

No: 10/92

Ref: EW/G92/06/01

Category: 1c

Aircraft Type and Registration: Avid Flyer, G-BTHU

No & Type of Engines: 1 Rotax 532 piston engine

Year of Manufacture: 1989 - 1992

Date & Time (UTC): 7 June 1992 at 1530 hrs

Location: Fieldhead strip, West Yorkshire

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - Minor Passengers - N/A

Nature of Damage: Landing gear destroyed, fuselage underside distorted port wing-tip and struts, propeller and lower rudder damaged, both flaperons broken free

Commander's Licence: Private Pilot's Licence

Commander's Age: 62 years

Commander's Flying Experience: 1,006 hours (of which 17 were on type)
Last 90 days - 19 hours
Last 28 days - 13 hours

Information Source: Aircraft Accident Report Form submitted by the pilot, telephone enquiries and analysis of reports subsequently produced on examinations of engine and aircraft

The aircraft type is powered by a Rotax two cylinder in-line two stroke piston engine. This engine type uses a fuel-oil mix to achieve lubrication of most of the moving parts. A separate lubrication system, incorporating an oil feed bottle, is used to supply the rotary induction valve.

The accident occurred during the second flight of the aircraft which was conducted 5 days after its successful 10 minute initial flight. The pilot reported that the early part of the second flight was uneventful, the aircraft climbing to 1,500 feet within two miles of the strip. About six minutes into the flight, however, the engine began to lose power although there was no indication of excessive temperature and all engine controls appeared to be correctly positioned. The pilot attempted to return to the landing strip, but with the reduction in power, height could not be maintained. It thus became necessary to land in an area of rough boggy ground, just short of the landing-strip, with consequent damage to the aircraft.

At the request of the Popular Flying Association, a number of examinations of the aircraft and engine were carried out after the accident. The first showed that the forward of the two cylinders was heavily oiled up. It was believed initially that the rotary valve lubrication system had lost a large amount of oil (since the oil bottle appeared after the accident to be almost empty although the pilot stated that it was full before take-off). It was presumed that this oil had leaked into the forward cylinder via a poorly sealed joint-face, entering the forward portion of the crank-case, hence leading to fouling of the No 1 sparking-plug and a consequent major loss of power in this two cylinder engine.

The UK importer of the engine subsequently examined both the engine and the aircraft and drew a somewhat different conclusion. He believed that the layout of the rotary-valve oil-chamber and the associated oil bottle in this installation normally produces a region of trapped air in an unvented cavity of the chamber, but that an impact and / or the inclination of the aircraft through a large angle can release this trapped air, allowing oil to fill the cavity and hence lower the level visible in the bottle, creating the false impression of a significant loss of oil. He also believed that the method of installation of the oil bottle would have made accurate viewing of the bottle oil level difficult if the damaged aircraft was lying in a tilted position after the accident. Examination of the joint face sealing mentioned above revealed no reason for, or evidence of, a leakage and the importer stated that there is no record of any past problems of this nature on the engine type. He considered that even if the total contents of the bottle had found their way to the No 1 cylinder at a steady rate over the duration of the accident flight, the oil / fuel ratio in that cylinder would still not have been great enough to have affected performance.

Nonetheless, during his examination of the cylinders, the importer noted deposits which, in view of the short total operating life of the engine, he considered as being indicative of continuous running with excessive oil in both cylinders, or an over-rich mixture. Unfortunately this examination was carried out after the engine had been substantially dismantled elsewhere and the possible cause of any rich operation could not be determined. No samples of the fuel mix were recovered and analysed so the precise fuel-oil ratio in the tank could not be established.

It was noted, however, that the ignition system was wired up in such a way that, according to the manufacturer, the timing would be correct but the spark energy would be reduced. It is considered that the lower spark energy either alone or in combination with a rich fuel / air mixture or a high oil-fuel ratio could have lead to loss of operation of the No 1 cylinder and hence the inability of the aircraft to maintain height .