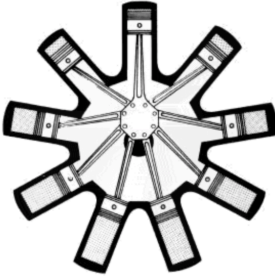


Ignition

The Saito gas engines designs are as you would expect, derived from the glow predecessors in which the glow plugs are always red hot so ignition is automatic in each cylinder at the correct time and position.



A radial engine uses a master with slave Con-rods, When you study the theory and geometry differences on each connecting rod you discover there are small differences in stroke and hence cubic capacity on each cylinder. This explains why at idle, a radial engine has that characteristic fluctuating exhaust note.

In addition, with respect to the master no 1 TDC. the other cylinders do not reach TDC at 120deg and 240deg but that is where Saito have timed their gas variants.

The following extract from a 9 cylinder full-size document reads,

The angle value of the top dead centre position of the pistons. - The maximum difference occurs between the cylinders 4 and 7, and is 7.6 CAD causing a significant shift in ignition timing in most cylinders according to TDC.

So cylinders 4 & 7 in 9 cylinder (corresponding to 2 & 3 on a Saito) need to be timed with an 8 deg difference and unlike the glow engine, the ignition timing needs to be precise.

These timing errors in the factory Saito causes rough running at lower RPM which is fudged by designing the motor to run with smaller diameter props at high speed. This explains why they are timed at 47deg BTDC to optimise power at higher revs.

So the Morris modified prop driver / timing ring refines the timing of each cylinder to match the radial engine geometry AND retards the basic timing to 30deg BTDC to suit larger props and enable smooth low RPM.

Interestingly Saito have refined the timing in the new 5 cylinder Saito to match the motor geometry. but still at high angle BTDC. to suite smaller diameter props. Its unlikely these engines would be installed in anything other than a scale type with radial cowl so logically its must be beneficial to turn a larger prop to produce thrust outboard of the cowl .