

AA2016-10

**AIRCRAFT ACCIDENT
INVESTIGATION REPORT**

**PRIVATELY OWNED
JA 4193**

December 15, 2016



The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board and with Annex 13 to the Convention on International Civil Aviation is to determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi

Chairman

Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

AIRCRAFT ACCIDENT INVESTIGATION REPORT

DAMAGE FROM THE BELLY LANDING A PRIVATELY OWNED PIPER PA-28R-201, JA4193 SAPPORO AIRFIELD AT AROUND 15:38 JST, AUGUST 19, 2015

December 2, 2016

Adopted by the Japan Transport Safety Board

Chairman	Kazuhiro Nakahashi
Member	Toru Miyashita
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Keiji Tanaka
Member	Miwa Nakanishi

SYNOPSIS

<Summary of the Accident>

On Wednesday, August 19, 2015, a privately owned Piper PA-28R-201, registered JA4193, took off Sapporo Airfield at 12:33 Japan Standard Time (JST:UTC+9hours, all time are indicating in JST on a 24-hour clock), for the practical examinations for competence certification of a commercial pilot qualification, and at around 15:38, when executed practical examination the power off accuracy approach over Sapporo Airfield, it made a belly landing, which caused damages to the aircraft fuselage.

A pilot-in-command and two passengers were on board the aircraft, but no one was injured. The aircraft was substantially damaged, but there was no outbreak of fire.

<Probable Causes>

In this accident, it is certain that the aircraft made a belly landing without extend the landing gears during the power-off accuracy approach in the Practical Examination.

Regarding having become the belly landing, it is probable that the examinee forgot to extend landing gear and he was not aware of this.

Regarding the examinee forgot to extend the landing gears at the timing of performing the gear down, it is somewhat likely that it contributed that he could not understand the meaning of what having been pointed out by the Examiner and felt the embarrassment against it.

Regarding the examinee did not notice that the landing gears were not extend, it is somewhat likely that he was strongly conscious of speed and altitude processing of the aircraft whose deceleration rates and descent rates were lowered, and could not afford to accomplish the checklist by concentrating on its maneuvering operation. In addition, it is somewhat likely that it contributed that the Examiner and Instructor who were on board the aircraft did not notice that its landing gears does not go down.

The abbreviations used in this report are as follows:

KIAS : Knot Indicated Air Speed
RPM : Revolution Per Minute
VFR : Visual Flight Rules
VMC : Visual Meteorological Condition

Unit Conversion List:

1 ft : 0.3048 m
1 in : 25.40 mm
1 inHg : 33.86 hPa
1kt : 1.852 km/h
1 lb : 0.4536 kg
1 nm : 1.852 km

1. PROCESS AND PROGRESS OF THE AIRCRAFT ACCIDENT INVESTIGATION

1.1 Summary of the Accident

On Wednesday, August 19, 2015, a privately owned Piper PA-28R-201, registered JA4193, took off Sapporo Airfield at 12:33 Japan Standard Time (JST:UTC+9hours, all time are indicating in JST on a 24-hour clock), for the practical examinations for competence certification of a commercial pilot qualification, and at around 15:38, when executed practical examination the power off accuracy approach over Sapporo Airfield, it made a belly landing, which caused damages to the aircraft fuselage.

A pilot-in-command and two passengers were on board the aircraft, but no one was injured. The aircraft was substantially damaged, but there was no outbreak of fire.

1.2 Outline of the Accident Investigation

1.2.1 Investigation Organization

On August 20, 2015, the Japan Transport Safety Board designated an investigator-in-charge and two investigators to investigate this accident.

1.2.2 Representatives from the Relevant State

An accredited representative of United States of America, as the State of Design and Manufacture of the aircraft involved in this accident, participated in this investigation.

1.2.3 Implementation of the Investigation

August 20 and 21, 2015: Interviews, aircraft examination, on-site investigation and Information gathering

August 24, 2015: Interviews

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

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

1.2.5 Comments from the Relevant State

Comments were invited from the relevant State.

2. FACTUAL INFORMATION

2.1 History of the Flight

On Wednesday, August 19, 2015, a privately owned Piper PA-28R-201, registered JA4193, took off Sapporo Airfield at 12:33 JST, for Practical Examinations for competence certification of a commercial pilot qualification (hereinafter referred to as "Practical Examination"); cf. 2.8 for Practical Examination), an examinee sat in the left seat of the cockpit as pilot-in-command, an examiner (hereinafter referred to as "Examiner") sat in the right seat of the cockpit, and the person who performed education and training to the examinee and carried out the competence certification *1 (hereinafter referred to as "Instructor") sat in the right rear seat.

The outline of the flight plan for the aircraft was as follows:

Flight rules: Visual flight rules (VFR)

Departure aerodrome: Sapporo Airfield

Estimated off - block time: 11:50

Cruising speed: 120 kt

Cruising altitude: VFR

Route: Otaru - Yakumo - Onuma - Hakodate Airport - Shikabe - Muroran - Kuromatsunai - Yoichi

Destination aerodrome: Sapporo Airfield

Required time: 2 hours and 30 minutes

Remarks: A touch-and-go *2 at Hakodate Airport

Fuel load expressed in endurance: 5 hours

Persons on board: 3

Thereafter, the following remarks were added before the flight, the route and the required time were changed further in flight.

Route: Otaru - Yakumo - Onuma - Hakodate Airport - Shikabe - Muroran - Rankoshi - Yoichi.

Required time: 2 hours and 50 minutes

Remarks: Tree touch-and-go at Sapporo Airfield

The history of the flight up to the time of the accident is summarized as below, according to the statements of the examinee, the Examiner and the Instructor.

(1) Examinee:

The day was the final day of the Practical Examination, and it was scheduled to execute mainly the examination subjects navigation flight*3 and the touch-and-go.

*1 The "competence certification" refers to, in a Practical Examination, those who hold the qualification of examination qualifications or over, performs education and training on examining the examinee, and certifies that his or her skills have reached a predetermined level. Certification by the Instructor is done by signing the certification section of the Practical Examination results report that must be submitted to the Examiner.

*2 The "touch-and-go" refers to an aircraft once landed takes-off by accelerating without stopping. As operations of the takeoff and landing can be repeated, it is done a lot in the training flight.

On the morning of the day, the examinee informed the Examiner that the navigation flight to Hakodate Airport was possible. At around 11:30, since the weather in Sapporo Airfield began rough with a gust of wind, despite they were supposed wait for a while, the examinee judged that the flight was possible. At that time, there was advice from the Instructor to encourage discontinuing the flight; however, the examinee chose to leave because visual meteorological condition was maintained. The examinee performed a pre flight inspection of the aircraft, and then took-off after confirming that there were no abnormalities.

The aircraft, on its way back from Hakodate Airport to Sapporo Airfield, receiving the information from Sapporo Terminal Control Facility*⁴ (hereinafter referred to as "Radar") that a flight inspection had been implemented of the facility in Sapporo Airfield; besides, it was instructed by the Sapporo Aerodrome Control Facility*⁵ (hereinafter referred to as "Tower") to hold Naebo.

While holding, the examinee requested the clearance for touch-and-go from the Tower. After obtaining the approach clearance from the Tower, the examinee requested the Tower for the clearance to enter the short downwind leg*⁶ after the touch-and-go, and then started the approach. The examinee, at the time of approach, when receiving the wind information from the Tower that the wind direction 300° and the Wind velocity at 22 kt, felt it was severe for the power-off-accuracy approach*⁷ as the examination subject. As the examinee was instructed by the Examiner to execute a go-around*⁸ as an examination subject before the landing, and then executed it, but at the time when entering the short downwind leg, he worried about the influence of the tail wind.

The examinee requested the clearance of touch-and-go from the Tower and got it. Shortly before starting the examination subject of power-off accuracy approach, the examinee was inquired the plan after the touch-and-go from the Tower, although he was intending to respond that "After touch-and-go, Request full stop (after the touch-and-go, we will request the landing)," but the Examiner pointed out that the contents response was wrong. As to the examinee the response was with the intent of "Next full stop" after this touch-and-go. The time when such indication was provided was originally the timing to extend the landing gears. In addition, he was strongly aware that the aircraft in the wind from the point taught by the Instructor to start turning, as a consequence, he had no room to complete the checklist because he was impatient; accordingly, he overlooked the check of the lighting of the three

*³ The "navigation flight" refers to such as in the Practical Examination of commercial pilot, a flight to turn to or the original point of departure to the final destination via an intermediate point to perform the landing from the starting point.

*⁴ The "Terminal Control Facility" refers to the organization established at the airport to perform the terminal control duties and approach control duties, which mainly deals with departing/arriving aircrafts by using the Radar, for the period between the time until the aircraft that departed the airport goes out of the approach control area, and until the aircraft that arrived the approach control area is transferred to the airport control tower (hereinafter referred to as "Tower").

*⁵ The "Aerodrome Control Facility" refers to an organization performing the airport control duties that supports the safety of the aircrafts taking off or landing the airport, the aircrafts flying around the airport or in the air traffic control zone, or the aircrafts leg and the vehicles that run in the airport running areas.

*⁶ The "short downwind leg" refers to the downwind having a pattern of the closer distance from the runway than the ordinary downwind which is meant to carry out landing on the limited land.

*⁷ The "power-off accuracy approach" refers to on the assumption that the engine output is lost, in the downwind lateral to the grounding position of the runway, to try controlling of the aircraft at the idle output and the gliding state in order that it is landed on the land in the vicinity of the ground point of the goal.

*⁸ "go-around" refers to abandon a landing of an aircraft once and to rise again and retry the landing. It is called Go-around.

green lights*⁹. On the final approach leg, because the examinee had found that the altitude was too high, he attempted to touch down as soon as possible by fully pushing-down the flap and by lowering the nose, the aircraft touched down beyond the aiming point.

After the belly landing, the examinee recognized that the landing gears were not extend when he noticed that the landing gear warning lamps were lit and the landing gear warning horn was kept sounding. The examinee reported to the Tower, following the instruction of the Examiner, that the aircraft landed without landing gear down and that there was no person injured. The examinee, being almost in a daze, after finishing the subsequent measures by the instruction of the Examiner, including to turn off the switches, got-off the aircraft.

The aircraft landed without any problems in the fuselage; therefore it is probable that the switch operation for extending landing gears was forgot. It is probable that the landing gear warning horn was sounding even before the landing; however, the examinee was concentrating in the maneuvering operations, accordingly, he did not hear the horn at all until in made a belly landing.

(2) Examiner

After taking off from Sapporo Airfield at around 12:30, the aircraft conducted the touch-and-go one time at Hakodate Airport, then returned to Sapporo Airfield. At Sapporo Airfield on that day, an inspection of the facility by the flight inspection aircraft of the Japan Air Self-Defense Force had been carried out; therefore, the aircraft was instructed by the Tower to hold over Naebo about 3 nm south of Sapporo Airfield. While holding, the Examiner told the examinee about the remaining examination subjects.

The aircraft, about 15 minutes later, obtaining the approach clearance to the runway 32, commence the approach to the runway. When the altitude became less than 50 ft, the Examiner instructed the examinee to execute a go-around as the examination subject. The aircraft, after the go-around, entered a short downwind leg in order to implement the power-off accuracy approach.

The power off accuracy approach requires to perform a series of operations in a short period of time, because turning base and turning final are consecutive, it is necessary to squeeze the engine output, extend landing gears and operate the flaps in a shorter distance than the ordinary landing.

The Examiner, when the aircraft had entered the short downwind leg, felt that the distance between it and the runway was close. The Examiner, although feeling doubt if it was possible to down the aircraft to the touch down point in this situation, he was watching in silence because of the examination decision. The engine power of the aircraft had been squeezed; accordingly, landing gear warning horn would have been sounding, but there was no memory that the horn was sounding. After the examinee had squeezed the engine power to idle, being asked about the plan after the touch-and-go by the Tower, he replied that it would be a touch-and-go. The Examiner had a plan to execute the short range landing after a touch-and-go, then he told the examinee of it; accordingly, the examinee told the Tower that he would land as a revision. The Examiner was worried about the close distance between the

*⁹ The "Three Green lights" refers to a situation where total three gears of the landing gear consisting of the nose gear and two main gears respectively are fixed at the down position, all of those three green gear position indicator light on corresponding to those three gears.

downwind leg and the runway, and judged that the distance to lose the altitude of the aircraft would be shortened; moreover, the altitude and the speed during approach would be higher, if the distance was too short. In such a case, the Examiner had recognized from experience that the pilots tend to make a landing from the front wheel by attempting to forcibly ground the touch down point. Moreover, if the speed was fast, pilots tended to ground from the front wheel, as they were unable to change the altitude sufficiently (flare operation) when grounding. Examiner was defensive in order to take over if the aircraft ground the front wheel, because the grounding from the front wheel would cause porpoising*¹⁰. At the same time, the Examiner was focused on carrying out the decision of judgment criteria, such as the final approach speed and the touch down point. At that time, the final approach speed that the Examiner confirmed was 95 kt.

The Examiner felt that something such as burst of the tire might had happened because an abnormal noise arose at the landing of the aircraft. Examiner, being informed from the Instructor that a belly landing was made, noticed that the operation switch of the landing gears had been set to the its retracted position. The Examiner had no memory that the landing gear warning horn had been sounding after the belly landing.

(3) Instructor

When being on board the aircraft, the Examiner sat in the right of the cockpit and the Instructor sat in the right rear seat. The Instructor, as it was difficult for him to read the Instruments from the rear seat due to large physique of the examinee, and it was not allowed to give advices during the examination, without looking the instruments, he had been confirming the position of the aircraft by the outside monitoring, including the vigilance of other aircraft. The aircraft entered a traffic pattern and executed the go-around one time. The Instructor, at the power off accuracy approach, felt that the aircraft was approaching higher than usual altitude. The aircraft was in the normal state without feeling any trouble. Concerning the belly landing, the moment of grounding was felt like gliding without any bounce. A sound of tapping after that of rubbing were heard; accordingly, the Instructor considered it as a burst of tire for a moment from it but then recognized that they were caused by the belly landing. The Instructor had no memory that the landing gear warning horn had been sounding even after the belly landing.

This accident occurred on the runway of Sapporo Airfield (Latitude 43°07' 03" N and Longitude 141° 22' 54" E) at about 15:38, on August 19, 2015.

(See Figure 1: Estimated Flight Route; See Photo 1: Accident Aircraft; See Photo 2: Instrument panel; See Attachment: ATC Communication Records)

2.2 Injuries to Persons

No one was injured or killed.

*¹⁰ The "Porpoising" refers to a motion of the aircraft to repeat the grounding and lifting of the fuselage by the bounce or the like.

2.3 Damage to the Aircraft

2.3.1 Extent of Damage

Substantially damaged

2.3.2 Damage to the Aircraft Components

Structural members of the fuselage	Abrasion
Bottom of engine cowling	Damage
Propeller Blade	Bent
The inner rear edges of the right and left flaps	Deformed
The footstep	Damage

(See Photo 1: Accident Aircraft; See Photo 3: Damage situation of the accident Aircraft)

2.4 Personnel Information

(1) Examinee: Male, Age 30

Private Pilot Certificate (Airplane)

Type rating for single engine land August 13, 2010

Class 2 aviation medical certificate

Validity March 26, 2020

Specific Pilot Competence

Expiry of practicable period for flight June 2, 2017

Total flight time 292 hrs 23 min

Flight time in the last 30 days 22 hrs 15 min

Total flight time on the type of aircraft 50 hrs 30 min

Flight time in the last 30 days 22 hrs 15 min

(2) Examiner: Male, Age 43

Commercial Pilot Certificate (Airplane)

Type rating for multiple engine land December 15, 1999

Instrument flight certificate December 15, 1999

Flight Instructor Certificate March 27, 2008

Pilot Competence Examiner November 1, 2012

Class 1 Aviation Medical Certificate

Validity March 6, 2016

Specific Pilot Competence

Expiry of practicable period for flight April 22, 2016

Total flight time 5,526 hrs 53 min

Flight time in the last 30 days 25 hrs 19 min

Total flight time on the type of aircraft 1 hrs 10 min

Flight time in the last 30 days 1 hrs 10 min

2.5 Aircraft Information

2.5.1 Aircraft

Type

Piper PA-28R-201

Serial number	2837053
Date of manufacturing	October 21, 1986
Certificate of airworthiness validity	No. Tou-27-163 July 1, 2016
Category of airworthiness	Airplane Normal N
Total flight time	8,744 hrs 49 min
Flight time since last periodical check (50-hour Check on August 10, 2015)	17 hrs 10 min

2.5.2 Weight and Balance

When the accident occurred, the aircraft weight of the aircraft was estimated to have been 2,478 lb and its center of gravity (CG) was estimated to have been 88.9 in aft of the datum line, it is probable that it has been located within the allowable range (maximum takeoff weight of 2,750 lb and CG range of 83.8 to 91.5 in) corresponding to its weight.

2.6 Meteorological Information

The aviation routine weather report and the aviation special weather report at Sapporo Airfield at 11o'clock level and immediate after the accident were as follows:

11:09 Wind direction 310°, Wind velocity 18 kt, Maximum instantaneous wind velocity 28 kt, prevailing visibility 10 km or more, Light showers of rain,
Cloud: Amount 1/8 or less, Type Stratus, Cloud base 500 ft
Amount 3/8, Type Stratus, Cloud base 1,500 ft
Amount 5/8, Type Cumulus, Cloud base 3,500 ft
Temperature 20°C, Dew point 19 °C
Altimeter setting (QNH) 29.83 inHg

11:18 Wind direction: 310°, Wind Velocity 14 kt, Maximum instantaneous wind velocity 24 kt, prevailing visibility 10 km or more, Light showers of rain,
Cloud: Amount 2/8, Type Stratus, Cloud base 500 ft
Amount 3/8, Type Stratus, Cloud base 1,500 ft
Amount 6/8, Type Cumulus, Cloud base 2,500 ft
Temperature 20°C, Dew point 18 °C
Altimeter setting (QNH) 29.83 inHg

15:00 Wind direction 340°, Wind velocity 19 kt, prevailing
Visibility 10 km or more, Light showers of rain,
Cloud: Amount 1/8 or less, Type Stratus, Cloud base 800 ft
Amount 3/8, Type Cumulus, Cloud base 2,000 ft
Amount 5/8, Type Cumulus, Cloud base 2,500 ft
Temperature 21 °C, Dew point 18 °C
Altimeter setting (QNH) 29.84 inHg

15:40 Wind direction 330°, Wind velocity 12kt, Prevailing visibility 10 km or more,
Cloud: Amount 1/8 or less, Type Stratus, Cloud base 800 ft
Amount 3/8, Type Cumulus, Cloud base 2,000 ft
Amount 5/8, Type Cumulus, Cloud base 2,500 ft

Temperature 19°C, Dew point 17 °C,
 Altimeter setting (QNH) 29.85 inHg
 16:00 Wind direction 330°, Wind velocity 13 kt, Prevailing visibility 10 km or more,
 Cloud: Amount 1/8 or less, Type Stratus, Cloud base 800 ft
 Amount 3/8, Type Cumulus, Cloud base 2,000 ft
 Amount 5/8, Type Cumulus, Cloud base: 2,500 ft
 Temperature 19°C, Dew point 17 °C
 Altimeter setting (QNH) 29.86 inHg

2.7 Information on the Air Traffic Control Communications Records

The main communication contents between the aircraft and the Radar, and the aircraft and the Tower on the day that has been recorded were as follows: (Excerpt)

15:03:22 The Radar communicated that "JA4193, radar contact, 27 miles north west of Airport. SAPPORO runway 32 wind 340 at 23 QNH 2984, maintain VMC.

15:05:50 The Radar communicated that "Expect landing via NAEBO, due to Flight check."

15:09:58 The Radar communicated that "Radar service terminated, contact SAPPORO tower 118.1."

15:12:46 The aircraft communicated that "Request two times touch-and-go."

15:17:22 The aircraft communicated that "Request touch-and-go, after touch-and-go join ...join short downwind, after short downwind will be full stop.

15:32:32 The Tower communicated that "Runway 32 cleared touch-and-go, wind 330° at 14 kt."

15:34:50 The aircraft communicated that "Go around."

15:36:21 The aircraft communicated that "Request touch-and-go."

15:36:26 The Tower communicated that "Runway 32 cleared touch-and-go, wind 330 at 12 kt."

15:36:37 The Tower communicated that "Request intention after touch-and-go."

15:36:41 The aircraft communicated that "Touch and go, one more touch-and-go."(no sound for about three seconds) "Then full stop."

15:36:47 The Tower communicated that "Roger".

(See Attachment: ATC Communications Records)

In addition, in the communication record from the examinee to the Tower that he made the belly landing, it was recorded that the landing gear warning horn had been sounding.

2.8 Information about the Practical Examination

The Practical Examination is implemented based on the Practical Examination Standards of Flight Standard Division, Aviation Safety and Security Department, Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport Tourism enactment (hereinafter referred to as "Practice Standards") and the Practice Standards for Practice Examination for Competence Certification (hereinafter referred to as " Detailed Practical Standards,") which consists of oral examination and skill test.

The examination subjects related to take-off and landing of the skill test, according to the Detailed Practical Standards, are as follows:

- (1) Take-off climb during the normal and in the crosswind
- (2) Approach/Landing during the normal and in the crosswind
- (3) Short field take-off
- (4) Short field landing
- (5) Power-off accuracy approach
- (6) Go-around
- (7) Rejected takeoff (Note: It is performed by an oral method unless a flight training device is in use.)

2.8.1 Information on the Schedule of the Practical Examination

The Practical Examination of the examinee this time was carried out on both days of August 17 and 19. On August 17 the Skill test of aerial operation was mainly carried out, and on the day of the accident the rest subjects of the Practical Examination for the take-off and landing, and the navigation flight were scheduled to be carried-out. On the day of the accident the Examiner intended to implement a touch-and-go for one time at Hakodate Airport, and go-around and the power off accuracy approach by the two touch-and-go at Sapporo Airfield, and then finish with the short field landing at the airfield.

2.8.2 Information on the Attendance of the Practical Examination

It has been provided in the Practice Standards about the attendance of the Practical Examination: (Extract)

*1-5 When implementing the Practical Examination, one who holds the examination qualifications or over of qualification (however, it must be a Flight Instructor*¹¹ when the examinee tries to get the first time competence certificate) must perform the education and training on the examinee in advance and it must be proved that his or her's skill have reached a predetermined level.*

1-5-1 Upon performing a Practical Examination, one who carried out the certification of skills of the examinee must attend.

(Omitted)

It must be noted that, for the advice during the examination, it has been provided in the Practice Standards as follows: (Extract)

2-2 In a case where the examinee of an oral examination falls under one of the following items the Practical Examination must be suspended.

(Omission)

2-2-2 When receiving advice from others.

(Omission)

3-8 In a case where the examinee of skill test falls under one of the following items the Practical Examination must be suspended.

*¹¹ The "Flight Instructor" refers to a person who has a skills certificate and an aviation medical certificate relating to the type of aircraft to be used for training and examination and a flight Instructor certificate.

(Omission)

3-8-4 When receiving advice or assistance from others. However, it must not be applicable in the case where the examinee has received advice or assistance based on the operating policy in a aircraft that require two people to maneuver.

(Omitted)

2.8.3 Positioning of Pilot-In-Command in the Practical Examination

Annex 1 Personnel Licensing to the Convention on International Civil Aviation, CHAPTER 1, Definitions and General Rules Concerning Licenses of the Definitions determine that the pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight. In the flight plan of the aircraft, the examinee had been notified as pilot-in-command.

On the other hand, it has been provided in the Practice Standards as follows:

(Extract)

1-9 In a case where the examinee falls under one of the following items the Practical Examination must be suspended.

1-9-1 When the examinee or the relevant people does not follow the instructions of the Examiner.

(Omitted)

2.8.4 Information on the Passenger in the Practical Examination:

According to the Civil Aviation Bureau, Practical Examinations are carried out normally, if an aircraft is to be maneuvered by one person, people are on board in the order of a examinee, an examiner, and a person who carried out the competence certification of the examinee depending on the number of seats installed, that means, an examinee only is on board in the case of the single-seat plane, the an examinee and an examiner are on board in the case of two-seated plane, and all of above-said three people are on board in the case of three or more seated. If there is a maneuverable seat in addition to the cockpit to be seated by the examinee, the Examiner or the person who carried out the competence certification of the examinee is seated. In any case it should be noted that the Examiner does not on board as a pilot-in-command.

2.9 Additional Information

2.9.1 Information on the Traffic Pattern:

As the Traffic Pattern of Sapporo Airfield is set in the northeast side of the runway only, when runway 32 is the duty runway, the course becomes the clockwise. In the case of short downwind leg, an aircraft will fly over a closer path of distance from the runway than the normal downwind leg. The name of each point in the Traffic Pattern is as Figure 1.

(See Figure 1: Estimated Flight Route)

2.9.2 Information on the landing gears

(1) Information on the airspeed in the landing gear down situation:

The Flight Manual of the aircraft provides in "Chapter 4 Normal Operating Procedure,

27. Cruise states on the airspeed in the landing gear down situation as follows: (Extract)

27. Cruise

The true airspeed with gear down is approximately 75% of the gear retracted airspeed for any given power setting.

(Omitted)

(2) Information on the landing gear warning device:

About the landing gear warning device that operates its light and horn are provided in Chapter 4 Normal Operating Procedure, 39. Landing Gear as follows:

(Extract)

39. Landing gear

The pilot should become familiar with the function and significance of the landing gear position indicators and warning lights.

(Omission)

The red gear warning light on the instrument panel and the gear warning horn operate simultaneously in flight when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or bellow, and the gear is not in the DOWN position. The red gear warning light and horn will also operate simultaneously on the ground when the battery master switch in ON, the gear selector switch is in the UP position, and the throttle is in the retarded position.

(Omitted)

In the aircraft examination by simulating the situation of the accident, it was confirmed that if the throttle is drawn down in a situation when the landing gear is not in the full down position during the flight, the red landing gear warning light and the landing gear warning horn activate.

(See Photo 2: Instrument Panel)

2.9.3 Information on the Check List

Details of the Check List concerning the approach and landing of the aircraft are provided in Chapter 4 Normal Operating Procedure of the Flight Manual as follows:

(Extract)

5k. Approach and Landing Checklist (29.)

APPROACH AND LANDING (29.)

Fuel Selector PROPER TANK

Seat Backs ERECT

Belts/Harness FASTEN

Electric Fuel Pump ON

Mixture SET

Propeller FULL INCREASE

Emergency Gear Extension Lever UP POSITION

*Gear DOWN -129 KIAS*¹² max*

*¹² The "KIAS" refers to the one that displays the indicated airspeed at kt (knot) unit.

Flap SET-103 KIAS max

Trim to 75 KIAS

(Omitted)

29. Approach and Landing (5k.)

(Omitted) The landing gear may be extended at speeds below 129 KIAS. The airplane should be trimmed to a final approach speed of about 75 KIAS with flaps extended. The flaps can be lowered at speeds up to 103 KIAS.

(Omitted)

Additionally, the following placard was stuck on to the instrument panel of the aircraft.

LANDING

1. Landing Gear . . . Down & 3 Green

2. Prop High rpm

3. Flap Set

(See Photo 2: Instrument Panel)

2.9.4 Information on the Training Organization

The training organization that the examinee and the Instructor were members has been operating in the form of a flying club, which aims for a member (trainee) who already has proven to have a private pilot certificate to obtain the pilot skills for commercial pilot certificate and instrument flight certificate.

3 . ANALYSIS

3.1 Airman Competence and Aviation Medical Certificate

The examinee had a valid airman competence certificate and a valid aviation medical certificate.

3.2 Airworthiness Certificate

The aircraft had a valid airworthiness certificate, and had been maintained and inspected as prescribed.

3.3 Relations to the Meteorological Conditions

As described in 2.1 (1) and 2.6, the weather of Sapporo Airfield before the the departure of the aircraft was in the weather conditions that were rough with a gust of wind. In addition, about the strong wind, it had been notified in communication with the Radar on the way back to Sapporo Airfield as the wind direction 340° and wind velocity 23 kt at 15:03:22. Then, the examinee said that he had received information from the Tower when approaching Sapporo Airfield for the first time as the wind direction 300° and wind velocity 22 kt; however, in the communication records with the Tower at 15:32:32 before the approach it was notified that the wind direction 330° and wind velocity 14 kt, there was a difference in respect to the strength of

the wind between the memory of the examinee and the notified information, it is somewhat likely that he had continuously held a consciousness that strong wind had been blowing in Sapporo Airfield.

The examinee said that he worried the influence of the tail wind when entering the short downwind leg, also that he had strongly aware that the aircraft was the point to start a turn. However, just before the occurrence of this accident, the wind information received from the Tower with the entry clearance at 15:36:26 was wind velocity 12 kt; therefore, the wind was not so strong as the examinee worried about. the reason for he strongly felt that the aircraft was because its landing gears were not down and it is somewhat likely that it had influenced that it did not slow down.

From these things, although the weather conditions at the time of the accident was not directly related to the occurrence of the accident, it is somewhat likely that the examinee was in the state of tension with strong belief that strong wind was blowing, and that he must correspond well to strong wind.

3.4 Gear Warning Device and Landing Gear Operation of Aircraft

As described in 2.1 (1) and (2), concerning the landing gear warning horn as the gear warning device of the aircraft, the examinee was aware that the horn was continuously sounding along with the lighting of the landing gear warning light after the belly landing, although the Examiner and the Instructor said that they had no memory of the sounding after the landing. As described in 2.7 there was a record in the communication record with the Tower that the horn was continuously sounding after the landing, and in the aircraft examination it was confirmed that the landing gear warning light and the landing gear warning horn were normally operating; therefore, it is somewhat likely that they have been activated. However, it is considered somewhat likely that the examinee was distracted by the maneuvering operations, the Examiner was distracted by the examination judgment, and the Examiner was distracted by the outside monitoring; therefore, they were not aware of the landing gear warning light and the landing gear warning horn.

In addition, as described in 2.1 (1) and (2), the examinee thought to have forgotten the switch operation to extend landing gears, and the Examiner was aware after the belly landing that the landing gear operation switch was in the gear retracted position; accordingly, it is highly probable that the landing gear down operation of the aircraft had not been performed before the landing.

3.5 Relations between Communication Contents and the Pointing Out

The Examiner was intending to execute a go-around and the power-off accuracy approach by two consecutive take-offs and landings in Sapporo Airfield and finish with the short field landing. As described in 2.1 (2), when the aircraft was holding the Examinee conveyed the remaining examination subjects to the examinee, and then the examinee also requested the clearance for the two times touch-and-go in the communication with the Tower at 15:12:46; consequently, it is probable that the flight procedures both of them were aware at this time was identical. However, as described in 2.1. (1), the examinee insisted that he replied that "After touch-and-go, Request full stop" when being asked from the Tower about the plan after

the touch-and-go at the time when he started the power off accuracy approach; on the contrary, it was so recorded in the communication to the Tower from the pilot-in-command at 15:36:41 that "Touch-and-go, one more touch-and-go." From this fact, it is highly probable that the examinee made a mistake in saying the reply contents contrary to his intention.

The examinee could not understand the meaning of what having been pointed out by the Examiner that the reply with the Tower was wrong when performing the gear down; therefore, and it is somewhat likely that he forgot to let the gear down because he had felt embarrassment. In addition, the background that he felt the embarrassment was that, it is also somewhat likely that because being pointed out from the Examiner might had reminded his anxiety concerning the discontinuation of the Practical Examination as described in 2.8.2 and 2.8.3.

The Examiner immediately pointed out to the examinee that the reply to the Tower was wrong; however, the examinee was within the hectic series of operations of the power-off accuracy approach as a Practical Examination subject when he was concentrating his conscious; consequently it might have caused a psychological burden that would affect the continued safe operations. From this point, the Examiner is desired consideration in accordance with the situation for the time to point out.

3.6 Relations between the Flight Situation and the Maneuvering Operations

The aircraft had been forget the gear down operation, it is probable that the deceleration and the descent rates were lower compared to the landing performance with the time of gear down.

As described in 2.1 (1) and (2), when making a power-off accuracy approach in the skill test the aircraft was in the almost gliding state without engine power at approach speed and landing point within the determined criteria; accordingly, it is probable for the examinee to have been required at the occurrence of the accident to select the correct flight route and its precise maneuvering operation. It is somewhat likely that the examinee did not notice that the landing gears were not extend because he was strongly conscious of speed and altitude processing of the aircraft whose deceleration rates and descent rates were lowered, and could not afford to accomplish the checklist by concentrating on its maneuvering operation.

3.7 Correspondence that Should be Carried Out by the Passenger

As described in 2.1 (2) and (3), the Examiner and the Instructor were on board the aircraft; however, the Examiner stated that he was defensive in order to take over from the situation of the approach speed and its altitude, and had been focused on carrying out the judgment. In addition, the Examiner had been aware that the speed of the aircraft was too fast and the altitude was too high; however, he judged that it was because the distance between the downwind leg and the runway was close. It was difficult for the instructor to read the instrument from the rear seat and it was not allowed to give advices during the examination; therefore, he stated that he had been confirming the position of the aircraft by the outside monitoring.

The reason for the Examiner who did not give advice nor support as he had not been aware that the landing gears were not extend and the gear warning device had been activated, was that it is somewhat likely that in a difficult flight situation, he had to focus in the

confirmation of the speed and the landing points for the determination of examination; accordingly, he could not afford to see the flight objectively. In addition, it is probable that the Instructor should have monitor the flight from the broader point of view, not limited to the monitoring of the outside situation of the aircraft.

For the Examiner and Instructor boarding on the aircraft, although in the current Practice Standards it is hard to give advice for safety that might lead to stop the examination, whereas, as the examinee, by the tension under the special environment of Practical Examination, it is also somewhat likely that he or she must be deviated from the normal procedure; therefore the passenger, especially who was seated on the maneuverable seat is required to strive to risk aversion, including the rapid and appropriate advice or assistance as necessary.

Examiner is in a position to judge the conduct of Practical Examination who has a strong authority for instructions or pointed out during the Practical Examination; therefore, it is probable that the Instructor is in a difficult position to give any advice. In the Practical Examination, it is necessary to make the duty responsibilities and confirmation items clear in each position of the Examiner and the Instructor boarding on. It is probably necessary for the Examiner to confirm communicating and confirming to all of the passengers that safety is the top priority even in the skill test.

4. PROBABLE CAUSES

In this accident, it is certain that the aircraft made a belly landing without extend the landing gears during the power-off accuracy approach in the Practical Examination.

Regarding having become the belly landing, it is probable that the examinee forgot to extend landing gear and he was not aware of this.

Regarding the examinee forgot to extend the landing gears at the timing of performing the gear down, it is somewhat likely that it contributed that he could not understand the meaning of what having been pointed out by the Examiner and felt the embarrassment against it.

Regarding the examinee did not notice that the landing gears were not extend, it is somewhat likely that he was strongly conscious of speed and altitude processing of the aircraft whose deceleration rates and descent rates were lowered, and could not afford to accomplish the checklist by concentrating on its maneuvering operation. In addition, it is somewhat likely that it contributed that the Examiner and Instructor who were on board the aircraft did not notice that its landing gears does not go down.

5. SAFETY ACTIONS

5.1 Safety Actions taken by the Civil Aviation Bureau

The Civil Aviation Bureau, the Ministry of Land, Infrastructure, Transport and Tourism has added the postscript "Securing of safety in skill test "to the Practice Standard for prevention of recurrence. With this, the responsibility for the safety securing in the skill test that shall be carried out by the examinee, Instructor, and Examiner can be made clear, and

the Examiner is imposed to explicitly state to the examinee and the Instructor in the preflight briefing. (Extract of additional part)

Chapter 5 Securing of Safety in the Skill Test

5-1 Responsibility on the securing of safety

5-1-1 Examinee

In an aircraft that can be maneuvered by one person, the examinee has the primary responsibility for security during the examination as pilot-in-command

(Omitted)

5-1-2 Instructor

In the case of an aircraft that can be maneuvered by one Person, the Instructor must constantly monitor the maneuvering of the examinee, and when it is required for safety even during the test, properly implement appropriate guidance and supervision. However, in the case where boarding can be made by two people or less on an aircraft, monitor must be implemented on the ground to the extent possible, and when it is required even during the skill test.

(Omitted)

5-1-3 Examiner

In the case of an aircraft that can be maneuvered by one person, the Examiner must be seated in a position where the maneuvering skills of the examinee can be verified and perform the test. When it is required for securing of safety, provide advice and support even during the test.

(Omitted)

5-2 Measures for ensuring safety in the examination using actual aircraft

5-2-1 *In order to ensure safety during the test, the Examiner must perform the briefing in order to clarify the responsibility for safety assurance during the test to the examinee and the passenger Instructor before the flight.*

(Omitted)

Figure1: Estimated Flight Route

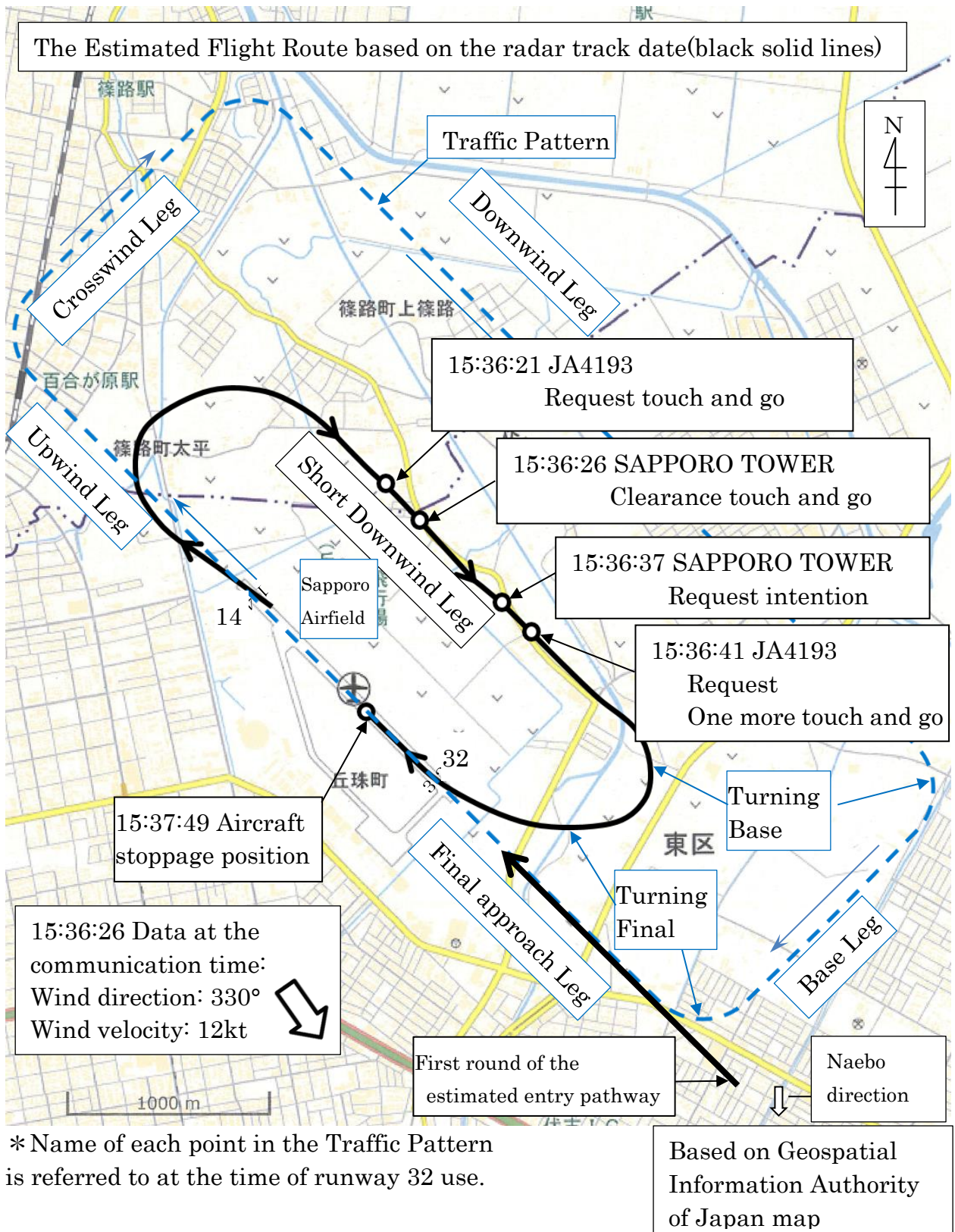


Figure2: Three Angle View of Piper PA-28R-201

Unit: m

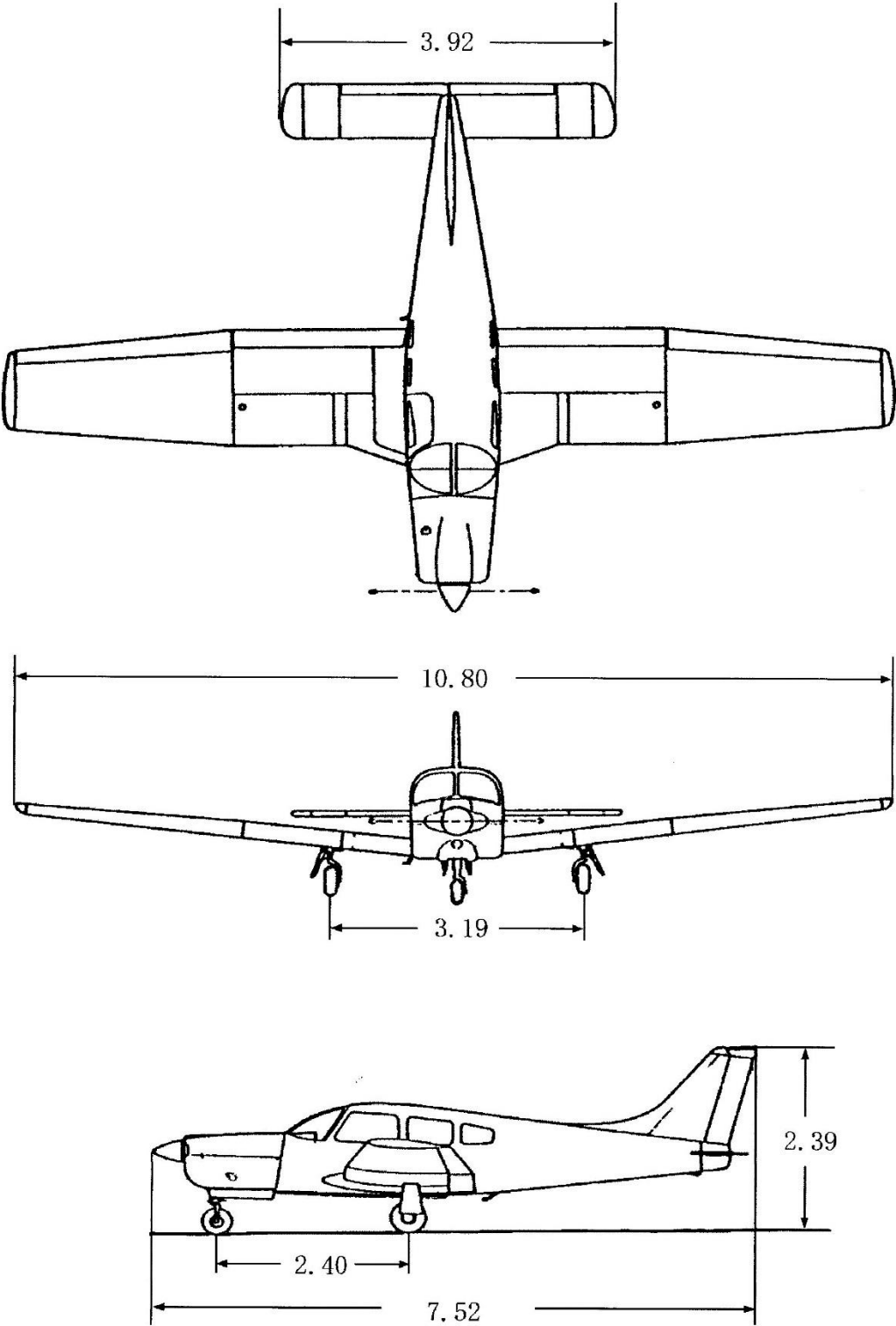


Photo1: Accident Aircraft

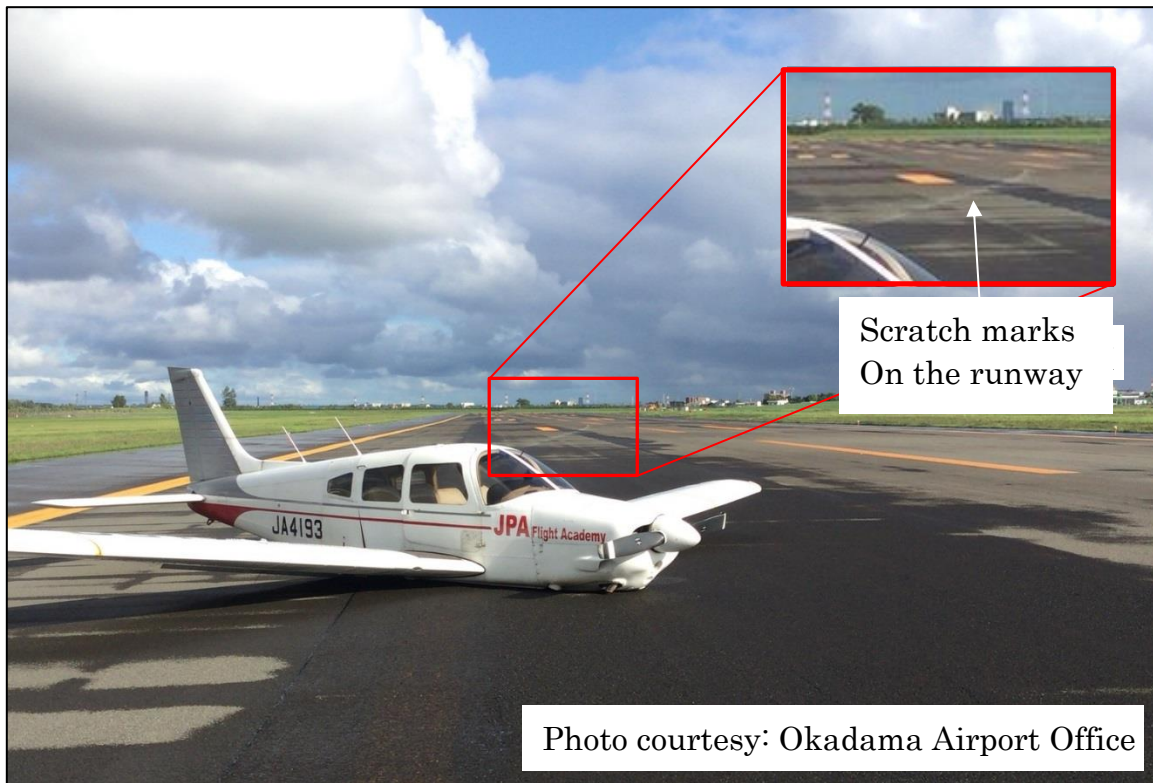


Photo2: Instrument Panel

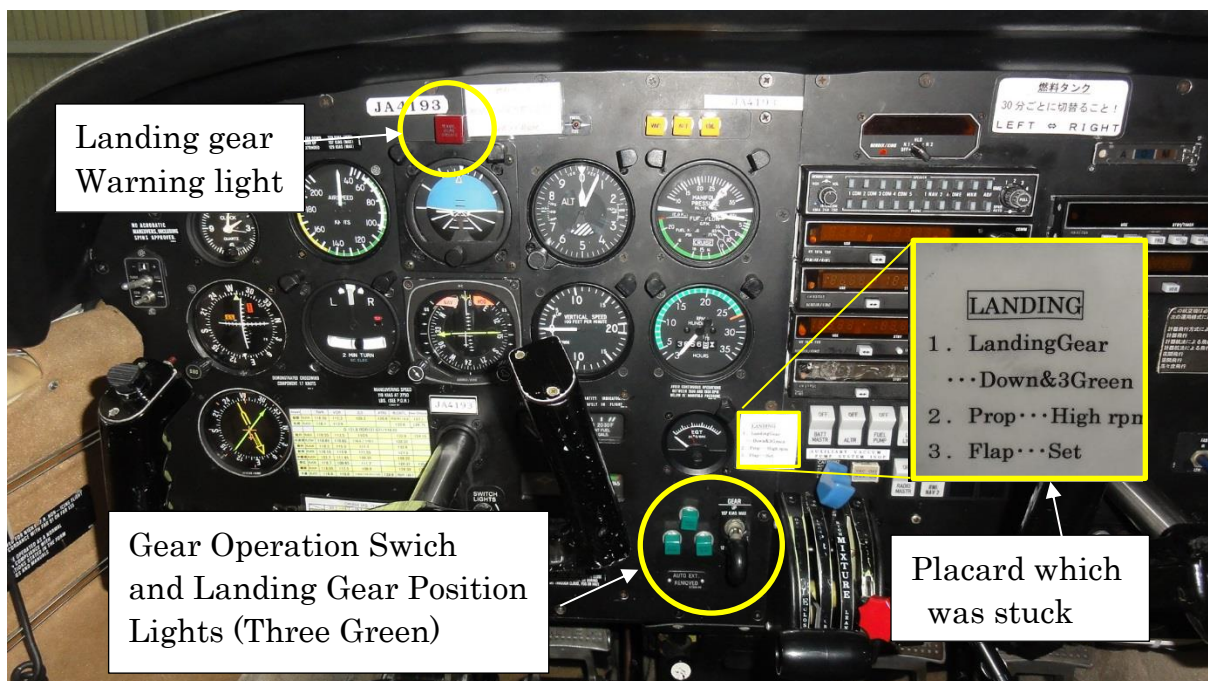
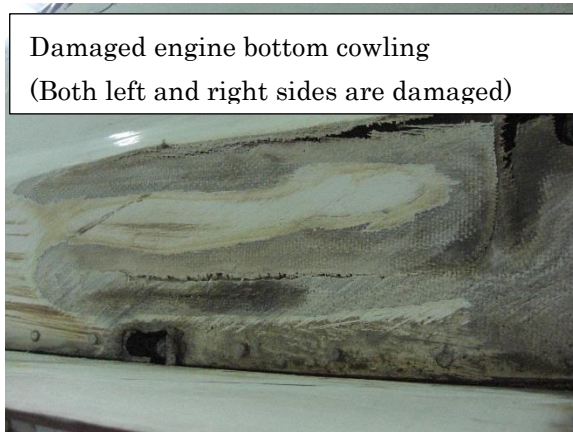
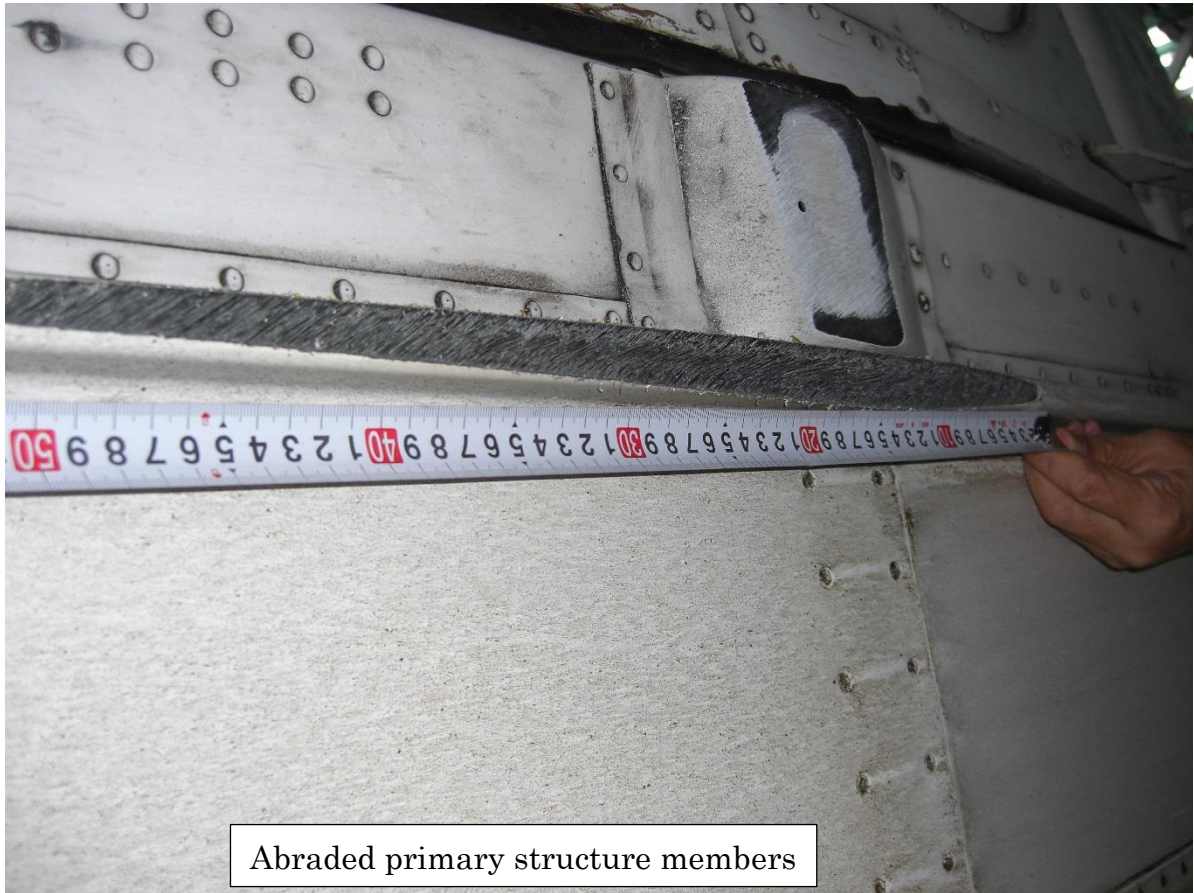


Photo3: Damage Situation of the Accident Aircraft



Attachment: ATC Communication Records

JST h:m:s.	Source	Communication contents
15:03:22	Radar	JA4193, radar contact, 27miles north west of airfield. SAPPORO runway 32 wind 340 at 23 QNH 2984, maintain VMC
15:03:34	JA4193	Using runway 32 QNH 2984, <i>let's see</i> , maintain VMC.
15:05:50	Radar	4193, expect landing via NAEBO, due to flight check.
15:06:11	JA4193	JA4193 expect from NAEBO, 4193.
15:09:58	Radar	JA4193, radar service terminated, contact SAPPORO tower 118.1
15:10:17	JA4193	Contact SAPPORO tower 118.1, 4193.
15:10:30	JA4193	SAPPORO tower JA4193, inbound to SAPPORO.
15:10:32	Tower	JA4193 SAPPORO tower, report NAEBO.
15:10:37	JA4193	Report NAEBO, 4193.
15:11:39	JA4193	SAPPORO tower JA4193, request touch-and-go.
15:11:45	Tower	JA4193, confirm touch-and-go?
15:11:45	JA4193	JA4193, affirm.
15:11:49	Tower	4193, this time report NAEBO then hold.
15:11:54	JA4193	Report NAEBO then hold, 4193.
15:12:23	Tower	JA4193 SAPPORO tower, break. <i>Well, at present SAPPORO is under flight check. For touch-and-go flight, expected wait quite long. Well,</i> Request intention.
15:12:35	JA4193	JA4193 hold. Holding, hold short of present position.
15:12:43	Tower	4193, <i>Let's see</i> , Say again.
15:12:46	JA4193	JA4193, request two times touch-and-go, and we accept holding.
15:12:53	Tower	JA4193 roger, report NAEBO.
15:12:56	JA4193	Report NAEBO, 4193.
15:13:11	Tower	All station SAPPORO tower, YS-11 passing 15 nm runway 14 low approach.
15:16:46	JA4193	4193, now over NAEBO.
15:16:48	Tower	4193 roger, continue hold NAEBO.
15:16:52	JA4193	Continue hold over NAEBO.
15:17:22	JA4193	SAPPORO tower JA4193, request touch-and-go, after touch-and-go join..., join short downwind, after short downwind will be full stop.
15:17:32	Tower	4193, this time unable, hold NAEBO.
15:17:36	JA4193	4193 roger, hold over NAEBO.
15:18:49	Tower	All station SAPPORO tower, YS-11 passing 6 nm runway 14 low approach.
15:19:29	Tower	4193 SAPPORO tower, break. <i>At present flight check is going on, let me see, well, opposite, on runway 14 your opposite is going on, 14. Let's see, your request of touch-and-go, waiting expected 15 to 20</i>

15:19:45	JA4193	4193, <i>Roger</i> . Hold over NAEBO.
15:19:49	Tower	Roger.
15:20:38	JA4193	SAPPORO tower JA4193, <i>Uh, request for touch-and-go for CAB check.</i>
15:20:46	Tower	4193, <i>Roger. Uh</i> -, Continue hold NAEBO.
15:20:50	JA4193	Continue hold over NAEBO, 4193.
15:25:16	Tower	All stations SAPPORO tower, YS-11 passing 15 nm runway 14 low approach.
15:25:49	Tower	All stations SAPPORO tower, YS-11 passing 10 nm to runway 14 low approach.
15:26:38	Tower	<i>Uh, JA4193 SAPPORO tower, break. Going to be a possible entry in about three more minutes. Contact at that time again.</i>
15:26:46	JA4193	<i>Yes, Roger.</i>
15:27:50	JA4193	SAPPORO tower JA4193, request wind check.
15:27:54	Tower	4193, wind 330 at 13.
15:27:57	JA4193	Thank you.
15:30:22	Tower	4193, <i>Sorry to have kept you waiting.</i> Report turning final runway 32.
15:30:27	JA4193	<i>Thank you so much.</i> Report turning final, 4193.
15:31:06	JA4193	SAPPORO tower JA4193, after touch-and-go request short downwind.
15:31:12	Tower	4193, short downwind approved, report turning final.
15:31:15	JA4193	Report turning final, JA4193.
15:32:29	JA4193	4193, turning final.
15:32:32	Tower	4193, runway 32 cleared touch-and-go, wind 330 at 14.
15:32:35	JA4193	JA4193, cleared touch-and-go.
15:34:50	JA4193	4193, go around.
15:35:04	JA4193	SAPPORO tower JA4193, go around.
15:35:07	Tower	4193 roger, report short downwind.
15:35:10	JA4193	Report short downwind, 4193
15:36:21	JA4193	SAPPORO tower JA4193, short downwind, request touch-and-go.
15:36:26	Tower	JA4193, runway 32 cleared touch-and-go, wind 330 at 12.
15:36:32	JA4193	Cleared touch-and-go, 4193.
15:36:37	Tower	JA4193, request intention after touch-and-go.
15:36:41	JA4193	Touch-and-go, one more touch-and-go.....then full stop.
15:36:47	Tower	4193, roger.
15:38:13	JA4193	4193, <i>Uh.....</i>
15:38:21	Tower	4193, tower, <i>Let's see report the abnormal situation.</i>
15:38:32	JA4193	<i>Yah, belly landing with no gear down.</i>
15:38:38	Tower	<i>What about abnormal of fuselage and human body.</i>
15:38:42	JA4193	<i>Well, nothing in particular.</i>

* Bold letters are communication records extracted in the text.

* * Descriptions in the *OBLIQUE* font display communication in Japanese language.