's ceiling, partially because Ship A was hit by wave splashes. It is required to make sure not to overlook other vessels by keeping proper lookouts even in a situation where the detection of vessel images on radar is difficult due to surface reflections, through, not fully relying on radar information since the basic lookout is conducted visually, making proper lookouts by sight, hearing, and all other available means appropriate in the situation.

31. Fire on car carrier PYXIS

(publicized on September 30, 2011)

It is probable that the accident occurred because a fire broke out in the engine bay of a car stored in the cargo hold by an unidentified cause and spread to other stored cars; CO_2 was released into Zone F, where the fire has started, as well as into Zone E and Zone D, where the fire detection system was activated; and the chief engineer died due to suffocation caused by CO_2 intoxication and was found in Zone D, DK 7.

As for the death of the chief engineer, it is probable that although the chief engineer had known of the release of CO_2 because the master repeatedly had made the announcement requesting to go to the muster station for the preparation of CO_2 release, the chief engineer entered DK 7 without carrying a transceiver, although he had been requested to carry one by the muster list.

It is desirable that Company A should inform crew members at an orientation about carrying, in an emergency, the equipment prescribed in the muster list and about the importance of following the instruction from the master to evacuate in an emergency; and as for CO_2 release, Company A should determine the procedures for safety confirmation of the place into which CO_2 will be released and instruct the ships under their management to conduct exercises simulating actual emergency situations.

Although the cause of fire in the engine bay of the car remains unidentified, the possibility that it was the electric equipment in the ship or the handling of fire such as smoking, or that the electric system of the car was involved cannot be completely denied. Therefore, it is desirable that Company A should motivate crew members to be more sensitive to fire protection, execute stricter controls on fire-handling, inspect electric equipment in cargo holds more strictly; and the automobile manufacturing company should give more consideration to fire protection starting from cars in transportation.

32. Grounding of cargo ship DONG PHONG

(publicized on October 28, 2011)

It is probable that the accident occurred because, in the situation where storm warnings had been issued, although the weather became worse to the extent that a west wind of maximum instantaneous speed greater than about 21 m/s was blowing and waves were rising to the height of about 4 to 5 m, the ship stayed on anchorage due to the master's decision, dragged anchor, tried to move after heaving-up anchor, drifted due to the wind pressure, and grounded on the coast to the north east of Ishikari-Wan Port.

It is probable that ships on anchorage in heavy weather are requested to collect weather and sea information, pay attention to the information delivered by the port authorities when heavy weather is expected, and take preventive measures against anchor dragging. In addition, it is necessary to consider moving promptly to a different anchorage point in response to the changes of weather and the sea conditions, and calmness of an anchorage area and so on.

33. Fire on fishing vessel YUKO MARU

(publicized on October 28, 2011)

It is probable that, in the east offing of Tomioka Town, the accident occurred while the gravity tank was being manually filled, when, because of the master's failure to shut-down the fuel pump, the fuel, blasting out of the air vent pipe of the gravity tank, spraying over the casing of the main engine's super-charger-exhaust, vaporized and accumulated in the engine room as inflammable gas and ignited.

It is required that the master, while refilling a tank with fuel oil by a fuel pump operated manually, always examines the state of fuel poured into the gravity tank, and in addition, uses for the gravity tank an overflow pipe with an inner diameter that allows an oil-flow equal to or larger than the flow supplied through the oil-filling pipe.

34. Collision between oil tanker TAIYO MARU No.32 and gravel carrier KATSU MARU No.38

(publicized on October 28, 2011)

It is probable that, in the night hours, in the south of Irakomisaki Lighthouse, while TAIYO MARU No.32 (Ship A) was proceeding north-westward and KATSU MARU No.38 (Ship B) was proceeding westward on autopilot, the accident occurred when the vessels collided, because Master A, not assessing the risk of collision with Ship B approaching from the starboard side and conduct of crossing-vessel continued to proceed, and in addition, Engineer B, on lone bridge watch keeping, fell asleep.

It is somewhat likely that Master A, wrongly thinking that Ship B would eventually proceed along the route because Ship B's true-speed vector was pointing to Buoy No. 2 and Ship B was in a situation where a prediction that Ship B would eventually proceed along the route seemed reasonable according to Master A's experiences so far, continued to proceed without making an assessment on the risk of collision with Ship B.

It is likely for a human to make a judgment on the basis of his experiences or conventions. However, such experiences are not always proper judgmental standards.

As a result, decisions made only by experiences may lead to human errors.

It is probable, therefore, that routinely making judgment on other vessels' movements solely based on the predictions derived from experiences or conventions will interfere with timely and proper assessment of the risk of collision.

It is required, for making a timely and proper judgment on the risk of collision, unlike the judgment insufficiently made in the accident case based on the other vessel's true speed vector pointing to Buoy No. 2, to strictly and routinely comply with the regulations in the Act on Preventing Collision at Sea, such as to make as early judgment as possible on collision or judgment on conduct of crossing-vessel.

It is required that a person on bridge watch-keeping should sleep long enough before standing on duty, and when feeling drowsy during the duty, should take actions, such as removing drowsiness with fresh air or asking the master to replace him with another crewmenber, to prevent drowsiness from causing trouble.

It is required, in addition, that Master B, while proceeding in a narrow channel, should be on the bridge and take navigation command himself, because the Mariners' Act requires a master to take navigation command him/herself while the vessel is proceeding in narrow waters.

35. Capsizing of motorboat NIKKO MARU No.2

(publicized on October 28)

It is probable that NIKKO MARU No.2 (Ship A), while proceeding at a speed of about 5 to 8 km/h on its way back to North Mooring Point located at the mouth of the Omono River toward the north of the shallow water in the river center while being hit by following waves, tumbled over in the following sequence: Ship B got over the first river-mouth-wave about 1.8 m high near the river mouth; Ship B, then increased the speed to catch up with the ascending slope of the second river-mouth-wave ahead, about 2.0 to 2.4 m high, but it failed to stay on the ascending slope of the second river-mouth-wave; Ship B was forced to slide on the descending slope; Ship B was then pushed by the first river-mouth-wave approaching behind, and hit by the wave at the starboard stern; Ship B got caught in a broaching and tumbled over.

Since 1990, 50 capsize cases have occurred near river-mouths; 26 of them—about half—were caused by following waves; the significant factor in 9 of the 26 cases was broaching. In addition, among the 34 people who died in those cases, three wore life jackets and twenty-one didn't, while it is not known whether the remaining ten did or not.

Therefore, the following is required to prevent the accidents related to capsizing at river mouths:

1. Enhancement of safety awareness

   The Ministry of Land, Infrastructure, Transportation and Tourism, and the Japan Coast Guard should continue to make efforts to enhance safety awareness by holding orientation sessions or utilizing other occasions in order to take measures to cancel leaving port when wave conditions would worsen, or to evacuate to another port when the weather suddenly changes during navigation by fully obtaining information, such as weather forecasts.

2. Promulgation of information of navigational risks

   The Ministry of Land, Infrastructure, Transportation and Tourism, and the Japan Coast Guard should, by holding orientation sessions or utilizing other occasions, provide information on the following risks: navigation in following-wave situations near river mouths is difficult, where navigable areas are limited, and incoming waves grow taller and steeper, and break; therefore, there is a chance of broaching in the case of failure to stay on the wave ascending-slope.

3. Wearing of life jackets

   The Ministry of Land, Infrastructure, Transportation and Tourism, and the Japan Coast Guard should, by holding orientation sessions or utilizing other occasions, provide information on the wearing of life jackets during navigation near river mouths because it is hazardous for passengers to go overboard during a capsize, etc. due to the current flowing out of the mouth toward the sea.

4. Research and study

The Japan Coast Guard, for the purpose of preventing a reoccurrence of similar accidents related to capsizes at river mouths, and in order to find safe navigation measurer, should study as many actual cases as possible with regard to the physical states of river mouths, such as shallow waters or navigable areas, and wave conditions, as well as empirical accident-prevention rules used by the vessels regularly navigating through such river mouths, and should promote the sharing of the results of such studies among the parties concerned.

5. Safety measures by the master

The master should, for the purpose of safe navigation near river mouths, pay attention to the following:

(1) Safety measures for the prevention of capsizing

The master should comprehend the weather conditions and collect information of shallow waters and around river mouths, and in a situation where waves are high or predicted to go higher, refrain voluntarily from departing a river because navigation in following waves is accompanied by a higher risk of capsize, and also take other actions, such as seeking a safe shelter in a nearby port when proceeding toward the river from the offing.

{2} Wearing of life jackets

The master should guide persons on board to wear life jackets as much as possible to prepare for unexpected situations.

{3} Inspections prior to departure

The master should make a check inside the vessel prior to departure to confirm that the life-saving gear, including life buoys, is ready to use.

36. Sinking of fishing vessel YAMADA MARU No.2

(publicized on November 25, 2011)

It is probable that the accident occurred when the engine room was flooded with water carried by a wave hitting the boat with a height more than twice that of the significant wave height, because the engine room exit was open.

It is desirable, therefore, that ship-owners, etc. manage their ships and provide guidance to their crew members with regard to the following points, and that the crew members navigate while keeping them in mind:

1. In some cases where a ship is proceeding and being hit by consecutive waves, a high wave is likely to come in over the board and flood the ship, although it is unexpected in a normal situation.

2. Even a small amount of flooding water could cause a reduction of stability that could lead to a hull list; due to such a hull list, waves could consecutively come over board in the ship, resulting in sinking.
3. It is required, therefore, that, during navigation, exit doors, etc. on the deck should be closed always, except for entering or leaving; the doors open in such a case should be closed promptly.

37. Fatality and injury to riders on personal water craft RED PEARL

(publicized on November 25, 2011)

It is required that a personal watercraft operator, because navigation around estuary barrages is often restricted—navigation is banned in some cases—for such a reason that currents flow faster there, should confirm the situations around estuary barrages from the management authorities in charge or marinas near-by, comprehend the precautions, and keep off the restricted areas.

It is required, at the same time, that the operator and passenger should wear a proper and fitting life jacket.

38. Fatality to a rider on personal water craft MINPA

(publicized on November 25, 2011)

It is probable that the accident occurred, in a situation where a strong wind warning had been issued, while the personal watercraft was proceeding southward around the mouth of the Sagami River, when the personal watercraft operator and the passenger were thrown into the water, because the driver continued to proceed although recognizing ahead a wave of 1 to 2 m high.

It is desirable that a personal watercraft operator, while proceeding around the mouth of the Sagami River, take the following actions:

1. Collect the latest information on wave height around the river mouth from mariners near-by or by using the Internet.
2. Keeping in mind that the preservation of a passenger's life and safety depends on the operator's judgment, cancel the navigation in a situation where waves are high.

39. Collision between oil tanker SHINSUI MARU No.8 and fishing vessel SUMIYOSHI MARU No.8

(publicized on November 25, 2011)

It is probable that the accident occurred in the night hours when the vessels collided, because, on SHINSUI MARU No.8 (Ship A) in a two-men watch-keeping arrangement, when one of the watch keepers left the bridge for a scheduled look-around, the other watch-keeper failed to keep a proper look-out, and because, on SUMIYOSHI MARU No.8 (Ship B), Master B, alone on the steering wheel, failed to make a look-out; Master B, was wearing a life jacket and was, therefore, successfully rescued by a friend's fishing vessel.

Master B was rescued as follows: Master B, when Ship B tumbled over, evacuated Ship B though the steering room onto the water surface; Master B, while floating on the surface, on sight of the light of a vessel, blew a whistle equipped on his life jacket to inform of his existence; the master on a friend's fishing vessel, hearing the whistle, searched around, recognized the light reflected by the reflection tape on Master B's life jacket, and rescued Master B.

Because many accidents have occurred on small boats where crew and passengers fell overboard as a result of a collision with another vessel, that, for the purpose of assisting rescue operations of persons overboard and avoiding damage, crew and passengers, even if they are not obligated to wear life jackets, should wear life jackets when on the deck and as much as possible during work in the steering room, etc.

Note that the management and operating company of Ship A, in view of the fact that a situation of one-man-watch-keeping occurred even though Ship A adopted a two-men watch-keeping arrangement, has reviewed their safety management manuals, etc. to revise the scheduled look-around procedures and ensure two-men-watch-keeping, and has taken measures to improve safety operations.

It is desirable that management and operating companies of domestic vessels make efforts to improve safety operations of the vessels they manage, by making examinations on whether the bridge watch-keeping in the vessels they manage actually complies with their safety management manuals, etc, and by taking necessary remedial actions in a case where an unsafe element is found, through referral to the case described above.

40. Grounding of cargo ship KATSU MARU No.8

(publicized on November 25, 2011)

It is probable that, in the night hours, while the ship was entering Hososhima Commercial Port in rain, the accident occurred when the ship grounded on a rock near the east tip of Hososhima Saki Point.

It is somewhat likely that the radars and the GPS, although operative, were not properly used for making lookouts and that the master, following the conventional entering procedures, was proceeding with visual look-outs.

It is desirable that an operator, in the night hours or in rain, makes best efforts to precisely know the ship positions by utilizing radars and GPS plotters, in addition to visual look-outs.

41. Contact with light buoy by passenger ship EIKYU MARU No.8

(publicized on November 25, 2011)

It is probable that, while the ship proceeding west-southwestward off the south coast of Amakusa-kamishima toward the south offing of the south light buoy, the accident occurred when the ship collided with the light buoy, because the master on manual steering proceeded the ship without making lookouts, and failed to recognize that the ship was turning to starboard while putting its helm to starboard toward the south light buoy.

The findings of the investigation of the accident clearly show the following: the operator neglected to make lookouts, despite that being the basis of safety operations; in addition, Company A had been operating the ship without a chief engineer on board, although the boarding of a chief engineer is required by law; Company A had provided no safety education to its employees, and furthermore had not encouraged its employees to participate in safety orientations held by the administrative organs concerned.

It is probable, therefore, that Company A should make efforts to preserve the safety of its passenger-services through the following measures: making efforts to improve its employees' awareness of safety by encouraging its seamen to participate in safety orientations, etc. held by the administrative organs concerned, as well as providing education regarding safety operations within the company; adjusting crew-member-arrangement to ensure the arrangement of seamen required by laws and regulations, even in a case where a regularly serving seaman disembarks from the ship.

42. Grounding of dive boat SOUTHWARD PASSAGE II

(publicized on November 25, 2011)

It is probable that, while the vessel mooring at a diving point in Inanse in a situation where a thunderstorm, gale, and high-wave warning had been issued because of a typhoon approaching Ishigaki Shima (Ishigaki Island), the accident occurred in the following sequence: when a gusty wind of about 20 m/s from the bow direction hit the boat, the starboard bow anchor rope broke, and then, the port bow anchor lost contact with a rock; when the boat began to drift as it was pushed by winds toward Inanse, in order to move away from Inanse, the boat released the port stern anchor rope, put the starboard engine to ahead and the port engine to stern to make a port turn; the port stern anchor rope tangled with the port propeller, causing both the engines to become inoperable; the boat was pushed further, grounding on Inanse.

It is required, therefore, that for the purpose of preventing the recurrence of similar accidents, diving-service operators should manage their cruises paying attention to the following:

1. Operators should cancel a cruise when the heavy weather is expected because a typhoon is approaching near Okinawa Shima or because a weather advisory or warning has been issued.
2. Boats should avoid, as much as possible, anchoring where shallow waters, such as reefs, are located on the leeside.

43. Capsizing of angler tender boat SETO MARU

(publicized on November 25, 2011)

1. Compliance with operational rules

It is probable that the accident, when the vessel departed in a situation where a gale-on-sea warning had been issued, occurred in the following sequence: at about 5 to 6 m south-southeast of Suzu Shima (Suzu Island), the vessel was hit by the first big wave on the stern and was pushed toward the rock, her bow grounding on it; the vessel listed to starboard due to the backwash; immediately after, the vessel, hit by a big wave from stern, had flood water in the hull carried by the wave; the water, accumulated in the starboard side of the hull, caused further listing to the starboard side; then, the vessel tumbled over.

It is probable that the master routinely made a judgment of departure according to visual observations of winds or waves in spite of a gale-on-sea warning, which had been adopted as the criteria for cancelling a departure on operational rules. It is required, therefore, that ferry-service operators comprehend their operational rules, and comply

with them.

It is probable, in addition, that operators can preserve safety by prompting their passengers to be aware of safety by displaying their criteria for cancelling a departure or for return to their ports.

It is desirable that Wakayama Prefecture, in charge of the supervision of service-operators in Azashi Fishing Port, where the accident occurred, continues its efforts to inform and educate those operators of the preservation of passengers' safety by holding sessions or distributing leaflets, and enhance such activities by informing them of, and supervising them to comply with, the following:

(1) Service operators should collect, prior to departure, the latest weather information and sea conditions through MICS (Maritime Information and Communication System), etc. by mobile phones, etc., which is necessary to make a judgment on cancelling a cruise.

(2) Service operators should ensure the preservation of passengers' safety through examining their criteria for cruise-cancel and return-to-port on whether the characteristics of waves, winds, or geographical configurations in the destination areas are reflected in such criteria, reviewing those criteria, and taking necessary actions.

(3) Service operators, for the purpose of passengers' safety preservation, should display their criteria for cruise-cancel and return-to-port in the places for passengers to easily find, such as in the hull or in the waiting room.

It is desirable, in addition, that, in view of the findings of the investigation that some of the service operators had no knowledge of the criteria for cruise-cancel and return-to-port, or no knowledge of the operational rules, and that 6 accidents related to recreational fishing vessels occurred in the areas belonging to Wakayama Prefecture in the past 3 years, Wakayama Prefecture instructs the service operators to understand the details of the operational rules and comply with them, by such means as requesting report-submissions and executing inspections pursuant to the Article 24 of the Act for Coordination and Improvement of Recreational Fishing Guide Business.

2. Checking prior to departure

It is desirable that passengers, for the purpose of avoiding fishing under severe conditions, themselves confirm the latest weather information and sea conditions, and understand the service operators' criteria for cruise-cancel and return-to port.

It is desirable, in addition, that passengers, to preserve safety in a case of falling overboard, wear life jackets, and clothes that retain body heat, in such a way that such gear does not slip off the body, and carry a mobile phone with GPS features in a water proof case.

3. Wave effects

It is probable that the accident occurred when the vessel, hit by the big wave at the stern, tumbled over in a situation where, near the location of occurrence of the accident, consecutive waves about 3.0 m high at most were hitting the vessel.

It is desirable, because, in shallow water, like the location of the occurrence of the accident, the shape of a wave coming in from the offing, in some cases, will deform and rapidly increase in height regardless of its significant height as small as 2.0 m, and in other cases, consecutive waves as high as the maximum height come in and hit, leading to the risk of a small vessel tumbling, like the vessel in the accident hit by a big wave on the stern, that service operators navigate their vessels in the destination areas, taking care of waves by paying attention to the waves coming in from the offing.

44. Fatality to a crew member on fishing vessel FUDO MARU No.3

(publicized in December 16, 2011)

It is probable that, while the vessel, in a supporting role with a net-support-line taken on the port side of a drawing-net boat, was pulling-up launch No. 5 into the stern hanger, the accident occurred in the following sequence: because it was difficult for the vessel to change its heading freely according to its intention, the vessel failed to reduce its pitch motion caused by waves; as a result, the vessel's stern went up and down, causing the bow of launch No. 5, which was on the slipway, to pop-up; the c-type ring of the vessel separated from the c-type ring mounted on launch No. 5; the c-type ring and the released line hit Ordinary Seaman C, who was working at the starboard side of the stern hanger not surrounded by a protection fence.

It is probable that, because the pull-up work of launch No. 5 to the stern hanger in a situation where the vessel connected with a supporting role prevented the vessel from changing its heading freely, the vessel should have turned its heading to such a direction to allow the vessel to receive waves abeam at first, and then should have started winding the line.

It is probable, in addition, that, because it is dangerous to stand in an area unprotected by a fence within a hazardous zone of a jumping-back line in cases where a c-type ring separates from a c-type ring mounted on a launch, like in this accident, such a dangerous zone on a deck should be painted to draw attention, and in addition, the winding work should be initiated after confirming that no one is in such a dangerous zone.

45. Collision between cargo ship OCEAN SEAGULL and cement carrier SUMISE MARU No.2
(publicized on December 16, 2011)

It is probable that the accident occurred in the east offing of Yokohama City Fishing Pier, Keihin Ko, when OCEAN SEAGULL (Ship A), proceeding southward, and SUMISE MARU No.2 (Ship B), proceeding westward, collided because of no proper lookout on either ship.

It is probable that persons stationed on the bridge are requested to, by strictly following the stipulation regarding lookouts in the Act on Preventing Collision at Sea, execute continuous and proper lookout inside harbors in order to make a full appraisal of the risk of collision with other vessels, because persons stationed on the bridge are requested to react promptly and properly to changes in the movements of other vessels in harbors, where vessels change their movements to a greater extent due to the movements of vessels berthing at wharfs, than in outside-harbor areas, especially when another vessel is approaching and crossing its course.

It is desirable for the persons stationed on the bridge to share information through the application of a systematic means, such as the BRM method, and at the same time make conscious efforts of proactively exchanging information via VHF with other vessels so that such information exchange will be practiced on a regular basis.

1. Marine incident (navigation obstruction) of passenger ferry OSADO MARU
(publicized on December 16, 2011)

It is probable that the incident occurred because the port side reduction gear was kept used in a situation where the metal of the bow-side shaft bushes on the output shaft was severely abraded.

It is desirable that, for the purpose of the avoidance of similar damage to the shaft bush of a reduction gear, ship owners take the following measures:

1. The temperature of shaft bushes should be monitored while the main engine is in operation.
2. Shaft bushes should be inspected regularly.
3. Gaps between shaft bushes should be measured on the occasion of inspection, and, if the gap measurement exceeds recommended value for replacement, such measures should be taken as releasing the lower metal.
4. Inspection or maintenance records should be properly kept, and effectively referred to on the next occasion of inspection or maintenance.

It is somewhat likely that the following facts contributed to the occurrence of the incident: Company A's persons concerned, although knowing that the gap between the

shaft bushes had exceeded the recommended value for replacement, had left the maintenance management to a manager of the engine department; in addition, the maintenance information or knowhow had not been properly handed-over on the occasion of a transfer of manager in charge of maintenance. It is required that all the parties concerned on ship maintenance service business, including ship owners and ship-operation managers, as well as Company A, Company B, and Company D, make efforts to improve maintenance techniques through sharing maintenance-information and knowhow by facilitating communication between seaman and managers in charge of maintenance.

Appendix 29 Actions taken in response to recommendations in 2011

Actions taken in response to recommendations were reported with regard to two marine accidents in 2011. Summaries of those reports are as follows.

1. Injury to passengers on passenger ship AN-EI GO No. 98	
Summary of accident	At about 09:40 hrs, Thursday, April 30, 2009, while the ship, boarded by a master with an ordinary seaman and 28 passengers, was underway from Iriomote Shima (Iriomote Island), Taketomi Town, to Ishigaki Shiama (Iriomote Island), Ishigaki City, Okinawa Prefecture, two passengers suffered injuries when the ship pitched (moved up and down).
Recipient of recommendations	An-ei Kanko Co., Ltd. (Recommended on March 25, 2011)
Summary of recommendations	In view of the results of this accident investigation, for the purpose of ensuring passengers' safety, the JTSB makes the following recommendations to An-ei Kanko Co., Ltd. pursuant to Article 27, Paragraph 1 of the Act of Establishment of the Japan Transport Safety Board: 1. Safety education on the safety management manual The company should regularly provide its crew with proper safety education on the company's operation standards, putting emphasis on measures for safe operation while underway on rough seas, and ensure their compliance with the standards. 2. Development of and compliance with safety manual for navigation on rough seas taking into account actual operation In order to ensure implementation of its safety management manual, the company should review its safety measures on rough seas in terms of route, speed, use of seatbelt, instruction for passengers to move to a place with less ship motion, and so forth, taking into account the size and the cabin arrangement of the ship in service, to develop a safety manual for navigation on rough seas, provide education its crew about the manual, and ensure their compliance with it.
Response or actions taken	An-ei Kanko Co., Ltd. submitted an execution plan in response to the recommendations as shown below (December 5, 2011): 1. Execution plan of safety education on the safety management manual

	(The company should regularly provide its crew with proper safety education on the company's operation standards, putting emphasis on measures for safe operation while underway on rough seas, and ensure their compliance with the standards.) (1) The company will provide safety education with regard to the safe operation of a passenger ship. (2) The company will use the following education materials: a. DVDs Title: "Safe Operation: Learn from close-call experiences" Title: "Safe Operation: How to prevent human errors" Title: "Safe Operation: Small craft, high speed craft, and ultra high speed craft" Title: "Importance of drills," "Response to an emergency," "Customer service on a passenger ship" b. "Measures for safe operation of high speed passenger craft and safety of passengers in winter or on rough seas" dated on February 18, 2008 c. "Safe operation of high speed passenger craft in winter - for the safety and security of passengers" d. Safety Management Manual (including Navigation Standards, Work Standards, Accident-handling Standards, and others) (3) The company will hold safety sessions inviting lecturers with expertise in the maritime field and other transportation modes. (4) In order to assess the extent of the crew's understanding of safety management, the operation managers or their assistants will have interviews with the crew during a safety session to ask questions about the safety management manual. Note: {1} to {3} have already started, and {4} is scheduled to be implemented. 2. Execution plan for development of and compliance with safety manual for navigation on rough seas taking into account actual operation (In order to ensure implementation of its safety management manual, the company should review its safety measures on rough seas in terms of route, speed, use of seatbelt, instruction for passengers to move to a place with less ship motion, and so forth, taking into account the size and the cabin arrangement of the ship in service to develop a safety manual for navigation on rough seas, provide education its crew about the manual, and ensure their

	compliance with it.) (1) The company will, based on the "Measures for safe operation of high speed passenger craft and safety of passengers in winter or on rough seas," develop "Safety operation manual on rough seas," with the following attached: "Safety measures for passengers' safety on rough sea," on wearing seat belts and carrying out security patrol; and "Notes for navigation on rough seas," which is a collection of the standard route maps with specific notes inserted, for example, notes for jet-boat operation, wind directions when sailing on each route, and notes for navigation in high waves. Although the company has considered numerically specifying speed and course for their navigation, setting specific numerical values may cause other problems, such as the rudder effectiveness at the specified speed may not be sufficient in a certain weather condition, so the company has decided to develop the manual by mentioning what should be taken into account for each navigation route. (2) The company uses the manual as an education material in its safety sessions provided for its crew. (3) In order to assess the extent of the crew's understanding of the manual, operation managers or their assistants will have interviews with the crew during the safety session to ask questions about the manual. 3. Due date of completion report (1) The company will submit a completion report for items (1)to (4) of section 1, some of which have already been completed, by March 31, 2012. (2) The company will submit a completion report for items (1) to (3) of section 2 by March 31, 2012. (3) Documents and photos will be attached to each completion report for the proof of execution.

2. Sinking of recreational fishing vessel SHIBUSAKI No. 10	
Summary of accident:	At around 11:35 hrs, Saturday November 28, 2009, the vessel, boarded by a skipper with 12 passengers and a child in the skipper's family, sank when water flooded into the vessel out of an open end of a fishing pipe made through the hull bottom while proceeding near Hatsushima off the east shore of Lake Suwa west-south-westward to a surf-smelt fishing raft. All the persons on board were rescued by a sight-seeing boat cruising nearby and others; three of the passengers suffered contusions.
Recipient of recommendations:	Shibusaki Co., Ltd. (recommended on September 30, 2011)
Summary of recommendations:	In view of the results of this accident investigation, for the purpose of ensuring passengers' safety, the JTSB makes the following recommendations to Shibusaki Co., Ltd. pursuant to Article 27, Paragraph 1 of the Act of Establishment of the Japan Transport Safety Board: The company should raise their awareness of ensuring the safety of passengers and vessels, maintain the seaworthiness of the vessels it owns by having ship inspections properly, and take measures to make sure that passengers wear life jackets for their safety.
Responses or actions taken:	Summary of the completion report by Shibusaki Co., Ltd. in response to the recommendations (November 30, 2011) 1. The company should raise their awareness of ensuring the safety of passengers and vessels. (Implementation Report) (1) The company has specified important safety measures with the principle of safety first as follows: ◎The company has posted a notice of the important safety measures in the office ◎The company has circulated reports and documents about the accident among its employees to make them aware of the significance of the accident ◎The company hold a daily meeting and document it in a meeting report form. ◎The company checks its vessels prior to departure according to a checklist.

	◎ The company continue to encourage reporting incidents using a reporting form in addition to verbal reporting. (2) The company has carries out emergency drills. ◎ The company has held a discussion session on possible accidents using information publicized by the JTSB. ◎The company has held a lecture session to its employees using the booklets on the website of Japan Craft Inspection Organization, "For the safety of a recreational fishing vessel/angler tender boat," and "For prevention of capsize." ◎The company has held an emergency drill after regular work to make sure that staff members on stand-by are dispatched to the accident site and other staff members call to persons concerned using the emergency contact-list on receiving a report of accident on the lake. 2. The company should maintain the seaworthiness of the vessels it owns by having ship inspections properly. (Implementation Report) (1) Revision of the list of vessels the company owns ◎The company develop and update a list of vessels it owns, clearly showing the inspection due date of each vessel. (2) Development of vessel maintenance log ◎ The company develop a vessel maintenance log for each vessel it owns to record the history of repair or maintenance, and refer to it when the vessel is inspected. 3. The company should take measures to make sure that passengers wear life jackets for their safety. (Implementation Report) (1) Sign boards instructing passengers to wear life jackets. ◎Display sign boards in its office and at the pier entrance (2) The company instructs passengers, prior to boarding, to wear life jackets, and confirms that they have done after the completion of boarding. ◎Guidance at reception Instruction by a reception staff member Confirmation by a skipper prior to departure Confirmation and instruction on occasions of security patrols

Appendix 30　Actions taken in response to safety recommendations in 2011

Actions taken in response to the safety recommendations were reported with regard to one marine accident in 2011. A summary of it is as follows.

・Fatality to workmen involved with container ship KUO CHANG	
Summary of accident:	At about 07:36 hrs, May 20, 2009, while the ship was docking at Port Island Container Berth 18, a mooring rope moored onto a bitt on the berth broke, snapped back, and hit two workmen engaged in mooring work. Both of the workmen died.
Recipient of safety recommendations:	Marine Department, Hong Kong Special Administrative Region of the People's Republic of China (Marine Department, the Government of Hong Kong) (recommended on March 25, 2011)
Summary of safety recommendations:	The JTSB, based on the results of the accident investigation, recommends CHENG LIE NAVIGATION Co., Ltd. to consider the following and take necessary actions, and the Marine Department, the Government of Hong Kong to supervise the company mentioned above. The safety management manual prepared by CHENG LIE NAVIGATION Co., Ltd. requires inspections on the mooring equipment at berthing to confirm that such equipment is in good condition. In the case of the accident, judging from the state of wear to the forward spring line, it is highly unlikely that the line was in a “good condition,” as stated in the manual mentioned above. Therefore, it is recommended to clearly state and require to pay attention to the route of mooring ropes and the bitts for mooring them in order to prevent mooring ropes from touching corners to the extent possible, and obtain safe and effective mooring forces, as well as to place a person in charge to take command of operations in such a position from where he/she can acquire knowledge of the overall conditions of mooring ropes. At the same time, it is recommended to make all the ships under management comply with such requirements.

Actions taken in response to safety recommendations:	Summary of the response from the Marine Department, the Government of Hong Kong (Dated on May 5, 2011) Please be advised that the Administration will: (i) instruct the ship management company, Cheng Lie Navigation Co. Ltd., to take proper corrective and preventive actions for implementing the safety recommendations in order to prevent recurrence of similar accident to their fleet; (ii) conduct quality assurance inspection to the ship and the ship management company to ensure corrective and preventive actions are properly implemented; (iii) disseminate the lessons learnt from this accident to all Hong Kong registered ships and their management companies that the mooring ropes must be maintained in good condition. In addition, the crew shall pay attention to the lay out of mooring ropes during berthing operation to avoid creating sharp angles.

Appendix 31　Information provision during an investigation in 2011

There was one case (for marine accident) of information provision in 2011, which is summarized below:

・Fatality and injury to crew members on chemical tanker NISSHO MARU
(provided on August 4, 2011)

The JTSB provided the Marine Bureau, the Ministry of Land, Infrastructure, Transportation and Tourism, Japan with the following information related to a fatal accident to crew members on chemical tanker NISSHO MARU, which occurred on June 28, 2011.

(Factual Information):

The investigation is still underway and all the facts are yet to be identified, but the ongoing investigation so far has revealed that cleaning water containing hydrosulfide was poured into the slop tank with cleaning water containing acrylic acid. It is somewhat likely, therefore, that hydrogen sulfide gas was generated as a result of the mixture.

Different types of residue had been mixed in the slop tank storing cleaning water on the ship, and a similar practice was also found in chemical tankers belonging to other shipping companies.

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Japan Transport Safety Board
2-1-2, Kasumigaseki, Chiyoda-ku, Tokyo, 100-8918 Japan
Tel: +81-3-5253-8824　Fax: +81-3-5253-1680
E-mail: jtsb_international@mlit.go.jp
URL: http://www.mlit.go.jp/jtsb/english.html


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