Denney Kitfox Mk III, G-PPPP

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Aircraft Type and Registration:	Denney Kitfox Mk III, G-PPPP
No & Type of Engines:	1 Rotax 582 piston engine
Year of Manufacture:	1991
Date & Time (UTC):	7 July 1997 at 1515 hrs
Location:	Magclough Farm, Eyam, Derbyshire
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - 1
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Landing gear collapsed, propeller, radiator and lower cockpit area damaged
Commander's Licence:	Private Pilot's Licence with Night Rating
Commander's Age:	73 years
Commander's Flying Experience:	3,076 hours (of which 497 were on type)
	Last 90 days - 53 hours
	Last 28 days - 25 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft was engaged on a local flightin the area of the Lady Bower Dams. Shortly before reaching thedams and at a height of 4,000 feet, the engine stopped. The areaaround the dams was of rugged terrain with very few areas suitablefor landing a light aircraft. The pilot chose a field but whencommitted to the forced landing saw that the field was on a steepupward slope. During the landing the aircraft's landing gear collapsed.

Initial examination of the engine indicatedthat it had seized, with no other external indications of mechanicalfailure. Subsequent strip examination of the engine by the pilotrevealed that there had been a major failure of the rear cylinder'big end' bearing, but further examination found no fault withinthe lubrication oil injection system.

Similar seizures of Rotax 582 engines haveoccurred and three earlier AAIB Bulletins (ie 12/95, page 55,10/96, page 29 and 5/97, page 63) which reported on engine seizureson a Renegade Spirit, a Kolb Twinstar and a Avid Speed Wing, drewattention to this problem. Although no statistics

appear to beavailable, the Popular Flying Association advised that there hadbeen a history of big-end failures on Rotax 582 engines, due toworn bearings. This was particularly the case for engines installedin heavier aeroplanes and those used in the training role whichuse extended running at high power. There were also indicationsthat long periods without use could be detrimental. 'Drying'of the roller type bearings may occur and residual products ofcombustion, which can be significantly acidic, can acceleratecorrosion of the bearing materials. If corrosion occurs, thispreconditions the bearings to wear rapidly when used subsequently,although it may then take several flights for the bearings todeteriorate to the point of failure.

The largest service centre for Rotax enginesin the UK has devised an instrument, the 'Cyclone Conrod BearingClearance Tester', for testing the combined big/little-end bearingclearances, which has apparently proved extremely effective inpreventing such failures.

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

At the time of the accident the engine hadachieved 730 hours since manufacturer. At 298 hours since manufacturethe engine's crankshaft failed and the engine was rebuilt by amanufacturer's approved agent. Between 5 and 6 hours before theaccident the pilot and an engineering friend had performed a checkof the big end bearing wear using the 'Cyclone Conrod BearingClearance Tester'. The rear cylinder bearing wear was found tobe 0.015 inch, which was within the limits specified.