

AIB Bulletin

9/84

No: 9/84

Ref: EW/G84/01/07

Aircraft type and registration: Reims Cessna FR172K G-BFIF (Light, single engined fixed wing aircraft)

Year of manufacture: 1977

Date and time (GMT): 25 January 1984 at 1300 hrs

Location: RAF St Athan

Type of flight: Training

Persons on board: Crew — 1 Passengers — Nil

Injuries: Crew — Nil Passengers — N/A

Nature of damage: Engine crankcase holed

Commander's Licence: Private Pilot's Licence

Commander's Age: 24 years

Commander's total flying experience: 606 hours (of which 46 hours were on type)

Information Source: Accident Report Pro forma from Commander, Engine strip insp by AI

The aircraft was on a training flight when the pilot heard a muffled bang from the engine followed by total loss of indicated oil pressure and a small amount of engine vibration. The pilot attempted to return to Cardiff airport, but engine power had so reduced when some 5 nm. west of the airport that he was unable to maintain height. In addition, as the aircraft passed abeam RAF St Athan, ATC informed the pilot that a large amount of smoke was streaming from the underside of the engine cowling. The pilot therefore decided to divert into RAF St Athan where a normal landing was made and the aircraft evacuated once clear of runway 26. There was no fire and later inspection of the oil covered engine revealed a large hole in the upper crankcase.

Subsequent strip inspection of the engine, a Continental 10360K, at the AIB facility, RAE Farnborough confirmed that No 3 cylinder connecting rod had suffered a 'big-end' failure due to fatigue cracking on its upper cap in the region of both big-end bolt counter sink recesses. Evidence was found which indicated that fatigue had initiated from bearing wear and damage. Secondary impact damage had occurred to the opposite cylinder skirt and connecting

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rod of No 4 and also to No 3 hydraulic tappet housings, causing loss of No 3 inlet tappet into the sump. The No 3 big-end bearing shells had failed due to wear, as had those associated with No 5 connecting rod, which was badly blackened due to overheating. Inspection of the other big-end bearing shells showed all were worn badly down to their copper backing and heavily scored. Detailed inspection of the oil system revealed no evidence of failure or malfunction before the No 3 connecting rod failure.

This engine had recently been inspected in accordance with the requirements of CAA airworthiness Notice No 35, during the aircraft's last annual check in November/December 1983, to allow continued operation in service to 120% of its recommended overhaul life of 1500 hrs. Airworthiness Notice No 35 states that the condition of the engines should be assessed in accordance with Civil Aircraft Inspection Procedures leaflet EL/3—15. The only checks specified by this which relate to the condition of the bearing in the engine are those associated with filter inspection, oil consumption and excessive 'play' in the propeller shaft. The maintenance personnel and records associated with this aircraft indicate that these checks were carried out satisfactorily. There is no existing check requirement for oil sample analysis (eg spectrographic) to check for the presence and quantity of bearing shell debris.

The engine failed at some 1523 hrs total.