

Druine D31 Turbulent, G-ARGZ

AAIB Bulletin No: 8/2003	Ref: EW/G2003/01/10	Category: 1.3
Aircraft Type and Registration:	Druine D31 Turbulent, G-ARGZ	
No & Type of Engines:	1 Volkswagen 1600 piston engine	
Year of Manufacture:	1961	
Date & Time (UTC):	11 January 2003 at 1520 hrs	
Location:	Headcorn Aerodrome, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Minor damage to undercarriage and mounting brackets	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	859 hours (of which 97 were on type)	
	Last 90 days - 3 hours	
	Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot, enquiries of maintenance engineer and examination of failed brackets	

The pilot reported that he had carried out an uneventful landing on the grass runway surface. The aircraft was then taxied clear and whilst moving on the grass taxi area the pilot heard a 'ping' like noise from under the inboard starboard wing. The starboard undercarriage leg folded forwards, the wing sank down and the aircraft rotated gently through 90 degrees about the wingtip. The pilot reported that he cut the magnetos as this occurred and the propeller did not strike the ground.

Examination of the damaged aircraft by the maintenance organisation revealed that failure of the attachment of the aft drag brace to the wing structure had occurred. The attachment consisted of a bolt passing through a pair of light gauge brackets, attached to a wing rib, which formed lugs protruding from the under-surface of the wing. The lugs of both brackets had failed. Examination of the components showed that they were of approximately 0.064 in thickness but they did not appear to be made of aircraft grade material.

The failures of the brackets involved considerable elastic deformation and there was evidence of long-standing wear. Discoloration of the failed area suggested that fretting had also taken place on both lugs. Although the precise mode of failure was not clear, it was considered probable that wear had increased the hole diameters and reduced the dimensions of the remaining lug material. It is possible

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that some elongation of the holes took place during previous landings or taxiing and the consequent weakening of the attachments was exploited during taxiing after the last landing.

The engineer responsible for the maintenance of the small fleet of D31 aircraft, of which G-ARGZ formed a part, noted that the brackets in this position on the other three aircraft were of 4130 steel to which 1/4 inch washers were brazed at the bolt holes which formed the lugs. This design distributed the loading and reduced both the wear rate and the stress concentration at the bolt attachment.

The aircraft type was a French design for which plans were available for home construction. A significant number of examples were, however, built by Rollason Aircraft and Engines in the UK and, according to the registration information, this aircraft falls into the latter category. In view of the age of the aircraft (42 years) it has not been readily possible to establish whether the brackets which failed were the original components. It is known that this aircraft suffered a landing gear collapse following a heavy landing in 1988 (see AAIB Bulletin 6/88) but the extent of the repair required after this previous event is not known.

The maintenance engineer tasked with repairing the aircraft proposes to manufacture new brackets from 0.064 in 4130 steel with washers brazed to the outside, similar to the corresponding designs on the other three machines of the fleet.