ACCIDENT

Aircraft Type and Registration:	Schleicher AS-K 13, G-DCMK	
No & Type of Engines:	None	
Year of Manufacture:	1975 (Serial no: 13305)	
Date & Time (UTC):	12 August 2022 at 1054 hrs	
Location:	Troed yr Harn, Talgarth, Powys	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - 2 (Serious)	Passengers - N/A
Nature of Damage:	Destroyed	
Commander's Licence:	BGA Instructor rating (Full)	
Commander's Age:	71 years	
Commander's Flying Experience:	7,099 hours (of which approximately 2,500 were on type) Last 90 days - 42 hours Last 28 days - 6 hours	
Information Source:	AAIB Field Investigation	

Synopsis

A student and his instructor were taking off under aerotow on an instructional flight when the tow rope detached from the glider. The instructor took over control and landed the glider in a nearby field. Both pilots sustained serious injuries but have since recovered.

The tow release had been modified, but not in a way that would have contributed to the occurrence, and the investigation was not able to determine with certainty any causal factors that would have resulted in a premature release from the tow.

History of the flight

The pilot of the glider was conducting an instructional flight from Talgarth airfield, with the aim of bringing the student to solo standard. They had flown together previously and the pilot reported the pre-flight preparation and briefing was all completed by the student to a satisfactory standard, with a particular focus paid to rigging and control connections. The weight and balance of the glider was assessed and within limits. The pilot and student discussed that it would be a crosswind takeoff under aerotow and agreed in the event of a launch failure that they would consider if a return to the airfield was a safe option; otherwise they would select a suitable field.

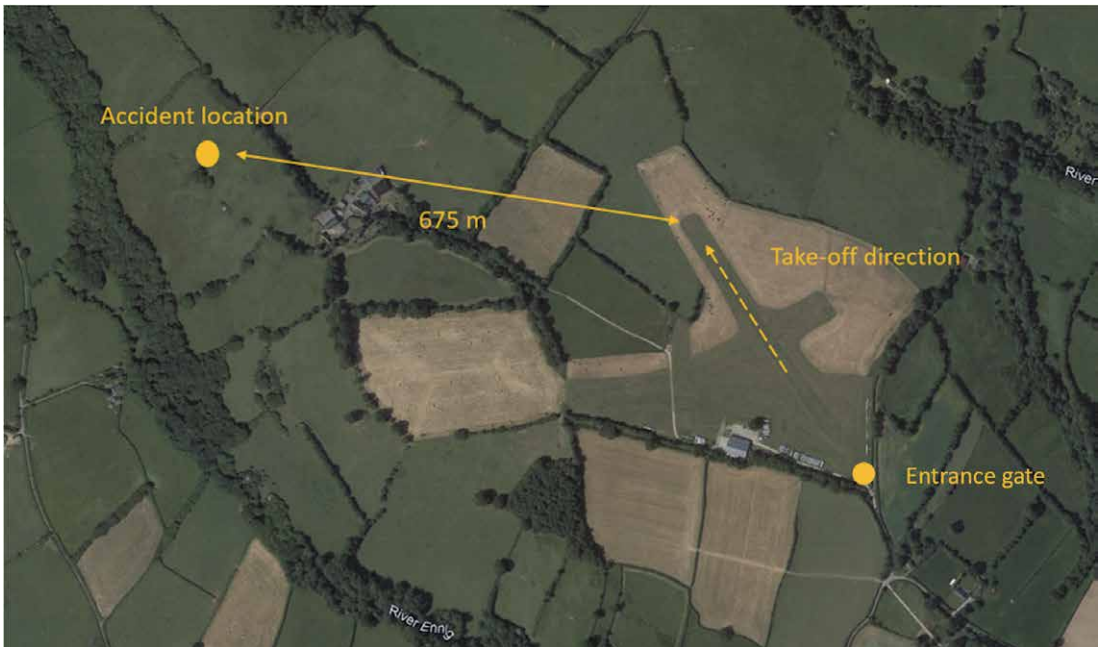

Figure 1

Takeoff run and accident location

The student was the handling pilot and the intention was to depart in a north-westerly direction (Figure 1), remain connected to the aerotow until 1,500 ft agl before tow release, then rejoin a left hand circuit to land in a north-easterly direction. The pilot intended to make minimal inputs and the student was expected to make all radio calls. The pilot noted the student was close to solo standard but needed to focus on his use of the airbrake during the approach.

Pre-takeoff checks were carried out as normal, and during the takeoff run the pilot recalled keeping his hand on the release knob until he was confident the student had aileron control. He then removed his hand from the release knob to avoid inadvertent inputs. The student recalled keeping his hand on the release knob throughout the takeoff roll, in line with BGA guidance[1].

The ground run was slightly longer than normal, likely due to a crosswind, high temperature and takeoff weight. The glider became airborne before the towing aircraft and began to climb. Moments later the student called out that the tow rope had detached from the glider. The pilot could see the rope trailing the towing aircraft. The student stated that although he could not be certain, he did not recall pulling the release knob and would have no reason to have done so.

The pilot took control and began to look for possible landing sites. He turned left towards lower ground, but he recalled the glider was quickly at tree height so his options were limited.

Footnote

[1] BGA Safe aerotowing booklet states '*during the ground run, the glider pilot should have their left hand on the cable release'*.

He could not identify an area suitable for a safe landing and continued flying between trees before a field came into sight to the left of the glider that had a favourable slope and long grass. The pilot turned towards the field, during which both he and the student spotted electricity cables, and the glider hit the ground. The student exited the glider immediately, while the instructor remained in the cockpit.

The glider was damaged beyond repair. Both the pilot and student sustained spinal injuries.

Aircraft information

General

The Schleicher AS-K 13 is a two-seat glider, commonly used for training. G-DCMK was purchased in June 2017 by the gliding club and was maintained by its members. The K 13 was designed to have two tow releases fitted, the first in the nose for aerotowing and a second "belly hook" under the fuselage, primarily for winch launching. At some point in the glider's history the belly hook was removed and replaced with a light spring to maintain the cable tension through the guides. This would not have affected the operation of the nose release.

Figure 2
G-DCMK

Nose tow release

The nose tow release fitted to G-DCMK at the time of the accident was a Tost E72, serial number 18058 (Figure 3 left). Figure 3 right shows a sectioned E85 tow release, which differs from an E72 in having a cast instead of welded housing. The tow release comprises the housing, adjustment screw, hook, link piece, release lever and a spring.

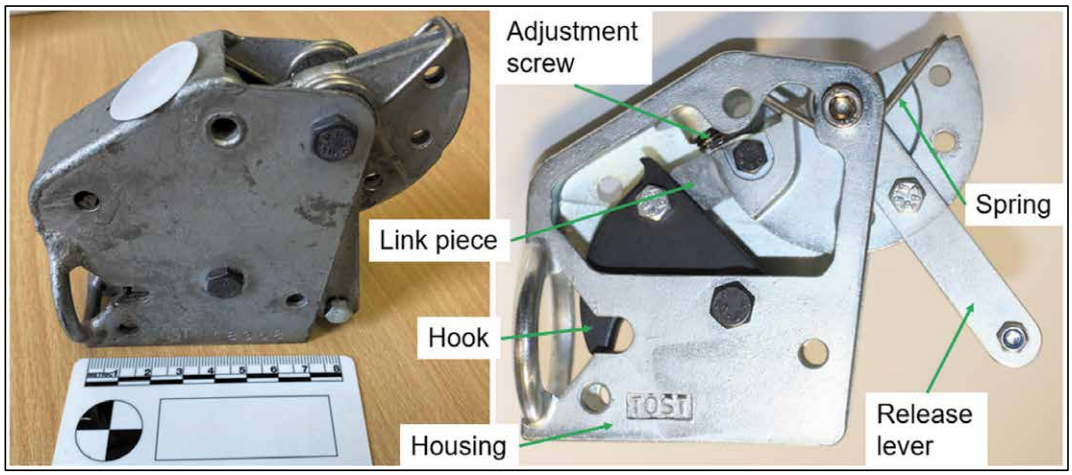

Figure 3

Left – Tost E72 tow release fitted to G-DCMK
Right – Example E85 tow release. Internal mechanism similar

It was operated by either pilot pulling on a plastic release knob attached to a steel cable in the cockpit (Figure 4 left and right). The steel cable passed through a series of guides and was attached to the release lever (Figure 4 centre), and another cable attached to the release lever continued under the cockpit area to the belly hook.

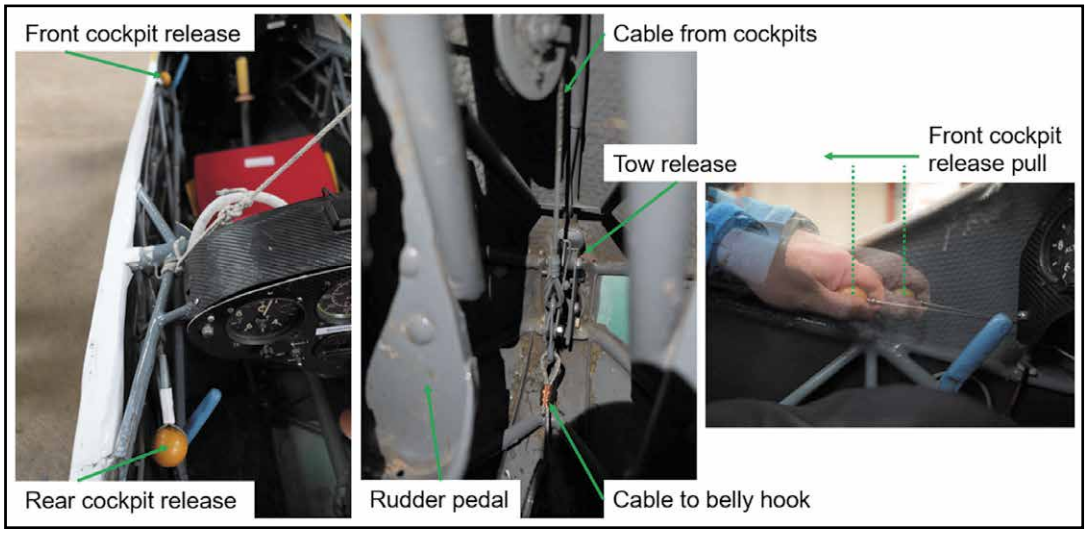

Figure 4[2]

Left – Cockpit releases
Centre – Cable attachments to the tow release
Right – Front cockpit showing the movement of the knob to release the tow cable

Footnote

[2] Note that all the images used in Figure 4 are from an exemplar aircraft and not from G-DCMK.

When the release cable is pulled the release lever rotates (counter-clockwise), against the spring tension, pulling the link piece and opening the hook, thereby releasing the tow ring.

The over-centre position of the mechanism is adjusted by the adjustment screw against the release lever. This adjustment screw is set at the factory and sealed with a security sticker. Incorrect setting of the screw may result in higher loads and a longer pull required to operate the hook mechanism and release the tow.

A previous report of an uncommanded nose tow release on this glider was investigated at the time by club members. No cause could be found for the uncommanded release and the E85 tow release was replaced as a precaution on 17 June 2022. The same replacement tow release was fitted to the aircraft at the time of the accident flight.

Aircraft examination

The AAIB inspected the glider and the tow rope at the gliding club and found no anomalies with the tow rope or rings. The front of the glider was disrupted and had been partially disassembled. It was found that one of the cockpit cable guides which was integral with the left mounting for the instrument panel, had detached from the fuselage. The tow release had been removed from the glider, so it was not possible to test the function of the tow release system.

The tow release was examined by the manufacturer, which noted that the white round sticker on the housing was not the security sticker applied by the factory (Figure 5 left). The sticker was removed and it was found that the over-centre adjustment screw had been removed (Figure 5 right).

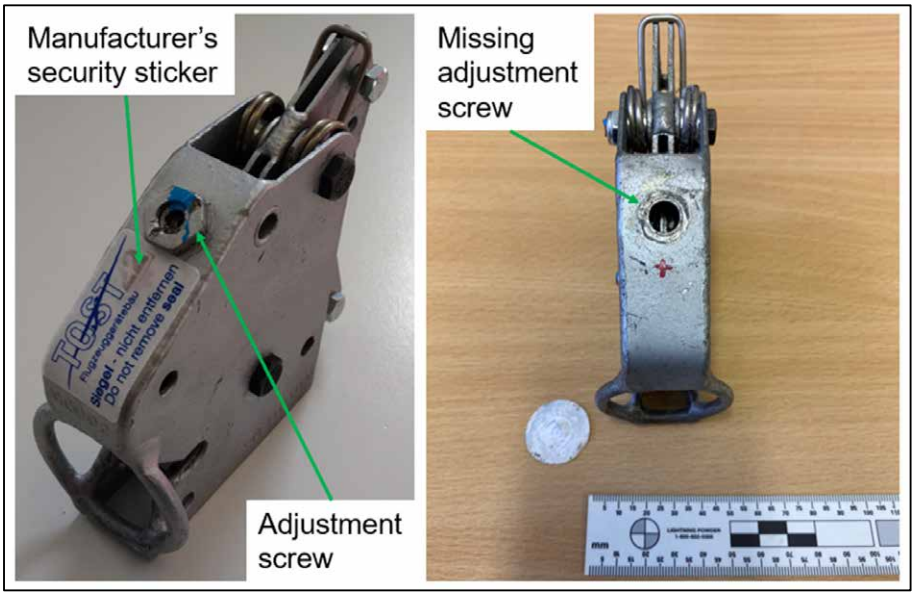

Figure 5

Left – Example of an E72 tow release as supplied from the manufacturer
Right – White round sticker removed showing missing adjustment screw

It was stated to the investigation that while installing it following the June 2022 incident, the replacement tow release would not fit because the adjustment screw fouled against the structure. To enable the release to be fitted the adjustment screw was removed. The tow release that was removed was an E85 which has a recessed adjustment screw as shown in Figure 3 right.

The AAIB was informed that the gliding club had performed its own investigation into possible causes for the premature release. It had considered several options and performed testing on another K 13 glider. These tests indicated that there was sufficient clearance to ensure that the front pilot's feet on the rudder pedals could not inadvertently pull the release cable and open the release hook.

Meteorology

At the time of the accident there were clear skies, a light north-easterly wind (less than 10 kt) and a temperature of 25°C.

Aerodrome information

The gliding club is located at Talgarth airfield, on the western edge of the Black Mountains in South Wales. The airfield has a number of grass runways, which provide three takeoff and five landing options. The airfield elevation is 970 ft amsl.

The takeoff run in the north-westerly direction is the longest available, sloping downhill from the entrance gate.

The airfield is surrounded by hilly terrain and there are limited options for forced landing sites in the event of low level disconnects from aerotows for gliders, or engine failures for powered aircraft.

Analysis

The examination of the tow release revealed that the over-centre adjustment screw had been removed from the housing. The adjustment screw is set by the manufacturer and sealed before delivery. The tow release is a certified, safety critical part and is supplied with an EASA Form 1. No modification or adjustment of this component is permitted except by qualified persons. No one at the gliding club was qualified to modify the tow release.

The adjustment screw on the E72 tow release was proud of the housing and prevented it from being fitted when the tow release was changed on 17 June 2022 following a previous uncommanded release. The adjustment screw of the E85 tow release which was removed from the glider during that change was recessed into the housing, so the problem only arose when the E72 was fitted. The removal of the adjustment screw would have increased the loads required to open the tow release hook and need a longer pull on the tow release cable, so would not have caused inadvertent release. The tow release manufacturer informed the AAIB that a special version of the E72 with a recessed adjustment screw is available.

It was not possible to determine whether detachment of the cable guide and panel mounting was a pre-existing defect or a result of the accident. If it were a pre-existing defect, it is unlikely to have caused an inadvertent release due to movement of the instrument panel because the panel is attached by an additional two bolts. It was found that if a tall pilot could push against the panel with their knees the resulting movement would not be sufficient to release the hook. Furthermore, any misalignment would cause additional friction, thereby increasing the load required to pull the release cable.

It was not possible for the investigation to establish if there was a technical issue with the complete tow release system (release knob to hook) that could have led to a premature release.

It is possible that the pilot or student inadvertently moved the tow release. Whatever the cause of the release, given the low level at which the glider disconnected from the aerotow, the pilot had to identify the safest landing site almost immediately.

Conclusion

The evidence available was not sufficient to determine conclusively why the tow rope disconnected from the glider. An inadvertent input on the release knob or an unidentified mechanical failure of the tow release system could not be ruled out.

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