

AIRCRAFT ACCIDENT INVESTIGATION REPORT

March 21, 2025

Adopted by the Japan Transport Safety Board

Chairperson TAKEDA Nobuo

Member TAKANO Shigeru

Member MARUI Yuichi

Member SODA Hisako

Member TSUDA Hiroka

Member MATSUI Yuko



Company	Kyushu Institute of Technology
Type, Registration Mark	Alexander Schleicher ASK13 (Glider, Two-Seater), JA2189
Accident Class	Crash
Date and Time of the Occurrence	At About 16:22 Japan Standard Time (JST: UTC+9 hours), May 25, 2024
Site of the Accident	Ubuyama Village, Aso County, Kumamoto Prefecture (33° 03' 38" N, 131° 12' 17" E)

1. PROCESS AND PROGRESS OF THE ACCIDENT INVESTIGATION

Summary of the Accident	On Saturday, May 25, 2024, the glider took off from the Aso Temporary Operation Site in Aso City, Kumamoto Prefecture by aerotow for flight training, for the towline had severe slack, the glider released the towline and attempted a forced landing, but the wing of the glider came in contact with trees and crashed and caused damage to the glider.
Outline of the Accident Investigation	Japan Transport Safety Board (JTSB) designated an investigator-in-charge and two other investigators for this accident. (May 25, 2024) Comments on the draft Final Report were invited from the parties relevant to the cause of the accident and the Relevant State.

2. FACTUAL INFORMATION

Aircraft Information	
Glider: Alexander Schleicher ASK13	
Serial number: 13526, Date of manufacture: December 9, 1975	
Airworthiness certificate: No. 2024-47-01, Validity: February 22, 2025	
Tow plane: Avions Pierre Robin DR400/180R	
Serial number: 1236, Date of manufacture: September 22, 1977	
Airworthiness certificate: No. DAI-023-360, Validity: September 14, 2024	
Personnel Information	
Glider pilot	Age 20
Private pilot certificate (Glider)	January 23, 2024

Pilot competence Assessment	Expiration date of piloting capable period:	January 23, 2026
Class 2 aviation medical certificate	Validity:	March 24, 2029
Total flight time		27 hours 20 minutes
Flight time in the last 30 days		2 hours 15 minutes
Tow pilot	Age	71
Private pilot certificate (Land Single-Piston)		September 5, 1973
Pilot competence Assessment	Expiration date of piloting capable period:	October 11, 2024
Class 2 aviation medical certificate	Validity:	November 11, 2024
Total flight time		853 hours 35 minutes
Flight time in the last 30 days		3 hours 15 minutes

Meteorological Information

The weather observations at the Takeda Regional Meteorological Observatory Station of the Japan Meteorological Agency, located about 20 km east-southeast of the accident site at about the time of the accident were as follows:

16:20 Wind direction East-Northeast; Wind velocity 2.5 m/s Temperature 25.0°C

Event Occurred and Relevant Information

(1) History of the Flight

On Saturday, May 25, 2024, at 16:14, the glider took off from Runway 08 of the Operation Site, aerotowed by Avions Pierre Robin DR400/180R, JA4319 (hereinafter referred to as “the tow plane”), of Makurazaki Glider Club, for flight training, with the captain of the glider (the glider pilot) sole on board. Prior to the flight, manager of the Kyushu Institute of Technology Gliding Club, had talked to the captain of the tow plane (the tow pilot) on behalf of the glider pilot, to take the glider to the 24 km flight course and tow the glider to an altitude as high as possible at the release point near Ohso Dam such as 700m AGL (see Figure 1), which is further than the normal flight to be released over the glider port. Following this discussion, the tow pilot thought for the glider higher would be better, and planned to climb to 6,000 ft (about 1,000m AGL), as the floor of the TCA*1 in this area was 6,500 ft. This flight was the glider pilot's first aerotow solo flight. The glider took off the Operation Site and was towed north-east along the agreed flight course. The speed has gradually increased from the start of the aerotow, when passing the Minami Cattle Feedlot, the speed was reaching 140 km/h, the aerotow speed limit for the glider, and was still increasing. When the glider reached the first turn point, at

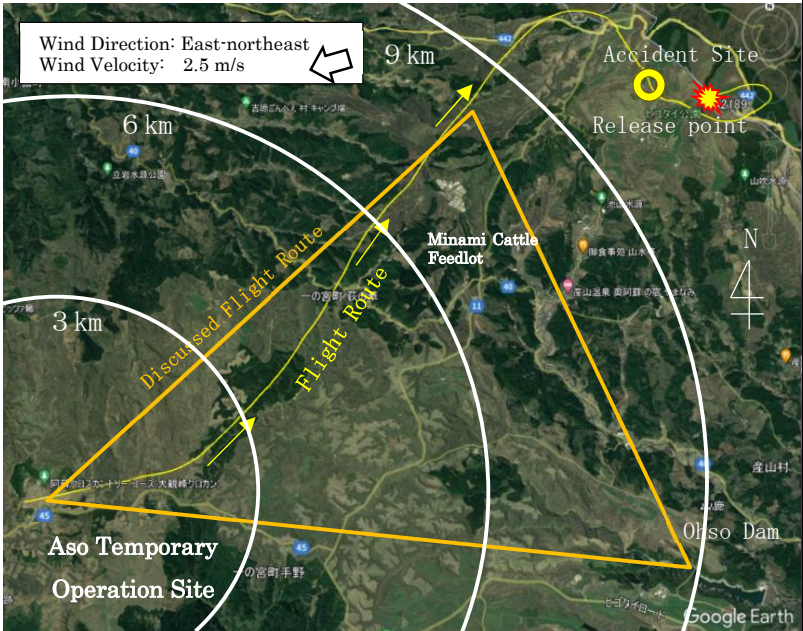


Figure 1: Estimated Flight Route
(based on mobile phone GPS records)

*1 “TCA (Terminal Control Area)” is to the designated area of the approach control areas where the services such as radar vector and the position information are provided to VFR (Visual Flight Rules) aircrafts.

around 11km from the departure site, the speed had reached 150 km/h and the towplane made a 90° turn to the right, the glider pilot was scared and tried to reduce the speed by opening dive brakes. But climb rate reduced, and the speed has further increased, glider pilot contacted the tow pilot using radio “The speed is too high, please slow down.” Upon receipt of this radio, the tow pilot acknowledged that the towplane speed was about 150 km/h, so the tow pilot pulled the control stick to increase the pitch to reduce the speed. However, the glider further accelerated and reached 170 km/h and the towline slacked severely, which was about to entangle the left wing of the glider, so the glider pilot released the towline.

Then, after settling the glider's attitude, the glider pilot confirmed the altimeter to find it indicated 320 m (it was set to 0 m at take-off) and as it was more than 10km away, confirmed that it was unable to return to the departure site. Looking around, the glider pilot found a grassland where it would be possible to land and thought that the glider had no choice but to make a force land there. The glider pilot made a traffic pattern and approached there. It was first time for the glider pilot to attempt a forced landing.

On final approach to the grassland, the glider pilot noticed that it had a slope. (the condition of slope are discussed later in (5)). The glider pilot opened the dive brakes, to slid the glider to make the descent, and attempted to land on the field, but was unable to land and overshoot. The glider wing then hit a tree at the end of the field, and the glider flew over the parking area and hit trees again, fell and came to a stop turning left 90°.

The glider was damaged the right-wing tip and the left-wing was broken in the middle and the nose was buckled, and the right horizontal stabilizer was broken. The glider pilot was examined at the hospital and found only minor injuries such as scratches.

(2) Glide Ratio*² and Towed Altitude

Figure 2 shows the flight altitude according to the distance from the departure site recorded by the glider pilot mobile phone GPS and the glide ratio 15, which can be used as a reference to be able to fly back to the departure site (200m for the altitude for the traffic pattern).

The best glide ratio for the glider in the manufacturer document was 27, however, the Kyushu Institute of Technology had instructed an operational glide ratio of 15, with the safety factor.

According to the tow pilot, the tow pilot gained the altitude slowly so as not to increase the altitude too much in the first half of the flight, considering the altitude should be 1,000 m AGL when reaching the release point Ohso Dam.

(3) Rate of Climb during Tow

From the GPS record, the speed of the glider gradually increased from 100 km/s from the start of the aerotow and continued to accelerate beyond 140 km/h, glider operation limitation for aerotow. On the other hand, the

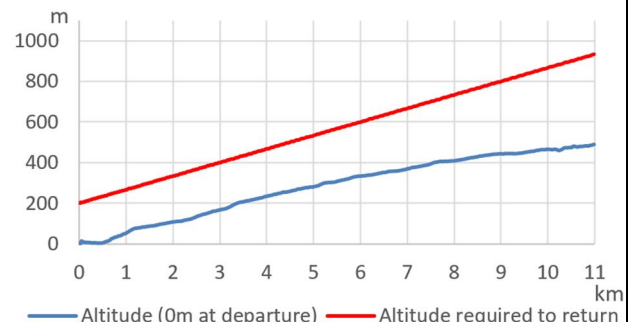


Figure 2: Altitude Required to Return

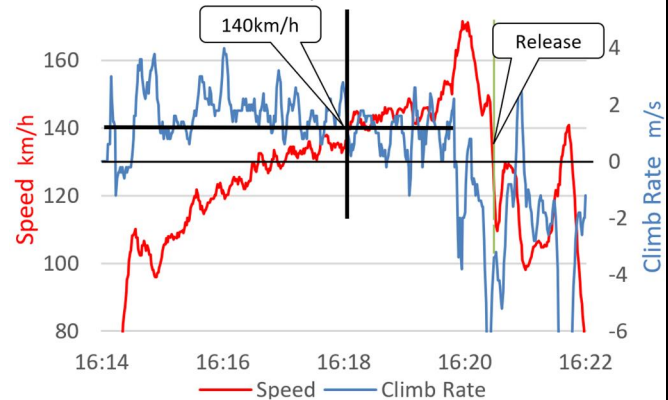


Figure 3: Speed and Climb Rate

* 2 "Glide ratio" is the ratio of the horizontal distance traveled and the altitude descended when a glider is gliding.

climb rate was positive and climbing until the speed of the glider reached 140 km/h, and then the climb rate was negative, and the glider gradually descended (see Figure 3).

According to the tow pilot, the tow pilot was trying to tow the glider gently, but was unaware that that the tow speed limit for the glider was 140 km/h.

(4) Radio Contact during Tow

While on tow, if the altitude is significantly below the altitude required to return, or the tow speed exceeds the aerotow speed limit, it is impossible to correct on the glider side. If it occur, glider pilot need to contact tow pilot at early stage to correct using radio.

(5) Slope of the grassland where the Forced Landing was Attempted

Based on GPS records and elevation data from the Geospatial Information Authority of Japan, the cross section of the grassland where the glider pilot attempted the forced landing was approximately 6° downslope, as shown in Figure 4. When the glider reached the grassland, the flight altitude was about 60 m AGL, but it dropped to a few meters AGL in the middle of the field. Then after flying almost parallel with the ground, the glider contacted trees at the end of the field.

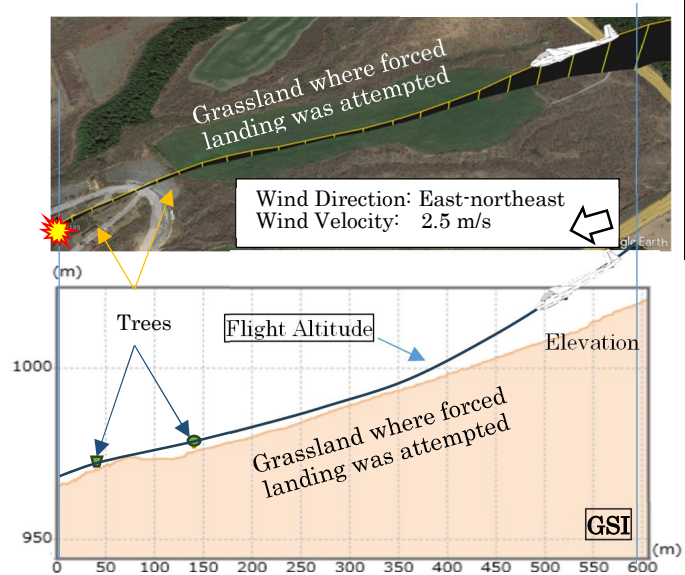


Figure 4: Cross Section of where Forced Landing was Attempted and Flight Altitude

3. ANALYSIS

(1) Altitude at which the Glider was Towed

Regarding the altitude at which the glider was towed, the JTSCB concludes as follows:

Based on GPS records, the distance from the departure site where the glider released the towline was 11 km, and the altitude difference was 320 m, therefore, as a glide ratio of 15, the glider did not have required altitude to return ($11 \text{ km}/15 + \text{pattern height } 200 \text{ m} = 933 \text{ m}$). As shown in Figure 2, after take-off, the glider had been flying below required altitude to fly back to Operation Site until it was 11 km away. The tow pilot was conscious to reach 1,000m AGL over Ohso Dam where was the planned as release point, and climbed slowly, and the tow pilot most likely did not consider required altitude for the glider to return to the Operation Site in an emergency such as a towline break.

As being concerned too much about the altitude reached at the planned release point, the tow pilot had most likely towed the glider at an altitude well below the glider to return safely to the departure site. Upon aerotow, it is necessary for tow pilot to fly considering the altitude required for glider to return, so that glider can land safely even if any emergency occur and glider pilot is forced to release. In addition, if glider is significantly below the altitude required to return, it is impossible to correct this from glider side, so glider pilot needs to contact tow pilot by radio early enough to make corrections.

(2) Towing Speed and Climb Rate

Regarding the towing speed and climb rate, the JTSCB concludes as follows:

When the glider was towed, the speed gradually increased, and exceeded glider operation

limitation speed for aerotow, 140 km/h (see Figure 3). On the other hand, the climb rate started to be negative when the speed got 140km/h. It is more likely that the tow pilot has reduced pitch unconsciously and increased speed and reduced climb rate. As the towplane made a tight right turn, which glider was difficult to follow, causing the glider pitch down and exceeded the tow speed, most likely resulting in significant slack in the towline. The tow pilot should have paid close attention to the tow speed to ensure a constant speed and rate of climb throughout the aerotow.

As the tow pilot was not aware of the glider operation limit for aerotow, the tow pilot most likely exceeded this limit. It is more likely that the glider pilot should have confirmed with the tow pilot the operation limit for aerotow for the glider, during the pre-flight briefing. And if the tow speed became high, the glider pilot should have contacted the tow pilot by radio early enough to make corrections.

(3) Slope of the Forced Landing Site

Regarding the slope of the forced landing site, the JTSB concludes as follows:

Upon release from the towplane, the glider pilot thought that it would be impossible to fly back to the departure site for the flight altitude was too low and looked for a place to make a forced landing. The glider pilot found a grassland nearby where it would be possible to land, and the glider pilot made an approach toward this field. However, as shown in Figure 4, field the glider approached was 6° downslope, which is close to landing approach angle of the glider, despite of the efforts of the glider pilot, the glider more likely was unable to touch down and overshot the field, and the glider contacted a tree.

For the glider pilot was on his first aerotow solo, had chosen a field with a slope unsuitable for a forced landing was probably due to lack of experience of the glider pilot.

(4) Pre-flight Briefing and Planning Circuit Flight

Regarding the Pre-flight Briefing and planning Circuit flight, the JTSB concludes as follows:

As it was the first aerotow solo flight for the glider pilot, the circuit flight going away from the departure site should not have been planned.

The manager instead of the glider pilot, made a pre-flight briefing with the tow pilot for the circuit flight. Circuit course and the planned release point was briefed in the meeting, but altitude required for the glider to return in an emergency such as a towline break, nor the aerotow speed limit for the glider were not mentioned. As the pre-flight briefing is critical for the flight, the glider pilot and the manager should have discussed and mutually confirm understandings with the tow pilot.

4. PROBABLE CAUSES

The JTSB concludes that in this accident, it is highly probable that during the forced landing attempt, the glider was unable to descend and land sufficiently as the site was on a downslope, the glider overshot, and the wing came into contact with a tree and fell, causing damage to the glider.

The reason why the glider required forced landing attempt was the glider was towed at excessive speed, and at decreased climb rate, caused slack in towline making difficult for the glider to stay in tow, and the glider pilot released because the glider pilot felt it was dangerous, and the release point was too low and most likely could not come back to the operation site.

The reason why the glider was towed at excessive speed and at a low altitude, as the aerotow speed limit for the glider had not been confirmed between the glider and tow pilots during the pre-flight briefing, was the tow pilot more likely not taking into account the altitude required for the glider to fly back and the aerotow speed limit for the glider.

5. SAFETY ACTIONS

(1) Safety Actions Required

At the time of aerotow, the tow pilot must consider emergency such as a towline break and always maintain sufficient altitude for the glider to return to the gliding field. The glider and tow pilots should confirm the aerotow speed limit of the glider during its pre-flight briefing and must not exceed this limit.

(2) Safety Actions Taken after the Accident

a. Safety actions taken by Kyushu Institute of Technology

- (a) The first solo aerotow shall be conducted as a normal flight, not as a circuit flight, and the pilot's skills, such as taking up slack in the towline and others, shall be fully confirmed.
- (b) Documentation of the appropriate aerotow speeds, and proper altitudes according to the distance from the runway shall be prepared together with Makurazaki Glider Club and informed to club members. In addition, glider side shall actively request through radio speed, altitude, course etc.
- (c) When performing aerotow, glider pilot and tow pilot shall discuss flight course, emergency procedures, and aerotow speed limits at pre-briefing.
- (d) As the areas such as Aso and Kuju are mountainous areas, where the members of the Kyushu Institute of Technology normally fly, most of the out-landing sites would be slope, therefore on the importance of landing on an upslope shall be educated. A map of emergency landing sites confirmed on-site, and the approach procedures shall be provided.

b. Safety actions taken by Makurazaki Glider Club

- (a) Training plan shall be exchanged with Kyushu Institute of Technology so that the club member can properly understand the training content required.
- (b) Tow pilots with limited glider experience shall have regular glider flying opportunities.
- (c) The three principles for flying at the Aso Temporary Operation Site, "Stay in gliding distance (even on tow), IP 3400ft / 200m AGL, no turns after entering downwind", shall be established and recited at every flight briefing.
- (d) Information of the appropriate aerotow speed and altitudes according to the distance from the runway and aerotow speed limits prepared together with Kyushu Institute of Technology will be included in the documentation introducing rules of flight in Aso and be informed to the club members.
- (e) When performing aerotow, glider pilot and tow pilot shall discuss flight course, emergency procedures, and aerotow speed limits at pre-briefing.