

AA2015-3

**AIRCRAFT ACCIDENT  
INVESTIGATION REPORT**

**PRIVATELY OWNED**

**J A 2 5 2 9**

**March 26, 2015**



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.

Norihiro Goto  
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

## FUSELARGE DAMAGE CAUSED BY HARD LANDING PRIVATELY OWNED SCHEIBE SF25C (MOTOR GLIDER, TWO-SEATER), JA2529 AT SHIKABE AIRFIELD, SHIKABE, KAYABE-GUN, HOKKAIDO, JAPAN AROUND 12:04 JST, MAY 6, 2014

February 27, 2015

Adopted by the Japan Transport Safety Board

Chairman	Norihiro Goto
Member	Shinsuke Endoh
Member	Toshiyuki Ishikawa
Member	Sadao Tamura
Member	Yuki Shuto
Member	Keiji Tanaka

### 1 PROCESS AND PROGRESS OF THE INVESTIGATION

The Japan Transport Safety Board designated an investigator-in-charge and an investigator on May 7, 2014 to investigate this accident. The occurrence of the accident was notified to the Federal Republic of Germany as the State of Design and Manufacture of the aircraft involved in the accident; however, the State did not designate an accredited representative. Comments were invited from parties relevant to the cause of the accident. Comments on the draft report from relevant State were invited.

### 2 FACTUAL INFORMATION

#### 2.1 History of the Flight

According to the statements of the captain and a witness, the history of the flight up to the time of the accident is summarized below.

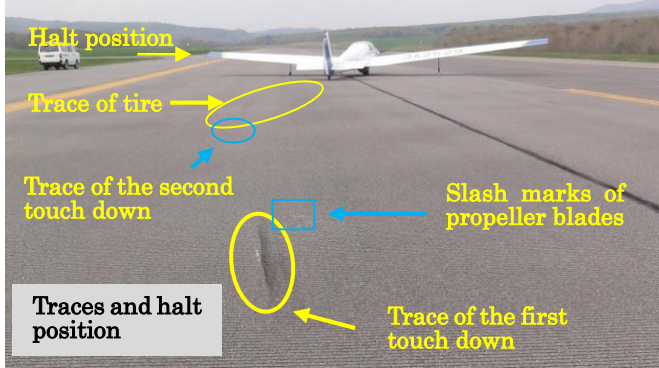
The captain made a flight plan to ferry the Scheibe SF25C, JA2529 to Tajima airfield, which would take several days. He conducted a familiarization flight for half an hour (including one time of landing) at Biei gliding field on the day before the accident.

On the day of the accident, the aircraft took off from Biei gliding field at around 09:33. The captain sat in the left seat with a passenger in the right seat. The aircraft proceeded to the downwind leg for runway 25 of Shikabe airfield via Muroran city.

The captain put the engine to idle when entering the base leg. The



	<p>wind information reported by the airfield radio operator was 260° with velocities as strong as 16 kt, maximum 25 kt; accordingly, he increased airspeed to 100 km/h, which is 10 km/h faster than usual. On final approach, he aimed for the touchdown zone marking adjusting the glide path slightly steeper than usual by using spoilers*1. At this time, he did not extend the spoiler a lot. He felt that the elevator response was a bit more sensitive than that of other aircraft of the same type he flew in the past when he initiated the flare*2 at the height between eight meters and 10 meters above ground level (AGL). Subsequently, he felt the flare was relatively high. To correct this situation, he slightly pushed the control stick forward and retracted the spoilers a little. Immediately after that, however, the aircraft hit the ground vigorously, bounced back and came to a halt.</p> <p>According to a witness on the second floor of the airfield office located about 300 meters away from the accident site, who provided landing information to the aircraft, the aircraft started its flare at higher than typical altitude, became high flare*3, lost its speed in level attitude, and then it seemed to drop nearly straight onto the ground. After the witness looked aside from the aircraft for a short period of time, he looked at the aircraft again and found that the aircraft was up again into the air. Thereafter, it landed with its nose slightly lowered and came to halt on the runway.</p> <p>The captain and the passenger evacuated from the aircraft after it halted.</p> <p>The captain did not notice any anomalies of the aircraft before the accident.</p>																		
<b>2.2 Injuries to Persons</b>	The captain sustained a minor injury.																		
<b>2.3 Damage</b>	<p>Extent of damage: Substantially damaged</p> <p>Damage of main wheel and deformation of its mounting structural portion</p> <p>Deformation of structure around the aircraft's nose</p> <p>Damage of the propeller</p> <p>Deformation of exhaust pipe at the lower part of the nose</p>																		
<b>2.4 Personnel Information</b>	<p>The captain: Male, Age 63</p> <table border="0" style="width: 100%;"> <tr> <td>Private pilot certificate (glider)</td> <td style="text-align: right;">January 22, 2004</td> </tr> <tr> <td>Type rating for motor glider</td> <td style="text-align: right;">July 1, 2010</td> </tr> <tr> <td>Class 2 aviation medical certificate</td> <td style="text-align: right;">Validity: August 31, 2014</td> </tr> <tr> <td>Total flight time (glider and motor glider)</td> <td style="text-align: right;">614 h 18 min</td> </tr> <tr> <td>Flight time in the last one year</td> <td style="text-align: right;">16 h 01 min</td> </tr> <tr> <td>Flight time in the last 30 days</td> <td style="text-align: right;">1 h 05 min</td> </tr> <tr> <td>Total flight time on the type of aircraft</td> <td style="text-align: right;">60 h 38 min</td> </tr> <tr> <td>Flight time in the last one year:</td> <td style="text-align: right;">2 h 06 min</td> </tr> <tr> <td>Flight time in the last 30 days:</td> <td style="text-align: right;">1 h 05 min</td> </tr> </table>	Private pilot certificate (glider)	January 22, 2004	Type rating for motor glider	July 1, 2010	Class 2 aviation medical certificate	Validity: August 31, 2014	Total flight time (glider and motor glider)	614 h 18 min	Flight time in the last one year	16 h 01 min	Flight time in the last 30 days	1 h 05 min	Total flight time on the type of aircraft	60 h 38 min	Flight time in the last one year:	2 h 06 min	Flight time in the last 30 days:	1 h 05 min
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	Aspect ratio	13.8
<b>2.6 Meteorological Information</b>	<p>According to the statement of the staff of the airfield, the weather at the time of the accident was sunny with occasional high cloud with good visibility.</p> <p>The average wind velocity observed at the airfield between 12:00 and 13:00 was of 11 kt with the maximum about 28 kt and minimum about 6 kt. The wind direction and the wind velocity which were reported to the aircraft during approaching were as follows.</p> <p>Upon five miles northwest passage of the airfield      250° 18 kt  Upon passage over the airfield                                      260° 16 kt  During the down-wind leg flying      260° 16 kt, maximum      25 kt</p>	
<b>2.7 Site of the Accident</b>	<p>The airfield, which is a nonpublic one, is managed by a private company. The runway is 890 meters long and 30 meters wide. Touchdown zone marking was placed between 150 meters and 172.5 meters from the threshold.</p>  <p>The aircraft came to a halt around 93.5 meters from the touchdown zone marking of runway 25, with its nose direction to nearly 290 degrees. The first trace of touch down (tire mark, metal scratch mark, etc) and slash marks made by propeller blades were observed. In addition, several broken pieces of tire wheel were found near the first trace of touchdown.</p>	
<b>2.8 Record of GPS Data</b>	<p>A handheld GPS device was brought into the aircraft, which retained the data of the flight until the accident. The estimated flight course of the aircraft and others are depicted in figure 1 and figure 2.</p> <p>Figure 1 and figure 2 indicated that altitude above ground level at the position 700 meters from the touchdown zone marking (as of 12:03:41) was determined about 105 meters, and the glide path between this point and touchdown zone marking was about 7:1 (approximately 8° ).</p>	
<b>2.9 Additional Information</b>	<p>(1) Landing maneuver of the same type of aircraft.</p> <p>According to a flight instructor of gliders who has experiences in the operation of the same type of aircraft, the outline of landing maneuver was as follows:</p> <p>The maneuver generally used in landing with the same type of aircraft is, after putting the engine to idle between the downwind leg and the base leg, basically the same as the landing of other gliders without engines.</p> <p>A straight path between about 700 meters and 800 meters long is generally used for final approach, and the final approach is initiated at roughly 100 meters (approximately 300 ft) AGL (Above Ground Level), with the airspeed at about 90 km/h, the spoilers extended halfway, aiming for the runway designation marking. The glide ratio is about 10:1 with</p>	

	<p>spoilers extended halfway; accordingly, it is a smaller approach path than generally used (7-8:1). If spoilers are kept extended halfway, the touchdown point is likely to shift forward beyond the intended point; therefore, the approach path should be adjusted by gradually extending spoilers in order to control the aircraft for a correct approach path to the aiming point. Typically, spoilers are eventually extended almost fully at the end of the approach (gliding ratio will be approximately 7:1).</p> <p>When wind is not stable, pilots should consider increasing airspeed by 10 km/h or so to keep the controllability of the aircraft.</p> <p>Under strong headwind conditions, it is required to make the approach path steeper than usual to keep the path adjustable by retracting spoilers for unintended aircraft's loss of altitude. When the approach path is steep, pilots should be vigilant to avoid possible high flare. When spoilers are not extended nearly to its maximum, landing maneuvers will become difficult due to sensitive elevator controllability.</p> <p>Pilots should carefully initiate landing flare at around 5 m (about 15 ft) AGL, then gradually bring the nose up as the aircraft descends, and touchdown with the tailwheel followed by the mainwheel onto the ground at near the minimum airspeed.</p> <p>Recovery from high flare requires prompt actions to discontinue the flare and retract spoilers so as not to rapidly lose airspeed.</p> <p>(2) Excerpts from the flight manual</p> <p><i>4-7 Landing</i></p> <p><i>2) Approach at about 90 km/h, controlling the glide path like gliders with the spoilers.</i></p> <p><i>4) Touchdown at the minimum airspeed (70 km/h) with the tailwheel first, then the mainwheel. Landing roll distance can be reduced to about 100 m by applying brake. (Omitted)</i></p> <p><i>4-10 Low speed flight and stall</i></p> <p><i>1) Stall speed is about 70 km/h whether or not the engine is running. (Omitted)</i></p>
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\*1: "spoilers" are devices to reduce the glide ratio by increasing drag, which causes decrease of lift. Pilots operate a spoiler lever to the open position to gradually extend plates installed in both wings.

\*2: "flare" refers to nose-up maneuvers at landing to mitigate the ground impact and touchdown smoothly.

\*3: "high flare" refers to temporary stop of airplane's downward movement and flying level too high above the runway as a result of too rapid flare. (Source: FAA Airplane Flying Handbook, Chapter 7)

### 3 ANALYSIS

<b>3.1 Involvement of Weather</b>	Yes
<b>3.2 Involvement of Pilot</b>	Yes
<b>3.3 Involvement of Aircraft</b>	No
<b>3.4 Analysis of Findings</b>	(1) Weather The wind information reported around two minutes before the accident was from 260° at about 16 kt, maximum 25 kt, and the average

wind velocity between 12:00 and 13:00 was around 11 kt, maximum at 28 kt and the minimum at about 6 kt.

Judging from these, it is probable that it was strong and fitful gust of wind condition although it was almost head wind.

(2) Approach

According to the GPS records, the glide path of the aircraft was about 7:1; therefore, it is probable that the glide path is relatively small, taking the strong wind condition into account. In such case where glide path is not large enough against strong wind, pilots may not be able to extend spoilers nearly to its maximum, which may lead to losing the altitude excessively. The captain stated that he did not extend the spoiler a lot all the way to landing. Based on these facts, with spoilers halfway open, it is somewhat likely that the glide ratio was large, which might make the landing maneuver more difficult than usual due to the sensitive elevators controllability.

It is also somewhat likely that the larger airspeed on final approach could be the cause of sensitive elevators response.

(3) Hard landing

It is probable that the aircraft was damaged as a result of hard landing after the high flare at around five meters above the runway under strong and fitful gust of wind condition which might make landing rather difficult due to sensitive elevator response. With regard to the aircraft's hard landing after the high flare, it is probable that measures taken to correct the situation were not appropriate; belated discontinuity of flare, and inadequate timing and commensurate amount of retracting spoilers.

Other than above, it is somewhat likely that following two points contributed to the rapid loss of lift.

- a. Due to fitful gust of wind at the time of the accident, headwind might suddenly decrease after the high flare, resulting in the loss of airspeed.
- b. Due to the captain having initiated flare at higher than typical altitude, the airspeed had reduced by the time when the aircraft leveled off at almost five meters AGL.

When motor gliders become high flare, pilots should immediately discontinue flare to prevent loss of airspeed and lift with retracting spoilers in order to avoid hard landing. Moreover, if necessary, pilots need to increase engine output and execute a go-around.

(4) Recent experiences

The captain flew the aircraft for the first time for half an hour as a familiarization flight including only one time landing on the day before the accident. In addition, the flight time of the captain on the same type of aircraft was around two hours during the last one year period of time including the familiarization flight. Judging from these, it is somewhat likely that the captain's experiences were not

	enough to fly the type of aircraft for landing in the strong and gusty wind condition.
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**4 PROBABLE CAUSES**

In this accident, it is highly probable that the aircraft was damaged due to hard landing after the high flare. With regard to the hard landing after the high flare, it is probable that the event was caused by rapid decreased airspeed and sharply reduced lift as a result of inappropriate measures taken to correct the situation; belated discontinuity of flare, and inadequate timing and commensurate amount of retracting spoilers.



Figure 1 Estimated Flight Route

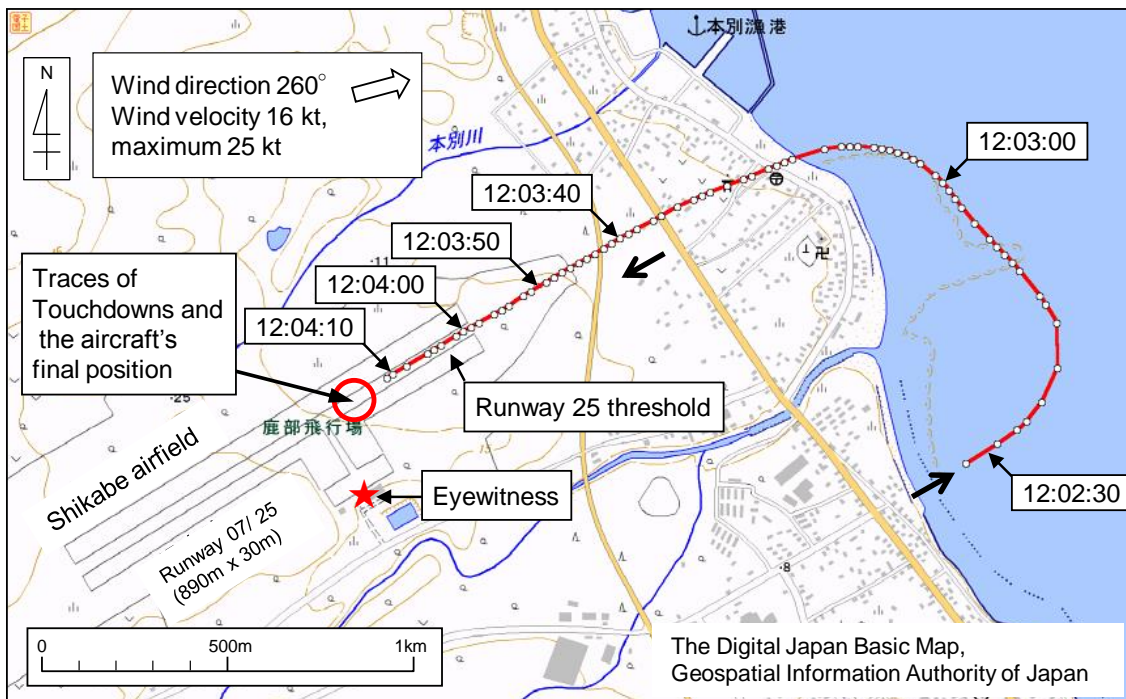
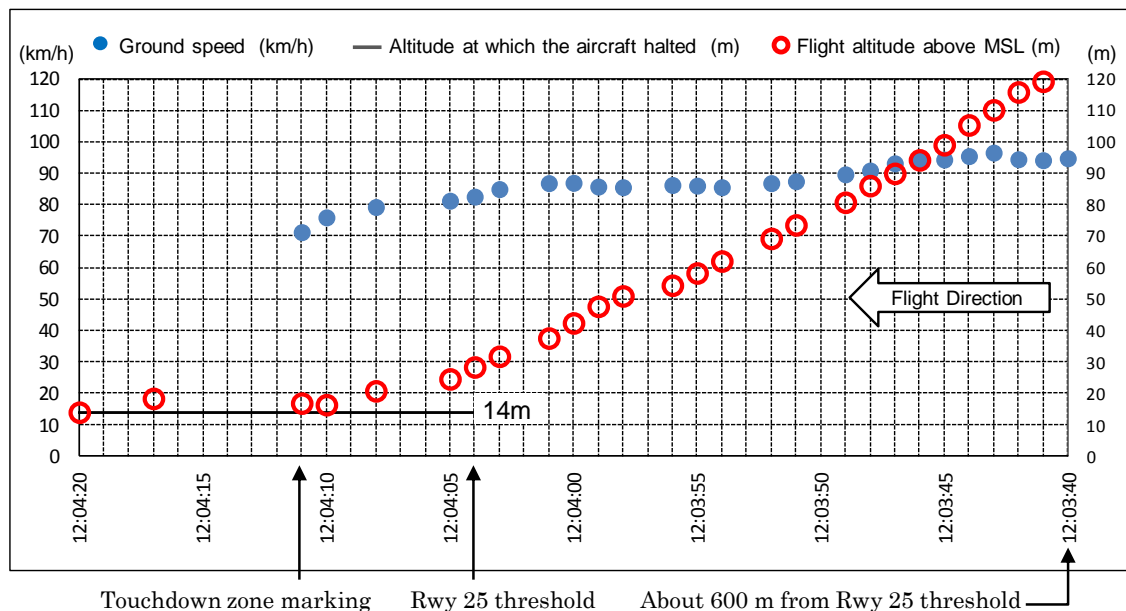


Figure 2 Flight altitude and Ground speed



- “Flight altitudes (m)” are the corrected values of GPS data referring to the ground level(14m) above MSL.
- “Ground speeds (km/h)” are the estimated values based on GPS records.