

No: 12/90

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Category: 1c

Aircraft Type and Registration: Reims Cessna F150M, G-BEXS

No & Type of Engines: 1 Rolls-Royce Continental O-200-A piston engine

Year of Manufacture: 1977

Date and Time (UTC): 25 July 1990 at 1410 hrs

Location: Hollywell Wood Estate, Panshanger, Hertfordshire

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - 1 (minor) Passengers - N/A

Nature of Damage: Aircraft destroyed

Commander's Licence: Private Pilot's Licence

Commander's Age: 40 years

Commander's Total Flying Experience: 77 hours (all on type)

Information Source: Aircraft Accident Report Form submitted by the pilot, inquiries with numerous aviation organisations and limited engineering investigation by AAIB

After an uneventful take-off the pilot climbed the aircraft to a cruising altitude of 2000 feet. As the aircraft approached the southern edge of Hertford, the pilot felt vibration from the engine. He attempted to cure this vibration by use of carburettor heat and accelerating and decelerating the engine, but to no avail. The pilot noticed that during these attempts to cure the vibration, the aircraft was losing height. He therefore selected a suitable field, turned downwind and then checked the fuel, engine primer, magnetos, carburettor heat and mixture but the engine continued to vibrate and produced very little power. The pilot then shut down the engine and transmitted a Mayday call to Luton ATC. As the aircraft neared the ground the pilot noticed a movement in the field and decided to go for the next field, which looked reasonable. However, there was a ditch and fence surrounding this field. As the aircraft approached the ditch and fence, the pilot raised the nose of the aircraft to clear them. The pilot stated that the aircraft then "landed awkwardly" and was extensively damaged.

An initial engineering investigation was carried out by the operator's engineering organisation which found a partial failure of the propeller boss on the engine crankshaft. However detailed examination by the Materials Department of the Royal Aerospace Establishment showed that this failure had been caused by the ground impact of the aircraft. Further examination of the engine by AAIB at

Farnborough found that three out of the four exhaust valves, which were reasonably free within their working range, could only be removed from their cylinders by use of a hammer and drift. When the fourth exhaust valve, which was freely removed from its cylinder, was fitted in turn to the other three cylinders it could not be fitted without using excessive force. When the three exhaust valves that had to be forced from their cylinders were fitted in turn to the fourth cylinder, they were easily inserted and removed. The cylinder from which the exhaust valve was removed freely was a replacement whereas the other three cylinders were originally fitted when the engine was overhauled some 700 hours before the accident.

Continental Aircraft Engine Service Bulletin, No. M77-3, dated January 1977, entitled "Use of alternative aviation grade fuels in engines originally certified on 80/87, 91/96 and 100/130 grade fuels" warns about exhaust valve sticking:

"Exhaust valve sticking can result from lead salt (sulfated ash) accumulation in the lubricating oil. It is recommended that regular 50 hour oil changes be implemented to reduce such accumulation. A few stuck exhaust valves have been reported where examination of the cylinder assembly revealed an exhaust leak between the exhaust elbow flange and the exhaust port face. This condition created localized cylinder head overheating and subsequent exhaust valve and guide distress. The exhaust system should be inspected every 100 hours and leaks corrected prior to continued engine operational service".

No other fault was found within the engine, its systems or the airframe. A weather aftercast was obtained which indicated that there was a possibility of moderate carburettor icing at cruise power and serious carburettor icing at descent power.