

No: 10/92

Ref: EW/G92/07/15

Category: 1c

**Aircraft Type and Registration:** Piper PA-34-200 Seneca, G-TEST

**No & Type of Engines:** 2 Lycoming IO-360-C1E6 piston engines

**Year of Manufacture:** 1974

**Date & Time (UTC):** 19 July 1992 at 1906 hrs

**Location:** Cardiff-Wales Airport

**Type of Flight:** Private

**Persons on Board:** Crew - 1                      Passengers - 3

**Injuries:** Crew - None                      Passengers - None

**Nature of Damage:** Left maingear collapsed, damage to rear of left nacelle and adjacent wing structure

**Commander's Licence:** Commercial Pilot's Licence with Instrument rating

**Commander's Age:** 32 years

**Commander's Flying Experience:** 1,060 hours (of which 107 were on type)  
Last 90 days - 250 hours  
Last 28 days - 75 hours

**Information Source:** Aircraft Accident Report Form submitted by the pilot and failed component examined by AAIB

The pilot carried out a direct approach to runway 30 from overhead Cardiff city. As he began to turn for final approach the sun was directly in his eyes and he had difficulty seeing the runway. He used the localiser to assist his alignment but otherwise flew a visual approach. On landing the aircraft bounced three times but it was not thought by the pilot, nor by another occupant, that the touchdown was hard enough to damage the aircraft. The aircraft rolled out for about half a mile to a runway intersection where the pilot attempted to turn right but, as he did so, the aircraft slewed left as the left maingear collapsed. The pilot and passengers evacuated the aircraft through the normal exits.

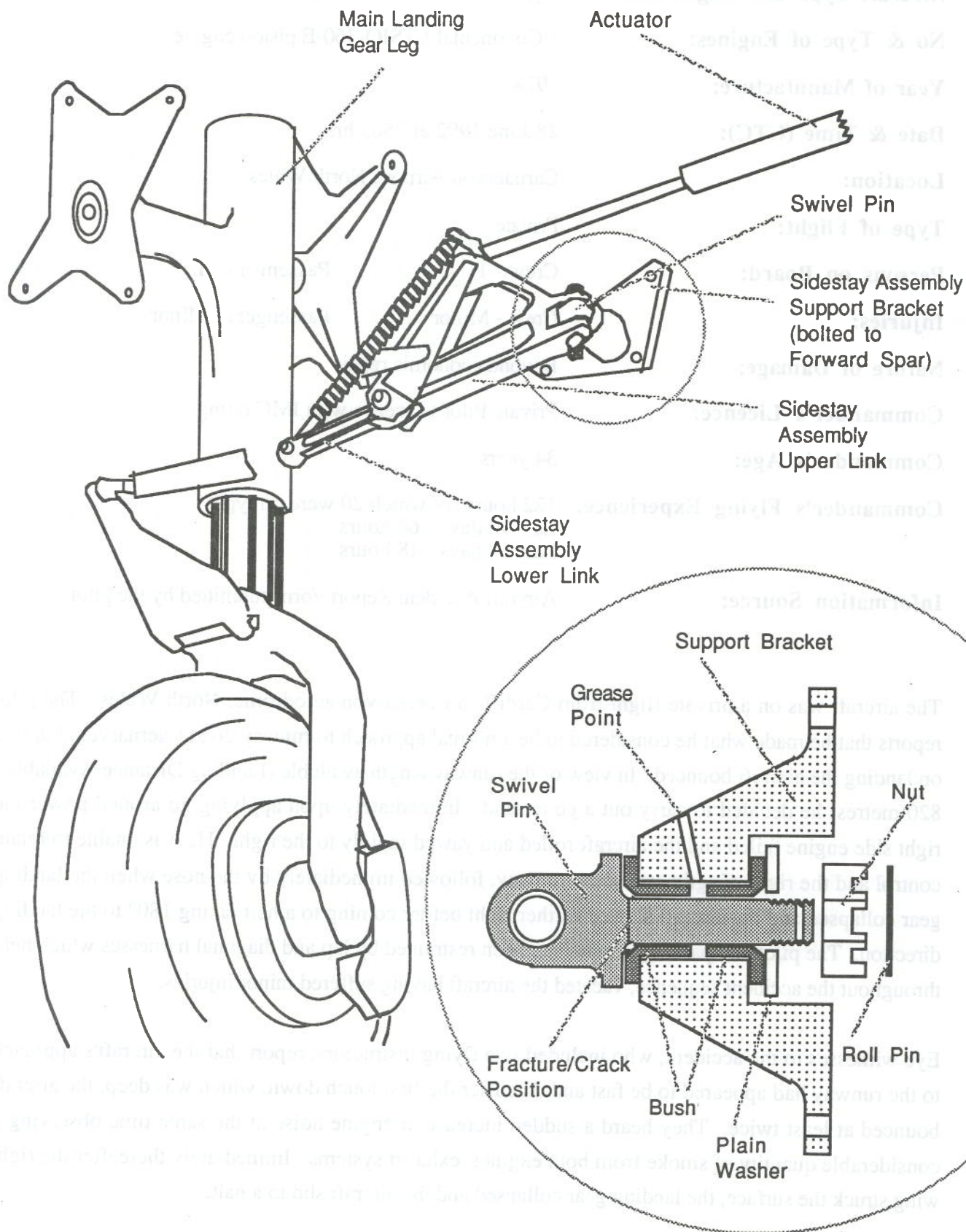
It was found that there had been a failure of the swivel pin at the attachment of the mainleg's diagonal brace to a bracket on the wingspar. The pin is part of the bracket assembly currently listed as part number 95643 (-06, left and -07, right) and similar components are used on Piper PA-28R and PA 32R single-engined models. The pin was sent to the AAIB for examination. The fracture of the pin had occurred at its root end where there was a large change of section to accommodate the protruding lug to which the diagonal brace attached (see Fig 1). The plane of fracture was through the

pin's shank at the start of the blending radius at the change of section. The failure was in fatigue in reverse bending in the plane of normal loading from the sidestay. The diametrically opposed areas of pre-existing fatigue cracking had occupied about 80% of the pin's cross section but there were indications that the fatigue development had accelerated before final rupture. The fatigue had started from multiple origins on both sides of the pin. The shank surfaces adjacent to the fracture were pitted with corrosion and the original cadmium plating had been worn away in the contact areas of the bushing which supported the pin within the bracket. Some of the fatigue initiations had developed along circumferential marks on the pin surface at the edge of the blending radius. The aircraft had completed 4069 operating hours at the time of the accident but it has not been ascertained whether the failed pin had been fitted from new. The diameter of the pin from G-TEST was 9/16 inches but later bracket assemblies contain pins of 5/8 inches diameter.

G-TEST had suffered a previous maingear collapse (AAIB Bulletin 10/91) when the right mainleg oleo housing split across the barrel. The area of the mainleg failure was already the subject of a Service Bulletin (SB 787A) and a CAA Airworthiness Directive (002-01-88).

Two previous cases which were effectively identical to the subject swivel pin failure have been reported by the AAIB; Piper PA34-200 Seneca G-BACB in AAIB Bulletin 4/91 and Piper PA34-200T Seneca II G-BOUM in AAIB Bulletin 7/92. In G-BOUM the pin in the unfailed right maingear was also found to contain cracks. Following the accident to G-BACB the AAIB made a recommendation that consideration be given to requiring a periodic check of the swivel pin. The CAA undertook to consult with Piper Aircraft on the overall service record and the possibility of issuing a Service Bulletin on the subject. The CAA also undertook to consider issuing an Airworthiness Directive. When the accident to G-BOUM occurred no check had been instituted and a further AAIB Recommendation (Reference Number 92-47) was made that, 'The CAA require a periodic check of the swivel pin and assess the need for mandatory replacement of the fitting type with one of more robust design'. Copies of the recommendation were also sent, for information, to JAA, FAA, NTSB and Piper Aircraft Corporation. The FAA Office of Accident Investigation have dispatched the Recommendation to the Small Airplane Directorate for evaluation and response which is normally completed within 90 days of receipt. The CAA is currently in communication with Piper Aircraft on the subject.

## G-TEST Main Landing Gear



**Figure 1**