

Piper PA-34-200-2 Seneca, G-ELBC

AAIB Bulletin No: 3/2003	Ref: EW/G2001/09/21	Category: 1.3
Aircraft Type and Registration:	Piper PA-34-200-2 Seneca, G-ELBC	
No & Type of Engines:	Two Lycoming IO-360-C1E6 piston engines	
Year of Manufacture:	1972	
Date & Time (UTC):	20 September 2001 at 1205 hrs	
Location:	Stapleford Airfield, Essex	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Right main landing gear detached, right propeller and right wing damaged, right engine shock loaded	
Commander's Age:	64 years	
Commander's Flying Experience:	8,000 hours (of which 1,500 were on type)	
	Last 90 days - 97 hours	
	Last 28 days - 62 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, AAIB inquiries and examination of failed parts	

The accident occurred during circuit flying carried out by a student under instruction. The student's total flying experience on all aircraft types was 140 hours and he had accumulated 2.7 hours flying on the PA-34-200. The aircraft was operating from Stapleford Runway 04L, a 1,120 metre long grass runway that was dry at the time of the accident. The weather was good with a surface wind of 315°/8 kt (demonstrated crosswind limit 17 kt).

The student flew two circuits, which were described by the Instructor as well flown for the student's experience level. Both landing touchdowns were described as positive, but not heavy. During the take-off roll following the second landing the right main landing gear collapsed. The crew aborted the take-off and the aircraft slid off the right side of the runway before coming to rest. Both crew members, who were wearing lap and diagonal seat belts, vacated the aircraft via the normal right overwing exit without injury. There was no fire.

Examination of the aircraft (Serial Number 34-735002) by the flying clubs maintenance organisation found that the right propeller and right flap had suffered ground contact damage and the right wing had distorted, causing rippling of its upper and lower skins in places. The right main landing gear was found structurally detached from the aircraft, with both forward and aft attachment fittings fractured.

The main landing gear leg is attached to the aircraft by a trunnion assembly forming the upper part of the leg. Each of the two trunnion spigots is housed in a mount fitting assembly attached to the wing structure. This fitting is an aluminium alloy casting with an integral boss fitted with a spherical pintle bearing. Each fitting is attached to the aircraft by four bolts. The forward fitting is mounted on the aft face of the wing forward spar and the aft fitting is mounted on the forward face of a short rear spar forming part of the wing structure in the landing gear bay area.

Examination of available parts of the right gear mount fittings indicated that the forward fitting (Part Number (PN) 67041-1) had fractured horizontally approximately across its centre, releasing the pintle bearing. In the case of the aft fitting (PN 67043), a portion of the boss had been broken away, both lower mount bolt flanges had distorted and the outboard one had fractured across the bolt hole.

Both fittings exhibited slight ovalisation of the attaching bolt holes and, in the region of these holes, appreciable fretting of the surface of the mounting face in contact with the respective spar. In the case of the forward fitting the damage included extensive pitting of the surface. While some fretting damage is reportedly common on these surfaces, the damage in this case appeared to be more severe than usual, suggesting that at some stage the aircraft had operated with the fitting attachment bolts undertorqued. Piper Aircraft Corporation Service Bulletin No 956, issued 3 March 1992, required a torque check (50-70 in-lb) of the fitting attachment bolts every 100 flying hours. Replacement of the affected fitting was required for the PA-34200 Model of the Seneca if the torque of any of the bolts were found to be below 50 in-lb.

Evidence suggested that the trunnion had pivoted down and rearwards about the aft pintle, fracturing the forward fitting and causing the damage to the aft fitting. No evidence was found to indicate that the fretting damage found had been relevant to the failure, or that long term pre-existing cracking had been present at the time of the failure. Evidence indicated that the fittings had failed due to overload. Insufficient evidence was available however to determine the point at which the overload occurred.