

Accident

Aircraft Type and Registration:	Flylight Nine, G-CMRF	
No & Type of Engines:	1 Polini 303 piston engine	
Year of Manufacture:	2023 (Serial no: DA275)	
Date & Time (UTC):	17 November 2023 at 1405 hrs	
Location:	Darley Moor Airfield, Derbyshire	
Type of Flight:	Private	
Persons on Board:	Crew – 1	Passengers – None
Injuries:	Crew – None	Passengers – N/A
Nature of Damage:	Significant damage to right wing and propeller.	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	70 years	
Commander's Flying Experience:	545 hours (of which 457 were on type) Last 90 days – 44 hours Last 28 days – 13 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by AAIB.	

Synopsis

During flight, the rear base bar control wires disconnected from the wing keel tube when the securing bolt dropped out of the keel tube. The pilot managed to land the aircraft, but the right wing and propeller were severely damaged. The manufacturer has issued replacement bolts, castellated nut and cotter pin, updated the design drawings and added a pre-flight check of the keel fitting to the Pilot's Operating Manual.

History of the flight

Approximately five minutes after takeoff, the rear base bar control wires became detached when the attachment bolt fell out of its fitting at the rear of the keel tube. The pilot quickly realised what had happened and applied back pressure on the base bar to create tension on the front base bar wires to keep the aircraft aerodynamically balanced. Without the rear attachment lines, the pilot could only apply limited control of the pitch of the wing using the control wires attached to the nose. The engine was not shut down at this point for fear of unbalancing the aircraft. The pilot carefully turned the aircraft back towards the airfield, which was only a mile away, as he considered this the best option for landing safely. The weather conditions at the time were calm, which assisted him to keep the aircraft stable with minimal movement of the base bar during the approach. The aircraft touched down on the soft, boggy runway. The aircraft landed flat but it was nose heavy, therefore, once lift was lost on landing, the base bar control wires went slack and the wing fell forwards. Loss of

the rear attachment wires meant the base bar was free to pivot on its keel tube fitting which allowed the right wing to fold around the rigid main post and foul the propeller. The aircraft came to a stop, the engine was shut down and the pilot egressed with no injuries. The right wing and propeller were badly damaged.

Aircraft information

The Flylight Nine is a Single Seat Deregulated (SSDR) aircraft¹ and was one of only two newly designed flexwing microlights under trial. The manufacturer stated that they follow BCAR Section S requirements as closely as possible when designing their machines despite their SSDR status.

Aircraft examination

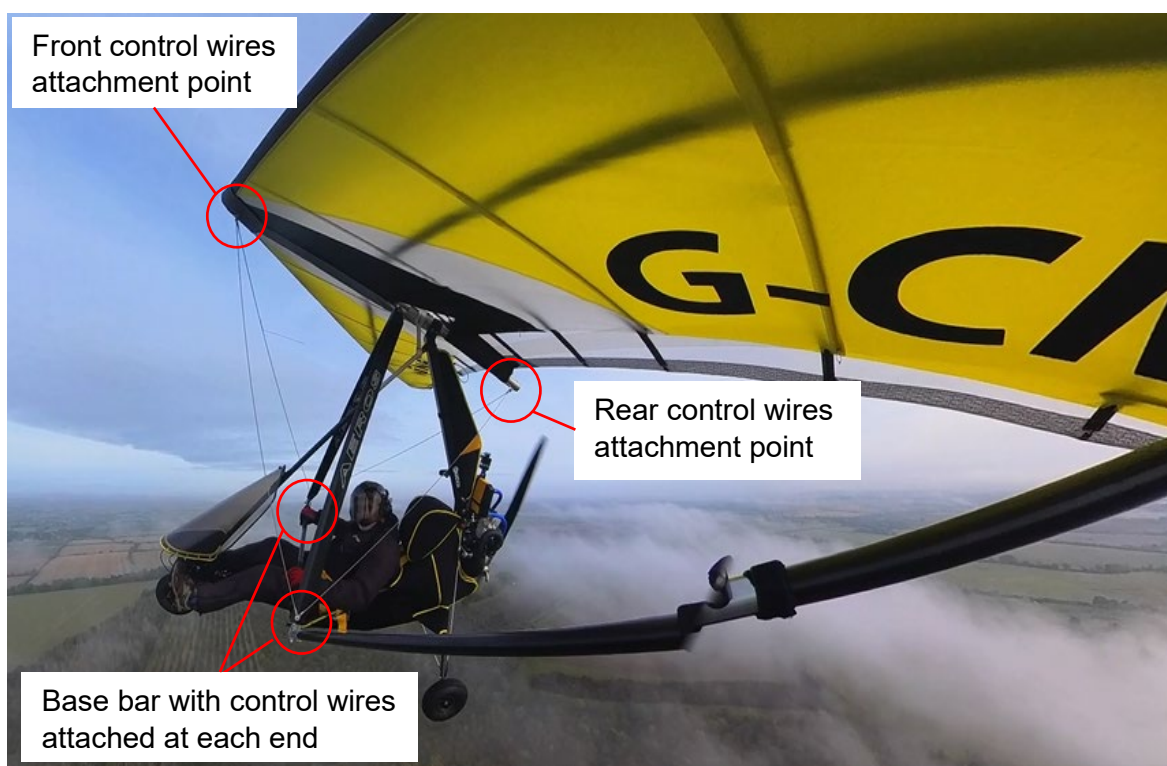


Figure 1

Image from an onboard camera showing base bar cables attached.

Examination of the keel tube after the landing found that the bolt and nyloc nut² securing the rear control wires to the keel tube were missing. As the aircraft was a new product, cameras had been fitted to record the flight. Video footage showed the moment where the rear control wires slackened indicating that they had detached from the keel tube.

Footnote

¹ 'In the UK, unlike two-seat Microlights, single-seat Microlights do not require a Permit to Fly, and as such are unregulated with regard to the airworthiness of the aircraft.' British Microlight Association Technical Information Leaflet number 045, issue 4, 'Single-seat Microlights', dated January 2018.

² Also referred to as a nylon-insert lock nut. It is a nut with a nylon collar insert designed to elastically deform over the threads of a bolt as it is tightened, thereby resisting unwinding from the bolt during use.

Pictures of the aircraft that were taken soon after construction was completed showed that the bolt, which was fitted to the underside of the keel tube, was secured by the nyloc nut on top of the tube but there was only one thread visible protruding from the nut³. The nut and bolt must have been present during the pilot's pre-flight inspection because the rear cables would not have been connected and it would have been immediately noticeable that the wires were slack. Moreover, the pilot would not have been able to use the base bar to adjust the angle of the wing during taxi, takeoff and flight. Figure 1 shows the rear cables still connected between the base bar and the keel during the accident flight. It was likely that the nut vibrated loose and, as a result, the bolt fell out due to vibration and gravity.

The manufacturer has replaced the bolt with a longer variant and the nyloc nut with a castellated nut and cotter pin, (Figure 2). They updated the design documents for the aircraft to reflect this change and added the requirement for pilots to specifically check this fitting during their walk-round check in the Pilot's Operating Manual.

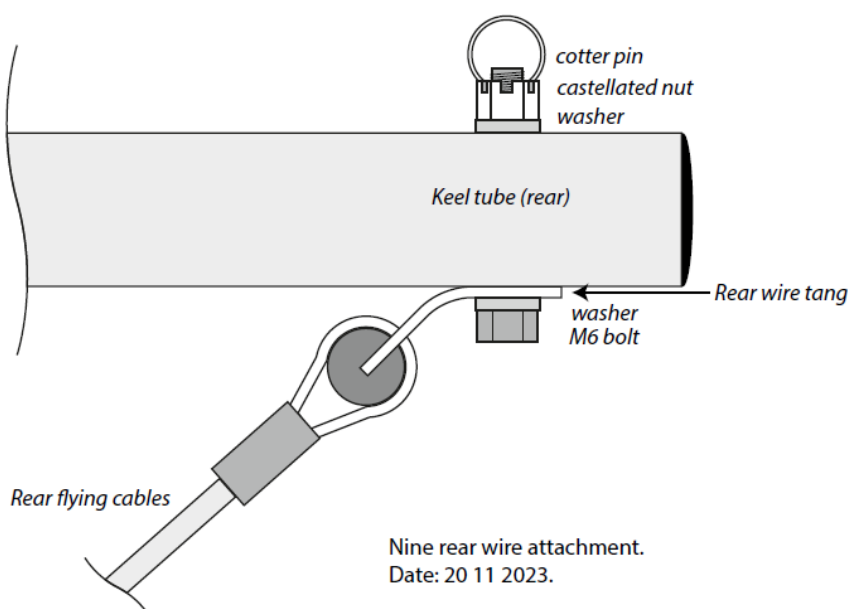


Figure 2

Diagram showing replacement castellated nut and cotter pin.

Conclusion

Failure of the nyloc nut and bolt that secure the base bar's rear control wires to the wing keel tube caused the wires to detach during flight. Despite the potential for aerodynamic instability, the pilot landed the aircraft successfully but the wing and propeller were badly damaged in the process. The manufacturer has issued longer replacement bolts and replaced the nyloc nut with a castellated nut and cotter pin and added the requirement for pilots to specifically check this fitting during their walk-round check in the Pilot's Operating Manual to prevent a recurrence.

Footnote

³ An engineering industry rule of thumb is that there should be two threads protruding through the nut to ensure all threads in the nut are engaged.