AA2006-3

AIRCRAFT ACCIDENT INVESTIGATION REPORT

Aero Asahi Corporation Aerospatiale AS332L, JA9690
UNAZUKI, SHINKAWA COUNTY, TOYAMA
(Merged into KUROBE City on March 31, 2006)
October 18, 2005

July 28, 2006

Aircraft and Railway Accidents Investigation Commission
Ministry of Land, Infrastructure and Transport

The investigation for this report was conducted by Aircraft and Railway Accidents Investigation Commission, ARAIC, about the aircraft accident of Aero Asahi Corporation Aerospatiale AS332L helicopter in accordance with Aircraft and Railway Accidents Investigation Commission Establishment Law and Annex 13 to the Convention of International Civil Aviation for the purpose of determining cause of the aircraft accident and contributing to the prevention of accidents and not for the purpose of blaming responsibility of the accident.

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

Junzo Sato,
Chairman,
Aircraft and Railway Accidents Investigation Commission

AIRCRAFT ACCIDENT INVESTIGATION REPORT

Aero Asahi Corporation Aerospatiale AS332L, JA9690

UNAZUKI, SHINKAWA COUNTY, TOYAMA

(Merged into KUROBE City on March 31, 2006)

Around 11:05 JST, October 18, 2005

21 June 2006
Adopted by the Aircraft and Railway Accidents Investigation Commission
(Air Sub-committee Meetings)
Junzo SATO, Chairman
Yukio KUSUKI, Member
Susumu KATOH, Member
Noboru TOYOOKA, Member
Yukiko KAKIMOTO, Member
Akiko MATSUMOTO, Member

1. PROCESS AND PROGRESS OF THE ACCIDENT INVESTIGATION

1.1 Summary of the Accident

On Tuesday, October 18, 2005, an Aerospatiale AS332L of Aero Asahi Corporation Limited, registered JA9690, departed a temporary operation site in Unazuki-machi, Shinkawa County, Toyama Prefecture to airlift suspended materials. While releasing the cargo at Atobiki Water Bridge around 11:05, the suspended cargo touched the marshaller on the bridge and he sustained a serious injury. The two persons on board the aircraft, a captain and a mechanic, did not sustain any injuries and the aircraft was not damaged.

1.2 Outline of the Accident Investigation

1.2. 1 Organization of the Investigation

On October 19, 2005, the Aircraft and Railway Accidents Investigation Commission (ARAIC) assigned an Investigator -in-Charge and an investigator for investigating this accident.

1.2.2 Cooperation by Foreign Authority

An accredited representative of France, the state of design and manufacture of the aircraft, participated in the investigation.

1.2.3 Implementation of the Investigation

The investigation proceeded as follows.

October 20, 2005 On-site investigation and collection of statements.

1.2.4 Hearings from Persons relevant to the Cause of the Accident

Hearing was held.

1.2.5 Hearing with Participating States

Comments will be invited.

2. FACTUAL INFORMATION

2.1 History of flight

On October 18, 2005, an Aerospatiale AS332L (Common name: Super Puma), registered JA9690 (hereinafter referred to as " the aircraft"), of Aero Asahi Corporation Limited (hereinafter referred to as "the company"), departed the Temporary operation site in Unazuki-machi (hereinafter referred to as "the Unazuki Temporary") around 10:16 to airlift materials.

The aircraft was scheduled to transport scaffolds and construction materials for the safety check of Atobiki Water Bridge (hereinafter referred to as "the bridge") by nine shuttle flights using a 20m long sling.

The flight history up to the time of accident is, according to the statements of persons relevant to the accident, as follows.

(1) The captain

I boarded the aircraft in the right seat and departed Toyama Airport to check the weather and the flight route to the bridge, and landed at Unazuki Temporary. I was in charge of watch on the right side of the aircraft. We departed at 10:16 to airlift the first cargo to the bridge. It took 7 to 8 minutes for a shuttle flight to the bridge. Six airlifts were done smoothly.

The visibility was OK around the bridge, and I conducted approaches and departures southwestwardly in order to evade power lines which run north side of the bridge. During the approach we flew in tail wind, but it did not affect our operations. The weight of the seventh cargo was 1.1t total, which consisted of a bundle of aluminum pipes for building scaffolds and a bundle of aluminum ladders. After arriving at the bridge, I grounded the cargo on the east edge of the bridge once, in order to stop the spinning of the cargo, and then moved it to the left slowly to lower the suspended cargo down on the point following the mechanic relayed direction from the marshaller. During the operations, I kept the height of the suspended cargo lower to the ground to set the surface at once and not to let it swing to and fro.

I grounded the cargo on the point indicated by the marshaller, but lifted it again because I received the direction through the mechanic that it should be displaced slightly. When I felt that the cargo moved to the left slightly, I saw the marshaller fell backward in the mirror installed on the right side of forward fuselage. So I moved the cargo away from the marshaller and released it. Then I flew back to the Unazuki Temporary at 11:09. After arriving, I was informed that the marshaller got a fractured leg and the remaining flights were canceled.

(2) The mechanic

I boarded the aircraft and occupied the left back seat of the cabin to operate a cargo hook to release the suspended cargo. At the site, I received the signals from the marshaller and relayed them to the captain to place the aircraft on the exact spot, keeping the left cargo door open. Because we can not obtain any meteorological information in most cases of cargo airlifting, we flew once in advance to confirm the whether applicability.

The accident occurred when the grounded cargo was being displaced after it almost touched the ground. When the suspended cargo was lifted, the part of it might be still on the bridge, the whole cargo pivoted around the touched portion, and hit the marshaller to fall him backward, I suppose.

(3) The marshaller

I did not feel the sunshine was too bright to work. The wind blew lightly and did not affect our operations of sling airlifts.

By the occurrence of the accident, the cargos of six flights were unloaded on the points where I planned. But as to the seventh unloading, the cargo was unloaded slightly out of alignment from where I planned during the initial phase of operations. So I wanted to displace the cargo and gave the hand signal to the mechanic to lift and displace the suspended cargo slightly. At that time, the edge of the bundle of aluminum pipes (3m long) hit my right leg and I fell backward because my leg was sandwiched between the edge of it and one of the H beam set 30cm up on the bridge. The fractured part of my right low leg was just the part sandwiched between them.

The accident site was the unloading site of Atobiki Water Bridge in Unazuki-machi, Shinkawa County, Toyama Prefecture. The time of the accident occurrence was around 11:05. (See the attached Figures 1 and 2 and Photoes 1 and 2.)

2.2 Deaths, Missing Persons and Injuries

The marshaller was seriously injured..

2.3 Crew Information

(1) Captain: Male, aged 42

Commercial Pilot License (rotary-wing aircraft)	Issued May 8, 2000
Type Ratings Airplane turbine multiengine	
Aerospatiale AS330	Issued May 8, 2000
Class 1 Aviation Medical Certificate	
Term of Validity	until February 9, 2006
Total flight time	6,799 hours 30 minutes
Flight time during the previous 30 days	52 hours 31 minutes
Total flight time on the same model of aircraft	304 hours 15 minutes
Flight time during the previous 30 days	5 hours 11 minutes

2.4 Aircraft Information

2.4.1 Aircraft

Type	Aerospatiale AS332L
Serial Number	2089
Date of Manufacture	November 07, 1984
Certificate of Airworthiness	Tou-16-596

Terms of validity	February 15 ,2006
Category	Rotary-wing aircraft Transport TA class Transport TB class or Special aircraft X
Total flight time	9,674 hours 42 minutes
Flight time since scheduled maintenance (100hours inspection: conducted on September 27, 2005)	57 hours 22 minutes

(See the attached figure 3)

2.4.2 Engines	NO.1	NO.2
Type:	Turbomeca – Makila 1A	Turbomeca- Makila 1A
Serial No.:	311	341
Date of Manufacture:	March16, 1983	March 29, 1984
Total time in service:	10,273hours 9minutes	8,590hours 40minutes

2.4.3 Weight and Center of Gravity

The aircraft's weight at the time of the accident is estimated to be 6,252.4 kg, with the center of gravity at 4,567mm. It is estimated that both values were within the allowable limits (maximum take-off weight 9,350 kg, with allowable center of gravity range corresponding to the weight at the time of the accident of 4,400 - 4,900 mm.)

2.5 Meteorological Information

According to the statement of the captain, the meteorological condition of the accident area was as follows:

Weather : Cloudy, Visibility: Approximately 10km, Wind Direction: West, Wind Velocity: 2 - 4 m/s

2.6 Accident Site

The accident site was on the bridge (Altitude: 290 m) over Kuronagi-river which flows into the middle part of Kurobe-river located in the east of Toyama Prefecture. The bridge was approximately 48 meters long, 6 meters wide and the both sides of the bridge were steep hills of 50 degree gradient.

In the north of the bridge, the power lines run east/west, 15 meters above the bridge, about 40m away from the unloading point at the southeast part of the bridge. The approach and departure route to the unloading point was set so as to keep the aircraft away from the power lines concerned.

Around the time of accident, there were 9 persons in total at the site; 6 workers excluding the marshaller, the on-site representative, and the safety expert[1]. The accident site's elevation from the river bed is about 30m. A 75cm-wide passage was set longitudinally in the center of the 6m wide bridge. The materials airlifted by six flights were placed on the bridge avoiding the passage.

2.7 Medical Information

According to the medical certificate, the marshaller sustained a compound fracture on his right lower bones.

2.8 Information on Search, Rescue and Evacuation relevant to Survival, Death or Injury

The marshaller was piggybacked by the safety expert to the nearest station and was transported to the hospital in Unazuki-machi by train and vehicle.

2.9 Other Information

2.9.1 The aircraft flight with the altitude under the minimum safety altitude had been authorized as of September 30, 2005.

2.9.2 The cargo flights were conducted in accordance with the "Flight Operating Procedures" prescribed by the company concerning the flight conditions, meteorological conditions, the transportation methods, the safety measures, and the noise abatement measures. However, in this procedure, there were no descriptions on the marshaller's precautions to secure his footholds when he does his duty. In addition to that, a before-airlift meeting on the procedures had not been held among the pilot, the on-site-representative, the safety expert, and the marshaller.

2.9.3 The marshaller is well experienced with his duty. He had an experience of marshalling at the same site on October 7 and at other sites approximately three month before.

2.9.4 The role of the on-site representative and the safety expert concerning this accident had not been defined clearly.

3. ANALYSIS

3.1 Crew Certifications

The captain had valid airman proficiency and airman medical certificates in accordance with applicable regulations.

[1] The person who was in charge of safety matters dispatched from the promoter.

3.2 Certificate of Airworthiness

The aircraft had a valid certificate of airworthiness and had been maintained in accordance with applicable regulations.

3.3 Weather Conditions

The weather conditions at the time of accident may had no bearing on the accident, although the week tail wind was blowing during the approach.

3.4 Progress until the accident

3.4.1 The aircraft

After arriving at the bridge for the seventh unloading, the aircraft grounded the suspended cargo on the bridge once to stop the cargo's spin and lifted it again and the aircraft moved to the appropriate position and lowered it on the bridge following the direction of the marshaller. But the captain received additional directions of lifting and small displacement of the cargo and he did so accordingly.

3.4.2 The marshaller

The marshaller signaled the mechanic to lift and displace the seventh cargo to his intended position. At that time the marshaller was signaling the aircraft, walking not in the passage laid in the center of the bridge but on the bridge surface where H beams were laid. When he strode over the H beam to step backward, the suspended cargo swung toward him and his right leg was sandwiched between the cargo and an H beam. It is estimated that he sustained fracture on his right lower leg bones.

3.5 Response of the marshaller

Depending on a helicopter's position above the to-be-suspended cargo, the movement of a cargo leaving the ground is determined. It is not always possible for a marshaller to know whether the aircraft cargo hook is right above the cargo, he should assume the unexpected movement of a suspended cargo, keep safe distance from the cargo and pay proper amount of attention to his foothold during his work.

3.6 Expected safety measures by the company

As mentioned in Section 2.9.2, no descriptions on the marshaller's precautions to secure his footholds during his duty were found in the "Flight operating procedure". Therefore, for the better operations in the space-limited area like the area of this accident, provisions as to the marshaller's safety measures, namely to secure footholds, should be enriched. Furthermore, as it is expected that

the unloading area will be occupied by the unloaded materials leaving smaller space for the marshaller, the company should hold daily before-operations meeting and let all persons concerned know necessary safety measures.

3.7 Expected safety measures of the on-site representative and the safety expert

As mentioned in Section 2.9.4, the roles of the on-site representative and the safety expert were not clearly stated. Therefore, they were not considered as the persons in charge of directing the marshaller. However, as to the safety measures of airlifting cargos by helicopter, especially for the operations conducted at the elevated and space-limited site, they should implement the necessary measures such as holding meetings prior to operations to let all the persons concerned know safety measures and to make sure that they should be implemented accordingly.

4. PROBABLE CAUSE

In this accident, when the pilot grounded the suspended cargo on the bridge following the marshaller's directions relayed by the mechanic followed by the marshaller's trial to have it displaced, it is estimated that the cargo moved toward him and seriously injured him by sandwiching his right leg between itself and the H beam laid on the site.

(Contributing factors are marshaller's lack of attention to his footholds, insufficient tasking to the representative and safety expert, lack of before-operations meeting and dissemination of safety information.)

Figure 1 Accident Site

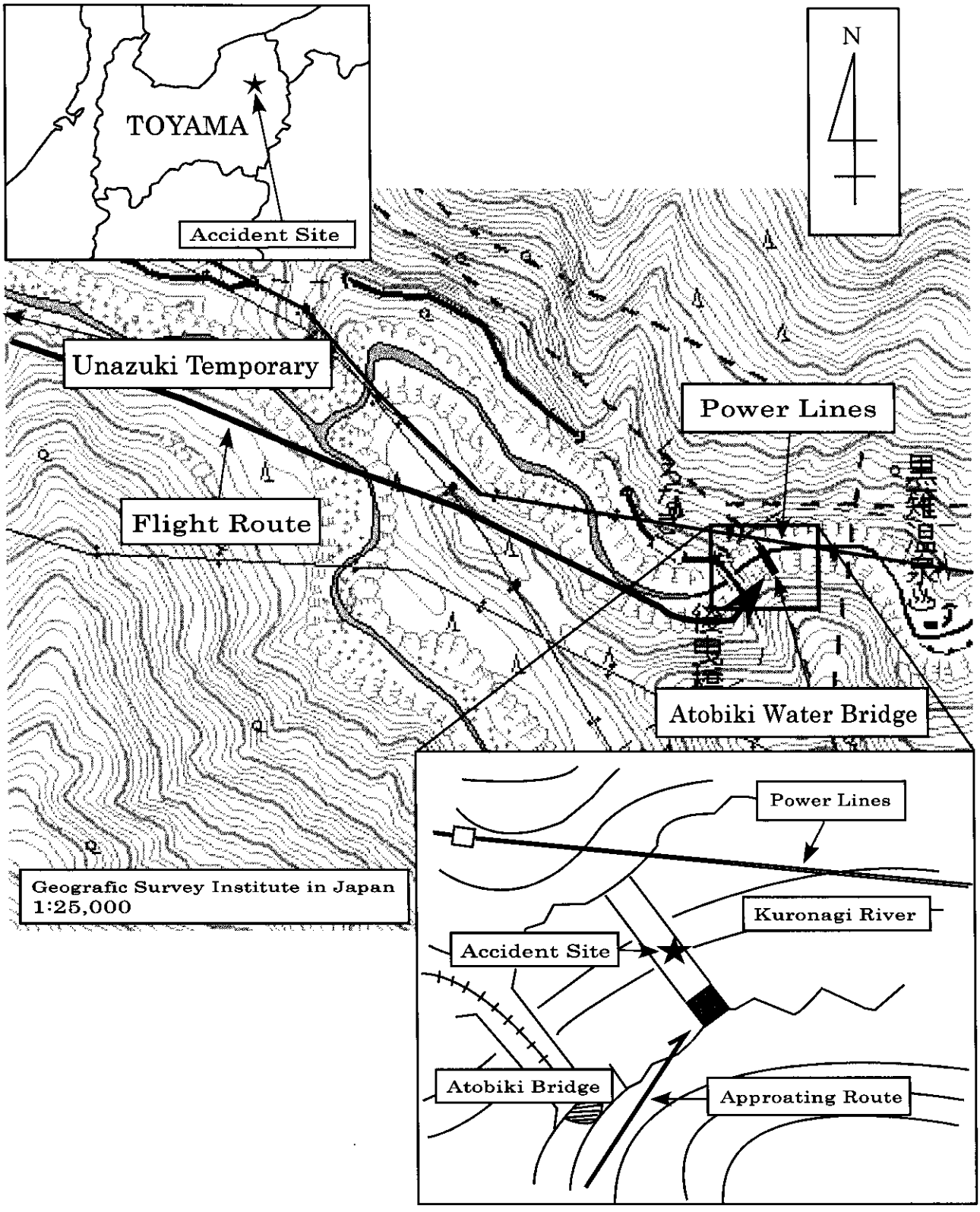


Figure 2 Accident Site Layout

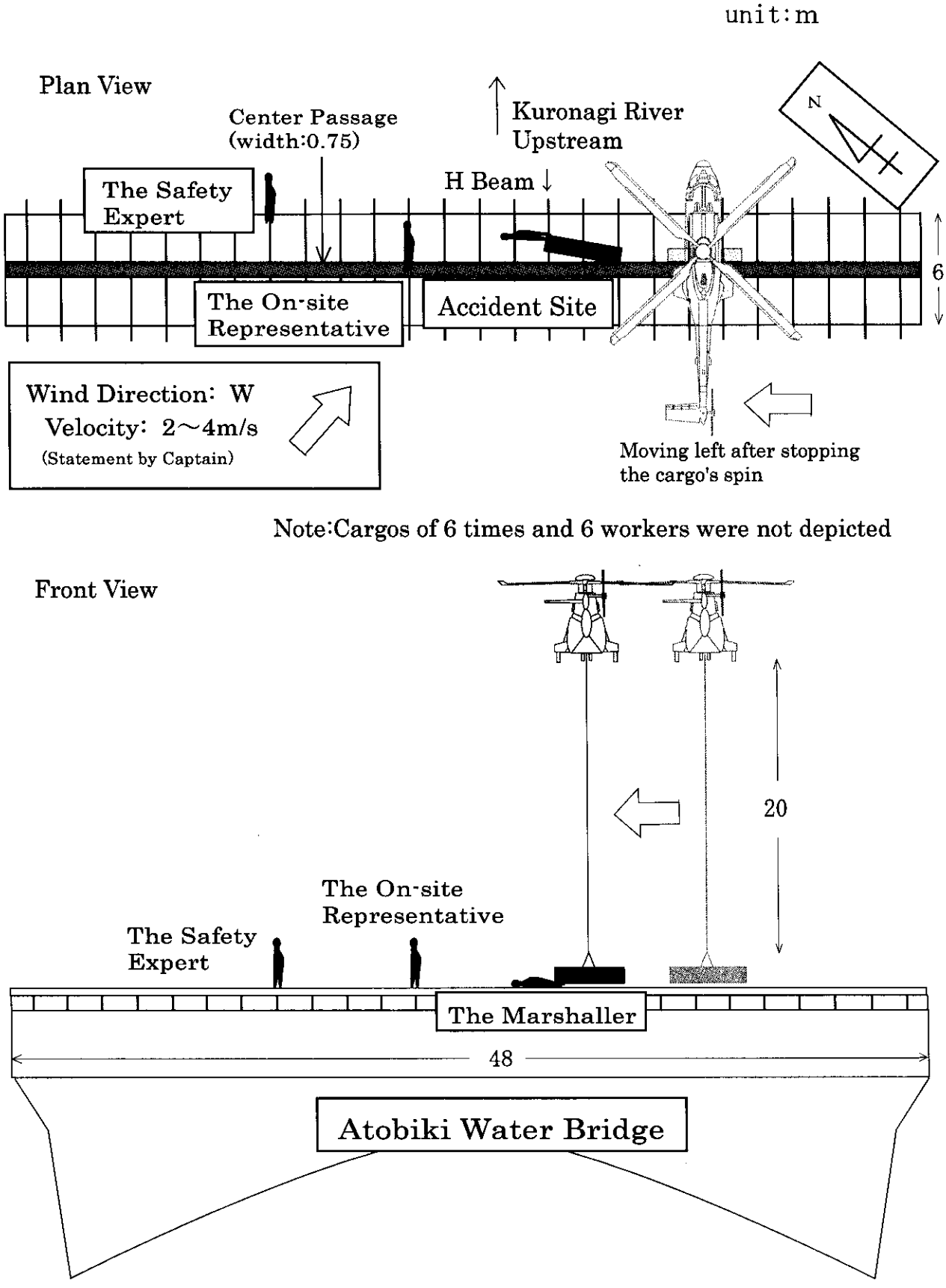
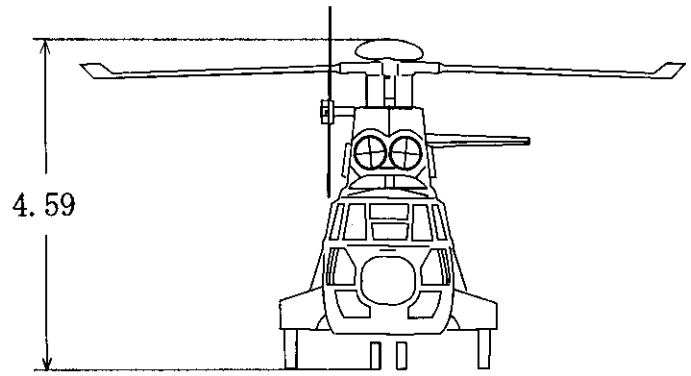
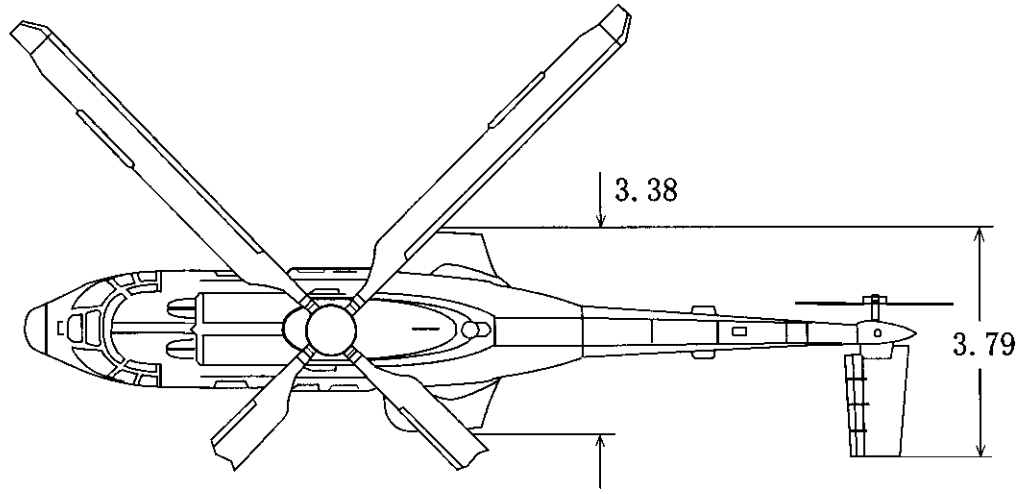


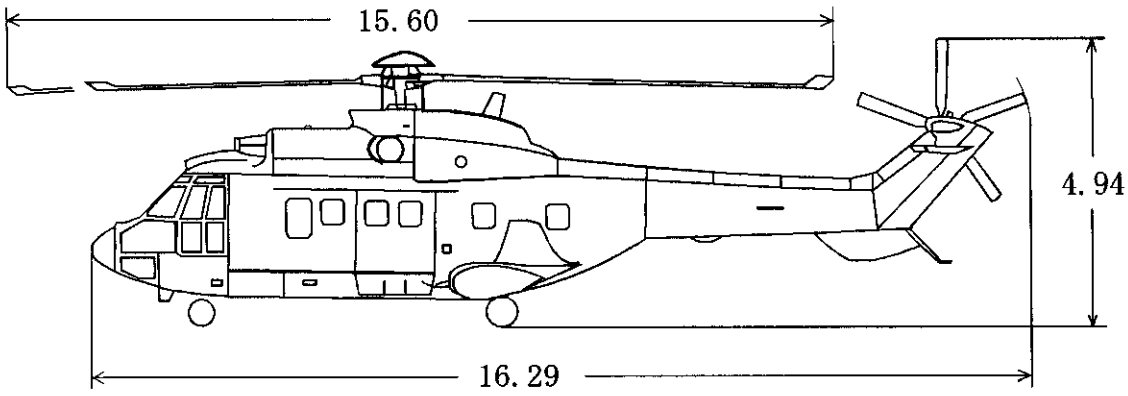
Figure 3　Aerospatiale AS332L

Three angle view

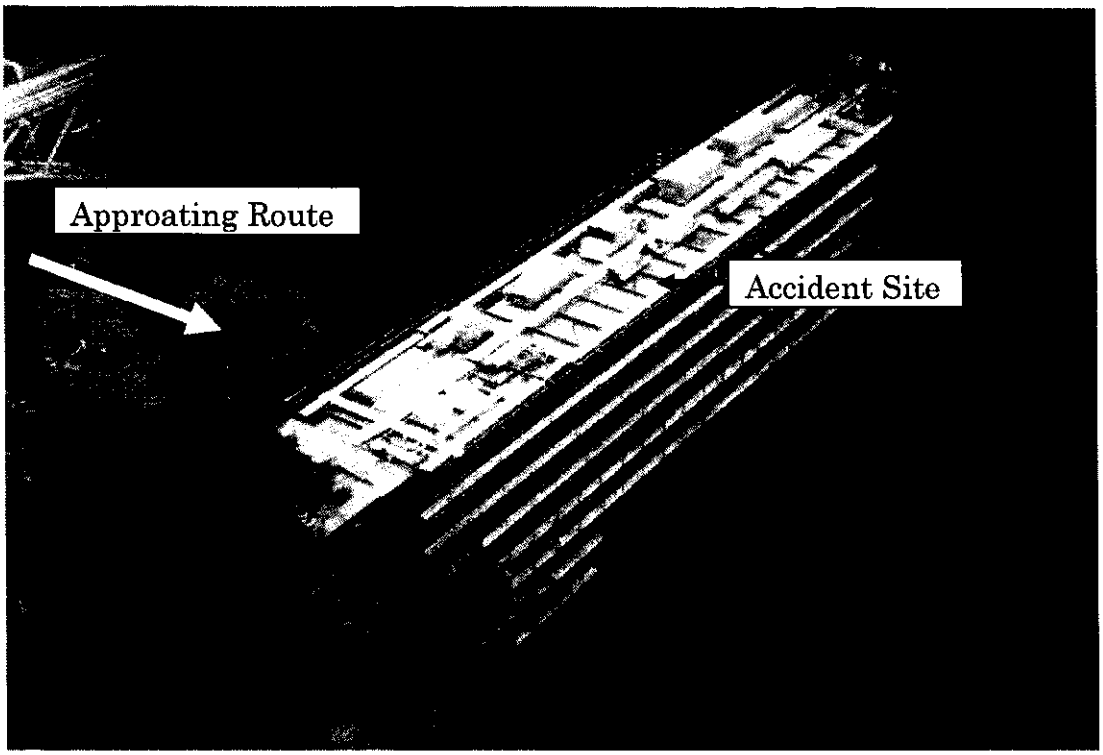
unit : m







Photograph 1　Atobiki Water Bridge



Photograph 2　Marshaller's Situation(simulated)