How and why you should check your main bearings.

Microlighting and their power plants have come a long way since their humble beginnings. 2 stroke engines were the power plant of choice due to their much higher power to weight ratio. Unfortunately this is achieved by revving almost twice as fast as equivalent power rated 4 stroke engines. The problem with this is that the forces imposed on the crank shaft are high, which has led to many crank shafts eventually breaking in flight causing catastrophic engine failure. Manufactures have over the years improved their designs, and now, if treated correctly the crankshafts are giving good service. But due to the large numbers of 2 stroke engines still being used failures are still not uncommon.

The main cause of crank shaft failure is big end play. All engines have a finite life and Rotax specify time before overhaul limits for all their engines, for the 503 and 582 this is 300hours. If an engine is replaced or overhauled at these specified times then the likely hood of failure can almost be eliminated, none the less there are a large number of engines which have well exceeded these limits with out failure. To achieve this they must be well maintained and monitored.

So back to the big ends. If an engine is left unused for a large period of time then it is possible for acids to build up in the crank case which can lead to premature degradation of the bearings leading to greater wear and larger clearances which will ultimately lead to a broken crankshaft. If you know you are going to store the engine or not use it for some time then follow the storage procedure in your engine manual. The other main cause of bearing wear is plan ordinary over use. It seems that different engines on different aircraft in different conditions can all have different wear times. The point is it is impossible to say when exactly your engine will fail, unless you monitor it closely.

One of the most important checks you can do to your engine is check the combined bearing play each time you change the spark plugs. With a 582 for instance this should be every 25 hours. The play should be noted in your log book and examined for any trend. If the clearance starts to rise quickly, its time for an over haul or at least more frequent checks, maybe every 5 hours. This check is not part of the normal maintenance regime but has been proven to almost eliminate failure if done regularly and the results taken notice of.

Normal combined end play should be some where between 0.03mm and 0.08mm, anything over this and you've got no more than 20 hours before it's all over, in fact end play of 0.1mm has given times of less than 1 hour before failure. The test obviously wont stop it form happening but will tell you very accurately when it's about to happen, it would be very unwise and brave to disregard the signs.

The diagram below shows the basic layout of the tester, the piston is moved to top dead centre using the dial gauge and then the syringe is pushed in and out, the piston goes up and down, and the movement of the dial gauge is noted.