

No: 10/91

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Category: 1c

**Aircraft Type and Registration:** Piper PA-34-200T Seneca II, G-CJWS

**No & Type of Engines:** 2 Continental TSIO-360-EB1 piston engines

**Year of Manufacture:** 1979

**Date & Time (UTC):** 6 July 1991 at 1657 hrs

**Location:** Liverpool Airport

**Type of Flight:** Private

**Persons on Board:** Crew - 1 Passengers - 5

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

**Nature of Damage:** Right wing, propeller and landing gear

**Commander's Licence:** Commercial Pilot's Licence

**Commander's Age:** 43 years

**Commander's Flying Experience:** 2,530 hours (of which 91 were on type)

**Information Source:** Aircraft Accident Report Form submitted by the pilot

The aircraft was returning from Wattisham to Liverpool. The pilot reports that after an uneventful approach and touch-down, using two stages of flap, there was a rumbling noise from under the right wing which then began to drop. Although opposite aileron was applied, the wing continued to drop. The throttle, propeller and mixture levers were pulled back and right rudder applied to vacate the runway. The aircraft came to rest some 50 feet onto the grass.

Examination of the aircraft after salvage revealed that the right main landing gear trunnion housing had fractured, leaving the wheel, brake and piston unit attached to the aircraft only by the brake hose and part of the operating mechanism. The fracture was found to have occurred in a position approximately 5 inches from the lower end of the forging.

A study of service experience with the type revealed that in July 1985 the manufacturers of the aircraft issued Service Bulletin No.787, which was superseded in August 1985 by Bulletin No.787A. This calls for examination of certain PA34 series aircraft main landing gear trunnion housings. This inspection, as applied to G-CJWS, is required to be carried out at 100 flying hour intervals once the first 1000 flying hours has been exceeded. The records make it clear that at the time of the accident the aircraft had completed just under 7 hours flying since the inspection was last carried out. This occurred during a 50 hr/62 day check completed on 18 June 91.

The required inspection procedure quoted in Bulletin 787A is as follows:-

1. Properly clean the trunnion housing of dirt and paint and carefully inspect the housing for cracks with a 10 power glass at the lower end of the fillet.
2. If cracks are detected, the trunnion housing must be replaced.
3. Make logbook entry of compliance with this Service Bulletin.

( In 1988 the Civil Aviation Authority issued Additional Directive 002-01-88 requiring extension of the Service Bulletin requirements to include further trunnions having part numbers not covered by the bulletin )

A metallurgical examination of the failed area of the trunnion revealed evidence of fatigue cracking which is considered to have resulted from bending loads applied during service. The initiations of these fatigue cracks were in regions which were already relatively extensively damaged by intergranular corrosion and/or stress corrosion cracks. The site of the origin of the cracking was on the aft face of the main cylinder where the curved flange runs out to the flashing line of the forging, *ie* at the point where the inspection described in Bulletin 787A is required to be carried out. Stress corrosion cracks were also evident elsewhere in the area of the fracture face.

Corrosion and stress corrosion are phenomena likely to be encountered in this type of material and application in the absence of good quality paint protection. The Service Bulletin effectively requires removal of paint from the critical area of the trunnion.

On 5 July 91 an engineer who had extensive experience on Piper PA 34 series aircraft (but had no involvement with G-CJWS) visited Liverpool. During discussion with another engineer unfamiliar with the type, he mentioned that the PA 34 required an inspection to be carried out at intervals on the trunnions of the main legs.

Since an example of the type, namely G-CJWS, was parked nearby, the two engineers walked over to it to enable the position of the required inspection to be pointed out. In doing so the engineer with the type experience noticed a crack at that very position. The defect was therefore pointed out to a pilot who appeared to be about to fly the aircraft. The pilot in question did not thereafter fly the aircraft, however, as he subsequently left the country it has not been possible to establish what further action he took.

The technical log shows that the aircraft did not fly on 5 July 91 but was flown to Wattisham on the following day. It suffered the failure on its return from Wattisham to Liverpool.