

No: 11/92

Ref: EW/G92/07/25

Category: 1c

Aircraft Type and Registration: Renegade Spirit UK, G-MWOO
No & Type of Engines: 1 Rotax 582 piston engine
Year of Manufacture: 1990
Date & Time (UTC): 21 July 1992 at 1000 hrs
Location: Full Sutton, North Humberside
Type of Flight: Private
Persons on Board: Crew - 1 Passengers - 1
Injuries: Crew - None Passengers - None
Nature of Damage: Engine, engine cowl, lower wings and landing gear damaged
Commander's Licence: Private Pilot's Licence
Commander's Age: 37 years
Commander's Flying Experience: 15 hours (all on type)
Last 90 days - 8 hours
Last 28 days - 2 hours
Information Source: Aircraft Accident Report Form submitted by the pilot and AAIB inquiries

As the aircraft was climbing out after take-off the pilot found that its performance was degraded, although engine indications were normal. At around 750 feet agl the engine died away. Mature standing crops covered the only available forced landing areas and the choice of approach path was restricted by a number of power lines in the area. A forced landing onto a field of wheat resulted in severe damage to the landing gear, lower wings and engine installation. The occupants evacuated without difficulty. The aircraft had come to rest somewhat nose down and this caused fuel to drip from the vents of the almost full upper wing tanks onto the engine, causing smoke as the fuel contacted the exhaust pipes until the pilot stopped the fuel release by levelling the aircraft. There was no fire.

The powerplant comprised a liquid-cooled, twin cylinder, two-stroke engine of 580 cc displacement, driving a propeller via a reduction gearbox. With the exception of an oil bath provided for a crankshaft offtake gear, the engine is mist lubricated by the fuel/oil mixture. The manufacturer recommends a 50:1 mixture using Super two-stroke oil to proposed ASTM/CEC Standard TSC3. Strip examination revealed gross damage to the aft big end bearing, with the roller bearing destroyed, with rollers

apparently melted, and in the order of 2.5 mm of vertical play between the connecting rod and the crankshaft. The components adjacent to the bearing showed signs of overheating. The connecting rod had contacted the crankcase while the engine had been rotating, resulting in machining damage and localised splitting of the crankcase. Reports are awaited on the types of fuel and oil used by the three pilots who commonly used the aircraft, and on analysis of samples taken from the fuel tanks after the accident.

Engine total time was 163 hours from new. No previous problems clearly connected with the big end failure were reported to have been experienced. It was noted that considerable vibration had been experienced some time prior to the accident until the Type B reduction gearbox had been changed for a Type C gearbox.

The components were sent to the engine manufacturer for further investigation. The manufacturer reported that four previous similar cases were known to have occurred in an approximately two year period, in all cases on aircraft installed engines, although the same type of engine is widely used in other applications, such as hovercraft and skidoos. Several thousand aircraft engines with a similar type of big end bearing arrangement are in service. The failures were not restricted to either the front or the rear big end. Review of the design and the measures for corrosion prevention and checks of material properties and tolerances had not identified the likely cause of the failures, and several hundred hours of test bed running had failed to reproduce the problem. The manufacturer is continuing to investigate the failures.

The following statement is taken from the Rotax Operator's Manual Engine Type 582 UL DCDI (Equipped with breakerless ignition system and BING carburettor) Edition 06 1991.

Danger!

This engine, by its design, is subject to sudden stoppage! Engine stoppage can result in crash landings. Such crash landings can lead to serious bodily injury or death.

Never fly the aircraft equipped with this engine at locations, airspeeds, altitudes, or other circumstances from which a successful no-power landing cannot be made, after sudden engine stoppage.

Warning!

This is not a certificated aircraft engine. It has not received any safety or durability testing, and conforms to no aircraft standards. It is for use in experimental, uncertificated aircraft and vehicles only in which an engine failure will not compromise safety.

User assumes all risk of use, and acknowledges by his use that he knows this engine is subject to sudden stoppage.