

ACCIDENT

Aircraft Type and Registration:	Rans S6-ESD XL (Modified), G-MZNV	
No & Type of Engines:	1 Rotax 503-2V piston engine	
Category:	1.3	
Year of Manufacture:	1998	
Date & Time (UTC):	8 May 2005 at 1645 hrs	
Location:	1 mile NE of Kingsclere Mast, Hampshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Right cockpit door detached in flight, minor damage to right wing and tailplane	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	53 years	
Commander's Flying Experience:	350 hours (of which 303 were on type) Last 90 days - 8 hours Last 28 days - 3 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The lock nut on the right door forward attachment/hinge bolt came off, allowing the bolt to migrate out and the door to fall from the aircraft. The door struck the airframe damaging the underside of the right wing and leading edge of the tailplane.

History of flight

Ten minutes after departing Brimpton Airfield, the pilot heard a loud bang and the right door disappeared. The aircraft was slowed to 60 mph and, as the handling felt normal, the pilot informed Brimpton of the situation and returned to the airfield where he made an uneventful landing.

Inspection

The aircraft is constructed from a tubular frame covered in fabric. Two tears were discovered in the fabric after this event, one approximately 50 mm in length on the underside of the right wing, the other approximately 20 mm long in the fabric covering the leading edge of the right tailplane. The forward door hinge (Figure 1), which is welded to the tubular airframe, was undamaged, whereas the rear door hinge had broken off. Whilst the lock nut for the door forward attachment bolt was found on the cockpit floor, the attachment bolt itself, the right door, its rear hinge, attachment bolt and lock nut were never recovered. The aircraft owner stated that the door attachment bolts, which had been supplied by the

manufacturer with the aircraft construction kit, had never been disturbed since the aircraft was built 322 flying hours prior to the incident. The owner, however, did recall that he had fitted additional washers between the hinge and door assembly in order to reduce excessive sideways movement of the door.

Following the incident the owner checked the security of the door attachment bolts on the left door and discovered that the protruding part of the bolt was almost flush with the end of the lock nut. The owner further stated that the door attachment bolts on three other Rans S6 aircraft at Brimpton were in a similar condition. The Popular Flying Association (PFA) subsequently undertook a random check of 10 aircraft and established that on nine, the correct door attachment bolts had been used with the thread protruding through the lock nuts by approximately

six mm. Shorter bolts had been used on the tenth aircraft; however, the bolts still protruded through the lock nut by approximately one and half threads, which the PFA considered to be acceptable.

Analysis

The presence of the nut on the cockpit floor, and undamaged front door hinge, indicated that the nut had come off the door attachment bolt thereby allowing the bolt to migrate from the hinge and door assembly. As the door would not now be attached at the forward position, air pressure would most likely have caused the door to move upwards and outwards, allowing the front door catch to unlatch. The door would then have continued to pivot about the rear hinge and latch, until the hinge failed and the door fell from the aircraft.

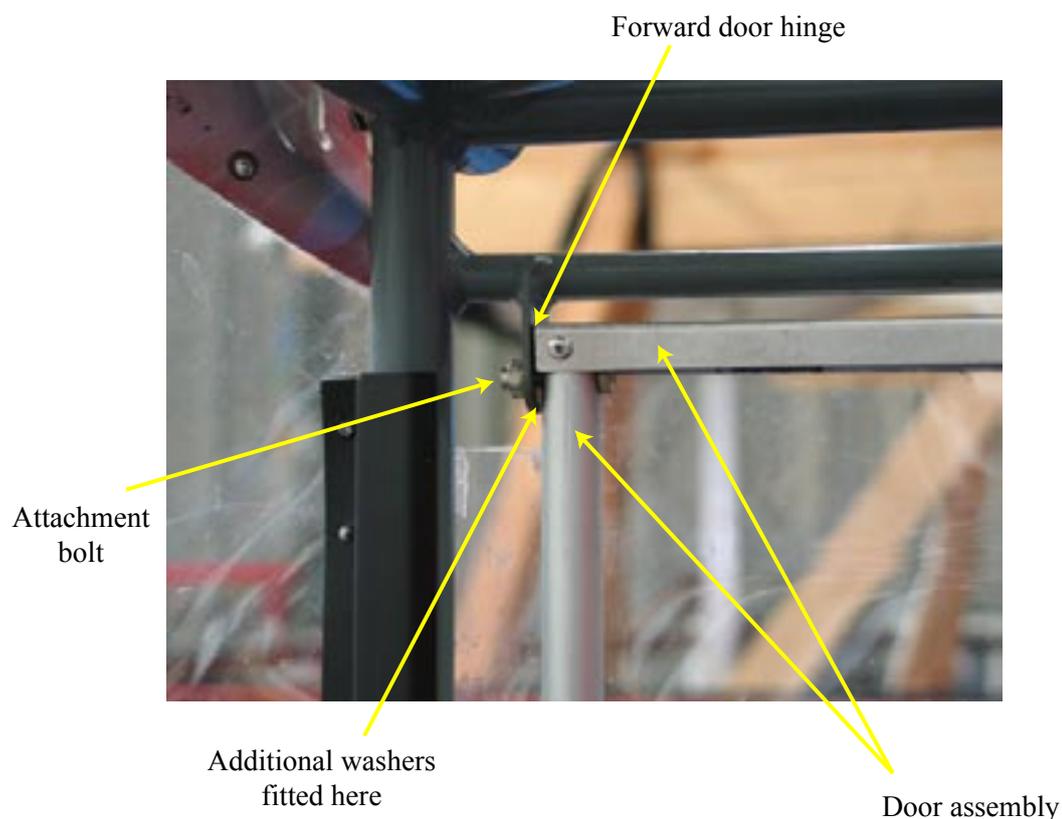


Figure 1
Door attachment arrangement on a similar aircraft

It was not possible to determine why the lock nut came off the front attachment bolt. The condition of the bolts on the left door suggests that the front attachment bolt on the right door might not have protruded through the lock nut sufficiently to ensure positive locking. Assuming that the correct length bolts were used, the need to fit additional washers to take out excessive sideways movement of the door suggests that the accumulation of manufacturing tolerances was such that the distance between the front and rear hinges might have been close

to the acceptable limit, reducing the amount of thread that would protrude through the lock nuts. Nevertheless, it was still incumbent on the individual assembling the aircraft and the Inspector undertaking the stage inspections to check that the bolts were 'in safety'. Since this incident, the PFA has authorised the owner to fit longer bolts that are secured with a castellated nut and split pin. The PFA has also taken action to advise its members, via the Association's magazine, of the dangers of not ensuring that nuts and bolts are fitted correctly.