

Accident

Aircraft Type and Registration:	Rans S6-ES, G-BZKO	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2000 (Serial no: PFA 204-13564)	
Date & Time (UTC):	26 February 2024 at 1400 hrs	
Location:	Newtownards Airport, County Down	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - 2 (Minor)	Passengers - N/A
Nature of Damage:	Shattered windscreen and skylight. Right door damaged and cuts in the Dacron fuselage covering	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	75 years	
Commander's Flying Experience:	7,627 hours (of which 10 were on type) Last 90 days - 51 hours Last 28 days - 24 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further AAIB enquiries	

Synopsis

The examiner landed the aircraft successfully after the windscreen and skylight assemblies shattered and detached in flight. The cause was not determined but photographs indicated that the skylight installation did not comply with the aircraft build manuals. There is no definitive link between this anomaly and the failure, but this accident is a good reminder to be prepared for the unexpected and to concentrate on maintaining control of the aircraft.

The Light Aircraft Association (LAA) will publish an article highlighting the effects of startle and the need to comply with aircraft manufacturer's construction drawings and assembly methods.

History of the flight

The aircraft had recently undergone an annual check, and the flight was a general skills test to revalidate the owner's licence. The flight was uneventful until the windscreen and skylight shattered without warning shortly after the aircraft recovered from an intentional spiral dive. This startled both pilots, and the in-rush of air blew their headsets off, preventing them from communicating verbally. The examiner checked that the aircraft was controllable and indicated his intention to return to the airfield, which was approximately 10 miles away. The aircraft owner managed to recover the examiner's headset from the baggage compartment, and he made radio calls to the airfield every 30 to 60 seconds. He used his

jacket to shield the microphone against the effect of the wind and, as they got closer to the airfield, they could see the emergency services were prepared for their arrival. The landing was successful, and both occupants were helped from the aircraft having sustained minor injuries. No third parties were reported to have been injured.

Aircraft examination

The owner said that the windscreen and skylight broke into numerous pieces and the majority had departed from the aircraft. The right door was damaged, and the Dacron fuselage material was torn in a few areas where it had been hit by broken parts. Figures 1 and 2 show the aircraft and some of the damage after landing.



Figures 1 and 2

Broken windscreen and torn fuselage coating

The owner's headset was reported to have been found in the rear fuselage, having apparently entered through a hole in the damaged fuselage cover. The owner visited the area where they had been flying and recovered several broken parts from the ground. He said there were no obvious indications of a bird strike.

Aircraft history

The aircraft was first registered in 2000, and the current owner purchased it in 2017. It was repaired by an agency which used LAA inspectors after a forced landing in the same year, and it was returned to the owner in 2018. The invoice showed that the repairs included a replacement skylight and the part number indicated that this was an original equipment manufacturer's part. The owner said the aircraft had accrued around 250 flying hours since the repairs.

Windscreen and skylight information

The windscreen and skylight assemblies are made of Lexan¹. The current aircraft parts catalogue and the build manual show the assemblies are rivetted to the aircraft framework, but 'sandwiched' between foam strips and metallic trim strips (Figure 3). The trim strips under the rivet heads spread the loads over a larger surface area, which reduces the risk of the Lexan cracking around the rivet holes. Photographs of G-BZKO after the accident showed that neither the foam strips nor the trim strips were fitted.

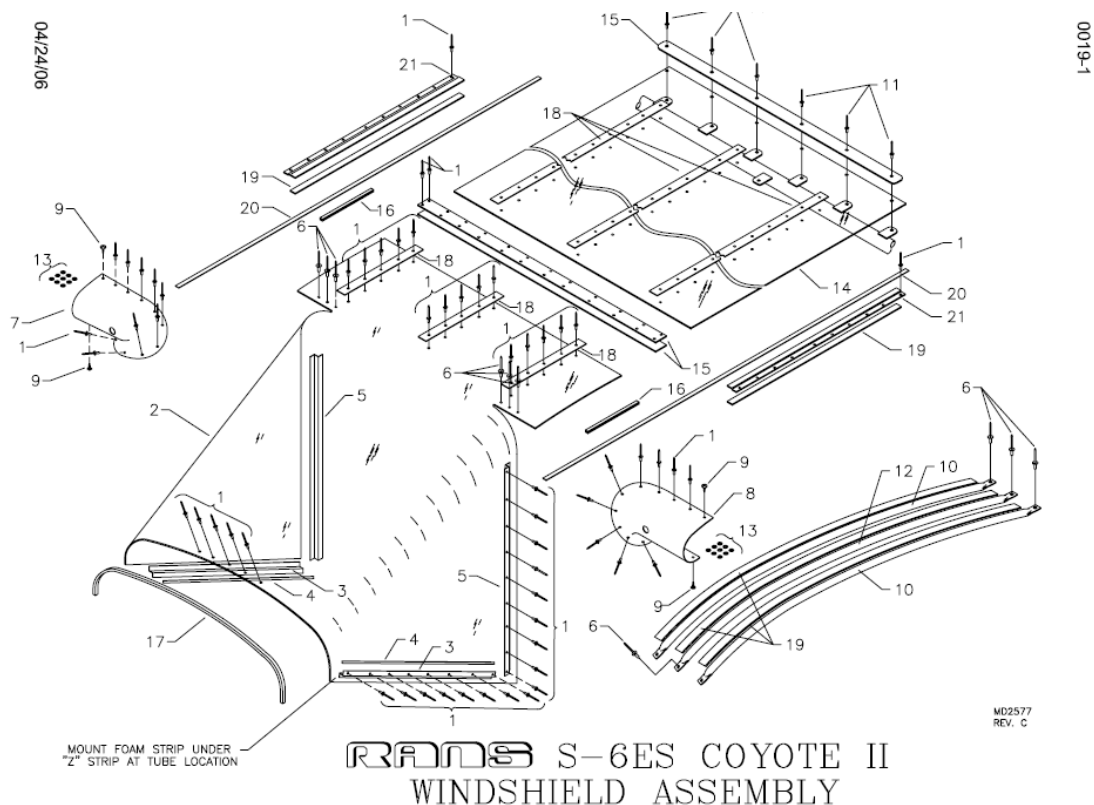


Figure 3

Parts catalogue showing the foam strips (items 19) and the trim strips (items 18)

A build manual from 1991 included a requirement for the foam strips, but there was no requirement for the trim strips. The aircraft manufacturer advised that the trim strips were introduced in 1995 when larger engines were installed, and cruise speeds increased.

Aircraft manufacturer's comments

The aircraft manufacturer said they were not aware of any similar failures in the Coyote aircraft series or any other models they produce with similar glazing installations. They suggested several factors that they believed could contribute to such a failure. These included incorrect rivet hole size, incorrect or embrittled glazing material, incorrect rivets, operating outside the specification (weight and engine performance) and fuel / solvent spills. The aircraft build

Footnote

¹ Lexan is a brand name for a specific polycarbonate product.

manual contains a cautionary note in the general information section: “*CAUTION: Do not allow fuel, acetone, lacquer thinner or Loctite to come in contact with the Lexan glazing. These and some other solvents will destroy the Lexan.*”

LAA's records

The LAA had no records of previous failures in the UK Coyote fleet, or other similar type of aircraft.

Analysis

The indications are that the pilots worked well together after the initial startle effect with the examiner concentrating on flying the aircraft whilst the owner did his best to alert the airfield of their problem. Using a jacket to protect the microphone from the effects of the wind blast may have helped to make the transmissions clearer to personnel at the airport.

Neither pilot could discount the possibility of a bird strike, but there was no obvious evidence. Similarly, the possibility of the windscreen shattering for another reason could not be discounted. Photographs showed that foam strips and trim strips, intended to reduce localised stresses in the acrylic, were not fitted. The trim strips were introduced in 1995, but the foam strips were a requirement from the original design. The absence of the foam strips could potentially have contributed to the failure if their omission caused localised cracking in the Lexan.

Conclusion

The windscreen and skylight shattered during the flight for an unknown reason. The pilots were startled but were successful in alerting the airfield before completing a successful landing. This accident is a reminder of the importance of being prepared for the unexpected and concentrating on maintaining control of the aircraft.

Safety promotion

The LAA will publish an article in their Light Aviation magazine to highlight the potential consequences of a windscreen shattering in flight, and the need to comply with manufacturer's construction drawings and assembly methods.