AIRCRAFT SERIOUS INCIDENT INVESTIGATION REPORT

August 8, 2025
Adopted by the Japan Transport Safety Board
Chairperson RINOIE Kenichi
Member TAKANO Shigeru
Member MARUI Yuichi
Member SODA Hisako
Member TSUDA Hiroka
Member MATSUI Yuko

Company	Privately owned
Type, Registration Mark	SOCATA TB21, JA4022
Incident Class	Dragging during landing of any other part of the aircraft other than the landing gears. 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 13:45 Japan Standard Time (JST: UTC+9 hours), May 15, 2024
Site of the Serious Incident	Fukui Airport, Sakai City, Fukui Prefecture (36° 08' 46" N, 136° 13' 25" E)

1. PROCESS AND PROGRESS OF THE SERIOUS INCIDENT INVESTIGATION

Summary of the Serious Incident	On Wednesday, May 15, 2024, the lower fuselage of the aircraft and the propeller came into contact with the runway surface during landing on Runway 18 at Fukui Airport, as all landing gears had been returned to the retracted position. The pilot, who was the only person on board the aircraft, did not sustain any injuries.
Outline of the Serious Incident Investigation	On May 15, 2024, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and two other investigators.. Comments on the draft Final Report were invited from parties relevant to the cause of the serious incident and from the Relevant State.

2. FACTUAL INFORMATION

Aircraft Information

Aircraft type: SOCATA TB21
Serial number: 780 Date of manufacture: October 9, 1987
Airworthiness certificate: No. DAI-2023-146 Validity: June 12, 2024

Personnel Information

Pilot: Age 80

Private pilot certificate (Airplane)	August 30,2005
Pilot competency assessment/confirmation	
Expiration date of piloting capable period	March 31, 2026
Class 2 aviation medical certificate	Validity: September 29, 2024
Total flight time	1,154 hours 24 minutes
Flight time in the last 30 days	0 hour 20 minutes
Total flight time on the type of aircraft	17 hours 05 minutes
Flight time in the last 30 days	0 hour 20 minutes

Meteorological Information

The wind direction and wind velocity observed at Fukui Airport around the time of this serious incident were as follows:

13:00 Wind direction 200°, Wind velocity 9 kt

13:54 Wind direction 210°, Wind velocity 8 kt

Event Occurred and Relevant Information

(1) History of the Flight

After taking off from the airport with only the pilot on board, the aircraft approached the west downwind leg at an altitude of about 800 ft for touch-and-go training. The pilot lowered the flaps by one step to the take-off position (10°) when the aircraft was around abeam the runway center. However, the pilot decided to delay the landing gears and the flaps operation and extend them on the final approach to reduce the time spent circling the traffic pattern, then started a base turn with the landing gears retracted. After turning onto the final approach, the aircraft became unstable due to its low altitude and being blown by the wind. Therefore, the pilot focused on correcting the approach angle and speed.

When operating the throttle lever prior to landing, the pilot recognized the landing gear warning (see (2) d.), and immediately lowered the landing gear lever, setting the flap lever to the landing position (40°). At 13:45, the aircraft landed touching down on Runway 18 with the main wheels first, and then with its nose wheel. Immediately after that, all the landing gears were returned to the retracted position, its lower fuselage touched the ground. After skidding by inertia to the aiming point marking, the aircraft came to a stop.

Figure 1: The Aircraft after the Stop

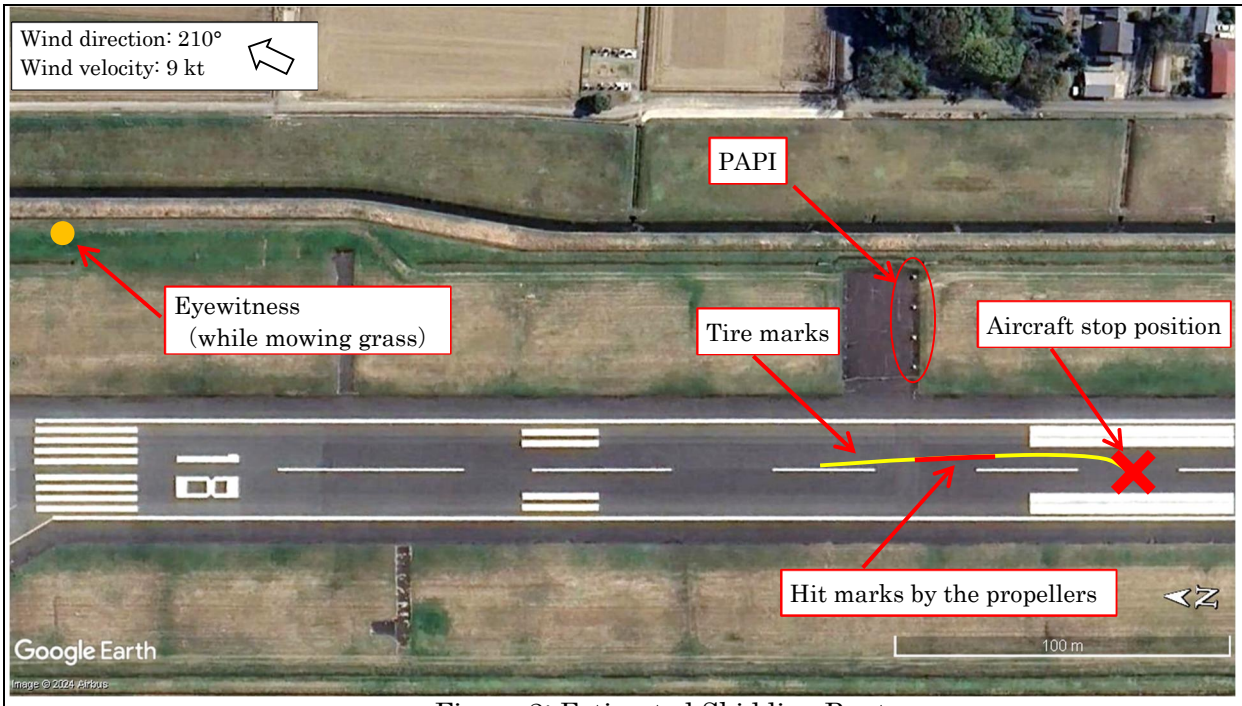

Figure 2: Estimated Skidding Route

(2) Information on the Aircraft

a. Damage to the aircraft

Minor: Scratch marks were observed on the main wheels, the trailing edge of the flaps and the lower fuselage. The two propeller blades were also damaged.

b. Maintenance

Maintenance work was conducted on the aircraft between the end of November 2023 and May 2024. The flight test conducted on May 11, 2024, after the maintenance work, did not reveal any anomalies with the aircraft, including landing gears. In addition, according to the pilot's statement, there were no anomalies with the aircraft on the day of this serious incident.

c. Landing gear system

The aircraft is equipped with a retractable landing gear powered by a hydraulic power system. The investigation after this serious incident revealed that, while all landing gears operated normally by the retracting operation using the landing gear lever, they did not operate correctly by the extending operation. It also revealed that the landing gear warning system had lost its function and failed to operate correctly, however, no damage or deformation was observed in the landing gear downlocks mechanism, all landing gears extended correctly by the emergency landing gear extension and were downlocked, and the gear position indicator also worked correctly.

Note that according to the maintenance company's flight test records, which were conducted prior to the airworthiness inspection on June 5, 2023, indicated that it took nine seconds to extend the aircraft's landing gear using normal procedures.

d. Landing gear warning system

The aircraft's landing gear warning system sounds an alarm through the speaker in the cockpit ceiling when the landing gears are not downlocked and one of the following conditions is met.

・The throttle lever is retarded to within12 mm of the aft stop (idle position).

・The flaps are extended beyond 15°

(3) Statements of the Pilot

a. When a qualified person was on board, the pilot used to ask the passenger to read the checklist aloud. However, during solo flights, the pilot would perform the procedures from memory without using the checklist. And the pilot did not use the checklist for this flight either.

b. Not only for this flight, even in the situations where any coordination of control separation between other departing and arriving aircraft was unnecessary, the pilot used to conduct landing training by intentionally delaying the extension of the landing gears.

c. The pilot think that on the final approach, before reaching the site boundary of the airport, the pilot recognized the landing gear warning sound and extended the landing gears.

d. When the landing gear warning sounded, the pilot did not think of executing a go-around.

e. The pilot think that the pilot retarded the throttle to the idle position when the aircraft was about halfway between the runway threshold and the precision approach path indicator (PAPI).

f. After extending the landing gears, the pilot was monitoring the PAPI and the runway, was unaware of the gear position indicators. But the pilot think that the nose landing gear had been downlocked.

g. The pilot could not remember how long the landing gear warning continued to sound for.

(4) Statement of the Eyewitness

According to the eyewitness who was watching the aircraft landing by the side of Runway 18, the landing gears had been retracted when the aircraft passed the runway threshold, and after passing in front of the eyewitness, the landing gears began to extend, but before they fully extended, the aircraft touched down, resulting in a belly landing.

(5) Use of Checklist

The following description of the use of checklists is given in AIM-J, No. 81 (published by the Japan Aircraft Pilot Association, early 2025 edition, p. 9–9).

942.〖USE OF CHECKLISTS〗

Important operational checks for a flight should be made always in accordance with checklists. Humans are not able to conduct several tasks at the same time. Especially when a task is suspended due to another task, the important task will likely be forgotten, and tasks not yet done tend to be misunderstood as completed. The use of checklists will sufficiently cover these faults in human nature.

3. ANALYSIS

(1) The Timing of Extending Landing Gears

The JTSB concludes that it is more likely that, although the pilot had approached while intentionally delaying the extension of the landing gears, during the final approach in which the pilot planned to extend the landing gear, the pilot had to correct the approach angle and speed, causing the pilot to forget to extend the landing gears. At this time, the pilot probably increased the engine output for the corrective maneuvers. It is possible that the throttle lever was advanced beyond 12 mm from the aft stop, resulting in the landing gear warning failing to sound as the activation conditions of gear warning system were not met.

Delaying the timing of extending the landing gears when making an approach would increase the workload during the limited time before touchdown, therefore, it is important to perform the procedures such as the landing gear extension operation for the landing well in advance, allowing concentration to be given to flight control operation during the final approach phase.

Based on the statement of the pilot saying that the pilot recognized the landing gear warning and immediately extended the landing gears, and that the throttle was retarded when the aircraft was about halfway between the runway threshold and the PAPI, it is probable that its activation conditions were met and the landing gear warning sounded around this time. Therefore, the landing gear extension operation was more likely performed after the aircraft passed the runway threshold and immediately before landing, which is consistent with the eyewitness account that the landing gears began to extend after the aircraft passed the runway threshold.

(2) Touchdown

The JTSB concludes that it is more likely that, just before landing, the landing gear began to extend, but that the landing gear extension was not completed in time, resulting in the aircraft touching down while the landing gears were still in the middle of extending. During the investigation after this serious incident, no damage and others were observed in the landing gear downlock mechanism, which was functioning normally when the downlock operation was confirmed. Therefore, it is probable that, because the aircraft touched down before all the landing gears were downlocked, the unlocked landing gears were unable to support the weight and returned to the retracted position, resulting in a belly landing and 「the lower fuselage and propeller coming into contact with the runway surface.

Besides, it is highly probable that the reason the landing gears were not extended by operating the landing gear lever during the investigation after this serious incident was due to a failure caused by the belly landing, and that the landing gear extension function would normally have worked just before this incident occurred. Furthermore, regarding the landing gear warning system, the pilot stated that it was functioning correctly prior to the serious incident. Therefore, it is most likely that it failed to activate correctly during the investigation after this serious incident due to a failure caused by the belly landing.

(3) Checking the Status of Landing Gear Extension

The JTSB concludes that it is most likely that as the pilot conducted each operating procedure from memory without using the checklist, there was no opportunity to notice the landing gear extension operation had been forgotten, resulting in the failure to notice that the landing gears had not been extended until the pilot recognized the landing gear warning sound just before landing. In addition, when the landing gear warning sounded, it is probable that the pilot was already focused on landing, thus, the pilot reflexively operated the landing gear lever, but did not pay attention to confirming the downlock status and continued with the landing.

The purpose of using checklists during a flight is to ensure that all necessary tasks are conducted properly in any situation. Therefore, even for solo flights, the use of checklist should not be omitted, and it is necessary to plan the timing of the various operational procedures at each phase of the flight, including the implementation of the checklists, allowing sufficient time for them to be performed. Especially, regarding landing, it is important to consider executing a go-around if the checklist is not completed in the final approach phase, to redo landing preparations.

4. PROBABLE CAUSES

The JTSB concludes that the probable cause of this serious incident was that it is more likely that, just before landing, the pilot had started the landing gear extension operation, thus, the landing gear extension was not completed in time, resulting in the aircraft touching down while the landing gears were still in the middle of extending, and the unlocked landing gears were unable to support the weight and returned to the retracted position, resulting in a belly landing and the lower

fuselage and propellers hitting the runway surface.

The reason why the aircraft touched down while the landing gears were still in the middle of extending was probably because the pilot had intentionally delayed the landing gear extension operation when making the approach, however, during the final approach, the timing of the corrective operation for the approach angle and speed overlapped, causing the pilot to forget to extend the landing gears, and when realizing that the landing gears had not been extended, the pilot did not execute a go-around, but instead initiated the landing gear extension procedure and continued with the landing without confirming the downlock status.

5. SAFETY ACTIONS

Safety Actions Required

(1) Use of Checklists

As described in AIM-J, No. 81, 'Humans are not able to conduct several tasks at the same time', and it is difficult to eliminate oversights and misunderstandings. Therefore, important operational checks for a flight should be conducted using checklists. The purpose of using checklists during a flight is to ensure that all necessary flight operations are conducted properly in any situation. Therefore, it is necessary to plan the timing of the various operational procedures at each phase of the flight, including the implementation of the checklists, allowing sufficient time for them to be performed.

(2) Decision of a Go-around

Pilots must always fly with a sense of urgency. It is vital that they execute a go-around without hesitation if there is any chance that they will be unable to land safely.

In addition, it is important to consider executing a go-around if the checklist is not completed in the final approach phase, to redo landing preparations.