

AA2017-6

**AIRCRAFT ACCIDENT  
INVESTIGATION REPORT**

**PRIVATELY OWNED  
J A 3 7 6 2**

**September 28, 2017**

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 CAUSED BY BELLY LANDING A PRIVATELY OWNED BEEHCRAFT A36 JA3762 SENDAI AIRPORT AT AROUND 12:25 JST, NOVEMBER 16, 2015

September 8, 2017

Adopted by the Japan Transport Safety Board

Chairman	Kazuhiro Nakahashi
Member	Toru Miyashita
Member	Toshiyuki Ishikawa
Member	Yuichi Marui
Member	Keiji Tanaka
Member	Miwa Nakanishi

### 1. PROCESS AND PROGRESS OF THE INVESTIGATION

1.1 Summary of the Accident	<p>On Monday, November 16, 2015, a privately owned Beechcraft A36, JA3762 with the captain and one passenger on board, took off from the runway 12 of Sendai Airport and during the touch-and-go training, it made a belly landing, which caused damages to the aircraft fuselage.</p>
1.2 Outline of the Accident Investigation	<p>On November 16, 2015, the Japan Transport Safety Board (JTSB) designated an investigator-in-charge and other investigator to investigate this accident. An accredited representative and an adviser of the United States of America, as a state of design and manufacturer of the aircraft involved in this accident, participated in the investigation.</p> <p>Comments were invited from the parties relevant to the cause of the accident. Comments on the draft report were invited from the relevant State.</p>

### 2. FACTUAL INFORMATION

2.1 History of the Flight	<p>According to the statements of a pilot and a passenger, and based on the ATC communication records and Radar Track records, the history of the flight was outlined as follows.</p> <p>On November 16, 2015, because a captain would fly Beechcraft A36 for the first time, the captain initial plan was getting familiar with the aircraft by implementing a basic flight training at first and then touch-and-go training, and he requested a person with sufficient experience with the type of aircraft to be on board as an observer.</p> <p>On the morning of the accident, because the plan was changed due to the passenger's business, the captain decided to do the touch-and-go</p>
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training without doing a basic flight training.

The captain did a preflight inspection with the passenger, confirmed that the aircraft had no anomaly and sat in the left seat. Then, the captain with a passenger who sat in the right seat checked an operating procedure during a flight with using a checklist, however the captain did not confirm how to operate the flap control switch handle. The passenger had an intention to have the captain to understand the flap control switch handle operating method in a flow of touch-and-go trainings.

The aircraft took off from the runway 12 of Sendai Airport at 12:15 Japan standard time (JST, UTC+9hrs), received an instruction to hold from air traffic controller (hereinafter referred to as “Tower”) at the time about to enter a downwind leg and performed 360 degrees turn. Then, the captain

confirmed that the position was abeam the threshold of the runway 12, operate a flap control switch handle to a down position in order to set flap in 10 degrees and at the same time, checked the sweep second hand clock in order to measure a timing to lower the landing gear but because he did not know that the second hand was required to press button to start,

the second hand of the clock was not in operation.

The flap resulted in full down position, because the captain did not return the flap control switch handle to the “stop” position at the timing of the flap to be at 10 degrees. Because of the remarks for the flap being in full down position given by the passenger, the captain asked the passenger to correct the flap position back to 10 degrees and he himself focused on the correcting operation of the elevator trim corresponding to the change of the pitch required by the excessive lowering of the flap as pulling the control wheel.

After this, at the time that the captain reached out to pull the landing gear switch handle down while saying “gear down”, he was told the Tower was calling the aircraft by the passenger. The captain stopped the gear down operation, communicated with the Tower and accepted clearance for the touch-and-go training. At this time, the passenger was performing the operation to move the flap back to 10 degree while moving his attention to

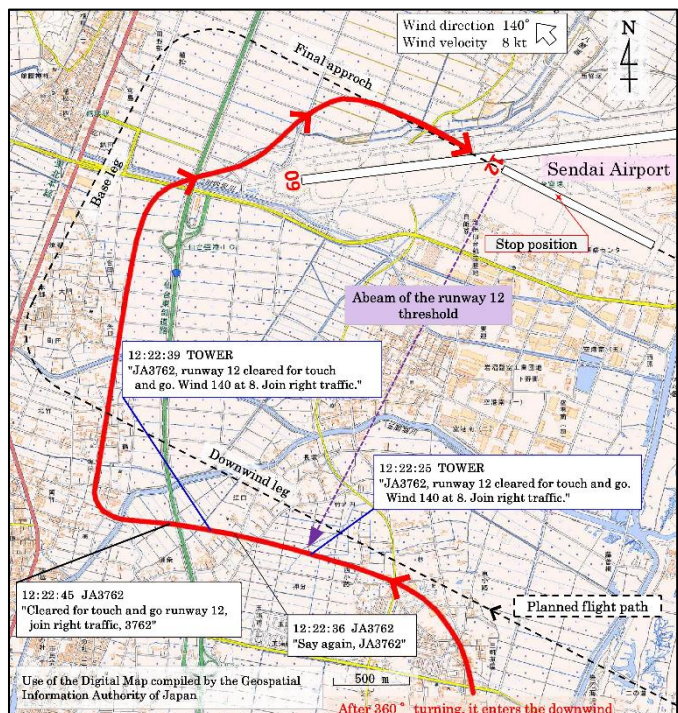


Fig.1 Estimated flight route

the Flap Position Indicator at the lower part of the instrument panel.

When the passenger looked outside of the aircraft as completing the flap operation at the same time with completing the base turn, the runway seen in front was too close so that he reminded the captain that the height was too high. While the passenger told the captain to close the throttle, he took over the piloting from the captain and started to descend with heading to the runway in front.

The captain was watching the passenger’s piloting, but he noticed that the passenger saw the runway 09 which was coming to visual in front as the approach runway 12 by a mistake, he took over the piloting from the passenger as saying “the runway to land is the runway 12” and directed the aircraft to the approach path to the runway 12.

At this time, because the height of the aircraft was quite low, the captain flew as maintaining the height by increasing the engine power. Because the aircraft returned to the normal approach angle at around the approach threshold of the runway 12, the captain set the flap at full down position and reduced the engine power to continue the approach.

The captain realized that the aircraft landed with the belly as he saw that the propellers started to bend with sounding abnormal noise right before the landing on the runway and shut down the engine power completely. The aircraft stopped with the nose facing slightly to right, after sliding along the runway centerline.

The captain did not have the memory to extend the landing gear, he did not carry out the checking of the gear down operation during the before landing check, and then he

did not also perform the reconfirmation of the gear down operation during the final approach. Furthermore, both of the two men did not have a memory of hearing the warning sound of the landing gear warning system.

The accident occurred on the runway 12 of Sendai Airport (38°08’15”N, 140°55’8”E) at around 12:25 on November 16, 2015.

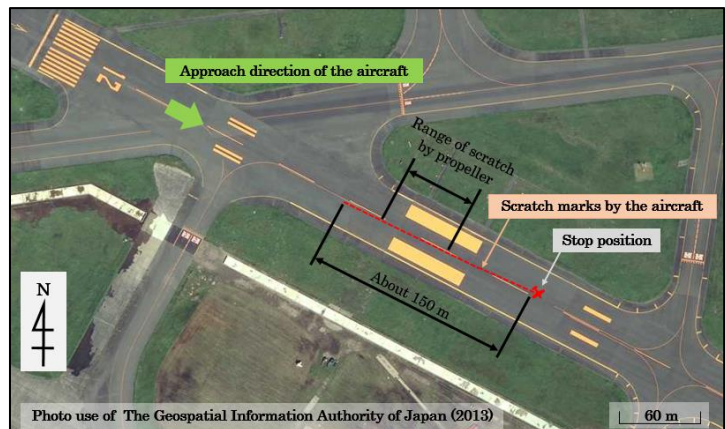



Fig.2 Accident site

The accident occurred on the runway 12 of Sendai Airport (38°08’15”N, 140°55’8”E) at around 12:25 on November 16, 2015.

2.2 Injuries to the Persons	None
2.3 Damage to the Aircraft	<p>Extent of Damage: Substantial Damage</p> <ul style="list-style-type: none"> <li>• Fuselage: Damage on the bottom surface of fuselage (including major structural members)</li> <li>• Wing: Damage of the trailing edge of flap</li> </ul> <p>Deformation of the pitot tube</p>

	<ul style="list-style-type: none"> <li>• Landing gear: Damage of the nose gear doors</li> <li>• Engine: Damage of the right and left exhaust pipes</li> <li>• Propeller: Bended of the every blade tip</li> </ul>	<p>Photo 1 The Aircraft on the runway</p> 
<p>2.4 Personnel Information</p>	<p>(1) Captain: Male, Age 54</p> <p>Private pilot certificate (Airplane) February 21, 2002</p> <p>Type rating for single-piston engine (land)</p> <p>Specific pilot competence</p> <p>Expiration date of piloting capable period October 20, 2017</p> <p>Class 2 aviation medical certificate Validity: August 6, 2016</p> <p>Total flight time 179 hours 22 minutes</p> <p>Flight time in the last 30 days 9 hours 25 minutes</p> <p>Total flight time on the type of aircraft 0 hours 0 minutes</p> <p>The captain had not flew for about 6 years since December 2009 and resumed the flight on October 2015, but he flies only a fixed landing gear type airplane, his last flight on the airplane with a retractable gear was on November 2009.</p> <p>(2) Passenger: Male, Age 76</p> <p>Commercial pilot certificate (Airplane) January 6, 1970</p> <p>Type rating for single-piston engine (land) September 22, 1967</p> <p>Specific piloting competence</p> <p>Expiration date of piloting capable period December 3, 2015</p> <p>Class 1 aviation medical certificate Validity: February 23, 2016</p> <p>Total flight time (Based on the statement of the passenger) about 17,400 hours</p> <p>Flight time in the last 30 days 25 hours 30 minutes</p> <p>Total flight time on the type of aircraft (Based on the statement of the passenger) about 50 hours</p> <p>Flight time in the last 30 days 0 hours 10 minutes</p>	
<p>2.5 Aircraft Information</p>	<p>(1) Type: Beechcraft A36</p> <p>Serial number: E-871 Date of Manufacture: June 14, 1976</p> <p>Airworthiness Certificate: No. Tou-27-040 Validity: April 23, 2016</p> <p>Category of airworthiness: Airplane Utility U</p> <p>Total flight time: 2, 620 hours 06 minutes</p> <p>(2) At the time of Accident, it is highly probable that the weight and the center of gravity of the aircraft were within allowable range.</p>	
<p>2.6 Meteorological Information</p>	<p>Accident Specific Observation Weather Report on 12:29 at the accident date were as follows:</p> <p>Wind direction 140°, Wind velocity 8 kt, Visibility 60 km,</p> <p>Cloud: Amount 1/8 to 2/8, Cloud base 3,000 ft, Type Cumulus</p> <p>Amount 5/8 to 7/8, Cloud base unknown, Type unknown</p> <p>Temperature 18°C, Dew point 9°C, Altimeter setting (QNH) 30.13 inHg</p>	
<p>2.7 Additional</p>	<p>(1) The procedure of the gear down operation and the checking</p>	



Information

According to the captain and the passenger, when flying the traffic pattern, they lowered the flap to 10 degrees at the downwind leg near the abeam of the threshold of the runway in use, and about 25 seconds later, down the landing gear and entered the base leg. At the base leg, they intended to carry out the before landing check according to the checklist memorized in advance, to confirm that the landing gear is lowered by the position of the landing gear switch handle and the landing gear position indicator, and to reconfirm the lowering the landing gear at around 300 ft above ground on the final approach.

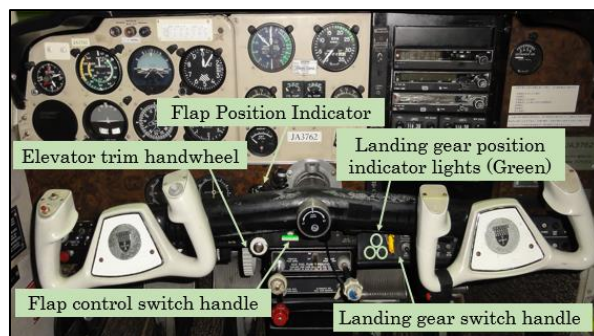


Photo 2 Instrument panel of the aircraft

The captain carried the self-made check list into the cabin of the aircraft and handed it to the passenger, but he was planning to use it the time only when he could not recall the checking items.

The before landing check list items had included checking the “Down” position of the landing gear switch handle and three green light of the landing gear position indicator.

Furthermore, the landing gear switch handle was at the “Up” position at the time of the aircraft investigation after the accident.

(2) Flap operation

The flap control switch handle to control the flap of the aircraft has three positions such as “up”, “stop” and “down”. By lowering the handle, or raising the handle, activate the flap, confirming the angle with the flap position indicator, when it reached to the desired position, stop the flap operation as returning it to the “stop” position.

The indicator and the handle were located at lower part of the instrument panel.

(3) Landing Gear Warning System

(See Fig. 3)

Throttle Control System of the aircraft has the Landing Gear Warning System, and the warning sound when the throttle was closed below about 12 inHg manifold pressure at an up position of the landing gear.

At the time of the aircraft investigation after the accident, checking the operating condition of the system, because a part of

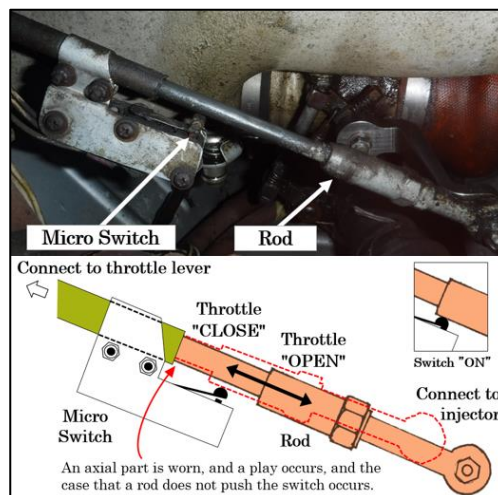


Fig.3 Micro switch

	<p>the rod linked with a throttle lever had uneven wear, it was confirmed that there would be a case for the rod not to activate the micro-switch.</p> <p>It was confirmed that the system operated properly at 100 hours inspection implemented at April 2015.</p>
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### 3. ANALYSIS

3.1 Involvement of Weather	None
3.2 Involvement of Pilots	Yes
3.3 Involvement of Aircraft	Yes
3.4 Analysis of Findings	<p>(1) Lack of understanding about operation method</p> <p>Even though the captain was about perform touch-and-go training for the first time without doing any basic training of the aircraft, he did not confirm the operation method of the flap control switch handle at the preflight inspection. It is probable that because the captain flew without understanding an operation method of the flap control switch handle, he could not set the flap at the desired position.</p> <p>It is necessary that because the operation method of each system differs depending on the models, when piloting a type for the first time, it is essential to understand an operation method in full prior to the flight and then to check the operation of each system on ground.</p> <p>It is probable that the passenger intended to teach the captain the operation method of the flap during the flight training, but because it is quite difficult to carry out these during the touch-and-go training which has a many procedures to be done within a short time.</p> <p>(2) Forgetting of the landing gear down operation</p> <p>The captain intended to carry out the landing gear down operation as measuring the timing with a sweep second hand clock after entering the downwind leg and lowering the flap to 10 degree at abeam of the threshold of the runway. However, it is probable that because the captain did not understand the operation method of the flap control switch handle and the clock in full, he wasting the time to measure the timing to operate the landing gear down, and the flap was at the full down position without his intention, it is probable that these caused the situation with no spare time to assess the situation and operate.</p> <p>It is probable that because when he attempted to extend the landing gear, the passenger spoke to him so that he stopped the procedure and talked with the Tower, then the captain forgot to extent the landing gear because of his concentration on operation to correct the elevator trim.</p> <p>It is probable that the passenger was distracted by correcting procedure of the flap position and the call from Tower so that he did not notice that the captain did not extend the landing gear.</p>



The captain did not have memories to extend the landing gear, did not confirm the landing gear down operation by the before landing check, and did not reconfirm the landing gear down operation during the final approach, furthermore, based on the fact that landing gear switch handle was at “up” position at the time of the aircraft investigation after the accident, it is certain that the aircraft did not have the down operation of the landing gear prior to the landing.

- (3) Forgetting to confirm the landing gear extension at the before landing check and to reconfirm the landing gear extension during the final approach

It is probable that because the passenger was operating to correct the flap position as turning his eyes to the flap position indicator located at the lower part of the instrument panel, he did not see the outside of the aircraft, temporarily.

It is highly probable that because the passenger mistook the runway 09 seen in front for the runway 12 to land as his seeing outside of the aircraft after his completing an operation to correct the flap position, he took over the control to correct the approach in a hurry and descend as directing the nose to the runway in front.

The captain took over the piloting because he found the passenger mistaking the runway to land, but it is probable that because he was preoccupied with correcting an altitude and a path, he forgot the before landing check.

Furthermore, after that because the captain was still focusing on the operation to correct approach path and the passenger was also focusing to check the piloting and the path to approach by the captain, it is probable that they also forgot to reconfirm to extend the landing gear which should be done during a final approach.

As for the prevention of the forgetfulness of the landing gear extension, the before landing checks and others, it is probable that it is effective to use a checklist, and if an approach has no time to spare, it is probable that the captain should execute go-around in order to have the time to do the check.

- (4) Functional defect of the landing gear warning device

It was confirmed that because the system has a case that the rod could not activate the microswitch according to the operation check after the accident, and the captain and the passenger stated that both of them did not hear the warning sound, it is somewhat likely that the system was not activated when the throttle was closed and this fact contributed both of the captain and the passenger not to notice their forgetting the down operation of the landing gear till the end.

It is probable that the cases that the rod did not activate the microswitch could be occurred because the rod was worn due to a long time use.

#### 4. PROBABLE CAUSES

In this accident, it is certain that the aircraft made a belly landing without extend the landing gear and damaged the aircraft fuselage.

Regarding the aircraft landed without extend the landing gear, it is probable that because the approach was implemented under the condition that the captain had no spare time to assess the situation, to pilot or to maneuver, the captain forgot the landing gear operation, furthermore, he had forgot to confirm the landing gear operation at the before landing check and to reconfirm the landing gear operation during the final approach.

Regarding the situation for the captain to approach without any spare to assess the situation and to pilot maneuver, it is probable that the facts to pilot or maneuver the unfamiliar aircraft without any prior understanding of any systems is involved.

Furthermore, it is somewhat likely that because the landing gear warning device was not worked due to the functional defect, it possibly contributed the captain and the passenger who could not find out their forgetting to operate the landing gear until the last.