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INVESTIGATION REPORT

Accident to the PZL BIELSKO - SZD-51 registered F-CAJC

on 3 October 2019
at Issoire Le Broc aerodrome (Puy-de-Dôme)

Time	Around 15:30[1]
Operator	Club Pierre Herbaud
Type of flight	Local
Persons on board	Pilot
Consequences and damage	Pilot injured and aircraft damaged

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in June 2020. As accurate as the translation may be, the original text in French is the work of reference.

[1] Unless otherwise stated, all times given in this report are in local time.

Disconnection of elevator control, hard landing

1 - HISTORY OF THE FLIGHT

Note: the following information is based mainly on statements.

The pilot carried out a towed take-off from right-hand runway 36[2] for a local flight. After release, at an altitude of about 1000 m, she was unable to gain altitude and decided to return to the aerodrome. During the return flight, she experienced difficulty maintaining the glider's attitude and joined the downwind leg into runway 36. During the landing, she was unable to flare despite applying a firm nose-up input. The glider hit the runway hard with a nose-down attitude and came to a stop on the runway.

[2] Grass runway, 855 m x 70 m, LDA 785 m.

2 - ADDITIONAL INFORMATION

2.1 Site and wreckage information

The glider came to rest approximately 300 m from the threshold of runway 36. The lower section of the nose fuselage was damaged. The horizontal tailplane was punctured in the area of the elevator control.

It was noted that there was no elevator movement when the control stick was moved. The other two flight controls were functional. The elevator control was found disconnected at the point where it connects to the control surface at the top of the fin.

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2.2 Pilot's statement

The 66-year-old pilot held a glider pilot licence issued in July 2017. She had logged about 175 flight hours, including 33 hours on the SZD-51 and 5 h 30 min in 2019.

The pilot indicated that she had completed a flight of about 40 minutes on F-CAJC just before the accident flight. When she could not find any uplift, she cut the flight short. On integrating the aerodrome circuit, she considered that she could no longer reach runway 36 and landed on runway 18. She was then helped to move the glider to threshold 36. During this flight, she did not observe any abnormal behaviour on the glider. She added that, during the pre-flight inspection, she visually checked for correct deflection of the control surfaces by actuating the flight controls and did not note anything unusual with them. She did not re-check the flight controls before taking off from runway 36 a few minutes after landing. She stated that she had not been taught to conduct any specific checks on the elevator control on the SZD-51.

She added that there was little wind that day and the air was not turbulent.

2.3 Glider information

The SZD-51 is a single-seat glider that was certified in 1984. The club operates only one glider of this model. It is mainly used by pilots who have just been licensed and have little experience.

2.3.1 Re-assembly of the glider

The club's technical manager said that for the purposes of an event, the hangar had been vacated and the club's 13 gliders disassembled. Once the hangar was available again, he scheduled for the gliders to be reassembled over three consecutive days. He said that the three people who usually help with the reassembly were not available and that he called on the help of other volunteers. He added that there was no particular time pressure involved.

On the first day, five gliders were re-assembled, including F-CAJC. The operations were supervised by the technical manager. The latter indicated that, as far as F-CAJC was concerned, he personally assembled the wings and fitted the tailplane. He did not supervise the rigging of the elevator. He added that he always assists with the checking of the controls after assembly. This operation is done in pairs, with one person at the cockpit control and one at the control surface. However, he stated that he did not visually check that the connection was locked in properly.

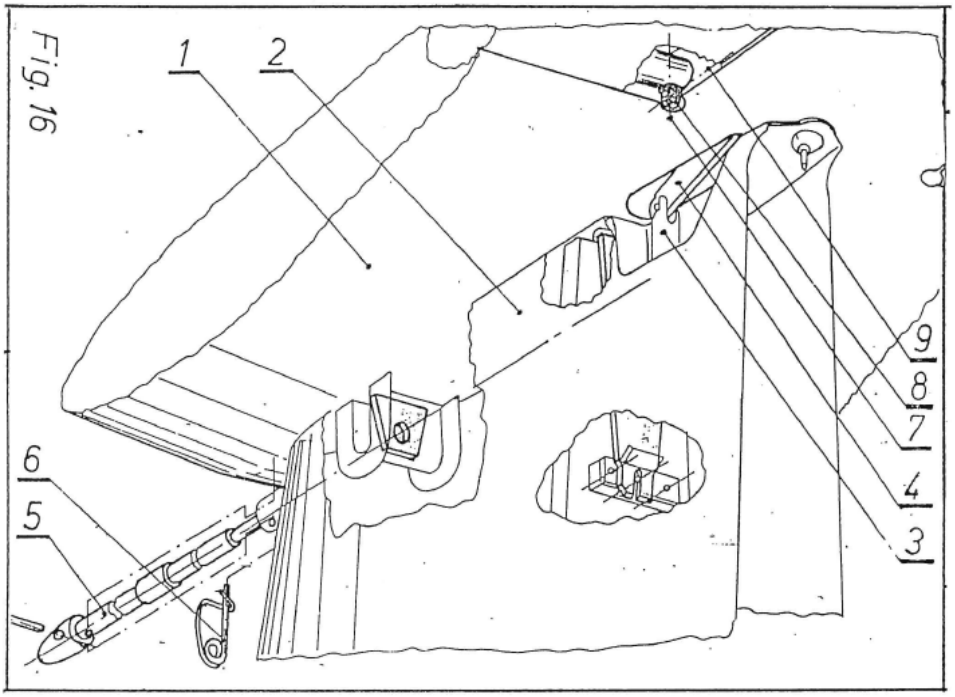
The technical manager stated that the control surface connection on SZD-51 is uncommon and is the only one of its kind among the club's gliders. He said that it was not easy to check that it is properly locked in.

F-CAJC had not flown between the date of its re-assembly and the day of the accident.

2.3.2 Rigging tailplane

The tailplane is a single unit. The procedure for rigging the tailplane in the SZD-51 maintenance manual is as follows:

- ❒ push the trimming control all the way forward;
- ❒ fit the tailplane (1) to the fin (2);
- ❒ assemble the quick-release end (3) and the elevator lever (4), and then lock with the sleeve;
- ❒ position the elevator and insert the bolt (5) into the hole in the leading edge of the fin;
- ❒ lock with the safety pin (6).



1/ horizontal tailplane 2/ fin 3/ quick-release end 4/ elevator lever 5/ bolt	6/ safety pin 7/ bolt 8/ nut 9/ cotter pin

Source: maintenance manual

Figure 1: Rigging tailplane

2.3.3 Examination of elevator control system on F-CAJC

After the accident, the elevator control system was found to be disconnected between the quick-release end (3) and the elevator lever (4).

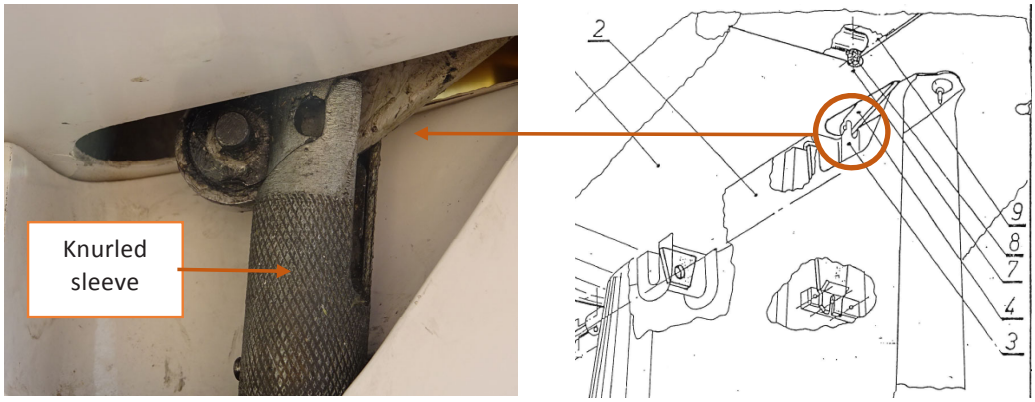


Figure 2: Disconnected elevator control

The sliding tests performed on the knurled sleeve of the quick-release end did not reveal any anomalies. The sleeve slid effortlessly when the bolt of the elevator lever was not inserted.

A spring system is used to stop the sleeve from sliding. The system is similar to an umbrella opening spring. This spring must be pressed down to allow the sleeve to slide.

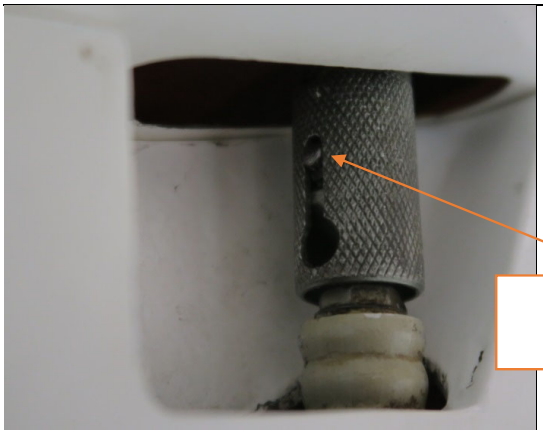


Figure 3: Sleeve slid to the bottom of the quick-release end (not locked)

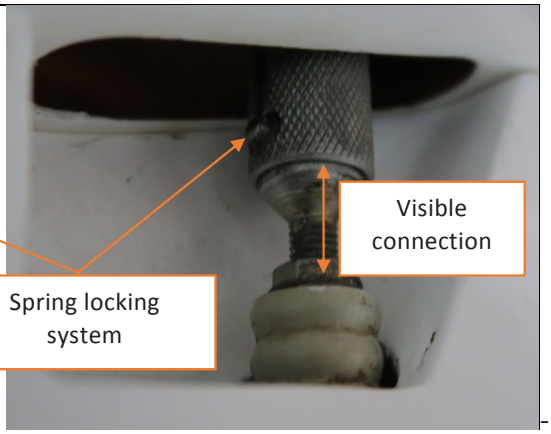


Figure 4: Sleeve slid to the top of the quick-release end (locked), connection visible

The photos show that when the sleeve is correctly slid to the top and locked, the end piece to control tube connection is visible.

A detailed examination of the lever bolt found that the two washers on each side of the lever, which are integral to the bolt, were both distorted.

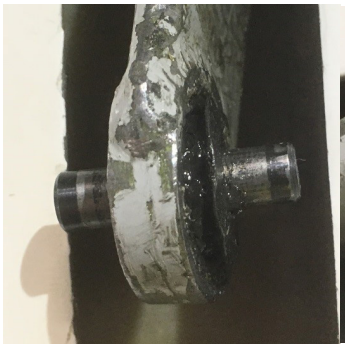


Figure 5: End of the left side of the lever

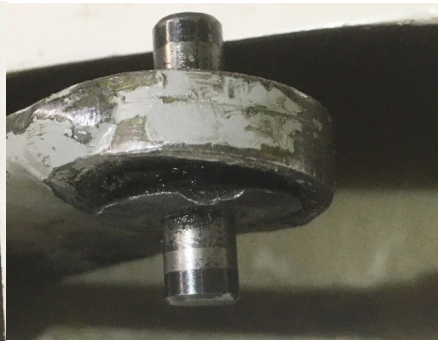


Figure 6: End of the right side of the lever

These distortions may prevent the sleeve from sliding up and down when the lever bolt is in place. The technical manager indicated that he had never had any particular difficulty sliding this sleeve. It is possible that the worst of the damage seen on the washers was caused by the interaction between the sleeve and the elevator lever during the hard landing.

Several complete rigging tests were carried out. No defects with respect to the connection and locking system were found, apart from the hindrance caused by the distortion of the washers.

Figure 7: Positioning elevator lever bolt on quick-release end (sleeve in the down position)

Figure 8: Connection made between elevator lever bolt and quick-release end (sleeve in the down position)

Figure 9: Connection made and sleeve locked with the spring system in its up position (secure connection)

If the sleeve is not fully slid to the top, it is not locked by the spring system and can slide down, thus disconnecting the connection between the quick-release end and the lever.

3 - CONCLUSIONS

The conclusions are solely based on the information which came to the knowledge of the BEA during the investigation. They are not intended to apportion blame or liability.

Scenario

When reassembling the glider, the rigging of the elevator control was not properly secured. As the pilot had not received any specific training on this system, she was unable to detect this anomaly during the pre-flight checks. The control probably disconnected during the flight leading to the pitch control difficulties reported by the pilot. Under these conditions, the pilot was unable to flare correctly and the glider hit the runway hard with a nose-down attitude.

Contributing factors

The reassembly of the glider took place at the club under unusual circumstances. All the gliders had been disassembled and the club had to call on the help of different volunteers to those who usually performed the reassembly operations. The following factors may have contributed, in this context, to the incorrect securing of the elevator control connection:

- an uncommon type of connection, the locking principle of which was probably not well known to those who connected up the control surface;
- failure by the person who supervised the reassembly to check that the connection was secured.

Safety lessons

In 2019, the European Aviation Safety Agency (EASA) published a safety information bulletin (SIB No. 2019-07) on good practices for sailplane rigging. This bulletin, which was only published in English, was adopted and translated into French in the June 2019 edition of the publication Actions Vitales[3] by the French Gliding Federation (FFVP). This document recalls the importance of being familiar with the type of glider, especially for older gliders. It is also specified that after assembly, the checks should include securing the connections (cotter pin or other system). It is mentioned that connections that are not properly secured cannot be detected by positive control checks. The proper securing can be verified only by a manual inspection through turning, pulling or shaking the bolt and further visual inspection. Several types of connections and locking systems are described in this SIB, but the system used on the SZD-51's elevator is not one of them. As a result of this accident, EASA has planned to updat

[3] https://www.securitedesvols.aero/images/articles/2019/initiatives/FFVP/ActionsVitales/Actions10.pdf