

No: 4/91

Ref: EW/G91/02/05

Category: 1c

Aircraft Type and Registration: Reims Cessna F152, G-BFKH

No & Type of Engines: 1 Lycoming O-235-L2C piston engine

Year of Manufacture: 1978

Date and Time (UTC): 18 February 1991 at 1415 hrs

Location: Ash, near Sandwich, Kent

Type of Flight: Private (training)

Persons on Board: Crew - 2 Passengers - None

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

Nature of Damage: Extensive

Commander's Licence: Commercial Pilot's Licence with Instrument and Instructor ratings

Commander's Age: 33 years

Commander's Total Flying Experience: 897 hours (of which 880 were on type)

Information Source: Aircraft Accident Report Form submitted by the pilot and examination by AAIB

Shortly after giving control of the aircraft to the student and while cruising at 2000 ft, the instructor noticed smoke entering the cockpit. He attributed the associated noxious smell to burning electrical insulation. The instructor took control of the aircraft, noting that the overvoltage warning light had illuminated and that the low voltage warning light was illuminating intermittently. He transmitted a 'PAN' RT call and carried out the appropriate drill, which included switching-off the battery and alternator. However this action did not cure the problem and smoke continued to enter the cockpit. As he was unable to detect the source of the smoke and was unsure as to whether the problem was forward or aft of the engine firewall, he decided that an immediate emergency landing was the safest option. He switched-on the aircraft's electrical system momentarily in order to inform ATC of his intention to land immediately. The instructor selected a field that was into-wind, but on closer examination saw deep furrows within the field and power lines extending across its width. He therefore selected a second field that appeared suitable for a power-on flapless approach. After carrying out the forced landing drill he made a successful touchdown in this field. After the touchdown but whilst the aircraft was still rolling, the instructor switched-off the fuel and magnetos, at which point the noseleg collapsed. The aircraft 'flipped over' and came to rest inverted. After both occupants had escaped from the aircraft, the instructor could see no signs of a fire, or where the smoke had come from.

Subsequent examination of the aircraft revealed that the alternator had seized and had caused the drive-belt to 'slip' on the alternator-pulley. This had led to the drive belt burning, due to friction-induced overheating and its failure. Detailed examination of the alternator showed that the bearing at the pulley

end had broken-up due to a lack of lubricant. Since there is no requirement for log cards to be raised on alternators, it was not possible to establish how many hours this unit had performed since new/overhaul.

The aircraft had accumulated 2655 hours before it was purchased by its present owner. There was no record of alternator replacement in the aircraft's documentation up to that time. The alternator had not been replaced or overhauled by its present owner although the engine had been replaced, the alternator having been transferred from the previous engine. At the time of the accident the aircraft had accumulated 6148 hours.

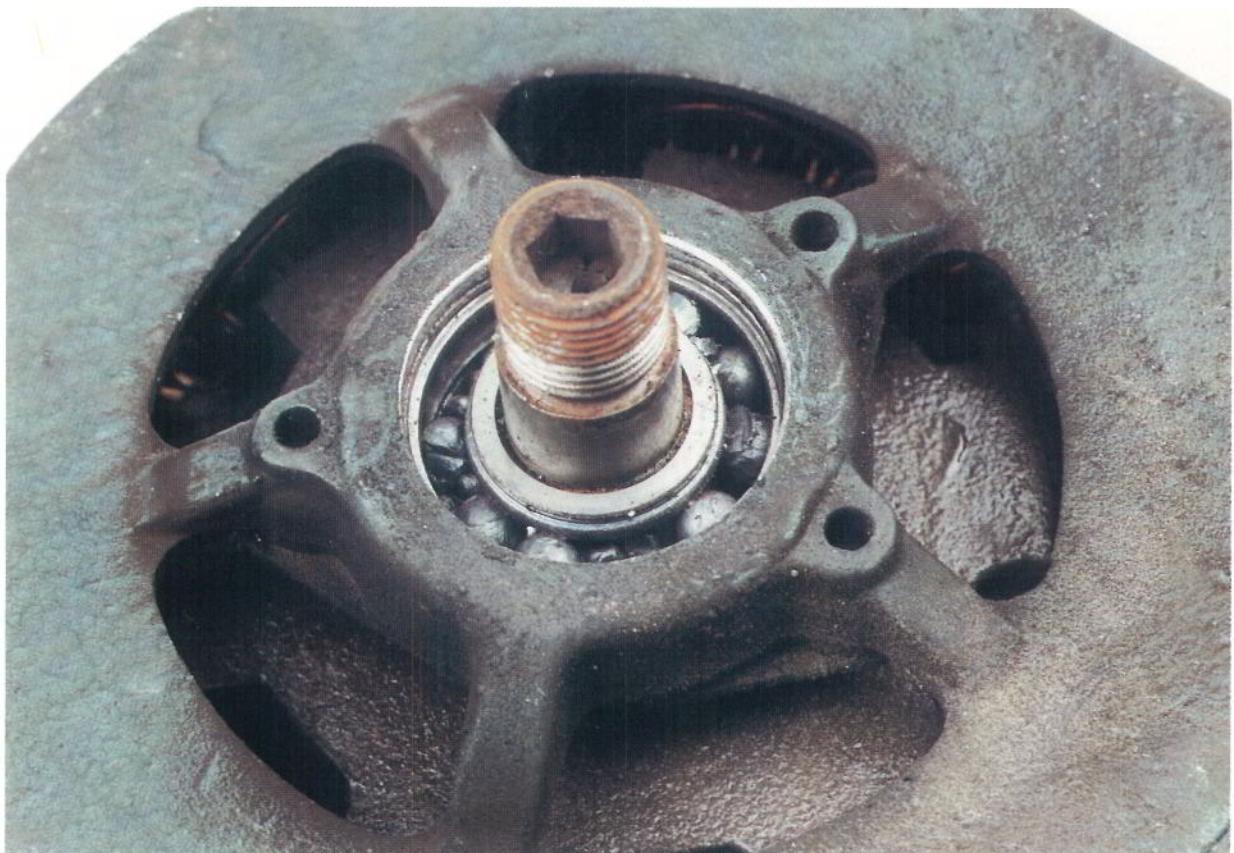
The engine section of the aircraft maintenance manual, paragraph 11-9 stated:

"TIME BETWEEN OVERHAUL (TBO). Avco Lycoming recommends engine overhaul at 2000 hours for the O-235 Series engine..... . At the time of overhaul, engine accessories should be overhauled".

In the alternator specifications it stated:

"PERIODIC BEARING LUBRICATION: Not required, new bearing is lubricated for life. Replace bearing if original bearing lubricant is lost or contaminated."

No inspection procedure appears to exist which would establish that the original bearing lubricant had been lost or had deteriorated.



FAILED ALTERNATOR BEARING