

Avid Speed Wing MK4, G-BUIR

AAIB Bulletin No: 5/97 Ref: EW/G97/01/14 Category: 1.3

Aircraft Type and Registration:	Avid Speed Wing MK4, G-BUIR
No & Type of Engines:	1 Rotax 582 piston engine
Year of Manufacture:	1992
Date & Time (UTC):	26 January 1997 at 1525 hrs
Location:	Nr Heapham , Lincs
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - None
Injuries:	Crew - None - Passengers - N/A
Nature of Damage:	Right landing gear torn off, right wing bent and underside of fuselage crushed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	53 years
Commander's Flying Experience:	87 hours (of which 18 were on type) Last 90 days - 8 hours Last 28 days - 5 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and telephone enquiries

The pilot, who owned the aircraft, had been intending to fly circuits at Sturgate Airfield and had completed one circuit without problem; the weather was fine and the wind calm. However after taking off for a second circuit and while climbing crosswind at about 700 to 800 feet agl, the engine speed dropped significantly. The pilot elected to turn back to land on the reciprocal runway and transmitted his intention.

During the descent the pilot attempted to diagnose the problem. However, the aircraft was descending rapidly and he realised that he would have to make a forced landing. At about 50 feet agl the engine stopped completely and the rate of descent increased. The landing gear clipped the top of a high hedge which bounded his chosen field, causing the aircraft to yaw and land heavily. The pilot was not injured and vacated the aircraft immediately, after turning off the fuel selector.

Subsequent inspection of the engine by the pilot revealed that there had been a major failure of the big end bearings and later examination showed that there was no significant fault in the lubrication oil injection system.

The pilot had owned the aircraft for about four years and, although its utilisation over the first two had been relatively high, over the last two years it had only been used infrequently. During this period he had turned the engine over regularly and started the engine occasionally, at times when he had not flown the aircraft. Prior to the accident, however, he had used the aircraft on several occasions within a short period. The owner had consistently used the recommended synthetic oil.

Similar seizures of Rotax 582 engines have occurred and two earlier AAIB Bulletins (12/95, page 55 & 10/96, page 29), which reported on engine seizures on a Renegade Spirit and a Kolb Twinstar, drew attention to this problem. Although no statistics appear to be available, the Popular Flying Association advised that there was a history of big-end failures on Rotax 582 engines, due to worn bearings. This was particularly the case for engines installed in heavier aeroplanes and those used in the training role which use extended running at high power. There were also indications that long periods without use could be detrimental. 'Drying' of the roller type bearings may occur and residual products of combustion, which can be significantly acidic, can accelerate corrosion of the bearing materials. If corrosion occurs, this preconditions the bearings to wear rapidly when used subsequently, although it may then take several flights for the bearings to deteriorate to the point of failure.

The largest service centre for Rotax engines in the UK has devised an instrument, the 'Cyclone Conrod Bearing Clearance Tester' (illustrated at Figure 1), for testing the combined big/little-end bearing clearances, which has apparently proved extremely effective in preventing such failures.

The Bearing Clearance Tester is essentially a dial gauge mounted on an extension tube which screws into the spark-plug holes and bears on the piston crown when at top dead centre. A syringe is used to suck/blow the piston up and down and the difference in gauge readings is converted into combined bearing clearance. The instructions recommend that this check be performed every 12.5 flight hours when the spark-plugs are removed for inspection in accordance with the Rotax service schedule. Maximum wear figures are provided with the instrument, but records should also be kept so that any trend can be detected in advance. It is understood that the Popular Flying Association acknowledges that this device has been effective in preventing failures of this nature and has published an article entitled 'KNOW YOUR BIG END WEAR' in the December 95/January 96 edition of its magazine, *Popular Flying*.

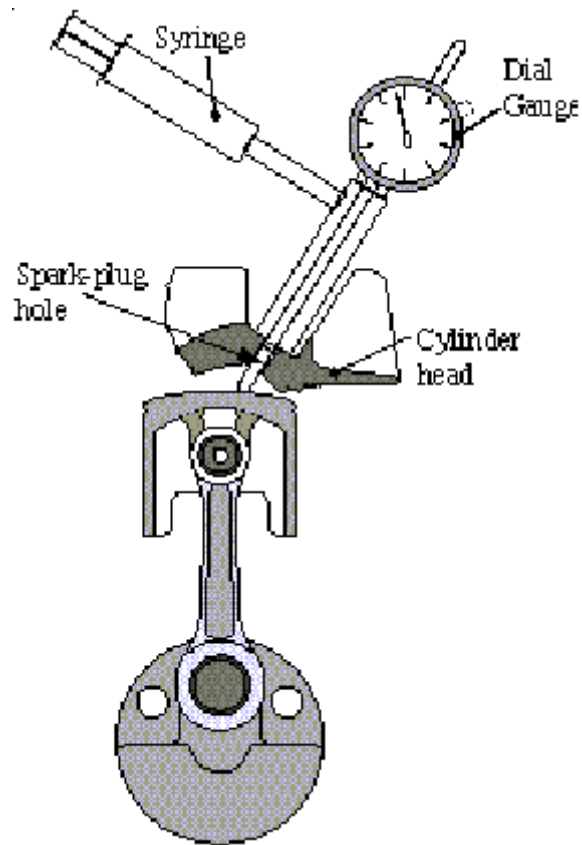


Figure 1 The Cyclone Conrod Bearing Clearance Tester for Rotax Engines