

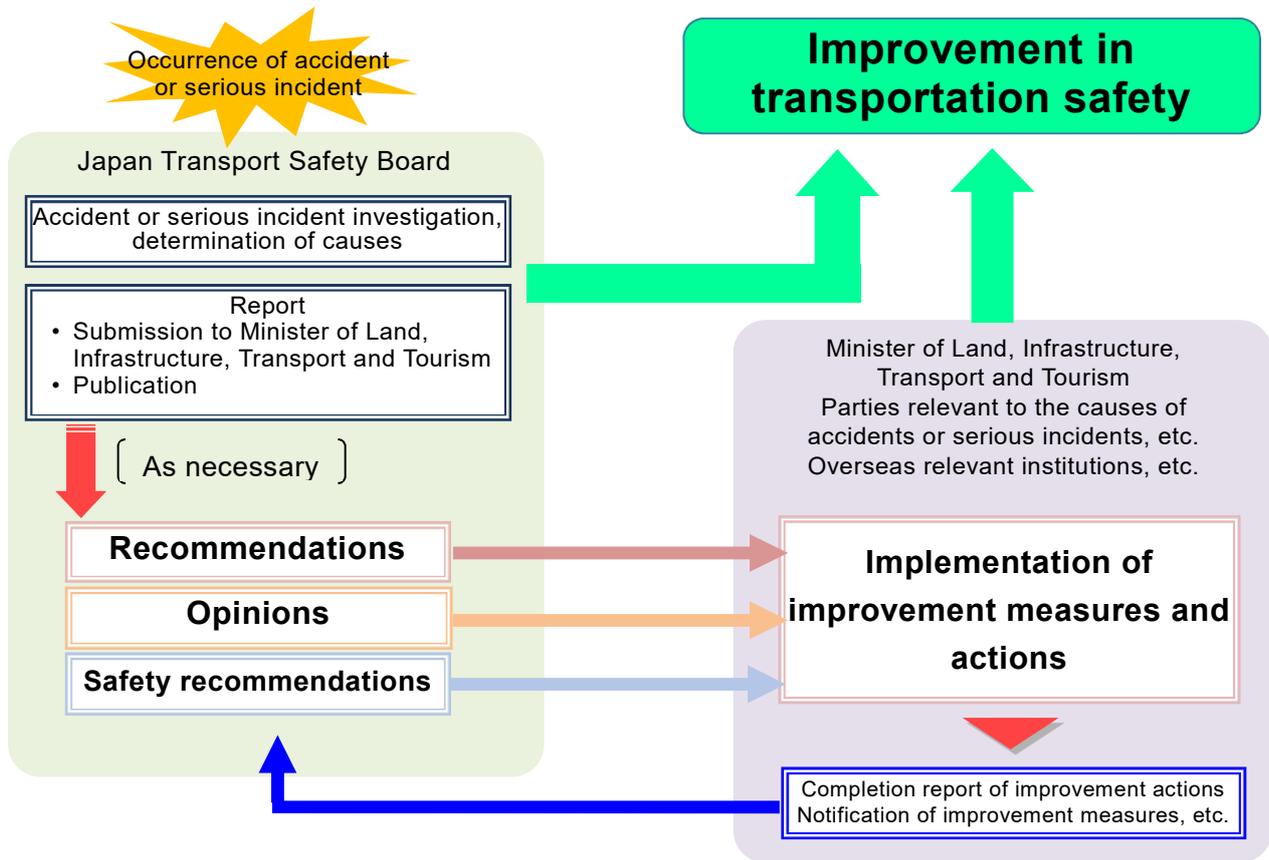
Chapter 2 Summary of recommendations and opinions issued in 2020

In order to fulfill the objectives of the law specified in Article 1 of the Act for Establishment of the Japan Transport Safety Board (hereinafter referred to as “Establishment Act”), the Japan Transport Safety Board has been established as an external bureau of the Ministry of Land, Infrastructure, Transport and Tourism based on the regulations of Paragraph 2, Article 3 of the National Government Organization Act (Article 3 of the Establishment Act). Its duty is to accurately conduct investigations identifying the causes of aircraft, railway, and marine accidents and serious incidents, as well as the causes of damage occurring due to those accidents and serious incidents, while also requesting required measures and actions to be taken by the Minister of Land, Infrastructure, Transport and Tourism or parties relevant to the causes of accidents or serious incidents, based on the results of its investigations (Article 4 of the Establishment Act).

The Japan Transport Safety Board has a system of "recommendations" and "opinions" as important systems along with accurate accident investigations in order to fulfill its mission of improving transportation safety. Specifically, the Japan Transport Safety Board has the ability to give recommendations to the Minister of Land, Infrastructure, Transport and Tourism or parties relevant to the causes of accidents or serious incidents, regarding measures that should be taken for the prevention of accidents or serious incidents, or for reducing their damage, based on the results of its accident investigations. The Minister of Land, Infrastructure, Transport and Tourism must provide notifications to the Japan Transport Safety Board on measures that have been taken based on its recommendations, and if parties relevant to the causes of accidents or serious incidents do not take measures in response to recommendations that have been given, the Japan Transport Safety Board has the ability to publicly disclose that fact (Articles 26 and 27 of the Establishment Act).

In addition to actions based on individual accident investigation results, if it is recognized to be necessary at an interim stage of investigations or from investigation results of multiple past accidents, the Japan Transport Safety Board has the ability to state its opinions to the Minister of Land, Infrastructure, Transport and Tourism or the directors of related government institutions regarding measures that should be taken to prevent accidents or serious incidents and to reduce their damage (Article 28 of the Establishment Act).

In the cases of aircraft and marine accidents and serious incidents, the Japan Transport Safety Board may provide recommendations (safety recommendations) on measures that should be taken quickly in order to improve safety, to related overseas institutions or parties as necessary in any stage of accident investigations, based on international treaties.



The recommendations and safety recommendations issued by the Japan Transport Safety Board in 2020 are summarized as follows.

1 Recommendations

(1) Collision of passenger ship GINGA with objects floating in the water

(Recommendations on March 26, 2020)

Summary of the Accident

Passenger ship GINGA, with its captain, chief engineer and two crew members as well as 121 passengers, was navigating westward on hydrofoils at about 41.7 knots off the eastern shore of Himesaki, Sado City, Niigata Prefecture on the way to Ryotsu Port also in Sado City, when the ship collided with floating objects at around 12:16, March 9, 2019. This resulted in the injuries of 108 passengers and one crew member.

This accident caused a breach in GINGA's starboard quarter.



Probable Causes

It is probable that, after GINGA passed through the deceleration zone located off the eastern coast of Himesaki, it accelerated and headed westward in a foilborne state, when the captain noticed floating objects in the direction of the port bow (front left side) of the ship and attempted to avoid a collision but was not successful. As a result, some objects probably hit the rear hydrofoil wing, resulting in many lumbar fractures among passengers.

It is probable that reason the captain could not avoid the collision is that, when he first identified them off the port bow, they had already approached beyond an avoidable distance.

The probable reason that he could not identify them until they were already so near was that the objects were submerged.

Regarding the probable cause of many passengers' lumbar fractures: After the rear hydrofoil was hit, the fuse pins sheered off, causing the rear hydrofoil to swivel backward with the points still attached to the ship body acting as pivot points. This lowered the stern and at the same time, the rear hydrofoil pulled the ship body into the sea due to the resulting resistance. As a result, it is probable that the bottom of the stern struck the sea surface, generating significant upward and backward acceleration resulting in a strong impact on the passengers.

Recommendations to the Minister of Land, Infrastructure, Transport and Tourism

This accident occurred after GINGA passed through the deceleration zone located off the eastern coast of Himesaki and was accelerating westward in a foilborne state. The captain noticed floating objects in the direction of the port bow (front left side) of the ship but failed to avoid a collision probably because they had already approached beyond GINGA's avoidable distance. As a result, It is probable that the floating objects struck the rear hydrofoil wing, resulting in many lumbar fractures among passengers.

It is probable that the passengers suffered lumbar fractures due to the impact from the bottom of the stern striking the sea surface.

The Ministry of Land, Infrastructure, Transport and Tourism's Maritime Bureau has already instructed jetfoil operators to take measures for collision avoidance. In addition to this, the necessity of further instructing to take effective measures in case of collision has been stressed to mitigate injury to passengers.

On the basis of the investigation results and to enhance transport safety, the JTSB recommends the following to the Minister of Land, Infrastructure, Transport and Tourism, pursuant to the provision of the Act for Establishment of the Japan Transport Safety Board, Article 26, Paragraph 1:

The minister should instruct jetfoil operators to take the following measures:

(1) The following measures must be taken to mitigate damage to passengers including lumbar fractures to the extent possible in case of collision with a marine animals, driftwood or other objects during the foilborne navigation of a jetfoil.

i) Shipowners should take into account the situation of passenger injuries including lumbar fractures resulting from this accident and take countermeasures such as ensuring that passenger

seats and seat cushions can adequately absorb a strong impact.

- ii) If marine animals, driftwood, or other objects have been detected in the vicinity of navigation route, or during periods when marine animals sightings are expected (e.g., seasonal migrations), ship operators should instruct elderly passengers to take their seats where the impact would be relatively mild such as the rear seats in a passenger compartment. This is due to the correlation between age and the bone density of the lumbar spine.
- (2) Shipowners must take measures such as placements of a shock-absorbing material in all seats to avoid injuries due to rapid decelerations in case of collisions with a marine animals, driftwood, etc. during foilborne navigation.
- (3) Ship operators shall develop written protocols and engage in regular crew training for cases in which many passengers have been injured so that rescues maybe conducted quickly and smoothly after accidents.

Measures based on the recommendations

The JTSB made recommendations to the Minister of Land, Infrastructure, Transport and Tourism on March 26, 2020, and received notification regarding the following measures having been taken based on the recommendations of December 16, 2020:

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

On March 26, 2020, the ministry sent an administrative guidance document to each jetfoil operator, requiring them to immediately take measures regarding the JTSB's recommendations to the minister.

- 1) To prevent collisions with marine animals, driftwood, etc. jetfoil operators must continuously ensure safety by utilizing the Japan Coast Guard's reports of sighting marine animals, driftwood, etc., a whale hazard map, information on whale sightings shared among operators, monitoring and underwater speakers (UWSs).
- 2) If a marine animal, driftwood, or other object has been sighted in the vicinity of navigation route, or during periods when such sightings are expected to increase (e.g., seasonal migrations), jetfoil operators and captains shall navigate their vessels at reduced speed to the extent possible to avoid collisions and mitigate impacts even in cases of collision. Jetfoil operators and captain shall review their deceleration zones when necessary while taking into account the current situation of similar accidents and reports marine life sightings, driftwood, etc.
- 3) When having judged that further navigation is difficult because of the risk of rear foil collisions with marine animals, driftwood or other object and the risk of a large impact on passengers, the ship operator shall immediately shift the navigation mode to full astern (reverse full speed), submerge the hydrofoils deeper and ease off on the throttle.
- 4) Even in cases of a collisions with marine animals, driftwood or other object during foilborne navigation, the following measures shall be taken to prevent injuries such as lumbar spine fracture to the extent possible:

i) Shipowners should take into account the possibility of passengers injuries including the lumbar fractures in this example and take countermeasures such as ensuring that passenger seats and seat cushions can adequately absorb impact.

ii) If a marine animal, driftwood, or other object has been sighted in the vicinity of a navigation route, or during periods when marine animals sightings are likely to increase, ship operators should instruct elderly passengers to take seats where collision impact would be relatively small such as the front seats of passenger compartments. This is due to the correlation between age and the bone density of the lumbar spine.

5) Shipowners must take measures such as placements of a shock-absorbing material in all seats to avoid injuries due to rapid backward decelerations in case of collisions with marine animals, driftwood, etc. during foilborne navigation. In order for passengers to keep an appropriate seating posture and to prevent them from colliding with the backs of the seats in front of them, the use of three-point seatbelts is recommended.

6) Ship operators and crew members shall keep passengers informed about the importance of fastening seatbelts and ensure their appropriate use.

7) Ship operators shall develop written protocols and engage in regular crew training for cases in which many passengers have been injured so that rescues maybe conducted quickly and smoothly after accidents.

* The contents of the notice are posted on the JTSA website.

https://www.mlit.go.jp/jtsb/shiphoukoku/ship-kankoku20re_20200326.pdf (Japanese only)

(2) Passenger ship Nankyu No. 10

(Recommendations on November 26, 2020)

Summary of the Accident

On December 2, with the captain, ordinary seamen and 55 passengers on board, passenger ship Nankyu No. 10 departed Nejime Port, Minamiosumi-cho, Kagoshima Prefecture and was taking a north-northwest course. At around 16:24, the ship encountered severe upward and downward pressures from incoming tidal waves. As the bow lifted, seated passengers were lifted upward and then slammed down onto their seats, resulting in 14 passenger injuries.



Probable Causes

It is probable that this accident occurred because passenger ship Nankyu No. 10 departed Nejime

Port in spite of weather and hydrographic conditions having reached the standards for departure and navigation cancellation conditions (specified by the safety management manual of Nankyu-Dock Co., Ltd.) and continued navigating outside the port at about 12 knots while taking a north-northwest course, which was further north from the standard navigation route. The bow of the ship was probably hit and lifted by oncoming tidal waves, which lifted the seated passengers upward and then slammed their buttocks down onto their seats, resulting in injuries.

It is probable that the ship continued navigating at 12 knots in the north-northwest direction, which was further north than the standard route, were twofold: Firstly, the captain probably believed that, despite the up-and-down motions, the ship could safely avoid the oncoming waves by making a series of left turns and navigating at a slower pace than that specified by the navigation standard table, secondly, although taking the north-northwest course would subject the ship to the oncoming wind and waves, it would prevent the ship from drifting toward the aquaculture facilities located to the west from the breakwater and lighthouse of Nejime Port.

It is probable that the captain considered the course to be safe probably because he did not consider the possibility of passengers being tossed violently upward from their seats and subsequently falling back down with such force that lumbar fractures would ensue.

It is likely that the reasons why the ship departed Nejime Port despite the bad weather and hydrographic conditions having reached the standards for departure cancellation conditions specified by the safety management manual of Nankyu-Dock Co., Ltd. were that the captain mistakenly believed that he could cancel departure only when the wind speed and wave height exceeded the standards for departure cancellation condition and also the operation management director left navigation the final decision on him. These factors are likely the cause of the accident.

Recommendations to the Minister of Land, Infrastructure, Transport and Tourism

It is probable that this accident occurred because Nankyu No. 10 departed Nejime Port despite weather and hydrographic conditions that had reached the standards for departure and navigation cancellation conditions specified by the safety management manual of Nankyu-Dock Co., Ltd and continued operations taking a north-northwest course (further north from the standard route), at about 12 knots outside the port. The ship was struck and lifted by oncoming tidal waves, which in turn caused passengers to be lifted above their seats and be slammed down, resulting in injuries.

It is probable that the ship continued navigating at 12 knots in the north-northwest direction, which was further north than the standard route, because the captain believed that, despite the up-and-down motions, the ship could safely avoid the oncoming waves by making a series of left turns and navigating at a slower pace than that specified by the navigation standard table and although he knew that taking the north-northwest course would subject the ship to the oncoming wind and waves, he thought that the course would prevent the ship from drifting toward the aquaculture facilities located to the west from the breakwater and lighthouse of Nejime Port.

It is probable that the captain considered the course to be safe probably because he did not consider

the possibility of passengers being tossed violently upward from their seats and subsequently falling back down with such force that lumbar fractures would ensue.

Among accidents published in the accident investigation reports of the JTSB from 2008 to October 2020, 15 involved small passenger ships (excluding hydrofoil boats) that navigated solo and their passengers suffered spinal injuries similar to those described above. In 11 of these accidents, the vessels were traveling at less than 22 knots.

It is probable that operators of small high-speed ships (excluding those of less than 20 tons in total tonnage and which attain speeds of 22 knots or more in service speed navigating only in horizontal areas) have been instructed by the Minister of Land, Infrastructure, Transport and Tourism to develop written protocols for navigation under wild weather and thoroughly implement accident prevention measures. However, instructions obligating measures for preventing similar accidents are also deemed necessary for passenger transportation business operators (referred to as “transportation business operators”) operating small passenger ships other than small high-speed ships.

Therefore, on the basis of the investigation results of the above accident and to ensure passenger transport safety, the JTSB recommends the following pursuant to the provision of Article 26, Paragraph 1 of the Act for Establishment of the Japan Transport Safety Board:

Recommendations

It is recommended that the Minister of Land, Infrastructure, Transport and Tourism should instruct transportation business operators to take the following measures:

1. Transportation business operators shall provide the following instructions to captains and relevant crew members:
 - i) When a ship oscillates due to wave impact, the operator shall decelerate to a speed that is adequate to prevent the passenger injuries.
 - ii) When significant up-and-down motions of a ship are anticipated with a strong wind and high-seas warning issued, the captain and relevant crew members shall guide passengers to take the suitable seats (e.g. rear seats in cases in which a ship’s center of gravity is located in its rear section) beforehand so that risks of being ejected from the seats and suffering violent impacts are minimal.
2. Transportation business operators shall recheck the possibility of topographical, tidal, tidal waves or heavy swell effects for standard routes, departure and arrival ports and share such information with captains and relevant crew members.
3. Transportation business operators shall regularly instruct captains and crew members to ensure compliance with the standards judgement as to whether departure and standard navigation are possible as specified by safety management manual.

(3) Accident of Excel Air Service Inc. Eurocopter AS350B3 (Rotorcraft)

(Recommendations on February 27, 2020)

Summary of the Accident

On Thursday, June 7, 2018, a Eurocopter AS350B3, registered JA350D, operated by Excel Air Service Inc., ditched near 41 km northwest of Naha airport while flying for Aguni airport after take-off from Naha airport, and sank in the sea. The pilot was seriously injured.

Probable Causes

In this accident, it is probable that NR of the main rotor was reduced during the flight and flight altitude became unable to maintain, which led to ditching at the excessive speed and descent rate and caused damage to the airframe, followed by sinking.

It is likely that the reduced NR of the main rotor was caused by some kind of malfunction occurring with engine system; however, it could not be determined in which section of the engine malfunction occurred and what caused it.

Recommendations to the Minister of Land, Infrastructure, Transport and Tourism

In this accident, it is highly probable that the helicopter, when ditching for emergency, ditched at an excessive descent rate and sank in the sea having damage to the Emergency Float and the airframe. The pilot, who did not put on a life jacket, was waiting for rescuers to come grabbing the Emergency Float in the sea, and he was found and rescued by a rescue helicopter about 13 minutes after the ditching.

It is necessary to sufficiently reduce speed and descent rate of aircraft in order to let the Emergency Float function in an effectual manner and to perform a stable ditching. It is predictable that, under the situation where such conditions is not met as in the case of this accident, a stable ditching is difficult to perform and crew members do not have enough time to exit after putting on life jackets.

In view of what is stated above, pursuant to the provision of Article 26 (1) of Act for Establishment of the Japan Transport Safety Board, the Japan Transport Safety Board recommends Minister of Land, Infrastructure, Transport and Tourism to take measures described below in order to prevent aircraft accident and to mitigate damage in the event of occurrence of aircraft accident.

Civil Aviation Bureau of Ministry of Land, Infrastructure, Transport and Tourism is to consider to request aircraft operators that all crew members on board wear life jackets when helicopters fly over a water area beyond the autorotation distance from the land.

Measures based on the recommendations

The Japan Transport Safety Board stated its opinion to the Minister of Land, Infrastructure, Transport and Tourism on February 27, 2020, and was notified on September 1, 2020 of the measures taken based

on the recommendations as follows.

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

Pursuant to the provisions of Article 62 of the Civil Aeronautics Act (Act No. 231 of 1952) and Article 150 of the Ordinance for Enforcement of the Civil Aeronautics Act (Order of the Ministry of Transport No. 56 of 1952), the Ministry of Land, Infrastructure, Transport and Tourism is mandating that helicopters flying over water be equipped with emergency floatation devices and life jackets for all crew members. However, the ministry has newly taken the following measures based on the recommendations:

- 1 The ministry has issued a notification titled “Safety Measures for Helicopters Flying over the Sea” (KOKU-KU-KOU No. 3111 on February 17, 2020) to helicopter operators and concerned bodies to instruct them to ensure the following:
 - i) Implementation of inspections, maintenance and captain’s pre-departure checks to ensure that all instruments and equipment including engine reliably function.
 - ii) Rechecks of emergency floatation device conditions, life jacket placements and emergency water landing procedures and their compliance
 - iii) Use of life jackets by all crew members as early as possible when flying above water in excess of autorotation distance from the shore
- 2 The Detailed Rules of the Operation Manual Examination Procedure (enacted on January 28, 2000, Kuko No. 78) was revised on July 31, 2020 and the following are required of air transport business operators using helicopters:
 - i) In case of a single-engine helicopters flying above water beyond a point where emergency on-shore landing by means of autorotation is possible, all members on board shall wear life jackets or their equivalent, excluding a medical condition in which this is difficult (i.e., due of emergency transport of a patient for example).
 - ii) In cases of a multi-engine helicopters flying above water at a distance equivalent to 10 minutes at normal cruise speed from land suited to an emergency landing, measures for ensuring the safety of all members on board shall be determined through risk analysis and assessment according to the operational situation to judge whether all should wear life jackets.
 - iii) In case of offshore operation of a helicopter (an operation using a sea-based facility or a ship heliport), all members on board shall wear life jackets or their equivalent, excluding a medical condition in which this is difficult (i.e., due of emergency transport of a patient for example).

* The contents of the notice are posted on the JTSB website

https://www.mlit.go.jp/jtsb/airkankoku/kankoku13re_020901.pdf (Japanese only)

(4) Accident of Gunma Prefectural Disaster Prevention Aviation Unit Bell 412EP (Rotorcraft)

(Recommendations on February 27, 2020)

Summary of the Accident

On Friday, August 10, 2018 around 10:01 JST (JST: UTC+9 hours; unless otherwise noted, all times are indicated in JST in this report on a 24-hour clock), a Bell 412EP, registered JA200G, operated by Gunma Prefectural Disaster Prevention Aviation Unit, took off from

Gunma heliport in Shimoauchi-machi, Maebashi City, Gunma Prefecture to explore and identify dangerous spots in preparation for rescue activities on the trails on the ridge lines of Gunma Prefectural border and crashed into the mountain slope in the vicinity of about 2 km northeast of Mt. Yokote in Nakanojo Town, Agatsuma County, Gunma Prefecture.

There were nine persons in total were on board, consisting of a captain, a mechanic A in charge, a chief air rescuer, an air rescuer and five firefighters, and all of them were killed.

The helicopter was destroyed, however, there was no outbreak of fire.

Probable Causes

In this accident, it is probable that, while flying over mountainous areas for exploration of mountain climbing trail, the helicopter entered the cloudy airspace and was unable to continuously recognize the ground surface due to lowered visibility, and the captain who was exposed to spatial disorientation could not perform an appropriate maneuvering to maintain the attitude of the Helicopter that subsequently crashed into the slope of the mountain.

It is probable that losing continuous visual recognition of the ground surface in the lowered visibility were caused by delayed decision to return and continuing flight in the situation that it was getting difficult to maintain VMC.

Recommendations to the Minister of Land, Infrastructure, Transport and Tourism

In this accident, it is probable that, while flying in mountainous areas for exploration of mountain climbing trail, the Helicopter entered the cloudy airspace and was unable to continuously visually recognize the ground surface due to lowered visibility that exposed the captain to spatial disorientation and disabled him to perform an appropriate maneuvering to maintain the attitude of the aircraft, which crashed into the slope of the mountain.

It is probable that the lowered visibility and losing continuous visual recognition of the ground surface were caused by delayed decision to return and continuing flight in the situation that it was getting difficult to maintain VMC.

Pilots operating aircraft for fire and disaster prevention and police rescue activities have many opportunities due to the nature of their missions to fly mountainous areas where meteorological conditions are easy to change and it is difficult to predict localized meteorological conditions. It is

important that, even in the case of abruptly worsened weather, pilots take appropriate actions to promptly leave air space in worsened weather conditions without being exposed to spatial disorientation. For that purpose, it is probable that pilots are required to regularly get acquainted with concrete preventive measures and coping ones by deepening understanding of danger in relation to spatial disorientation, to immediately switch to basic instrument flight, if required, and to properly use autopilot system, if equipped.

From what is described above, the Japan Transport Safety Board, pursuant to Article 26 (1) of the Act for Establishment of the Japan Transport Safety Board, recommends Minister of Land, Infrastructure, Transport and Tourism to take following measures in order to prevent an aircraft accident and to mitigate damage if an aircraft accident has occurred:

Civil Aviation Bureau of Ministry of Land, Infrastructure, Transport and Tourism should alert pilots operating aircraft engaged in rescue activities to danger of spatial disorientation and disseminate preventive measures not to be exposed to spatial disorientation, and coping measures to leave the situations if exposed to it by any chance.

(5) Accident of Toho Air Service Co., Ltd. Aerospatiale AS332L (Rotorcraft)

(Recommendations on April 23, 2020)

Summary of the Accident

While an Aerospatiale AS332L, registered JA9672, operated by Toho Air Service Co., Ltd., was flying from Arakura temporary helipad in Hayakawa Town, Minami-koma County, Yamanashi Prefecture, to Tochigi heliport for ferry flight, the tail rotor was separated from the airframe over Ueno-mura, Tano County, Gunma Prefecture, and the aircraft became uncontrollable and crashed around 14:29 JST on November 8, 2017.

Four crew members, consisting of a captain, a mechanic in charge and two mechanics were on board, and all of them were killed.

The aircraft was destroyed and there occurred the outbreak of fire.

Probable Causes

In this accident, it is highly probable that, when the Helicopter attempted an emergency landing due to abnormal vibrations occurring in the airframe in flight, the tail rotor was separated leading to loss of control and subsequent crash.

It is highly probable that the separation of the tail rotor from the airframe was caused by imbalanced rotation of the tail rotor due to the fracture of the spindle bolt of the flapping hinge of the White Blade, which generated excessive vibrations and damaged the section attached to the tail rotor.

It is highly probable that the fractured spindle bolt was caused by damaged and stuck bearings of the flapping hinge. Besides, it is highly probable that this resulted from the fact that the damaged

condition of the bearings was not grasped in inspections and maintenance work performed on the Helicopter and the appropriate measures were not taken.

Safety recommendations to the parties relevant to the causes of accidents or serious incidents

In this accident, the information on the malfunction of the flapping hinge of the white blade was not reported and appropriate maintenance was not performed in the disassembly maintenance work for the flapping hinge of the White Blade. Besides, the information issued by Airbus Helicopters with regard to the usage of the grease was not disseminated, and maintenance work in the event of parking at high temperature and high humidity was not thoroughly performed. It is probable that either case was related to the factors of the accident.

In the view of this accident investigation, in order to contribute to the prevention of recurrence of similar cases of accident, the Japan Transport Safety Board submits recommendations pursuant to the provision of the Article 27, paragraph (1) of the Act for Establishment of the Japan Transport Safety Board to Toho Air Service Co., Ltd. as follows:

- 1) In the event that malfunction including damage, which is not described in manual or the like of the designer and manufacturer, is found during maintenance inspection work, report to the designer and the manufacturer for their technical review, and take necessary measures for the malfunction in accordance with their instructions.
- 2) From technical point of the view, promptly review the malfunction information, notified in relation to caution in maintenance work that was notified by the designer and the manufacturer, and disseminate such information to mechanics on-site.

Measures based on the recommendations

The JTSB issued recommendations to Toho Air Service Co., Ltd. on April 23, 2020, and on September 1, 2020, received a report from them regarding the following measures taken in response to the recommendations:

○ Measures taken by Toho Air Service Co., Ltd. in response to the recommendations:

1 Progress of required measures

1-1 Regarding the recommendation: “In the event that malfunction including damage, which is not described in manual or the like of the designer and manufacturer, is found during maintenance inspection work, report to the designer and the manufacturer for their technical review, and take necessary measures for the malfunction in accordance with their instructions.”

(1) Newly established “Aircraft Maintenance Support Team” and “Maintenance Control Office”

To improve the maintenance organization for addressing malfunctions and ensure the integrity

of aircraft, the “Aircraft Maintenance Support Team” was newly established and the maintenance manual reviewed.

(Approval for the maintenance manual: January 30, 2020)

In the past, malfunctions of aircraft (including damage not described in the designer and manufacturer manuals) were handled by a division to which malfunctions are reported, such as the Management Division, but the “Aircraft Maintenance Support Team” was newly established as a maintenance division organization. Thus, a team system for centrally managing malfunctions has been established.

Moreover, the appendix of the maintenance manual was reviewed, the “Maintenance Control Office” for handling malfunctions found in maintenance work in general and an organization for comprehensively managing the “Aircraft Maintenance Support Team” were established. (Approval of the appendix of the maintenance manual: January 30, 2020)

(2) Revision of the work manual “Handling of Malfunctions Against Which Measures Based on Manufacturer’s Technical Data Are Difficult or Impossible”

A management system in which the Maintenance Management Division systematically handles malfunctions including damage not described in the designer and manufacturer manuals was stipulated in the appendix of the maintenance manual, and organizational handling methods for removing ambiguities in maintenance work were clarified.

(Approval of the appendix of the maintenance manual: January 30, 2020)

In cases in which a malfunction such as damage not described in the designer and manufacturer manuals that is difficult to handle occurs, the “Aircraft Maintenance Support Team” requests support from the Technical Affairs Division. The Technical Affairs Division reviews methods to repair the malfunction. If the division cannot find a repair method even armed with technical data, it reports the malfunction to the designer and manufacturer, requests their advice on a repair method and then reports the results to the Quality Assurance Office Head. When necessary, the Quality Assurance Office Head holds the Maintenance Management Division’s “maintenance technology review meeting.” Malfunction countermeasures reviewed by the Technical Affairs Division are transposed as work instructions via the “Aircraft Maintenance Support Team” to the site mechanics, who carry out the installation of these countermeasures.

Work manual (in-house manual; the same shall apply hereinafter) “Handling of Malfunctions Against Which Measures Based on Manufacturer’s Technical Data Are Difficult or Impossible (work evaluation records/entry manual)” was reviewed and revised (August 12, 2020).

(3) Ad-hoc training for all the members of the Maintenance Division

i) From November 30, 2018 to March 25, 2019, ad-hoc training was provided to all the members of the Maintenance Division to instruct them regarding the newly established “Aircraft Maintenance Support Team” and the work manual “Handling of Malfunctions Against Which

Measures Based on Manufacturer’s Technical Data Are Difficult or Impossible.”

ii) From December 10, 2018 to March 30, 2019, the company reviewed both its effectiveness and the level of comprehension of it on all the members of the Maintenance Division.

iii) From February 20 to May 29, 2020, the company provided ad-hoc training regarding the appendix of the maintenance manual revised according to an order to improve business operations and reviewed both its effectiveness and the level of comprehension of it on all the members of the Maintenance Division.

1-2 Regarding the recommendation: “From technical point of the view, promptly review the malfunction information, notified in relation to caution in maintenance work that was notified by the designer and the manufacturer, and disseminate such information to mechanics on-site.”

(1) From April 1 to May 1, 2020, the company implemented research and reviews of the “prompt technical review of maintenance-related information (such as points to note) pointed out by designer and manufacturer and alerting the site mechanics to such information” and took the following corrective measures.

i) Current situation of technical review and information sharing

As a result of current situational research from April 1 to 7, 2020, it was found that information such as maintenance alerts from designer and manufacturer consisted of ASB, SB, LETTER, NOTICE, etc., and it was confirmed that important aircraft malfunction notifications (ASB and SB) were technically reviewed promptly and shared appropriately among the site mechanics as maintenance information.

Regarding the technical review and sharing of “other maintenance information or maintenance alerts (LETTER and NOTICE),” it was found that their handling of alerts based on the maintenance manual was unclear.

ii) Improvements in technical reviews and information sharing

From April 8 to 30, 2020, as a result of reviewing methods of improving technical reviews and information sharing of “other maintenance information or maintenance alerts (LETTER and NOTICE),” the existing work manual “In-House Technical Information Handling Manual (Toho maintenance information sharing standard)” was revised (May 1, 2020) to establish a system for promptly and systematically carrying out technical reviews and sharing the maintenance information among site mechanics.

(2) From June 16 to 29, 2020, e-learning regarding the revisions of the “In-House Technical Information Handling Manual (Toho maintenance information sharing standard)” was implemented for all members of the Maintenance Division and their level of comprehension of the revised manual was checked.

* The contents of the notice are posted on the JTSCB website

https://www.mlit.go.jp/jtsb/airkankoku/kankoku15re_020901.pdf (Japanese only)

2 Opinions

No opinion was issued in 2020.

3 Safety Recommendations

(1) Collision Accident between Cargo Ship SM3 and Oil Tanker KOUTOKU MARU

(Safety Recommendations on January 30, 2020)

Summary of the Accident

While cargo ship SM3, with a master and 9 crew members on board, was proceeding north-northeast bound for Pohang Port, Republic of Korea, in Wakamatsu Passage of Kanmon Port, and while oil tanker KOUTOKU MARU, with a master, boatswain and 6 crew members on board, was proceeding southeast bound for Setonaikai in No. 2 Kanmon Passage of Kanmon Port, both vessels collided at around 14:55 on September 29, 2018, after having just entered Kanmon Passage.

SM3 suffered denting of her shell plate on her port fore side and port aft side, and KOUTOKU MARU lost her starboard anchor and suffered denting of her bulbous bow, etc.; however, there were no casualties or injuries on either vessel.

Probable Causes

It is probable that the accident occurred because, while SM3 was traveling eastward from Wakamatsu Passage to Kanmon Passage and KOUTOKU MARU was traveling southeastward from No. 2 Kanmon Passage to Kanmon Passage in a situation whereby the courses of both vessels would cross in Kanmon Passage, the master of SM3 intended to turn to the left and pass the bow of KOUTOKU MARU and boatswain of KOUTOKU MARU was maintaining the same course and ship speed, as a result of which both vessels collided.

It is probable that the master of SM3 intended SM3 to turn to the left and pass the bow of KOUTOKU MARU because of the possibility that he wanted to move ahead of a cargo ship proceeding northwest in Kanmon Passage and because he had the experience that other vessels kept out of the way of SM3 when he called their names by VHF wireless telephone, and that, at the time of the accident, the master of SM3 similarly thought that KOUTOKU MARU would turn to the right and avoid SM3 by passing off her stern.

It is probable that boatswain of KOUTOKU MARU was maintaining the same course and ship speed because, according to the navigation rules of Kanmon Port in the Ordinance for Enforcement of the Act on Port Regulations, SM3 was in a position whereby she had to keep out of the way of KOUTOKU MARU, and thus he was expecting SM3 to eventually avoid KOUTOKU MARU and diverted his attention to responding to a total three calls by VHF wireless telephone.

Safety recommendations to the parties relevant to the causes of accidents or serious incidents

It is probable that this accident occurred because, while the cargo ship SM3 was traveling eastward from Wakamatsu Passage to Kanmon Passage and the oil tanker KOUTOKU MARU was traveling southeastward from No. 2 Kanmon Passage to Kanmon Passage in a situation whereby the courses of both vessels would cross in Kanmon Passage, the master of SM3 intended to turn to the left and pass the bow of KOUTOKU MARU while the boatswain of KOUTOKU MARU maintained the same course and ship speed, as a result of which both vessels collided.

It is probable that the master of SM3 turned to the left toward the path of KOUTOKU MARU because he intended SM3 to go ahead of a vessel proceeding northwest in Kanmon Passage at the time of the accident and because it was his experience that other vessels kept out the way of SM3 when he called their names by VHF wireless telephone and thus, at the time of the accident, probably he again thought KOUTOKU MARU would turn to the right and avoid SM3 when he called KOUTOKU MARU's name by VHF wireless telephone.

In view of the result of this accident investigation, the Japan Transport Safety Board recommends that SEMYUNG SHIPPING CO., LTD. (Republic of Korea), which is the owner and the management company of SM3, take the following countermeasures for the purpose of preventing the occurrence of a similar accident and reducing damage:

SEMYUNG SHIPPING CO., LTD. (Republic of Korea) shall provide thorough instruction to masters of its vessels to unfailingly execute the following measures and shall also implement training in accordance with said measures:

- (1) Masters and duty watch persons should utilize information provided by the Vessel Traffic Service Center, etc., effectively. In particular, they should give immediate attention to dangerous situations based on the content of warnings from the Center, etc., and respond appropriately.
- (2) Masters and duty watch persons should navigate in accordance with rules that are established for the navigational area. In particular, when communicating with approaching vessels becomes necessary, they should not only call the vessel's name but also implement VHF wireless telephone communication proactively and mutually confirm the maneuvering intentions.