

AA2009-5

**AIRCRAFT ACCIDENT  
INVESTIGATION REPORT**

**OGAWA AIR INC.**

**J A 9 7 5 5**

**June 26, 2009**

**Japan Transport Safety Board**

The investigation for this report was conducted by Japan Transport Safety Board, JTSB, about the aircraft accident of OGAWA AIR INC., AEROSPATIALE AS350B registration JA9755 in accordance with the act for Establishment of the Japan Transport Safety Board and Annex 13 to the Convention on International Civil Aviation for the purpose of determining causes of the aircraft accident and contributing to the prevention of accidents/incidents and not for the purpose of blaming responsibility of the accident.

This English version of this report has been published and translated by JTSB to make its reading easier for English speaking people who are not familiar with Japanese. Although efforts are made to translate as accurately as possible, only the Japanese version is authentic. If there is any difference in the meaning of the texts between the Japanese and English versions, the text in the Japanese version prevails.

Norihiro Goto,  
Chairman,  
Japan Transport Safety Board

# AIRCRAFT ACCIDENT INVESTIGATION REPORT

OGAWA AIR INC.  
AEROSPATIALE AS350B (ROTORCRAFT), JA9755  
SEA SURFACE OFF CAPE OMASAKI  
OMA-CHO, SHIMOKITA-GUN, AOMORI PREFECTURE  
AT ABOUT 11:45 JST, JULY 6, 2008

June 12, 2009

Adopted by the Japan Transport Safety Board (Aircraft sub-committee)

Chairman	Norihiro Goto
Member	Yukio Kusuki
Member	Shinsuke Endo
Member	Noboru Toyooka
Member	Yuki Shuto
Member	Akiko Matsuo

# 1. PROCESS AND PROGRESS OF THE AIRCRAFT ACCIDENT INVESTIGATION

## 1. 1 Summary of the Accident

An Aerospatiale AS350B, registered JA9755, operated by Ogawa Air Inc., took off from the Aomori Airport at 11:16 JST (UTC+9H)<sup>1</sup>, July 6, 2008 for an aerial TV coverage, crashed into the sea and sunk off Cape Omasaki on Shimokita Peninsula.

On board the Aircraft were a pilot in command and three other passengers. Of which two of them died and the remaining two went missing.

The aircraft was destroyed, but no fire broke out.

## 1.2 Outline of the Accident Investigation

### 1.2.1 Investigation Organization

Aircraft and Railway Accidents Investigation Commission (ARAIC) designated an investigator-in-charge and two other investigators for the accident on July 6, 2008.

### 1.2.2 Representatives from Foreign Authorities

A representative from France, the state of design and manufacture, participated in the investigation.

### 1.2.3 Implementation of the Investigation

June 7-12, 2008	On-sight investigation and wreckage investigation
June 17, 2008	Engine and main gearbox investigation and interview
June 29, 2008	Interview
June 30-31, 2008	Document investigation

### 1.2.4 Comments from the Parties Relevant to the Cause of the Accident

Comments were invited from the parties relevant to the cause of the accident. But the comment was not invited from the pilot in command (PIC) due to his decease.

### 1.2.5 Comments from the Participating State

Comments were invited from the participating state.

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<sup>1</sup> Unless otherwise stated, all times are JST, based on a 24-hour clock.

## **2. FACTUAL INFORMATION**

### **2.1 History of the Flight**

On July 6, 2008, an Aerospatiale AS350B operated by Ogawa Air Inc. (hereinafter referred to as “the Company”), registered JA9755 (hereinafter referred to as “the Aircraft”), left its base on the Akita Airport (hereinafter referred to as “the Akita Base”) to the Aomori Airport for an aerial TV coverage of a Japan Maritime Self-Defense Force’s ship (hereinafter referred to as “the Ship”) which had a fire incident off Cape Shiriyasaki early morning that day. The Aircraft was refueled after the landing at the airport. It took off at 11:16 with the pilot in command (PIC) in the right seat and the pilot whose assigned mission was to watch (hereinafter referred to as “the Pilot A”) in the left seat, a reporter and a cameraman in the rear seats. The last telephone call was made from the Aomori Airport saying that the Aircraft would take off at 11:20 for the duration of three hours.

The Aircraft’s flight plan submitted to the Sendai Airport Office, Tokyo Regional Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism was outlined below:

Flight rules: VFR, Departure Aerodrome: Aomori Airport, EOBT: 11:20,  
Cruising speed: 100kt, Cruising altitude: VFR, Route: Shiriyasaki point,  
Aomori, Destination Aerodrome: Aomori Airport, Total EET: 3 hours,  
Endurance: 3 hours 30minutes.

#### **2.1.1 History of the Flight Based on ATC Radar Track Records**

The Air Traffic Control Radar at the Hakodate Airport picked up the Aircraft and recorded both flight track and altitude on and after 11:18:20 (two minutes after its takeoff) until 11:44:04. The Aircraft flew along the east coast of Tsugaru Peninsula to Kanita, changed directions there to the north-east and crossed the strait of Tairadate, reached Cape Hokkaimisaki and flew north along the west coast of Shimokita Peninsula to the waters off Cape Omasaki. It flew near Gankakeiwa cliff to be described in 2.1.2(1) around 11:39.

(See figure 1 “Estimated Flight Route”)

#### **2.1.2 Statements of Eyewitnesses**

The Aircraft’s flight over Saimura, Oma Town and near Cape Omasaki was described by eyewitnesses as follows.

(1) Eyewitness A

I was in the parking lot near Gankakeiwa cliff located about 15 km south-south-west of Cape Omasaki. I saw the Aircraft around 11:30.

The weather condition then was fog and visibility was below 200 m and the sea was very calm. A white helicopter with a red stripe came from the south and flew to the north along the coast. I thought it was flying confirming the coast line due to the bad weather. I didn't think the Aircraft's flight was unusual. The helicopter's altitude was about 100 m. It was about 100 m away from me.

(2) Eyewitness B

Around 11:30, I arrived at the breakwater located about 500 m south-west from Cape Omasaki and started fishing. When I heard the sound of a helicopter, I saw a white helicopter flying 700 m to 800 m offshore among masses of fog at about the same height of my eye toward Cape Omasaki. It was visible for about 10 seconds. It disappeared into a fog and I heard a boom right after that. I talked with the Eyewitness C and we agreed on the crash of the helicopter. It was 11:45 when I reported the police of the crash using my cell phone.

The sea was dead calm then. The visibility to the south was good. I could see, not clearly though, the ferry pier. The visibility to Bentenjima Island (to the north) appeared to be about 800 m.

(3) Eyewitness C

When I was fishing sitting on a wave-dissipating concrete block, the Eyewitness B showed up. I left there and climbed up the breakwater. I heard the sound of a helicopter coming from left (the south) and I spotted a white helicopter. Within one or two seconds, it flew into a fog and became invisible and I heard a boom. I consulted this with the Eyewitness B and he made an emergency call to the police. When I saw the helicopter I didn't recognize a red stripe. I think I got its rear view, not side view. I guess it was turning left to get out of the fog avoiding the Omasaki-Bentenjima light house ahead on Bentenjima Island.

The sea was dead calm and wind was calm.

The accident occurred around 11:45 July 6, 2008, on the sea surface (41°33.11'N, 140° 54.23'E) about 700 m south-west from the Omasaki-Bentenjima light house. (See figure 1 "Estimated Flight Route")

## 2.2 Deceased and Missing Persons

The PIC and the Pilot A were found deceased and two passengers went

missing.

## **2.3 Damage to the Aircraft**

### **2.3.1 Extent of Damage and Fire**

The Aircraft was destroyed but no fire broke out.

### **2.3.2 Damage to the Aircraft Components**

Fuselage: destroyed

Landing gears: broken

Main rotor hub and blades: broken

Main gearbox: broken

Engine: damaged

Tailboom: broken

Tail gearbox and tail rotor blades: unknown (because they were not salvaged)

## **2.4 Other Damage**

None

## **2.5 Personnel Information**

(1) PIC Male, Age 57

Commercial pilot certificate (Rotorcraft)

Issued on June 9, 1978

Rating: SOLOY 47

Issued on April 26, 1983

Class 1 aviation medical certificate

Validity

February 20, 2009

Total flight time

4,981 hours 41 minutes

Flight time in the last 30 days

7 hours 25 minutes

Total flight time on the type of aircraft

942hours 08minutes

Flight time in the last 30 days

7 hours 25 minutes

(2) Pilot A Male, Age 43

Commercial pilot certificate (Rotorcraft)

Issued on December 12, 1989

Rating: Land Single-Turbine

Issued on March 2, 1990

Class 1 aviation medical certificate

Validity

May 23, 2009

Total flight time

2,608 hours 49 minutes

Flight time in the last 30 days

14 hours 05 minutes

Total flight time on the type of aircraft	596 hours 42 minutes
Flight time in the last 30 days	14 hours 05 minutes

## 2.6 Aircraft Information

### 2.6.1 Aircraft

Type	Aerospatiale AS350B
Serial number	2093
Date of manufacture	April 25, 1988
Certificate of airworthiness	No. Dai-19-864
Validity	February 14, 2009
Category of airworthiness	Rotorcraft, Normal category N / Special category X
Total time in service	2,302 hours 59 minutes
Time in service since last periodical check (TA Check, February 4, 2008)	80 hours 07 minutes
(See Figure 3 “Three angle view of AS350B”)	

### 2.6.2 Engine

Type	Turbomeca Ariel 1B
Serial number	4132
Date of manufacture	February 19, 1988
Total time in service	2,674 hours 20 minutes
Time in service since last periodical check (TA Check, February 4, 2008)	80 hours 07 minutes

### 2.6.3 Weight and Balance

The weight of the Aircraft at the time of the accident was estimated to be approximately 1,858 kg, with the position of center of gravity at 3.30 m aft of the reference point. It is estimated that both of them were within the allowable limits. (cf. Maximum certified weight is 1,950 kg. Allowable center of gravity range corresponding to this weight is between 3.18 m-3.44 m in longitudinal axis.)

### 2.6.4 Fuel and Lubricating Oil

The fuel was JET A-1. The lubricating oil was Mobile Jet Oil II.

## 2.7 Meteorological Information



### **2.7.1 Information Provided by Eyewitnesses**

(1) The Eyewitnesses B and C at the breakwater at Cape Omasaki stated on the weather and the marine condition near the accident site as follows.

It was cloudy and wind was calm. A dense fog covered the area. The sea was dead calm. The ferry pier about 2 km away from the breakwater was faintly visible.

(2) A person who heard a boom on the west coast of Bentenjima Island stated that the visibility was about 50 m.

(3) A person who heard a crashing sound in an inn near the north end of Cape Omasaki stated that the area east of Bentenjima Island was covered by fog and visibility was very poor, 70 m to 80 m, however, in the area west of the island it was possible to see the partial sky.

### **2.7.2 Weather Observation by Ferries and the Ship**

(1) Weather information observed by ferries

a. The Ferry A cruising 3.4 nm east of Myojinsaki on Tsugaru Peninsula at about 11:26.

Weather - fog; north-west wind at 2 m/s; visibility - 800 m.

b. The Ferry B in Oma port at about 11:25.

Weather - fog; calm wind; visibility - 3 km

(2) The Ship cruising about 7 km west of the accident site at about 11:45.

Weather - fog; north-east wind at 4 kt; visibility - 100 to 500 m

### **2.7.3 General Weather Outlook and Dense Fog Advisories Issued by Aomori Local Weather Observatory**

(1) General weather outlook (04:52 July 6, 2008)

It will be fair and cloudy in Aomori prefecture. Due to high pressure system over Aomori prefecture it will be a fine day in most places; however, sporadic shower is expected in the mountainous area in the afternoon.

(2) Dense fog advisory over Shimokita area

Issued at 20:21 July 5, 2008

Dense fog advisory (first issue) for Shimokita area

Dense fog until noon July 6

Visibility less than 100 m on land, less than 500 m on the sea

Renewed at 10:52 July 6, 2008

Dense fog advisory (continued) for Shimokita area

Dense fog until noon July 7  
Visibility less than 500 m on the sea  
(See Figure 1 “Estimated Flight Route”)

## **2.8 Communications**

The communication between the Aircraft and the related air traffic control organizations exhibited no anomalies. At 11:18 the Aircraft established a contact with the Aomori Airport Control Tower and expressed its intention to leave its control zone. No further contacts with the air traffic control organizations were made thereafter.

## **2.9 Information on Accident Site and Wreckage**

### **2.9.1 Accident Site**

The accident site was located on the sea surface about 700 m south-west from the Omasaki-Bentenjima light house. At the time of the accident, the tidal current was running 4 to 5 kt from south-west to north-east. The aircraft was salvaged from the rock seabed of about 13 m deep.

The fuselage rested with its left side on the bottom orienting to the north-north-west. The tailboom, separated from the fuselage, rested about 200 m away to the north.

### **2.9.2 Detailed Information on Damages**

#### **(1) Fuselage**

Parts covering its nose section to the forward bulkhead (windshield, instrument panel and ceiling) were separated from the fuselage. The cabin floor was deformed and was separated along the connecting part with the forward bulkhead. Right and left floor support beams were separated from the floor panel a little forward of the above mentioned part exhibiting the force applied upward. The fuselage lower skin was missing and the control rods situated under floor were damaged. The fuselage lower skin forward of the tailboom connecting part was pushed inward to a great extent. In general the left side exhibited greater damage than the right side; the left aft cargo compartment floor was bulged upward; however, the right cargo room floor exhibited no deformation.

The left cyclic grip was fractured. The collective lever was at the lowest position. Only base of right cockpit seat remained attached. The left cockpit seat was damaged as if its base had been squashed and its seat back was broken into two pieces and bent

backwards.

(2) Landing gear

Both skids were snapped and lost at the area forward of forward cross tube connections. The broken surface of the right skid exhibited the force applied from the left, which caused snapping.

(3) Main rotor hub and blades

Each main rotor blade is attached to the mast via Starflex sleeve flange.

The sleeve flange to which a yellow blade is attached exhibited conditions of splintered bamboo stalk and the star arm was destroyed. The blade was broken at the point 1.5 m from its root. A part of leading edge 1.4 m from the blade tip had dents with blue paint scratches.

The sleeve flanges of blue and red blades were not broken. Both star arms were damaged at their spindles. Both blades were broken at points 1.5 m and 1.6 m from blade tips respectively.

(4) Main gearbox and mast

The main gearbox is installed to the fuselage with four rotor mast support struts and flexible suspensions. Due to the damages to these installations, the main gearbox (the mast inclusive) was separated from the fuselage. Left attaching point of the flexible suspension sunk slightly into the engine deck.

The magnesium gearbox case bulged inward due to the corrosion caused by salt water and blocked gear rotations. By removing the bulging corrosion after the gearbox tear-down it was confirmed that the gears and the mast were operational without seizure.

The mast exhibited no damage. The swashplate was placed near the upper limit and was almost rectangular to the axis of the mast, not leaning to any particular direction.

(5) Engine

The engine remained attached to the fuselage and those parts such as the engine case, the air inlet and the exhaust pipe were not deformed. The gas producer turbine and the power turbine was confirmed to be rotated without seizure.

The gears in the engine gearbox rotated without seizure and the clutch mechanism was confirmed intact.

(6) Tailboom

The tailboom was detached from the fuselage. When viewed from aft and upside is assumed 12 o'clock, the circular connection to the fuselage exhibited expansion

in the range of 11:30 to 5:30, while remaining half exhibited compression.

Right forward side of the tailboom had an about-3 m-long linear collapse hit by something long along the tailboom longitudinal axis and a small area of blue paint about 1.4 m from the aft end of the collapse was peeled off.

The aft end portion of the tailboom with a length of about 1.4 m was detached. This portion, which holds a tail rotor gearbox and an upper vertical fin, was not salvaged.

(See Pictures 1 “ Accident Aircraft (bottom fuselage) ” , 2 “ The aircraft (upright position) ” , 3“ Mainrotor hub and blades ” , 4“ Tailboom connecting part ” and 5“ Damaged tailboom ” )

## **2.10 Medical and Pathological Information**

The medical information provided by the Aomori Coast Guard Office of Japan Coast Guard (JCG) was as follows:

The PIC and the Pilot A's causes of death were drowning. Both crew's blood sample tested no trace of drugs.

The PIC's right knee, left knee and the thigh bones were broken. No broken bones were found in his upper limbs.

The Pilot A's right wrist bone, left upper limb bone and both ankle bones were broken. Among them both ankle bones were fractured.

## **2.11 Information on Search and Rescue Operations**

(1) The general development of the search and rescue operations

Sometime between 11:45 and 11:47, July 6, the Eyewitness B at Cape Omasaki made an emergency call to the Aomori Police Headquarters, stating that a helicopter seemed to have crashed near Cape Omasaki.

At 12:09, this information was transferred to the Tokyo Rescue Coordination Center (hereinafter referred to as “the Tokyo RCC”) via the JCG Headquarters Operations Center and then the Tokyo RCC started the search and rescue services. The search and rescue operations on the spot began around 12:30.

Around 17:50, July 7, the headset with the Aircraft registration number and the ID card of one of the passengers were salvaged off Cape Shiriyasaki, which is located about 50 km east-south-east of Cape Omasaki.

Around 6:10, July 9, part of the fuselage and the Pilot A's body were salvaged from the seabed located about 700 m west-south-west of the Omasaki-Bentenjima light

house off Cape Omasaki.

Around 6:30 through 8:10, July 10, the Aircraft was salvaged from the seabed.

On July 14, due to no additional information expected, the search and rescue services were terminated at 17:15.

Around 15:45, July 15, the PIC's body was salvaged off Higashidorimura village which is located about 60 km south-east of Cape Omasaki.

(2) Ships and aircraft mobilized for the search and rescue operations

Date	JCG		JMSDF		PP		Prefectural Helicopters	Fishing Boats
	Ships	Aircraft	Ships	Aircraft	Ships	Aircraft		
July 6	4	5	2	1	1		1	8
July 7	3	2		3	1	1	1	23
July 8	4	2	3	2	1	1	1	5
July 9	4	2	3	4	1	1	1	5
July 10	4	2	1	1	1			
July 11	3		1		1			
July 12	3	2			1	1	1	
July 13	1	1				1	1	
Total	26	16	10	11	7	5	6	41

Legend: JCG: Japan Coast Guard

JMSDF: Japan Maritime Self-Defense Force

PP: Prefectural Polices

Note: 5 Prefectural Police aircrafts include 2 helicopters from Aomori PP and 3 from Fukushima PP.

## 2.12 Radar Track Generated from the Air Traffic Control Radar

The air traffic control radar system at Hakodate Airport recorded the Aircraft's track and altitude at every four seconds starting 11:18:20 until 11:44:04. With this track information the speed of the Aircraft was calculated and changes in its speed and altitude at every one minute were generated.

(See Figure 1 "Estimated Flight Route")

## 2.13 Information on Organization and Management

### 2.13.1 Aircraft Operations in the Company

(1) Flight operations management system of the Company

The Akita Base was manned by three employees and the PIC was the

person-in-charge. Although the Aircraft was one-man operable, another pilot was often on board for visual watch.

Every morning upon coming to the Akita Base, one of the employees, regardless of flight schedule of a day, visited the weather station on the Akita Airport to receive a weather forecast briefing and shared the information with others. Aviation organizations (the Akita Base inclusive) in the airport have access to the Aviation Meteorological Information Service provided by the Japan Meteorological Agency and they can obtain weather information from personal computers as needed. Additionally, the Akita Base had access to live cameras installed in Tohoku region via internet.

The Company has contracted with three TV stations in Tohoku region on aerial TV coverage using the Aircraft and flights were made responding to their requests. A dispatch order was usually faxed to Ogawa Air Inc.'s head office (hereinafter referred to as "the Head Office") from Akita Base, been approved, then flights were carried out. There were cases where first-hand verbal approvals were made.

The Company's set cruising airspeed for the Aircraft was 100 kt.

(2) Development on the day of the accident

Around 8:30 the Pilot A visited the weather station to receive a weather briefing on the general weather outlook for Tohoku region, especially around the Akita Airport. The weather outlook for the airport and its vicinity at that time was: it was hazy and the visibility was poor; however, it was getting better and no foul weather was expected. Weather outlook along Pacific coast was: there would be areas where bad visibility and low ceiling were expected; however, as a general the weather was improving and it would improve along with the rise of the day's temperature.

At this moment, the Akita Base had no schedule of flights. So the Pilot A made no further in-depth questions on the weather forecast in specific area.

Around 9:30, the Akita Base informed the Head Office that one of the above mentioned TV stations (hereinafter referred to as "the TV Station") requested an aerial TV coverage of a fire incident on the Ship. The Head Office verbally authorized the flight considering the flight preparations at the Akita Base and the health conditions of the PIC and the Pilot A by phone.

At 10:06 a flight request form was faxed to the Head Office and a director of flight operations confirmed the contents. The Head Office checked weather conditions by visiting the websites of the Japan Meteorological Agency and commercial aviation weather companies. Considering the radar image of precipitation and sunshine duration, periodical weather conditions at airports in neighboring airports, it judged

that the fair weather would prevail over Akita and Aomori prefectures and both Akita and Aomori Airports were under non-problematic weather. However, it was unaware of the dense fog advisory issued for Shimokita area.

Because the remaining employee was off-duty at Akita Base that day, the Head Office took control of the flight management.

The Aircraft landed at the Aomori airport at 10:59. Neither the PIC nor the Pilot A confirmed the latest weather at the weather station on the airport.

### **2.13.2 Development in the TV station**

Past 9 o'clock, the TV station received an order from its key station in Tokyo to cover the Ship which had a fire incident off Shimokita Peninsula.

Around 09:30, the key station sounded Akita Base out on the aerial TV coverage and was approved after the weather check. The coordination was made to send its personnel to the Aomori airport to board the Aircraft. A person in charge of this coverage advised that they would use the visual in 17:30 news program, and all he needed was an image of the Ship. He handed the reporter a copy of released information from the 2nd Regional Coast Guard headquarters, which indicated the Ship's proposed in-port time to Ominato Port at 3:30pm.

### **2.13.3 The Policies of the Company and the TV Station on Aerial TV Coverage Flights**

The Company has established the Standard for Flight Operations as one of the internal regulations and the details of aerial TV coverage flights were stipulated in the Standard for News/Photo Missions. To be stated in 2.14.2, the Company directed pilots to change flight routes, to return to airports or to make precautionary landings when encountered by the foul weather.

Responding the accident in which a TV coverage helicopter crashed into the riverbed of Kiso river after colliding with power lines in Nagano prefecture, the Company established the Handbook for Aerial TV coverage (dated March 15, 2004), duplicated it and distributed them to contracting TV stations. The above mentioned precautions are also contained in the handbook.

An official of the Company stated "I had given safety-oriented directions to pilots to have a sense of crisis all the time, and in foul weather, on pilot's discretion, to return to airport or to make precautionary landings and never try to fly under unfavorable conditions. We do not care losing one or two flight orders by quitting

flights.” He also stated that “This policy should have taken root among all company employees.”

Concerning requests from the TV station, he stated “So far we have had no requests to fly under unfavorable conditions.” In June 2008 there was a case where the Aircraft quitted flying and returned to an airport due to bad weather on the PIC’s discretion.

An official of the TV station stated “Due to the safety-oriented nature of flights, we don’t force pilots to fly under difficult situations. The reporter and the cameraman who got on board the Aircraft are not pushy types. ”

## **2.14 Additional Information**

### **2.14.1 Health Conditions of the PIC and the Pilot A, and Instrument Flight Training**

An official of the Company stated that both were physically and mentally fit. As for the basic instrument flight training, both of them received the training on June 16, 2008, taking the opportunity of PIC qualification renewal check flights. The contents of the training were to fly straight and level, to recover from unusual attitudes and the like, under hooded condition to simulate instrument meteorological conditions.

### **2.14.2 The Standard for News/Photo Missions**

Excerpts<sup>2</sup> from the Standard for News/Photo Missions on points of special attention for overwater flights are as follows.

*(1) The obscured horizon leads to degraded sense of flight even under VMC. Crosscheck instruments with increased frequency.*

*(2) It is dangerous to fly overwater under low visibility/ceiling and strong wind conditions. Abandon flying or return to an airport.*

Excerpts of pilot’s preparedness and things to be observed stipulated in the Standard are as follows.

*(1) Maintain sound body and spirits and abide by the Standard of flight operations.*

*(2) (omitted)*

*(3) Analyze weather properly and know one’s flight skill*

*(4) Maintain strong will power to decline customer’s difficult requests and*

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<sup>2</sup> Excerpts are printed in italic type.



*courage to return to an airport.*

*(5) (omitted)*

*(6) When encountered by unexpected rough air or foul weather and the situation awareness indicates it unfavorable, change route, or if the situation requires, land at a nearest helipad or proper field.*

### **2.14.3 Emergency Equipment**

(1) The Aircraft was not equipped with a mandatory<sup>3</sup> Emergency Locator Transmitter (ELT<sup>4</sup>) when flying over waters.

(2) Emergency life jackets

Akita Base's life jacket inventory was 6; post-accident inventory was reduced to

2. The PIC and the pilot A did not wear life jackets when recovered.

Two life jackets still stored in a container bag were salvaged off Cape Shiriya.

### **2.14.4 Flying and Visual Sense**

Sensory illusions likely to be suffered during flight under poor visibility are described on page 45 of "Aviation Medicine and Safety (coauthored by Kenichi Higashi and Masaoki Tsuchiya, published by Hobun Shorin in 1997)" as visual spatial disorientation. Excerpts are as follows.

*Information from vision, body sensing mechanism<sup>5</sup> and sense of balance are integrated and judged in one's brain and spatial orientation is established. When these pieces of information are incorrectly judged, spatial disorientation develops. This may be caused by lack of sensory information, or discrepancy between visual sense and sense of balance, leading to an improper judgment. (Portions omitted) When flying during night or under foul weather it is difficult to acquire visual cues to judge aircraft attitude and this leads to spatial disorientation. When the horizon and distant view are indistinct in mist or haze, there are times when the aircraft attitude is off-balanced without noticing.*

As for the difficulties of altitude judgment for glassy water landing, it is

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<sup>3</sup> Upon the revision of the Civil Aeronautics Regulations, when a single-engine helicopter flying overwater exceeding the point of safe autorotation descent to the coast in an emergency, has to be equipped with two ELTs (one impact-activating automatic type and a manually activating type). However, the Aircraft is applicable to transitional measures in which one ELT is permissible until June 30, 2011.

<sup>4</sup> When the aircraft is in distress or crash and so on, it transmits the signal to provide the distress spot.

<sup>5</sup> The cutaneous sensation or the sensation perceived by tension of muscle and a tendon and so on.

described on page 150 of above mentioned book. Excerpts are as follows.

*When a sea plane lands on glassy waters, altitude judgment is extremely difficult. Except for the case of reflecting image of own aircraft under sunshine conditions, visual altitude judgment should be avoided and one should maintain set approach configuration and wait for the touch down on the waters.*

#### **2.14.5 An Advisory Circular Issued by FAA on Spatial Disorientation**

The excerpt of FAA advisory circular (60-4C, September 2, 1983) on spatial disorientation is as follows.

##### *3. DISCUSSION*

(Some portions omitted)

*c. Tests conducted with qualified instrument pilots indicated that it can take as much as 35 seconds to establish full control by instruments after the loss of visual reference with the surface.*

(Portions after this omitted)

#### **2.14.6 Visual Meteorological Conditions**

Visual meteorological conditions are defined in Article 5, item3 of the Civil Aeronautics Regulations as follows.

*For the Aircraft flying out of control area, control zone and information zone at altitude of 300m or less above ground surface or water surface, weather condition shall be as follows (except the case specified by following subparagraph) (For the helicopter flying at a speed slow enough to avoid objects, following (a) is excluded):*

*(a) Flight visibility of 1,500m or more; and*

*(b) Aircraft may clear of clouds and pilot may keep visual contact with ground surface or water surface.*

#### **2.14.7 Maintenance of Instrument Flight Skill**

Considering the fact that a spate of helicopter accidents occurred in 1990, the Civil Aviation Bureau, Ministry of Transport organized the Safety Measure Working Group consisting of outside aviation experts in order to wrap up safety measures in October, 1990. As a product of the Group the Bureau issued a directive "The Final wrap-up, Safety Measures for Helicopter Operations (Kuko no. 1176, December 6, 1990)"

The directive stated as follows: It is decided to introduce an improved teaching

method, a widely accepted airplane flight education method known as composite flight education technique in which an aircraft is controlled by viewing both outside objects and instruments in order to improve pilot's ability to counter unexpected weather degradation, into early stage of a helicopter flight training. And an item ensuring pilot's ability utilizing above mentioned method was decided to be added in the practical test items for helicopter pilot certificate and this practice was made effective on April, 1990.

Upon occurrence of the helicopter accident in Mt. Suishodake in Toyama prefecture on April 19, 2007, the Civil Aviation Bureau issued a directive titled "Assured safety of passenger transport by rotorcraft" (Kokukuko no. 857, November 30, 2007) to prevent future accidents. The directive stated as follows: The pilots, flying at high altitude in mountainous area like the above mentioned accident site, should be trained regularly to fly using basic instrument flight techniques, and they should be, as much as possible, checked in the annual check flight. In addition, the pilots should be trained regularly and acquire the ability to quickly get out of bad meteorological conditions using basic instrument flight techniques.

#### **2.14.8 The Ship's Visual/Acoustic Contact with the Aircraft**

Around the time of the accident occurrence, the Ship was cruising about 7 km west of the accident site. Watchmen on the Ship neither heard the boom nor spotted the Aircraft.

### **3. ANALYSIS**

**3.1** The PIC and the pilot A held both valid airman competence certificates and valid aviation medical certificates.

**3.2** The Aircraft had a valid airworthiness certificate and had been maintained and inspected as prescribed.

**3.3** Judging from the meteorological information described in 2.7, it is considered highly probable that dense fog, no wind and calm sea in the area of the accident affected the pilot judgment of attitude and height, and had strong bearing on the occurrence of the accident.

#### **3.4 Aircraft Condition**

As the inspection of the salvaged Aircraft revealed no anomalies in engine or power trains and eyewitness information suggests the Aircraft's normal flight, it is considered highly probable that the Aircraft's systems had no anomalies.

#### **3.5 Person in Charge of Flight at the Time of the Accident Occurrence**

A helicopter is flown by controlling a cyclic stick, a collective lever and rudder pedals with right hand, left hand and both feet respectively. When the Aircraft, to be described in 3.6, crashed into the sea, it is considered probable that the main rotor's impact with the surface was transmitted back to the cyclic stick via control mechanism, and at the same time the fuselage impact was transmitted to rudder pedals.

Because the left cyclic stick was broken, and it was the Pilot A whose right wrist bone and both ankle bones were presumably fractured by impacts, it is considered probable that the Pilot A was flying the Aircraft when the accident occurred.

#### **3.6 Sequence of Fuselage Destruction**

Given the fact that the portion extending from the nose section to the upper section of the fuselage was separated and the connecting portion of the cabin floor and the forward bulkhead was bent upward and separated, it is considered probable that the Aircraft crashed into the sea surface at high speed with the nose section first, followed by the fuselage lower section. Judging from the fact that both forward sections of both skids were broken forward of the connecting points of the cross tube

with force applied from the left, and left floor of the cargo room bulged upward while the right one was intact, it is considered probable that the Aircraft was in a small bank to the left. It is considered possible that the tailboom was separated at the connecting part to the fuselage by the impact force upon crash. Upon the impact with the sea, the main rotor blades, in the order of the blue blade and the red blade, hit the sea surface and the gearbox was separated to the right from the fuselage. As the position of the blue paint smudge on the yellow blade leading edge and the position of the paint damage on the long collapse in the tailboom matched, it is considered probable that this blade hit the tailboom diagonally and produced the long collapse.

### **3.7 Weather Judgment**

It is considered probable that the PIC and the Pilot A had the general weather outlook in Tohoku area after receiving the weather briefing that morning. Then they received a request of the aerial TV coverage. It is considered possible that they checked the weather conditions of Akita and Aomori Airports via Meteorological Information Equipments for Aviation Services or internet before departure; however, the details could not be confirmed.

It was 10:52 when the continued fog advisory was issued, and this took place before their landing at the Aomori Airport. Given the fact that neither the PIC nor the Pilot A confirmed the updated weather information at the weather station on the Aomori Airport, it is considered probable that they resumed their flight without knowing the issuance of and continued fog advisory. Given the fact that the Head Office was unaware of the issued fog advisory over Shimokita area, only recognizing the non-problematic weather condition over Akita and Aomori region, and with the PIC's aborted coverage flight one month before due to bad weather, it is considered probable that the Head Office expected that the same action would be taken, and did not take measures to acquire new weather information.

### **3.8 Development of the Flight**

#### **(1) En route**

Judging from the estimated flight route generated from the radar information and the PIC's acquisition of the Ship's in-port time to Ominato Port, it is considered highly probable that the Aircraft, after taking off from the Aomori Airport, headed north to reach Cape Omasaki to find the Ship for the aerial TV coverage before it would enter Mutsu Bay.

As shown in Figure 1, the Aircraft's speed calculated from the radar track exceeds 100 kt. This speed, contrary to the speed described in 2.14.6, cannot be considered to be slow enough to avoid objects while flying.

Judging from the weather observation data produced by the Ferry A and Eyewitness A's statements in 2.1.2, it is considered probable that overwater visibility north of Cape Hokkaimisaki was, depending on locations, less than 1,500 m, and this did not satisfy the VMC requirements described in 2.14.6. It is considered probable that the PIC should have discontinued the flight in light of the Standard for News/Photo Missions while flying there.

It is considered possible that the PIC continued the flight because he was able to have visual acquisition of the coast line and he had the favorable information that the weather outlook over the Pacific area would be improving.

(2) The eve of the accident

The statements by the eyewitnesses described in 2.7.1 and the person who heard the boom on Bentenjima Island, it is considered probable that in the vicinity of Cape Omasaki, visibility to the south-west of Bentenjima Island was about 2 km, however, the area east of Bentenjima Island (the island inclusive) was covered by fog, and the sea surface was very calm with no wind. Under this weather condition, it is considered probable that visual altitude judgment was difficult with the obscured horizon by fog, making the Aircraft attitude establishment difficult. It is considered probable that while the weather condition east of Bentenjima Island did not satisfy the VMC requirements and the PIC was able to confirm this situation upon reaching Oma port, he should have abandoned proceeding further east beyond Cape Omasaki.

Judging from the Aircraft inclination at the time of crash described in 3.6 and Eyewitness C's statement in 2.1.2 that the Aircraft might be circling left, it is considered probable that the Aircraft was circling left to get out of the fog by turning to the opposite direction, tuning to the direction of no expected obstacles and to the direction of easy look-out for the Pilot A. During this maneuver, the Aircraft probably flew into a dense fog and its surroundings became all white. It is considered possible that in the dense fog the Pilot A lost the horizon as the attitude benchmark, and as described in 2.14.5, failed to shift to instrument flight quickly, fell into spatial disorientation, failed to maintain attitude and crashed into the sea at high speed.

It is considered possible that the density of fog differed from place to place and part of the sea surface was observable, however, due to the very calm sea surface, it is considered probable that attitude reestablishment and altitude judgment were difficult.

The Ship, on the other hand, was cruising about 7 km west of the accident site at the time of occurrence, it is considered highly probable that the Aircraft was unable to spot it due to poor visibility.

### **3.9 Preventive Measures against Recurrences of This Type of Accident**

VFR flights should be conducted under VMC conditions and this is mandatory. Pilots shall make proper weather judgments and when encountered by weather condition where VMC is difficult to maintain, they shall not hesitate to discontinue flight and return to the originating place or to make a precautionary landing.

However, there are cases where a pilot is thrown into a inadvertent in-cloud situation. The latter part of contents described in 2.14.7 was issued for air transport service operators, however, purpose of this part and the directive issued in 1990 were aimed to improve basic instrument flight technique. It is necessary to recognize the importance of basic instrument flight training in order to evade inadvertent in-cloud situation quickly by shifting flight mode from VFR to instrument flight.

#### **4. PROBABLE CAUSE**

In this accident, it is considered probable that the aircraft crashed into the sea after entering a dense fog while flying at low altitude over the sea, and that the Pilot A lost the horizon as the attitude benchmark failing to maintain aircraft attitude. The Aircraft sunk. The PIC and the Pilot A were found deceased and two passengers went missing.

With regard to the failed attitude maintenance, it is considered possible that the Pilot A fell into spatial disorientation.



## **5. REFERENTIAL INFORMATION**

Upon the occurrence of the accident, the Company has taken the following corrective measures.

(1) The Company integrated the flight management functions into the head office and established a safety promotion section to supervise comprehensive safety matters.

(2) Revision of the operations manual and rules

The Company revised parts concerning weather requirements and flight management supervision.

(3) ELT

The Company installed a survival type ELT in addition to an ELT into every business aircraft.

Figure 1 Estimated Flight Route

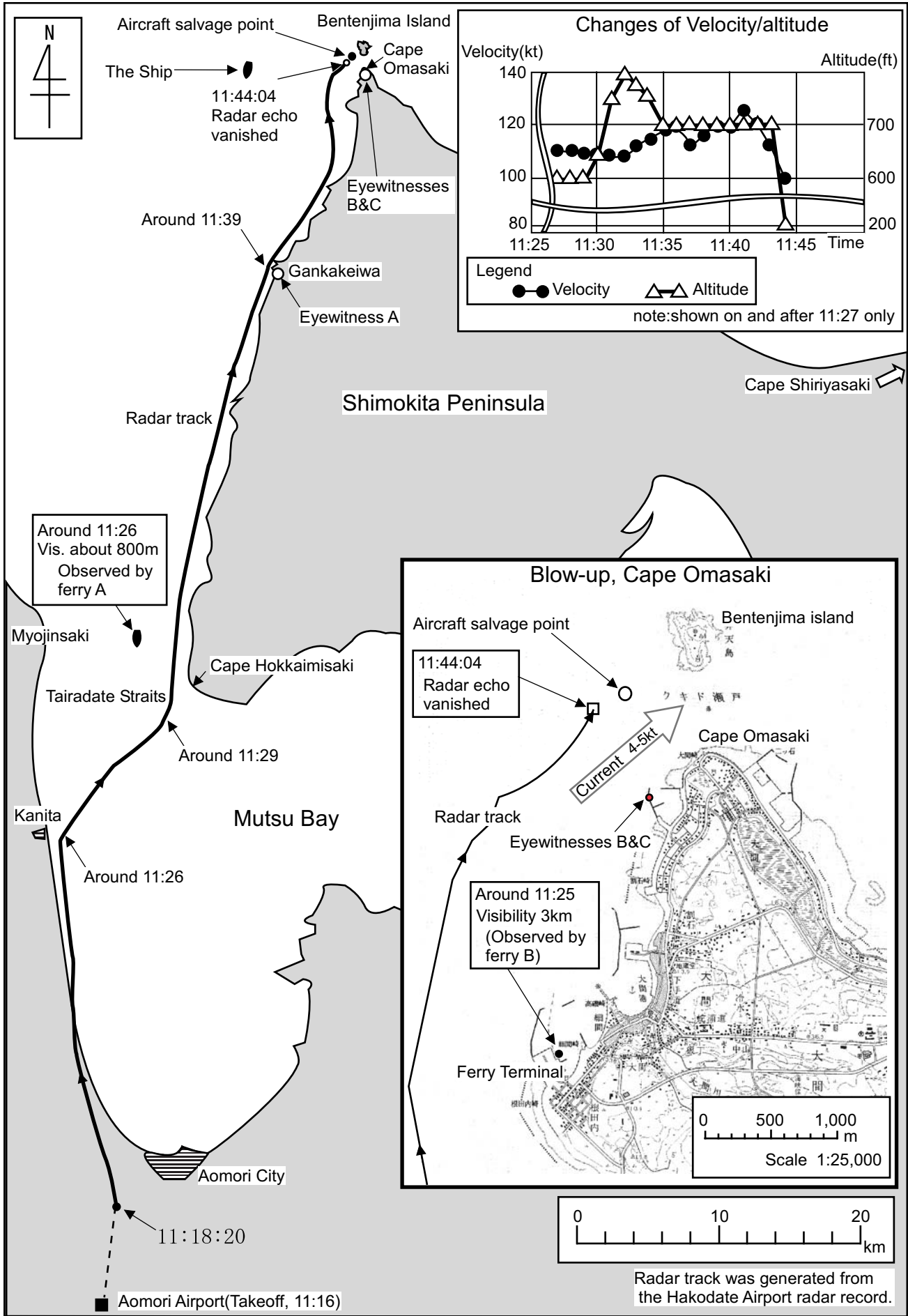
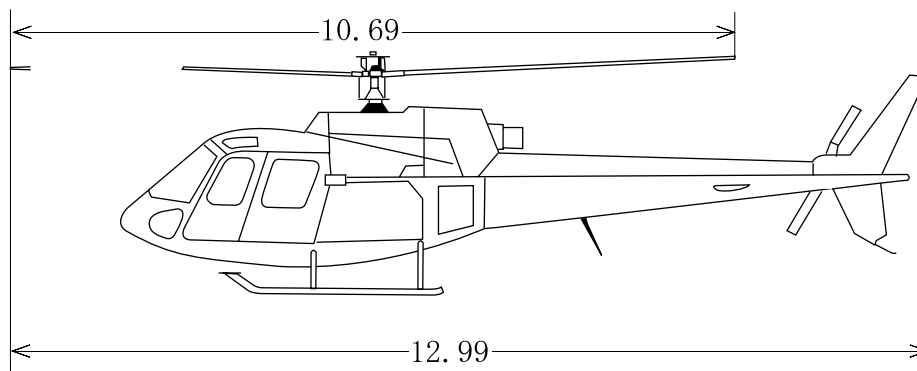
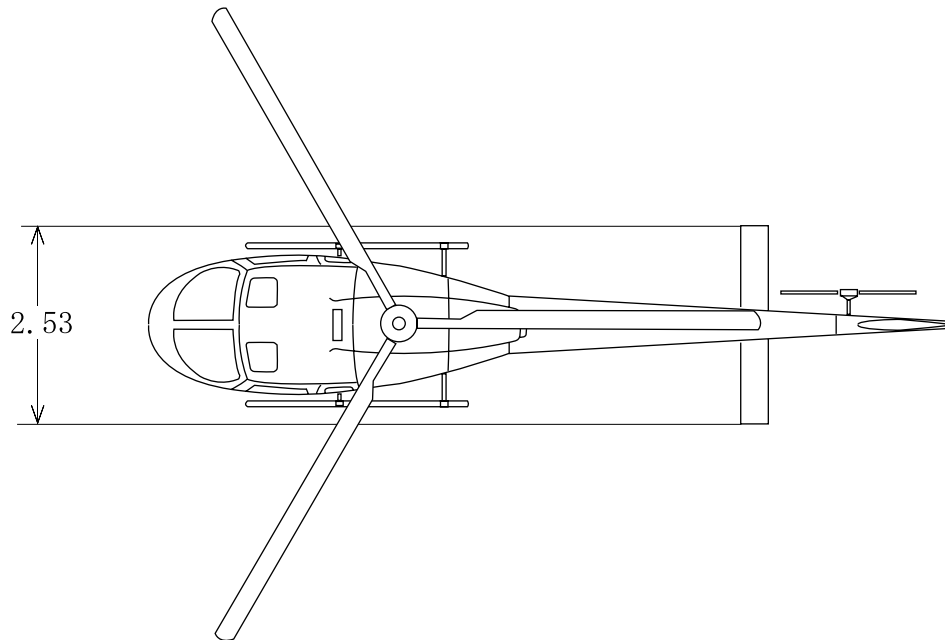
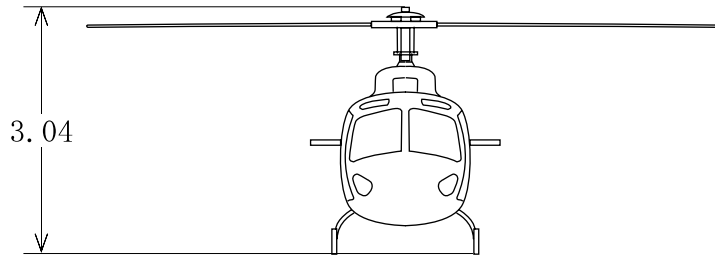


Figure 2 Three angle view of AS350B

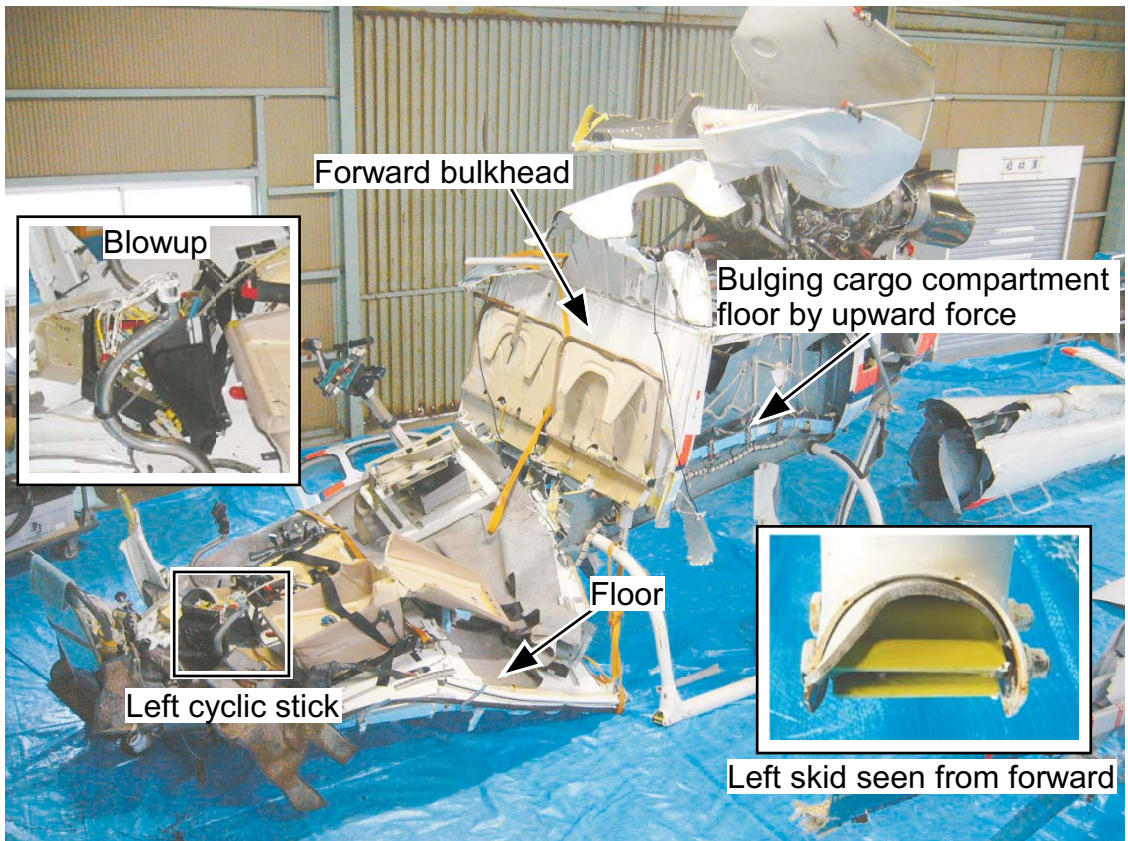
Unit : m



Picture 1 Accident aircraft (bottom fuselage)

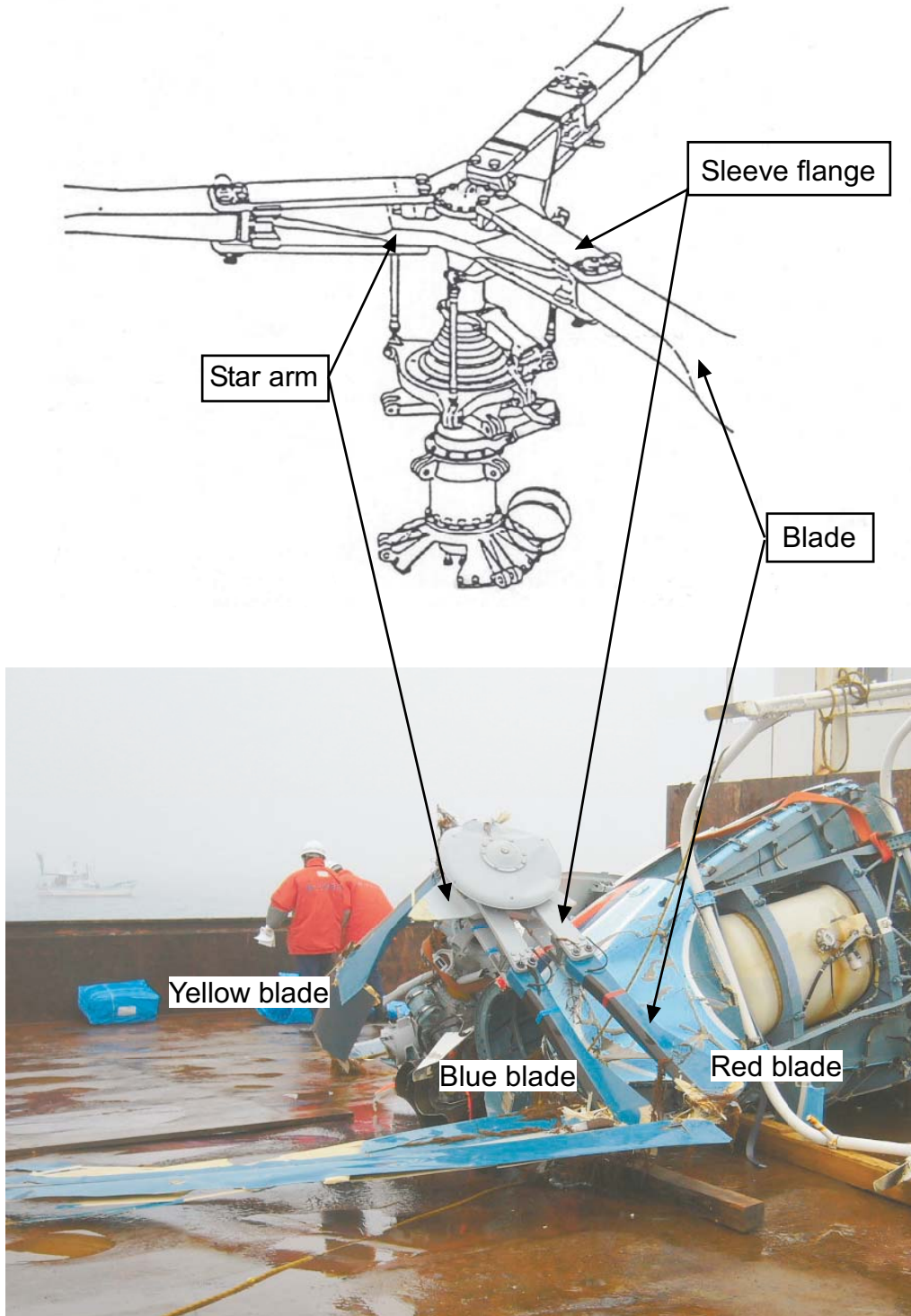


Picture 2 The aircraft (upright position)





Picture 3 Main rotor hub and blades



Picture 4 Tailboom connecting part



Picture 5 Damaged tailboom

