

# AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT



April 4, 2025

Adopted by the Japan Transport Safety Board

Chairperson RINOIE Kenichi  
Member TAKANO Shigeru  
Member MARUI Yuichi  
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Member TSUDA Hiroka  
Member MATSUI Yuko

Company	Privately owned
Type, Registration Mark	Cessna 172P, JA4059
Incident Class	The case where any component of the aircraft other than the landing gear had contact with ground surface during landing Item (iii), Article 166-4 of the Regulation for Enforcement of the Civil Aeronautics Act of Japan
Date and Time of the Occurrence	At about 13:54 Japan Standard Time (JST: UTC+9 hours), September 17, 2023
Site of the Incident	Bibai City Farm Road Airfield, Hokkaido Prefecture (43° 23' 33" N, 141° 51' 35" E)

## 1. PROCESS AND PROGRESS OF THE SERIOUS INCIDENT INVESTIGATION

Summary of the Serious Incident	<p>On Sunday, September 17, 2023, the aft lower fuselage of the aircraft contacted with the airstrip (hereinafter referred to as “the runway”) when landing at Bibai City Farm Road Airfield (hereinafter referred to as “Bibai Airfield”), Hokkaido Prefecture.</p> <p>The aircraft was damaged, but the pilot in command (PIC) and other three passengers on board did not sustain any injuries.</p>
Outline of the Serious Incident Investigation	<p>On November 24, 2023, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and two other investigators to investigate this serious incident.</p> <p>Comments on the draft Final Report were invited from the parties relevant to the cause of the serious incident and the Relevant State.</p>

## 2. FACTUAL INFORMATION

<b>Aircraft Information</b>	
(1) Aircraft type:	Cessna 172P
Serial number: 17275777	Date of manufacture: June 8, 1982
Airworthiness certificate: No. Tou-2023-017	Validity: April 18, 2024
(2) When the serious incident occurred, the aircraft's weight is estimated to have been 2,338 lb and the location of the center of gravity (CG) is estimated to have been 45.66 inches, both of which	

are estimated to have been within the allowable limits (maximum landing weight of 2,400 lb, and CG range of 39.5 to 47.3 inches).

#### **Personnel Information**

PIC: Age 64

Private pilot certificate (Airplane)	May 16, 1988
Private pilot certificate (Glider)	November 10, 1986
Pilot competency assessment/confirmation	
Expiry of practicable period for flight:	September 10, 2025
Class 2 aviation medical certificate	Validity: August 24, 2024
Total flight time	136 hours 18 minutes (54 hours 00 min of which were in airplane)
Flight time in the last 30 days	5 hours 58 minutes
Total flight time on the type of aircraft	5 hours 58 minutes
Flight time in the last 30 days	5 hours 58 minutes

#### **Meteorological Information**

The observation values at the Bibai Automated Meteorological Data Acquisition System (AMeDAS), which is located about 3.9 km southwest of Bibai Airfield, at around the time of the serious incident, were as follows:

14:00 Wind direction: South-south-west, Average wind velocity: 4.9 m/s,

Temperature: 25.8°C, Precipitation: None

15:00 Wind direction: South-south-west, Average wind velocity: 4.9 m/s,

Temperature: 24.8°C, Precipitation: None

In the status report at the time of the serious incident written by the designated manager of Bibai Airfield, the weather conditions were recorded as follows:

Wind direction: No record, Wind velocity: 7 kt or less, no gust was observed, QNH: 29.93 inHg

#### **Permission under Civil Aeronautics Act**

Permission pursuant to the proviso of article 79 of the Civil Aeronautics Act (Places for Landing and Takeoff)

The permission was obtained in the name of the aircraft owner, but not the PIC.

#### **Event Occurred and Relevant Information**

##### **(1) History of the Flight**

At about 13:06, on September 17, 2023, the aircraft took off from Sapporo Airfield toward Bibai Airfield for the PIC's familiarization flight, with the PIC in the left pilot seat, Passenger A, who was the owner of the aircraft, in the right aft seat, Passenger B in the right pilot seat, and Passenger C in the left aft seat. It was the first time that the PIC, who had originally planned to fly only with Passenger A, had maneuvered the aircraft with four persons on board, but during the flight, the PIC did not feel any difference in controllability of the aircraft. At about 13:51, the aircraft received the information "RUNWAY IS CLEAR" from Bibai Flight Service. During the final approach to Runway 20, the PIC extended the flaps to 20°. On the approach, the wind was not strong, headwind component was dominant, and the flightpath was not bumpy. The PIC recalled that the airspeed was 55 to 60 kt when approaching over the threshold and did not recall having heard a stall warning. On the other hand, some passengers recalled hearing a stall warning. According to the eyewitness who was observing the final approach of the aircraft from the administrative building of Bibai Airfield, the aircraft approached in an unstable condition, as if descending in a staircase pattern, touched down hard on the runway and bounced up. According to the PIC, the nose of the aircraft was raised higher on the first touchdown than on the second

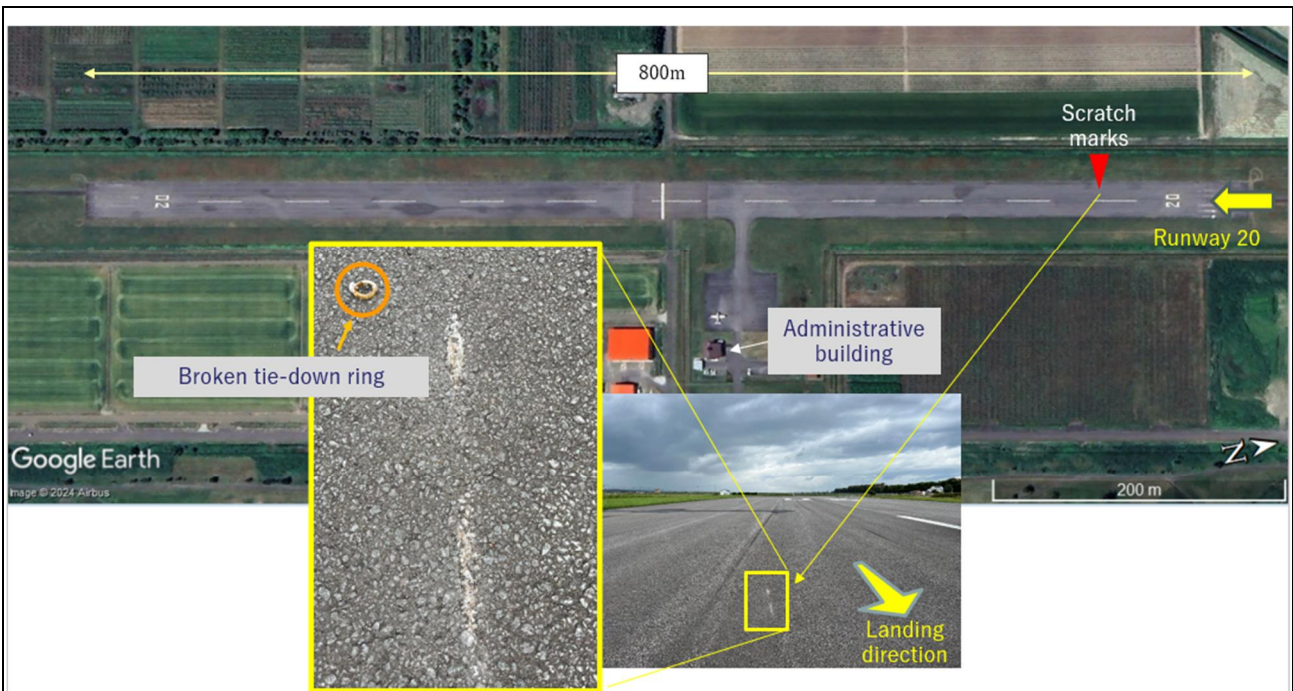


Figure 1: The Serious Incident Site

(The position of the broken tie-down ring was replicated by Passenger C who found it and took this photo.)

touchdown after the bounce, and the impact on the first touchdown was clearly greater than on the second. In addition, the PIC recalled that the throttle was in the idle position at the time of touchdown but did not recall how the PIC had moved the throttle during the final approach. The aircraft reduced the speed on the runway and made a 180° turn at a position about 100 m from the end of the runway, taxied to the apron of Bibai Airfield and parked there. The daily report and the status report written by the designated manager of Bibai Airfield stated that the aircraft made a hard landing on touchdown in such a condition that flare<sup>\*1</sup> was not possible, and the damage to the aircraft and injury to the persons on board were deeply concerned.

## (2) Sequence of Events Leading up to Confirmation of Damage to the Aircraft, and its Damaged Condition

After parking the aircraft on the apron of Bibai Airfield, the PIC, Passenger B and Passenger C conducted an exterior inspection of the aircraft, but because they felt strong impact on the nose gear at the time of the touchdown, they paid little attention to the condition of the tail components and thus did not notice the damage to the aircraft. Subsequently, the PIC conducted touch-and-go training three times with Passenger B and Passenger C on board, and four times with Passenger A and Passenger B at Bibai Airfield, and returned to Sapporo Airfield, but during the flight, the PIC did not feel any abnormality in the aircraft. The PIC and the three passengers noticed that the tail tie-down ring was missing and recognized the damage to the aft lower fuselage of the aircraft when mooring the aircraft on the apron of Sapporo Airfield. The following morning after this serious incident, the aircraft's tail tie-down ring was not found during the regular runway check carried out by the designated manager of Bibai Airfield, but Passenger B and

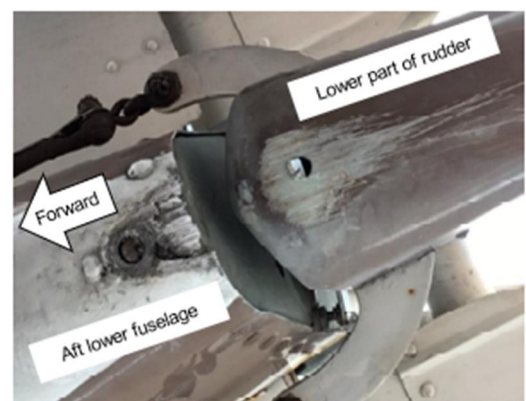


Figure 2: Damaged Condition

\*1 "Flare" is a maneuver in which the nose of the aircraft is pulled up before touchdown on the runway to reduce the airspeed and the rate of descent to reduce the impact of the landing.

Passenger C, who visited Bibai Airfield in the morning of the same day, found the tail tie-down ring on the runway at Bibai Airfield, and next to the tie-down ring (at a position about 100 m from the Runway 20 threshold), there were scratch marks, probably made by the aircraft. The damage to the aircraft was as follows:

- Scratch marks and damage to the aft lower fuselage skin
- Scratch marks on the tail cone bulkhead
- Breakage of tail tie-down ring
- Scratch marks on the fairing of lower part of the rudder and its partial damage
- Damage to the fixed tab of the rudder

### (3) Flight Experience of the PIC

By 2012, the PIC had about 82 hours of flying experience in gliders (including motor gliders) and about 48 hours in airplanes, but after that, the PIC had not flown for about 11 years. Besides, the gliders and airplanes the PIC had flown were all one or two-seaters. In August 2023, by taking an opportunity to pilot the Passenger-A-owned aircraft, the PIC restarted the flying activity. The PIC made three flights in the aircraft (4 hours and 40 minutes in total) under the guidance of Passenger A, and on September 10, 2023, the PIC underwent and passed the pilot competency assessment/confirmation. Passenger A, who was the examiner for the pilot competence assessment/confirmation, wrote in the overall practical skills assessment that the PIC would need to acquire more proficiency in short runway take-offs and landings.

### (4) Information on the Speed

- a. The approach procedures in the aircraft's Flight Manual contain the following descriptions of the airspeed at the time of landing.

#### (1) NORMAL LANDING

1. *Airspeed -- 65-75 KIAS (flaps UP)*
2. *Wing Flaps -- AS REQUIRED (0 - 10° below 110 KIAS, 10 - 30° below 85 KIAS)*
3. *Airspeed -- 60-70 KIAS (flaps DOWN)*

- b. Chapter 11 of “Pilot’s Handbook of Aeronautical Knowledge” published by the Federal Aviation Administration (FAA) describes the following overviews.

The regime of flight speeds between the speed for minimum required power setting and the stall speed is termed the region of reversed command since more power is required as its speed decreases to maintain steady flight. If an unacceptably high sink rate should develop, it may be possible for the pilot to reduce or stop the descent by applying power. But without further use of power, the airplane would probably stall or be incapable of flaring for the landing. Merely lowering the nose of the airplane to regain flying speed in this situation, without the use of power, would result in a rapid sink rate and corresponding loss of altitude.

One effect of an increased gross weight is that a greater speed is required to support the

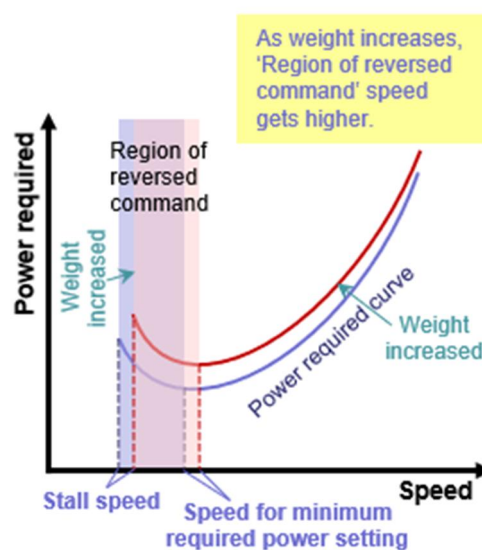


Figure 3: Power Required Curve



aircraft for landing. For an example of the effect of a change in gross weight, a 21 percent increase in landing weight requires a ten percent increase in landing speed.

The landing speeds specified in the Flight Manual are generally the minimum safe speeds at which the aircraft can be landed. Any attempt to land at below the specified speed may mean that the aircraft may stall, be difficult to control, or develop high rates of descent.

- c. The design and manufacture company of Cessna 172P made a best estimate calculation, and the airspeed where the region of reversed command first being encountered would be approximately 60 kt at Mean Sea Level, ISA (International Standard Atmosphere) conditions, flaps retracted, at a gross weight of 2400 lb. It was also added that this estimated speed would be valid for Cessna 172P with the basic optional equipment package installed (e.g. anti-collision lights and various antennas).

#### (5) Information on the Location of CG

Chapter 10 of “Pilot’s Handbook of Aeronautical Knowledge” published by the FAA describes the following overviews.

In addition to decreased static and dynamic longitudinal stability, the CG location aft of the allowable range reduces the capability to recover from stalls and spins, and produces light control forces, which make it easy to overstress an aircraft inadvertently.

#### (6) Aviation GPS Device Records

The aviation GPS device that Passenger A had brought onto the aircraft recorded the flight situation at and around the time of the serious incident. The data includes latitude, longitude, altitude, date, and time which were recorded every 6 to 11 seconds, but not the attitude of the

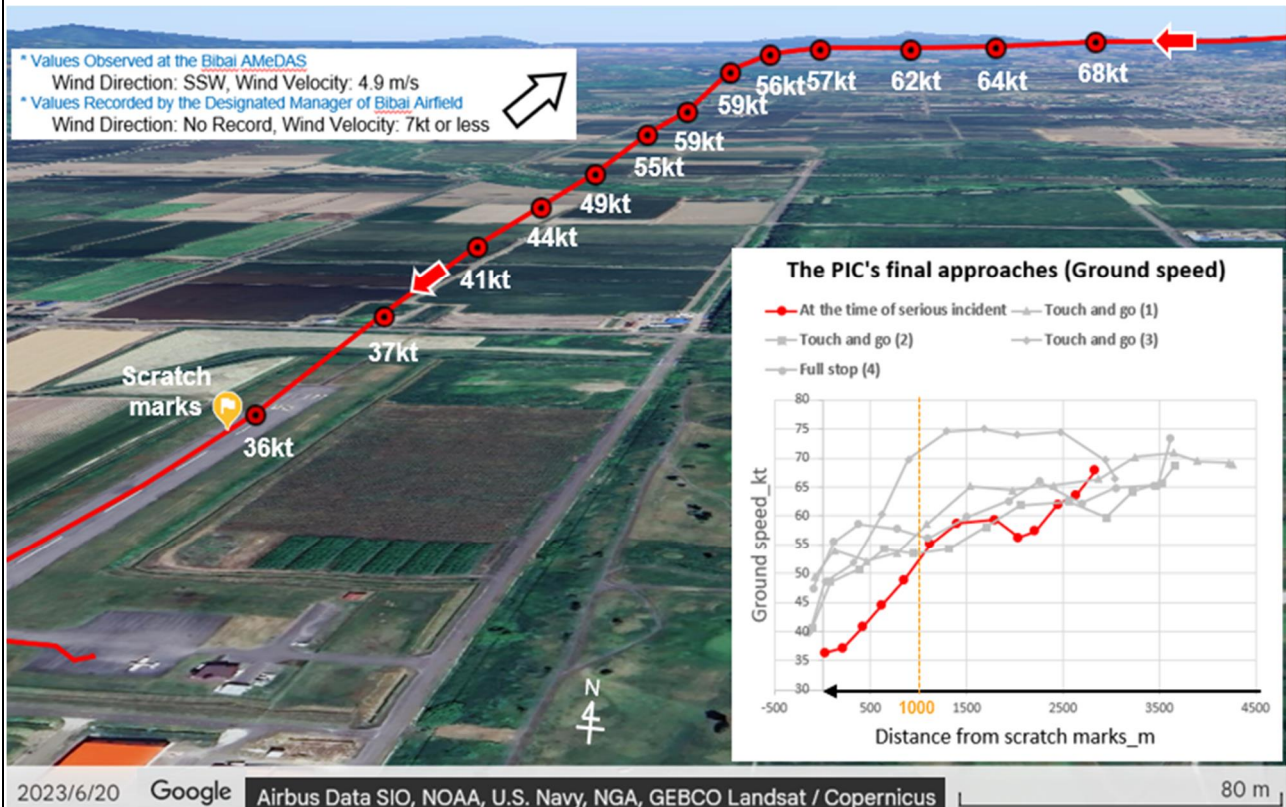


Figure 4: Ground Speed at the time of the Serious Incident and Comparison with That at the time of Touch-and-Go Training

aircraft and so on. Based on this recording, the status of the final approach (ground speed) at the

time of the serious incident is estimated to have been as shown in Figure 4. At this time, there was probably a headwind of about 7 kt, therefore the airspeed would be the ground speed plus about 7 kt, which would be less than the value in the PIC's statement. In addition, it was compared with those of the final approaches at the time of touch-and-go training the PIC had conducted on the same runway at Bibai Airfield about 1 hour after the occurrence of the serious incident (about 14:50 to 15:20 on the same day). As shown in the graph in Figure 4, at the time of the serious incident, the speed on the short final was 10 to 15 kt lower than at the time of the touch-and-go training. Besides, as shown in Figure 5, at the time of the serious incident, the point where the aircraft intercepted the final approach course was closer to the approach end of the runway and the approach angle was greater than at the time of the touch-and-go training. Furthermore, as shown in Figure 6, the aircraft touched down with an increasing descent rate at the time of the serious incident, but the descent rate prior to touchdown was reduced at the time of the touch-and-go training.

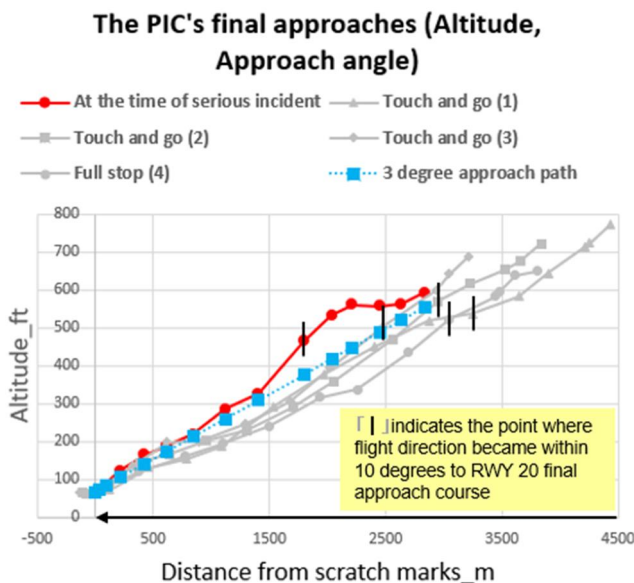


Figure 5; Comparison of the Aircraft's Final Approach (Altitude/Approach Angle)

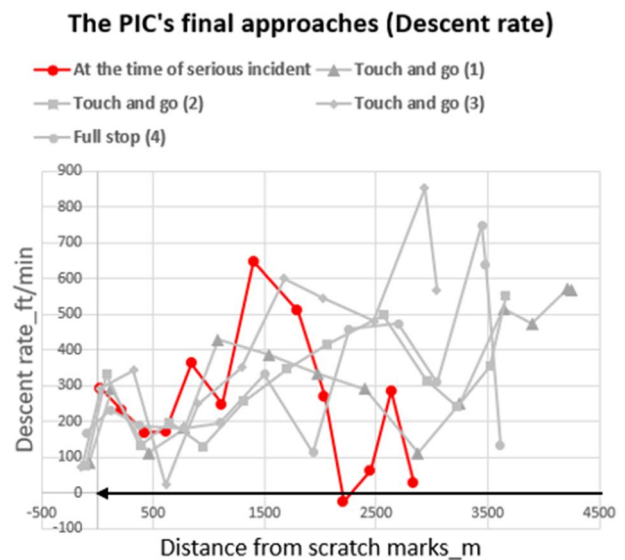


Figure 6; Comparison of the Aircraft's Final Approach (Descent Rate)

### 3. ANALYSIS

#### (1) From Final Approach to Landing

The approximate airspeed would have been the ground speed in Figure 4 plus about 7 kt, as the wind at that time was almost headwind on the final approach course of Runway 20.

According to the information gained from the eyewitness and the aviation GPS device records, the aircraft most likely made an unstable final approach at a lower speed than the airspeed specified in the Flight Manual. It is possible that the aircraft continuously reduced the speed from a point about 1,000 m before the touchdown and entered the region of reversed command. As the descent rate increased with decreasing speed, the aircraft gradually raised the nose to reduce the descent rate without using power, and touched down in such a high nose-up attitude that it was unable to flare as its speed continued to decrease, more likely resulting in its tail contacting with the runway surface.

#### (2) Effect of Weight and Balance

The JTSCB concludes that in case of the originally planned flight with two persons on board,

the weight of the aircraft is estimated to be 2,044 lb, and the CG location would be 41.23 inches, which would most likely result in 294 lb less weight and 4.43 inches forward and closer CG location to the nose than at the time of the serious incident. Considering that this was the first time for the PIC to have landed an aircraft with four persons on board, it is probable that the PIC should have made an approach by controlling the speed so that it did not fall below the minimum approach speed specified in the Flight Manual, as the speed where the region of reversed command first being encountered would have become greater as the gross weight had increased. In addition, it is more likely that the PIC should have been more careful with the elevator pitch control during the landing approach, taking into consideration for the CG location aft of the allowable range that may produce light control forces for nose-up and decreased longitudinal stability.

### (3) Utilization of Flight Data Monitoring Device (FDM)

The JTSCB concludes that in the investigation of this serious incident, the information that supported the analysis was able to be extracted, although it was limited, based on the aircraft's altitude and position recorded on the aviation GPS device. In addition, it is probable that installing FDM on the aircraft would realize further detailed analysis and contribute to preventing accidents in the future.

[Reference] "For Prevention of Accidents of Small Aircraft ~ Do you know flight data monitoring device (FDM)? ~" in JTSCB Digests No. 42 (Issued in August 2023)

([https://jtsb.mlit.go.jp/bunseki-kankoubutu/jtsbdigests\\_e/jtsbdigests\\_No42/No42\\_pdf/jtsbdi-42\\_all.pdf](https://jtsb.mlit.go.jp/bunseki-kankoubutu/jtsbdigests_e/jtsbdigests_No42/No42_pdf/jtsbdi-42_all.pdf))

## 4. PROBABLE CAUSES

The JTSCB concludes that the probable cause of this serious incident was that it is more likely that the aircraft made an unstable approach at a low speed and touched down in a high nose-up attitude, resulting in its tail contacting with the runway surface.

## 5. SAFETY ACTIONS

### Safety Actions Required

During landing approaches, it is important to comply with the procedures specified in the Flight Manual, especially to pay attention to precise control of airspeed.