

AA2007-2

**AIRCRAFT ACCIDENT  
INVESTIGATION REPORT**

**THE YOMIURI SHINBUN TOKYO HEADQUARTERS  
CESSNA 560, JA8576  
OVER TOKYO BAY  
JUNE 30, 2006**

March 30, 2007

**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 THE YOMIURI SHINBUN TOKYO HEADQUARTERS CESSNA 560,JA8576 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.

Norihiro Goto,  
Chairman,  
Aircraft and Railway Accidents Investigation Commission

# AIRCRAFT ACCIDENT INVESTIGATION REPORT

THE YOMIURI SHINBUN TOKYO HEADQUARTERS  
CESSNA 560, JA8576  
OVER TOKYO BAY  
JUNE 30, 2006, AT AROUND 17:50 JST

February 21, 2007

Adopted by the Aircraft and Railway Accidents Investigation Commission  
(Air Sub-committee Meeting )

Chairman	Junzo Sato
Member	Yukio Kusuki
Member	Susumu Kato
Member	Noboru Toyooka
Member	Yukiko Kakimoto
Member	Akiko Matsuo

# **1. PROCESS AND PROGRESS OF THE ACCIDENT INVESTIGATION**

## **1.1 Summary of the Accident**

On June 30, 2006 (Friday), a Cessna 560, JA8576, operated by the Yomiuri Shinbun Tokyo Headquarters, took off from Hiroshima Nishi Aerodrome for a corporate flight. At around 17:50 Japanese Standard Time (JST), when the aircraft was during approach to Tokyo International Airport, over Tokyo Bay approximately 15 kilometers east of the airport, it was shaken, which caused serious injury to one of the passengers.

A total of five persons were on board: the Pilot in command (PIC), the First Officer and three corporate passengers.

## **1.2 Outline of the Accident Investigation**

### **1.2.1 Investigation Organization**

On July 4, 2006, the Aircraft and Railway Accidents Investigation Commission assigned the investigator-in-charge and two investigators for the accident.

### **1.2.2 Accredited Representative Participating in the Investigation**

The National Transportation Safety Board (NTSB) of the United States of America, the state of design and manufacture of the accident aircraft, designated its representative upon notification of the accident.

### **1.2.3 Implementation of Investigation**

July 4, 2006 Interviews and inspection of the aircraft

July 25, 2006 Interviews

July 28, 2006 Interviews

### **1.2.4 Comment from Party Relevant to Cause**

Comments were taken from parties relevant to the cause of the accident.

### **1.2.5 Comment from Participating State**

Comments was invited from the participating state.

## 2. FACTUAL INFORMATION

### 2.1 History of Flight

On June 30, 2006, the Cessna 560 (also known as Citation V), JA8576 (hereinafter called “the aircraft”), operated by the Yomiuri Shimbun Tokyo Headquarters (hereinafter called “the company”) took off from Hiroshima Nishi Aerodrome at 16:20 JST for a corporate flight with five persons on board: the PIC, the First Officer and three corporate passengers (hereinafter called “the corporate passengers”), and it was flying bound for Tokyo International Airport. The flight plan submitted to the JCAB Hiroshima Airport Office is outlined below. (All times in this report are in Japanese Standard Time.)

Flight rules:	Instrument flight rules (IFR)
Departure aerodrome:	Hiroshima Nishi Aerodrome
Estimated off-block time:	16:15
Cruising speed:	380 kt
Cruising altitude:	27,000 ft
Purpose of flight:	Corporate Flight
Route:	KOLTY (reporting point) → TOZAN (reporting point) → G597 (airway) → XAC (Oshima VORTAC) → SPENS (reporting point) → WESTN (reporting point)
Destination aerodrome:	Tokyo International Airport
Estimated flight time:	1 h and 50 min
Fuel load in terms of endurance:	4 h
Number of persons on board:	Five

In the cockpit of the aircraft, the PIC took the left seat as PF (Pilot Flying; primarily responsible for aircraft maneuvering) while the First Officer took the right seat as PNF (Pilot Not Flying; primarily responsible for non-maneuvering tasks).

The history of this accident as determined based on the statements of the PIC, the First Officer and the corporate passengers (hereinafter individually called “Passenger A,” “Passenger B” and “Passenger C”) is outlined below.

#### (1) PIC

Flight route on the day of the accident was to depart from Hiroshima Nishi Aerodrome and then to fly via Otsu, Kowa, Hamamatsu, Oshima, SPENS, and WESTN to Haneda Airport. But after SPENS, the aircraft was vectored by radar. It was mostly cloudy in areas west of Hamamatsu. Once in the Kanto region, it was clear all along the flight course although there were some stratus at around 10,000 ~ 12,000 ft, airstream was calm and there were no reports of turbulence from other aircraft.

Seatbelt sign in the cabin was kept illuminated always.

As to the weather for landing, information at 17:30 was received from the automatic

terminal information service (ATIS), and recorded by the First Officer on a piece of paper, which was attached to the instrument panel in front. By that, I thought the weather would present no problems.

VOR/DME C [approach], and RWY16L were specified for landing. In accordance with the instructions from ATC, I flew the aircraft to intercept from the south the course of 300° inbound KOTO VOR/DME (hereinafter called “KWE”). I always exercise caution during approach via north side because I have occasionally encountered wake turbulence in the past. I am especially cautious in the vicinity of KWE. When we intercepted the course, I saw on our left side a preceding aircraft, which gradually flew away and eventually went out of view. As there were many aircraft making approach, we flew trying not to disturb the traffic flow .

When the accident occurred, the DME indication was 7.8 nm. The speed was then approximately 185 kt as we were slowing down from 190 kt to 180 kt and the altitude was 2,000 ft as the aircraft had yet to pass JONAN (reporting point).

The shaking we encountered at the time of the accident was one time vertical jolt without any preceding signs. In the past, I have experienced shaking during which I hit the ceiling with my head, but none of persons on board was injured. Therefore, I thought that no one would have been injured in the shaking of this time either. Passenger A (mechanic) told me that lids of two ashtrays on the cabin seats flew away but anything else did not. The aircraft was then flying with autopilot engaged. At the moment of the shaking, I grabbed the control wheel with both hands. As my seatbelt and shoulder harness were firmly fastened, my head did not hit the ceiling.

The passenger who was injured (Passenger B) was sitting on the seat shown in Fig. 5, in an apparently normal posture. After the shaking, Passenger A, who was looking after Passenger B, told me that Passenger B seemed to have suffered injury to his lower back. When I asked “ (Passenger B) did not fasten seatbelt ? ”, the answer was “Yes, he did properly.”

Consequently, I had Passenger A report the situation to the ground over the company radio. As the accident appeared to have been due to wake turbulence, I tried not to fly into it again during the remainder of the approach.

I knew that Passenger B was elderly and I paid attention to him. After the accident, I heard that Passenger B had probably been suffering chronic lower back pain.

(2) First officer

On the day of the accident, there were no reports of turbulence along the flight route.

The sudden shaking occurred soon after the control tower told, “Cleared to land. You are No. 4.” I thought the shaking was caused by wake turbulence but did not see any preceding aircraft. It was a shaking of moderate severity in my experience.

Our position at that time was before JONAN on the course [ to KWE ], at an altitude of 2,000 ft.

Because I had fastened my seatbelt tightly and also fastened my shoulder harness, my

head hit nothing, but the shaking was so strong that my head almost hit the ceiling. I heard that there was someone whose head had hit slightly. It seemed likely to me that if seatbelt was loosely fastened his/her head could hit the ceiling in such a shaking.

Soon afterward, when we passed JONAN, the preceding aircraft became in sight.

I think we subsequently flew at an altitude slightly higher than the preceding aircraft to avoid following its track.

We landed at 17:55 and arrived in front of the hangar at 17:59.

I was told that Passenger B had suffered injury to his lower back or thereabouts, but I never imagined that the injury was as serious as became evident later.

(3) Passenger A (mechanic)

As it was the rainy season, I was told that the weather at Haneda was not good at the time of departure from Hiroshima Nishi Aerodrome. En route, I did not experience much shaking.

Either before or after takeoff, Passenger B asked me "Should I fasten shoulder harness?" I replied, "I don't think you need shoulder harness, but you should fasten seatbelt."

Over Ichihara, I radioed to the company headquarters that we would soon be landing. About a minute or two later, near Tokyo Disneyland, I felt that my body was pushed up for about a second, then fell down and was stopped with a hard bump. I think the aircraft was not yet banked for turn.

Ashtray lids flew away and my head hit the ceiling. When I looked at Passenger B, I saw Passenger C apprehensively asking Passenger B, "Are you all right?" I then left my seat to check on Passenger B, who appeared to be in pain. I thought the passenger B might have injured his lower back.

I asked the ground staff to assist Passenger B disembark.

I conducted post-flight inspection resulting no abnormalities.

I went to check the baggage compartment in the tail cone in which there was a tied down plastic basket containing three or four spare oil cans. I found one of the cans outside the basket. I thought "As this is a rare occurrence, the shaking may have been hard."

(4) Passenger B

① Condition at the time of the accident

On the day of the accident, I kept always seatbelt fastened and remained facing forward on my seat. I did not fasten shoulder harness. Just before landing at Haneda Airport, due to violent up and down shaking, my head hit upper part of the cabin, then I fell hard into the seat, and at the impact I felt severe pain run through my upper and lower back. After landing, I found it difficult to disembark due to the pain. I disembarked with the help of the crew and other people. As the severe pain persisted, I decided to see a doctor and went to a hospital by a car which had been waiting for me. Since the medical examination at the hospital diagnosed possible broken vertebrae, I was hospitalized there. At the beginning of the

following week, on July 3 (Monday), I underwent a detailed examination, through which my condition was diagnosed as vertebral body fracture (in the lower middle portion of the back). On the following day, July 4 (Tuesday), I underwent surgery. I left the hospital on July 19 (Wednesday).

② Medical history

In the past, I was hospitalized for treatment of vertebral compression fracture. Even before the accident, I had suffered from chronic lower back pain. I think the condition of the affected part was worsened by the impact at the time of the accident. My condition has never been diagnosed as osteoporosis (a disease that causes bones to become easily broken).

I regularly take pain-relief and sleep-inducing medication prescribed by my doctor.

③ Experience of trips on airplanes

I have seldom used airplanes recently; I fly only once a year or two. I have not encountered such turbulence as this accident.

(5) Passenger C

On the day before the accident Passenger B took meals ordinarily and it seemed to me that he had enough sleep.

It was raining lightly at the time of departure from Hiroshima Nishi Aerodrome but I was told it would probably not be rainy in Tokyo.

The seatbelt sign in the cabin remained illuminated during the entire flight.

When the accident occurred, both Passenger B and I fastened seatbelts.

There was single sudden jolt and, after that, the flight was smooth. Luggage on the rear seats fell on the floor, probably because it had not been tied down.

The accident occurred at around 17:50, at an altitude of about 2,000 ft, approximately 15 km east of Tokyo International Airport (at latitude 35°33' north and longitude 135°57' east).

(See Figures. 1, 2, 3 and 5.)

## 2.2 Injury to Person

One of the passengers was seriously injured.

## 2.3 Damage to Aircraft

There was no damage to the aircraft.



## 2.4 Pilot Information

(1) PIC	Male, Age 55 years	
Commercial pilot certificate (airplane)		October 12, 1982
Type rating for multiple-engine airplane (land)		March 25, 1992
Instrument flight certificate (airplane)		May 18, 1987
1st class aviation medical certificate		
Validity		Until March 27, 2007
Total flight time		4,204 h and 45 min
Flight time in the last 30 days		14 h and 20 min
Flight time on the aircraft type		1,047 h and 55 min
Flight time in the last 30 days		10 h and 15 min
(2) First officer	Male, Age 50 years	
Commercial pilot certificate (airplane)		July 30, 1984
Type rating for multiple-engine airplane (land)		April 7, 2000
Instrument flight certificate (airplane)		April 28, 1989
1st class aviation medical certificate		
Validity		Until November 19, 2006
Total flight time		3,861 h and 48 min
Flight time in the last 30 days		12 h and 25 min
Flight time on the aircraft type		285 h and 35 min
Flight time in the last 30 days		7 h and 25 min

## 2.5 Aircraft Information

### 2.5.1 Aircraft

Type		Cessna 560
Serial number		560-0080
Date of manufacture		October 23, 1990
Certificate of airworthiness		TO-17-364
Validity		Until October 26, 2006
Airworthiness Categories	Airplane, Transport Category or Special Aircraft category	
Total time in service		2,789 h and 35 min
Time since last inspection (June 12, 2006)		13 h and 15 min
(See Figure. 4.)		

### 2.5.2 Weight and Balance

At the time of the accident, the weight and center of gravity of the aircraft were as follows:

The calculated weight and center of gravity of the aircraft at the time of the accident was approximately 13,545 lb and approximately 300.31 in aft of datum line. It is estimated that both

were within the allowable limits (maximum takeoff weight of 15,900 lb and center of gravity at 294.0 ~ 304.23 in aft of datum line for the calculated aircraft weight at the time of the accident).

### 2.5.3 Passenger Seats

Each passenger seat of the aircraft are equipped with a seatbelt and a shoulder harness to be fastened diagonally from the occupant's shoulder.

## 2.6 Meteorological Information

2.6.1 According to the quick access recorder (QAR) data of the preceding aircraft, the direction and velocity of wind in the area nearest to the site of the accident were as follows:

(17:48:06)

Altitude...2,200 ft; Direction of wind...231°; Velocity of wind...16 kt

2.6.2 The aviation weather report data at Haneda Airport, which is located approximately 15 km west of the accident site, in the accident-related time zone, was as follows:

17:30 Direction of wind...170°; Velocity of wind...10 kt; Prevailing visibility...10 km;

Clouds: amount...6/8, type...altocumulus, ceiling...13,000 ft,  
amount...7/8, type...unknown, ceiling...unknown;

Air temperature... 25°C; Dew point... 22°C;

Altimeter setting (QNH)...29.76 inHg

## 2.7 Other Relevant Information

### 2.7.1 ATC Communications Before and After the Accident (Excerpt)

<i>Time (JST)</i>	<i>Position</i>	<i>Contents</i>
17:47:30	<i>Preceding aircraft</i>	<i>Tokyo tower, (Preceding aircraft), VOR on course.</i>
	<i>TOWER</i>	<i>(Preceding aircraft), Tokyo tower, RWY16L cleared to land, wind 180 at 12 knots. You are No. 4, following B767, 3 miles before KWE.</i>
	<i>Preceding aircraft</i>	<i>OK, cleared to land 16L, (Preceding aircraft).</i>
17:49:01	<i>APPROACH</i>	<i>JA8576, contact tower 124.35.</i>
	<i>JA8576</i>	<i>Roger 8576, contact tower 12435, roger.</i>
17:49:15	<i>JA8576</i>	<i>Tokyo tower, JA8576, approaching JONAN.</i>
	<i>TOWER</i>	<i>JA8576, Tokyo tower, RWY16L cleared to land, wind 180 at 11 knots. You are No. 4, following B747, 3 miles before KWE ··· .</i>
	<i>JA8576</i>	<i>Roger ··· 8576, (unclear), cleared to land.</i>
17:50:30	<i>TOWER</i>	<i>JA8576 ··· 8576, 4 miles behind 747, his ground speed is 170 knots and reduce to minimum approach speed., caution wake turbulence.</i>

**2.7.2** In the master operation records (inbound) of Tokyo International Airport on the day of the accident, the aircraft, the preceding aircraft (Boeing 747-400D) and the second nearest preceding aircraft (Boeing 767-300) are indicated as follows:

(Excerpt)

	<i>Flight rules</i>	<i>Aircraft type</i>	<i>Arrival time</i>	<i>Takeoff weight (tons)</i>
<i>Second nearest preceding aircraft</i>	<i>IFR</i>	<i>B767-300</i>	<i>17:51 June 30</i>	<i>143</i>
<i>Preceding aircraft</i>	<i>IFR</i>	<i>B747-400D</i>	<i>17:53 June 30</i>	<i>272</i>
<i>JA8576</i>	<i>IFR</i>	<i>C-560</i>	<i>17:55 June 30</i>	<i>8</i>

**2.7.3** The Air Traffic Control Procedures Manual (Control Procedure for Wake Turbulence) established by the Civil Aviation Bureau stipulates the following with regard to separation.

(Excerpt)

*b. If an aircraft is in a positional relationship described in (a) or (b) with the preceding aircraft, a separation equal to or greater than that shown in the table below shall be established between both aircraft.*

*(a) When the aircraft is flying at the same altitude as the preceding aircraft or at an altitude less than 1,000 ft lower than the preceding aircraft, and the aircraft is either within the track of the preceding aircraft or is passing a point aligning with the six o'clock position of the preceding aircraft:*

<i>Preceding aircraft</i>	<i>Following aircraft</i>	<i>Minimum separation</i>	
<i>Heavy aircraft, etc.</i>	<i>Heavy aircraft</i>	<i>4 nm</i>	<i>Heavy aircraft: 136 tons or more</i>
	<i>Medium aircraft</i>	<i>5 nm</i>	<i>Medium aircraft: 7 ~ 136 tons</i>
	<i>Light aircraft</i>	<i>6 nm</i>	<i>Light aircraft: 7 tons or less</i>

#### **2.7.4 Wind Conditions at the Time of the Accident (Area Around Discontinuity Zone)**

The instantaneous wind direction and velocity observed at Tokyo International Airport and the QAR data of the preceding aircraft show wind variation on the approach course (at an altitude of 700 ~ 1,000 ft) asw, suggesting the existence of atmospheric discontinuity. However, the atmosphere at the accident site (at an altitude of 2,000 ft) was stable.

### **2.7.5 Tracks of Preceding Aircraft and Second Nearest Preceding Aircraft**

According to the ATC radar records (hereinafter called “the radar records”), the second nearest preceding aircraft flew approximately 1.1 km southwest (approximately 235°) of the accident site at an altitude of approximately 2,100 ft, 3 min and 4 s prior to the occurrence of the accident. The preceding aircraft flew approximately 0.3 km southwest (approximately 240°) of the accident site at an altitude of approximately 2,200 ft, 1min and 28 s prior to the occurrence of the accident. Furthermore, at 17:47:04 when the ATC issued speed instruction immediately before the transfer from radar approach control (hereinafter called “the radar”) to the airport control tower (hereinafter called “the tower”), there was a separation of approximately 5.3 nm between the aircraft and the preceding aircraft.

(See Figure. 3.)

### **2.7.6 Headroom of the Cabin**

The ceiling of the aircraft’s cabin was formed in a semi-cylindrical shape. The headroom was rather small even for someone sitting normally on the seat and a tall person could easily hit his/her head against the ceiling from even small vertical movements of the aircraft.

(See Figures. 5 and 6.)

### **3. ANALYSIS**

**3.1** The PIC and the First Officer possessed proper airman competency certificates and valid aviation medical certificates.

**3.2** The aircraft had valid certificate of airworthiness and had been maintained/inspected in accordance with the applicable regulations.

**3.3** Because the weather charts for the day of the accident (the surface weather chart for Asia and the significant weather forecast chart for Japan) showed a stationary front across Kanto region, and as mentioned in 2.7.4, wind was variable along the approach course (at 700 ~ 1,000 ft), the existence of atmospheric discontinuity was forecast analytically. However, because the area of atmospheric discontinuity did not coincide with the accident site and because there were no reports of turbulence from other aircraft, it is estimated that the weather at the time of the accident did not contribute to this accident.

(See Figures. 7 and 8.)

#### **3.4 Wind Direction/Velocity at the Time of the Accident**

As the PIC stated that the accident site is located 7.8 nm before KWE, and the time at which the aircraft passed that position could be determined from the radar records, it is estimated that the accident occurred at 17:49:34. As the QAR data of the preceding aircraft, at the time when it flew nearest to the accident site as mentioned in 2.6.1, indicates that at an altitude of 2,200 ft the wind direction was approximately 231° and the wind velocity was approximately 16 kt. Consequently, it is estimated that the aircraft was in a position at which it could have been affected by the wake turbulence of the preceding aircraft and the second nearest preceding aircraft .

#### **3.5 Separation from the Preceding Aircraft**

At the time of the accident, flying position of the preceding aircraft(Boeing 747-400D) was, based on the statement of the PIC and the radar records, approximately 4.6 nm (approximately 8.5 km) ahead of the aircraft. Because separation of five nautical miles or more (the minimum separation specified in the Air Traffic Control Procedures Manual (see 2.7.3)) had been maintained between the aircraft and the preceding aircraft when the aircraft had been given a speed instruction immediately before transfer from the radar to the tower, it is estimated that the separation had been maintained in accordance with the manual but the separation reduced due to deceleration of the preceding aircraft.

#### **3.6 Passenger Warning about Wake Turbulence**

According to the ATC communications records (see 2.7.1), the tower gave the aircraft a message, saying “caution wake turbulence” at 17:50:30, but it was after the accident occurred.

The PIC stated that he always exercised caution during approach via north side because he had occasionally encountered wake turbulence in the past. It is considered possible that the severity of injury to the passenger would have been lessened by taking attitude to mitigate impact such as holding body with both hands, had the PIC told the corporate passengers on the aircraft about his experience at appropriate timing.

### **3.7 Events Leading to the Accident**

- (1) Based on the PIC's statement and the radar records, it is estimated that the accident occurred at about 17:49:34 on the VOR/DME C route, approximately 1.8 nm before JONAN, as the aircraft was in level flight while decelerating, at a speed of approximately 185 kt and an altitude of 2,000 ft.  
(See Figure. 2.)
- (2) The radar records show that the second nearest preceding aircraft passed the area around the accident site at an altitude of approximately 2,100 ft, 3 minutes and 4 seconds before the occurrence of the accident, while the preceding aircraft passed the area at an altitude of approximately 2,200 ft, 1 minute and 28 seconds before the occurrence of the accident. Based on this, it is estimated that, at the time of the accident, the aircraft was flying approximately 100 ft below the altitude at which the second nearest preceding aircraft had passed near the accident site and approximately 200 ft below the altitude at which the preceding aircraft had passed there.
- (3) Based on the position of the aircraft relative to the preceding aircraft and the wind direction/velocity at an altitude of approximately 2,200 ft about 1 min and 30 s before the accident, it is estimated that the shaking of the aircraft was due to wake turbulence left behind large aircraft such as the preceding aircraft (or the second nearest preceding aircraft, or both) on the approach route crowded with landing aircraft.
- (4) Although it is considered possible that, had the aircraft selected the windward side or a higher altitude in relation to the tracks of the preceding two aircraft, it would have not been affected by wake turbulence. However, it is estimated that such a selection was difficult to make as the aircraft had been cleared for approach and accordingly advancing toward JONAN.
- (5) Based on the statements of the PIC and the First Officer, it is estimated that in general the shaking was of a magnitude not likely to hurt a person of ordinary build if he/she is seated.
- (6) According to the statement of Passenger B and the medical diagnosis, Passenger B had been under treatment for the past fracture of the bone which fractured again in the shaking of aircraft. It is estimated that the previous fracture of bone would have contributed to the fracture of bone this time.

- (7) Passenger A stated that Passenger B did not fasten shoulder harness. Even if Passenger B had fastened shoulder harness, it is considered that the accident would still have been unavoidable because the shaking of aircraft of this time, which is estimated to be caused by the wake turbulence, was in vertical direction, and the shoulder harness equipped in the aircraft's cabin was less capable of restraining the body against vertical movement.
- (8) During the shaking of the aircraft, the corporate passengers hit their heads against the aircraft's ceiling but did not sustain head injury. It is estimated that such factors as the semi-cylindrical shape of the ceiling and the lining working as a cushion helped prevent injuries to the passengers' heads.

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

It is estimated that the cause of this accident was that one of the corporate passengers sustained a bone fracture as the aircraft was jolted vertically by the wake turbulence which had been left behind the preceding aircraft (or the second nearest preceding aircraft, or both).

It is estimated that the previous fracture of the bone which the corporate passenger had sustained contributed to the fracture of the same bone.



Figure 1 Estimated Flight Route

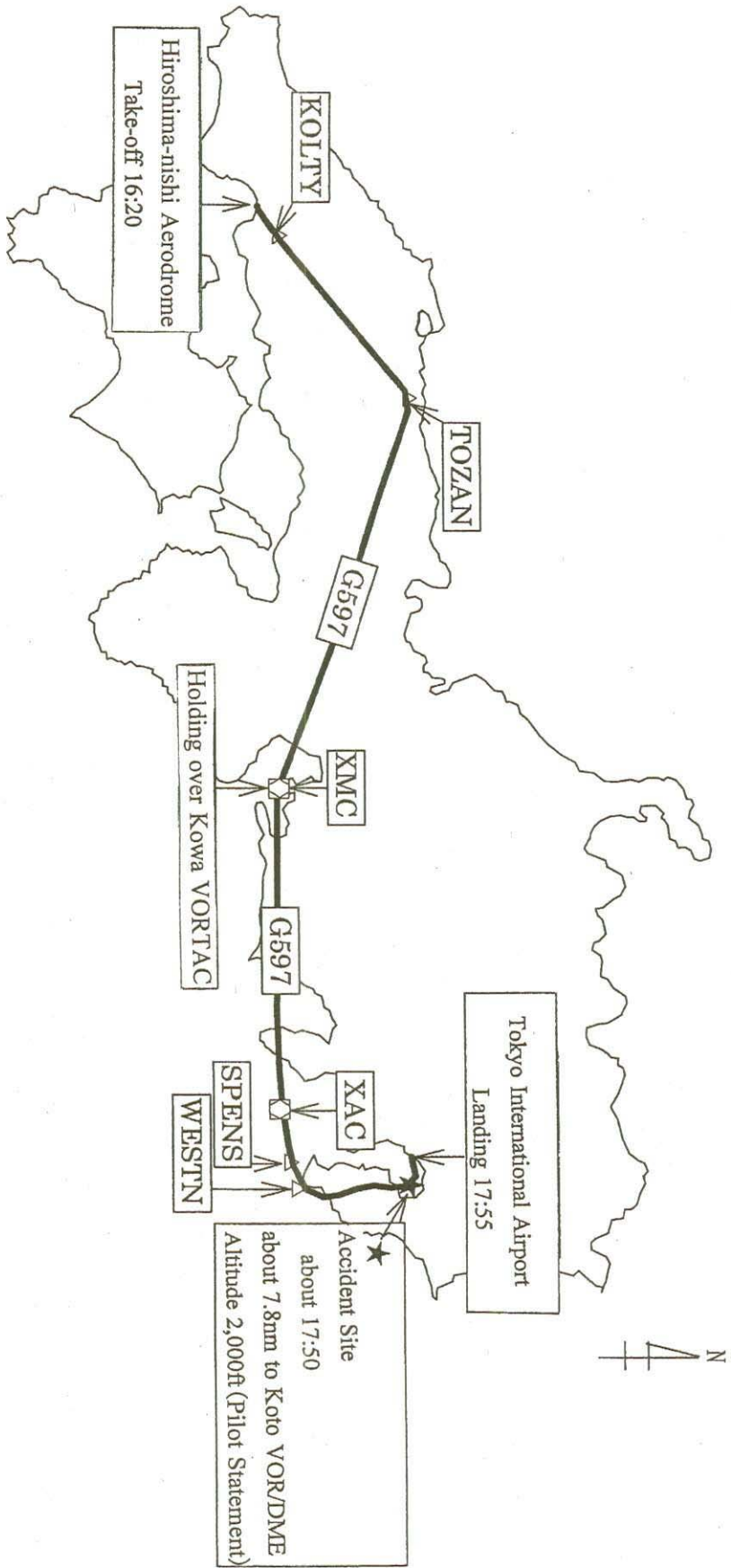


Figure 2 Estimated Flight Route near The Accident Site

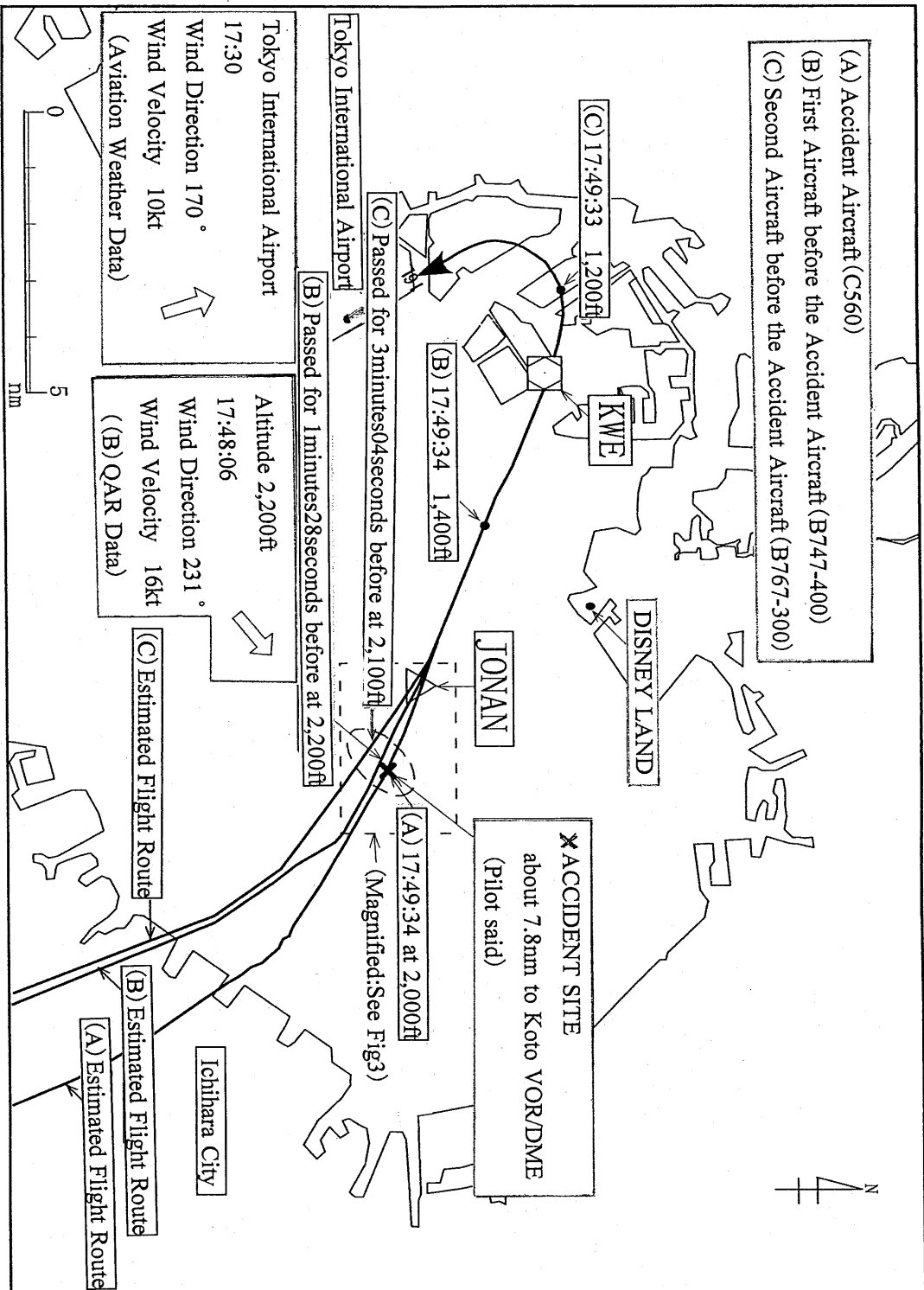


Figure 3 Around the Accident Site (Magnified)

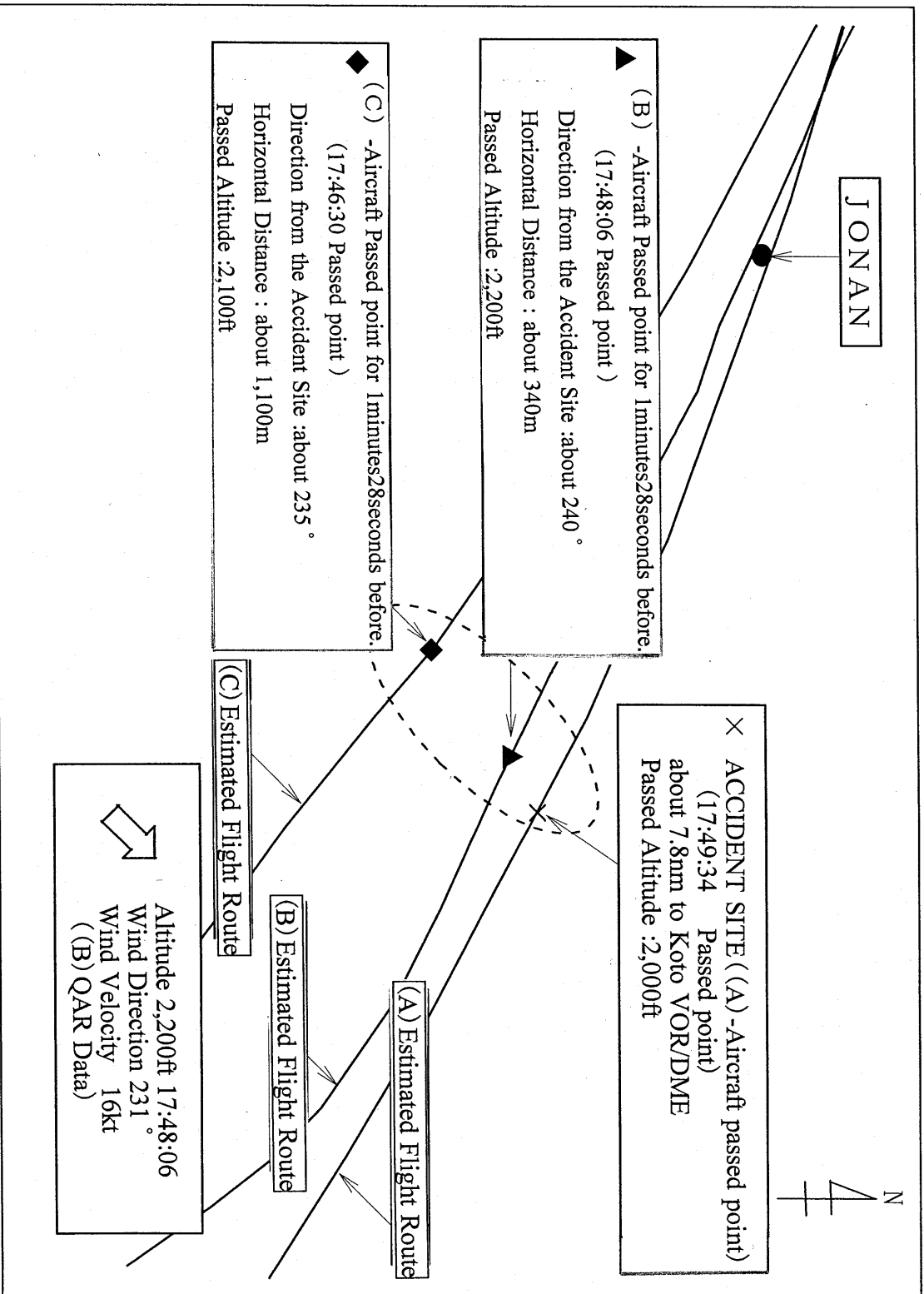


Figure 4 Three angle view of Cessna 560

Unit : m

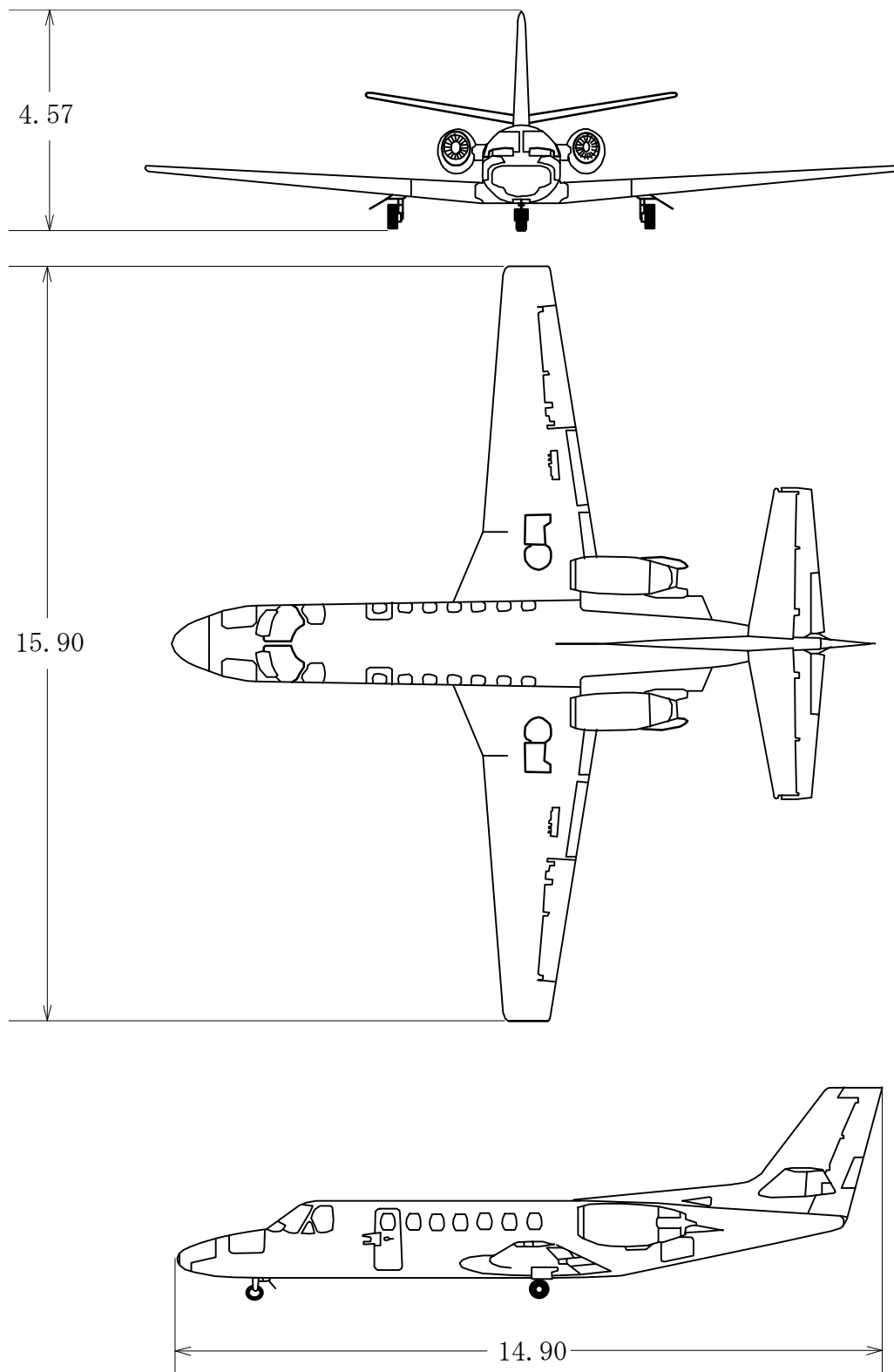


Figure 5 Seat Arrangement

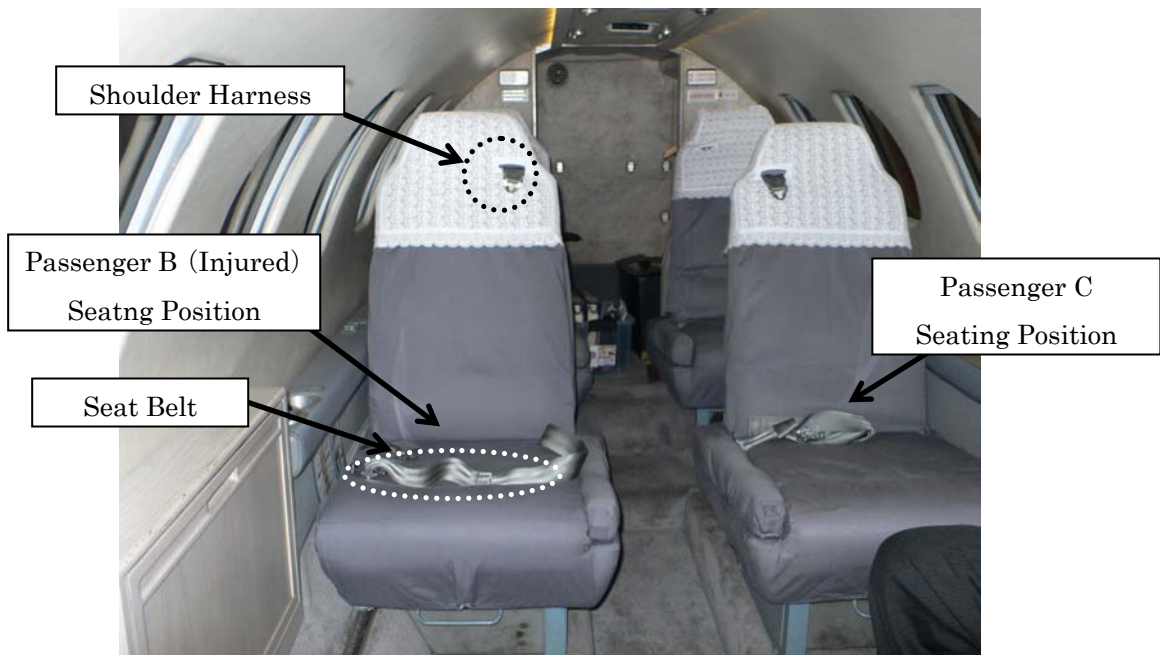
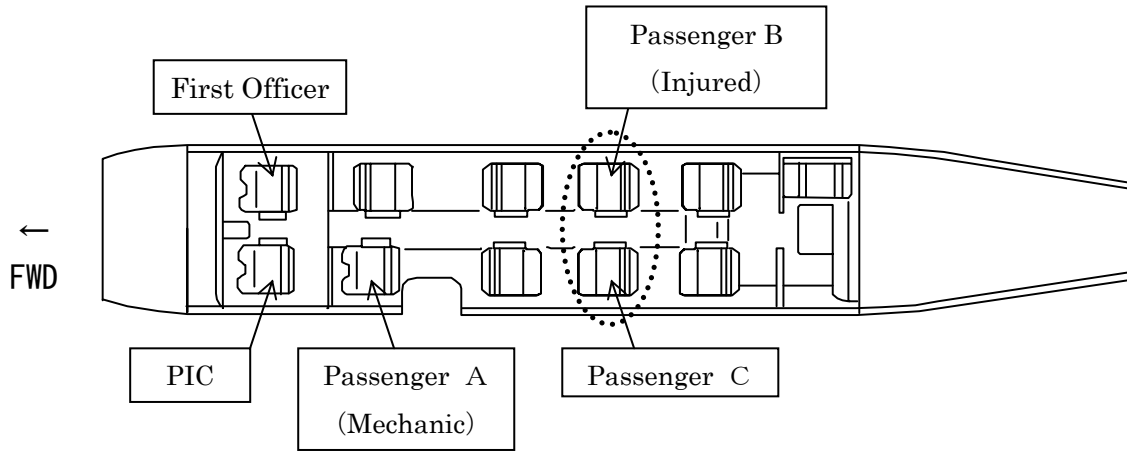


Figure6 Position Relation of Ceiling and Head



(Person on Board)      (Maximum Head Room)      (Minimum Head Room)

PIC	1 0 cm	Same as Left
First Officer	7 cm	Same as Left
Passenger A	7 cm	5 cm
Passenger B	1 0 cm	6 cm
Passenger C	8 cm	6 cm

Figure 7 Asia Surface Weather Map (On the day of the accident)

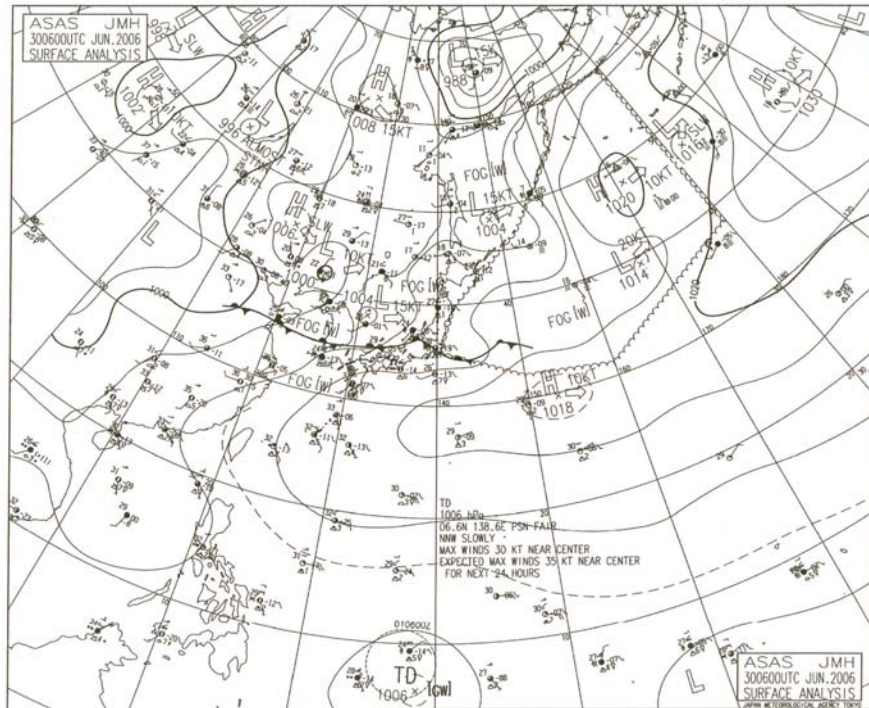


Figure 8 Forecast Significant Weather (On the day of the accident)

