AA2020-6

AIRCRAFT ACCIDENT
INVESTIGATION REPORT

PRIVATELY OWNED
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October 1, 2020

JTSB Japan Transport Safety Board

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.

TAKEDA Nobuo
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

August 28, 2020

Adopted by the Japan Transport Safety Board

Chairman TAKEDA Nobuo
Member MIYASHITA Toru
Member KAKISHIMA Yoshiko
Member MARUI Yuichi
Member MIYAZAWA Yoshikazu
Member NAKANISHI Miwa

Company	Privately owned
Type **Registration Mark**	Scheibe SF-25C Falke (Motor Glider, Two-Seater) JA2529
Accident Class	Damage to the Aircraft during take off
Date and Time of the Occurrence	Around 16:55 JST (JST: UTC+9 hours; unless otherwise noted, all times are indicated in JST in this report on a 24-hour clock), on August 27, 2019
Site of the Accident	Nishio-city, Aichi Prefecture (34°53'19" N, 137°04'52" E)

1. PROCESS AND PROGRESS OF THE INVESTIGATION

Summary of the Accident	The Aircraft took off from Kohnan Aerodrome in Okayama Prefecture to make a ferry flight, to Makabe Gliderport. On the way, the Aircraft landed for refuel on riverbed of the Yahagi River in Nishio-city, Aichi Prefecture. After refueling, when the Aircraft tried to take off from the riverbed, the left wing and left outrigger*1 were entangled with the tall grass, and the Aircraft veered to the left and fell down from the riverbed and stopped, which resulted in the damage to the main wings and propellers. The captain and one passenger on board the Aircraft suffered no injury.
Outline of the Accident Investigation	The Japan Transport Safety Board (JTSB) designated an investigator-in-charge and an investigator on August 28, 2019 to investigate this accident. Comments were invited from parties relevant to the cause of the accident and the relevant States.

2. FACTUAL INFORMATION

Aircraft Information

Aircraft type: Scheibe SF-25C Falke

Serial number: 4461; Date of manufacture: May 10, 1973

Certificate of airworthiness: No. 2019-36-01; Validity: August 3, 2020

*1 "Outriggers" refer to auxiliary wheels mounted on the bottoms of both main wings for Aircraft with a main wheel and tail wheel positioned on the centerline.

Maximum take off weight: 580 kg　　Weight at the time of the accident: 589 kg

Personnel Information

Captain:　Male, Age 78

Private pilot certificate (Motor Glider)　July 25, 1973

Pilot competence assessment　Validity or Expiration date: May 3, 2020

Class 2 aviation medical certificate　Validity: July 11, 2020

Total flight time (only for glider, based on the statement of the captain) about 15,000 hours

Meteorological Information

According to Japan Meteorological Agency data for Okazaki (10.5 km east-northeast of the accident site) at 17:00 on the day of the accident : East-southeast wind: 1.8 m/s, Temperature: 22.9 ℃, Precipitation: 9.5 mm

Details of the Accident and Related Information

(1) History of the flight (see Figure 1)

The Aircraft took off from Kohnan Aerodrome in Okayama Prefecture at 12:40 to make a ferry flight, to Makabe Gliderport in Ibaraki Prefecture. At the time of departure, the fuel tank of the Aircraft was filled up with 44 liters. The captain loaded portable fuel cans filled with 30 liters of gasoline for refueling in baggage compartment rear of the cockpit. Because of the bad weather, the Aircraft needed to go around the Kii Peninsula along the shore. When the Aircraft reached Atsumi Peninsula after about four hours from departure, as it was running out of fuel, the captain decided to land at Okazaki Gliderport in Aichi Prefecture for refuel. As it was the first time for the captain to land at Okazaki Gliderport, he tried to locate it by using his map. Captain found a riverbed which was long and wide enough to land along the Yahagi River in Nishio City in Aichi Prefecture. He misidentified the riverbed as Okazaki Gliderport, and landed at around 16:45. At the time of landing it was lightly raining.

The captain filled the fuel tanks with the gasoline he brought in the portable gasoline can. He started engine at around 16:55, he made a turn after taxing back to the end of riverbed in order to get take off distance as long as possible. As the Aircraft made a right turn from the center of the riverbed toward the river, the take off run started closer to the river. The captain did not measure the length of the riverbed before take off, nor consider the required take off run based on the performance table of the Aircraft.

The Aircraft continued its take off run, but before airborne, it plunged into a tall grass area and tall grass entangled left wing and left outrigger. When the Aircraft reached the point around 157m from the starting point of the take off run, the heading deflected to the left, and the Aircraft fell about 3 m down from the riverbed and stopped.

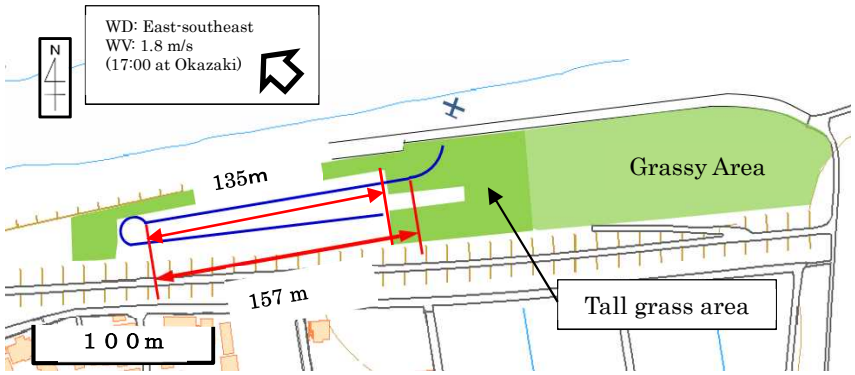

Figure 1:　Accident site layout

Figure 2: Accident Aircraft

The left wing leading edge was damaged and propeller was broken. Along the line which the Aircraft made its take off run, there were relatively fewer grass to the point about 135 m from the starting point, but from there on as closer to the edge of riverbed, there were tall grass in high density which exceeded the height of the main wings (about 1 m).

(2) Take off run distance

The flight manual of the Aircraft describes as follows. (excerpt)

4-5 Take off and climb (See Section 4-12 "Wet wing – warning.)

- *Trim neutral, spoilers closed and locked, control column central (do not push the column forwards.)*
- *Apply Full throttle*

4 -12 Wet wings – warning

1) *The Falke wing has a glider airfoil which is sensitive to rain. Drops of rain on the wings disturb the airflow and reduce the lift.*
2) *Do not attempt to take off at less than 85 km/h.*

In the placard in the cockpit, the following caution is described.

"Caution: Wet wings – see Flight Manual

The flight manual of the Aircraft describes the take off performance as follows.

5-1 Take off performance

Maximum all up weight : 580 kg

Level airfield with short well kept grass. Wings dry, wing surface clean.

No wind. Air pressure standard for height of airfield above sea level.

Lift-off speed: approx. 65 km/h

	Elevation (m)	*-15℃*	*0℃*	*+15℃*	*+30℃*
Take off run (m)	*0*	*78*	*88*	*98*	*108*

(3) Weight of the Aircraft

Upon departure from Kohnan Aerodrome, calculating from empty weight 413kg, weight of the two occupants about 139 kg, the weight for their clothes and belongings, portable gasoline can and others of 10 kg, 44 liters of fuel (34 kg with specific gravity 0.77), and 30 liters of reserve gasoline stored in portable gasoline can (23 kg with specific gravity 0.77), the weight would be 619kg which exceeds its maximum take off weight 580kg by 39kg. At the time of the accident, Aircraft had 35 liters of fuel (27kg with specific gravity 0.77) and the weight was about 589kg which exceeds the maximum take off weight 580kg.

(4) Flight plan

The flight plan of the Aircraft was as follows. (excerpt)

Departure Aerodrome: Kohnan Aerodrome Destination Aerodrome: Makabe Gliderport,

Estimated Off Block Time: 12:40 Cruising Speed: 70 kt

Total Estimated Elapsed Time: 6 hours Fuel Endurance: 7 hours

The straight distance between Kohnan Aerodrome and Makabe Gliderport is about 590 km.

When the Aircraft took off, the captain was planning to land somewhere on the way to supply the reserve fuel stored in the gasoline can, but had not decided where.

(5) Range and endurance

From the flight manual Section 5-5 Range and endurance, in the condition of 44 liter tank, Engine 2,500rpm; fuel consuption rate 10.1 ℓ/h; Airspeed: 130km/h, duration would be 4hours 20minutes and range would be 560km.

(6) Carrying reserve fuel

Under Article 86, Civil Aeronautics Act (Prohibition for Carriage of Explosives etc.), it is prohibited to carry gasoline in the portable can in cockpit.

3. ANALYSIS

(1) Captain's preparation before take off

When the captain was taking off from the riverbed, even though there were high grass area, he did not confirm the condition of the riverbed surface, nor measure the available take off run length. In addition, he did not confirm the weight of the Aircraft, so he did not review length required for the take off run.

It is probable that this is because the captain believed the riverbed was Okazaki Gliderport so he had no doubt that it should have required runway length.

(2) Required length for take off run

From the Section 5-1 in the flight manual, the required length for take off run would be about 100 m at maximum take off weight. The riverbed length available for the take off run was 135 m. However, soft ground due to rainy weather may decrease accelaration and as it is described in the Section 4-12 in the flight manual that with wet wings, "Do not attempt to take off at less than 85 km/h", the required take off run is calculated as $100 \text{ m} \times 85^2 / 65^2 = 171$ m, therefore, it is probable that the riverbed length available for the take off roll was not enough.

(3) Deflection of the heading

Height of the grass where the Aircraft plunged into were higher than the main wings, therefore, it is highly probable that those grass created a big drag. In addition, it is probable that those outriggers were also entangled with the tall grass, and deflected the heading to the left.

(4) Flight plan

The flight plan was filed as Departure Kohnan Aerodrome Destination Makabe Gliderport, total estimated elapsed time 6 hours, fuel endurance 7 hours, and cruising speed at 70 kt (about 130 km/h), as the duration is 4 hours 20 minutes, this flight plan was impossible to achieve. The captain should have decided safe and reachable en route landing site before flight, and filed it in the flight plan, and flown accordingly.

4. PROBABLE CAUSES

In this accident, when the Aircraft tried to take off, it is highly probable that it was not able to accelerate enough within the riverbed length, plunged into tall grass area before airborne, therefore its left main wing and left outrigger were entangled with tall grass, and veered to the left and fell down from the riverbed, which resulted in the damage to the main wings and propellers.

Concerning the reason why the Aircraft did not accelarate within riverbed length, it is somewhat likely that it might involve the following facts; the wet ground created a big drag, the wings were wet by rain and reduced lift, and the weight exceeded the maximum take off weight.