MODEL aircraft
ENGINE TESTS

The Merco Stunt 35

5.76c.c. Glow-plug Motor

"… we believe this to be one of the best engines of its type yet offered to the British modeler."

The Merco Stunt 35 can justly claim to be the No. 1 British- made C/L acrobatics engine. For years, stunt enthusiasts have waited for a British manufacturer to bring out a 0.35 cu. in. glow engine of the type originated in America that has proved so popular for top class stunt work all over the modelling world. But no established British company appeared willing to attempt to satisfy this apparent demand.

Two years ago, stunt flier Bill Morley and engine tuning expert Ron Checksfield decided to do something about the matter and the result was the Merco 35, the prototype of which was described and illustrated in "Latest Engine News" in M.A. in August and September, 1958. The first production Mercos began to appear during last season. Several minor changes have been made during the last few months and, for 1960, the Merco appears with a leaded steel cylinder liner (in place of the meehanite liner previously used) and an improved piston. It is this model which is the subject of our test this month.

The Merco is "typically 35" in appearance and layout, being a shaft induction, loop scavenged design with lapped piston and plain (bushed) main bearing. Without being a copy of any particular engine, it is modelled (and this is in accordance with the expressed preferences of most stunt experts) on typical stunt 35 design and has features which can be traced to at least two American engines of this class.

Like the Fox 35, for example, it has a Desaxe (offset) cylinder and roughly similar bore and stroke measurements. The main casting shape is very similar to that of the Veco Series too, except for the long lugs for the cylinder head screws, which extend well down the cylinder barrel between the fins, as on the Fox Combat and Rocket 35.

While, in possessing these features, acknowledgment is thereby made to the long experience of other manufacturers of this class of engine, it is pleasing to sec that the Merco does not stop here. In describing the excellent finish of the original prototype Merco in the August 1958 M.A. we said: "If the Merco should display equivalent high standards in its production version, purchasers may rest assured that it will be generally superior to current American mass-produced 35s." We can now say that the Merco does, in fact, live up to this promise. The finish, both internally and externally, is really excellent. By "finish" we are thinking not only of appearance, but also of the "constructional finish" which is vital to the performance and durability of any engine.

The first production Merco's had pistons of somewhat different design from the prototype engines. This production piston had a thicker skirt and a continuous gudgeon-pin band, as a result

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of which the piston was heavier and gudgeon-pin bearing area reduced. In the latest engine a reversion to the prototype design is now' made including the relieving of the top 1/32 in. of the piston to aid running-in this also being the reason for the adoption of the new leaded steel cylinder liner. Extensive tests and experiments have indicated that the new piston gives an improvement in both power and smoothness of running. This latter is also aided by a small modification to the crank-shaft i.e. a slightly thicker web and increased counterbalancing. The main bearing now embodies an oil groove to help lubrication during the running-in period.

Specification

Type: Single cylinder, air-cooled, loop-scavenged two-stroke cycle, glow plug ignition, with crankshaft type rotary-valve induction. (No sub-piston supplementary air induction.)
Bore: 0.798 in.
Stroke: 0.703 in.
Swept Volume: 0.3516 cu. in. = 5.762 c.c.
Stroke/Bore Ratio: 0.881 : 1.
Weight: 7.6 oz.

General Structural Data

Crankcase/cylinder-barrel/main- bearing unit pressure die-cast in LM.6 aluminum alloy with cast-in phosphor-bronze main bearing bush. Cylinder barrel bored and reamed for liner. Main bearing bored, reamed and honed to size for crank shaft. Counterbalanced crankshaft of EN.33 nickel steel, hardened and heat treated, ground on working diameters; elsewhere black anti-rust finish. Crankshaft journal in. dia., crankpin 7/32 in. dia. Leaded steel cylinder liner with honed bore and ground externally to fit cylinder barrel. Piston of meehanite grade GA, ground and honed, with straight baffle filleted at base. Piston skirt relieved 0.001 in. for lower 17/64 in. Top 1/32 in. of piston relieved 0.001 in. Fully-floating in. dia. tubular silver-steel gudgeon-pin with brass end-pads. Forged RR.56 aluminum alloy connecting-rod with plain reamed eyes. Finned cylinder head of pressure die cast LM.6 aluminum alloy, internally contoured to give hemispherical combustion chamber. Head stove-enamelled orange colour and secured with six Phillips head screws. Recessed head gasket. Central ignition plug location. Detachable crankcase rear cover of die cast LM.6 alloy, secured with four Phillips head screws. Machined alloy prop driver, pressed on to splined shaft section. Brass spray bar type needle-valve assembly with ratchet device and reversible for left or right-handed control. Beam mounting lugs.

Test Engine Data

Running time prior to test: 3 h ours.
Fuel used: running in: 70 per cent, methanol, 30 per cent, racing castor- oil.
Dynamometer test: 65 per cent, methanol, 25 per cent, racing castor- oil, 10 per cent, nitromethane.
Ignition plug used: KLG long reach glow plug.

Performance

An initial period of running-in o 1½ hours was given on the 70/30 methanol/castor fuel and, at the end of this time, the Merco would hold an even two-stroke. However, a t this point, it was still a little too light to accept much nitromethane and further running was given until the engine held a steady continuous two-stroke on to per cent, nitromethane this being the fuel mixture requested by the manufacturer for the performance tests.

During this preliminary running, it was quickly established that the Merco possessed very good handling characteristics. Starting was as $ccd as anything we have encounter td in the 35 class, being both quick and reliable. Cold starts, provided the engine was not loo stiff with residual oil from previous use, were usually almost immediate, after priming. Hot restarts required no more than one or two preliminary choked flicks, the engine then restarting within two or three flicks and, of course, without disturbing the needle-valve from its running setting.

In the course of performance tests, a maximum torque of 0.26 lb. ft. (50 oz. in.) was determined at 9.000 r.p.m., while a peak power of 0.57 b.h.p. was realised at just short of 14.000 r.p.m.

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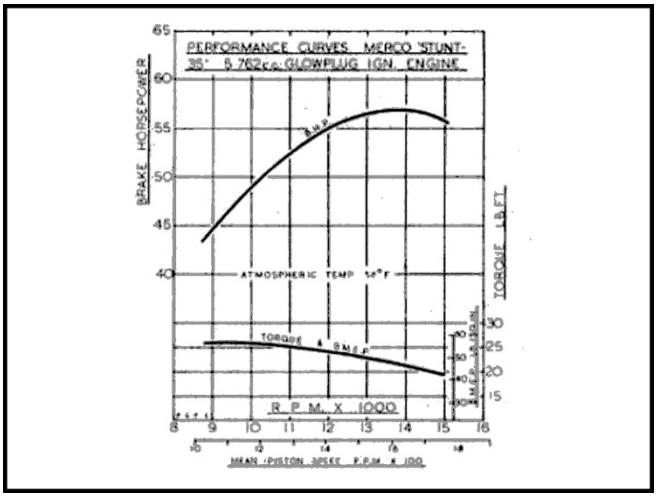
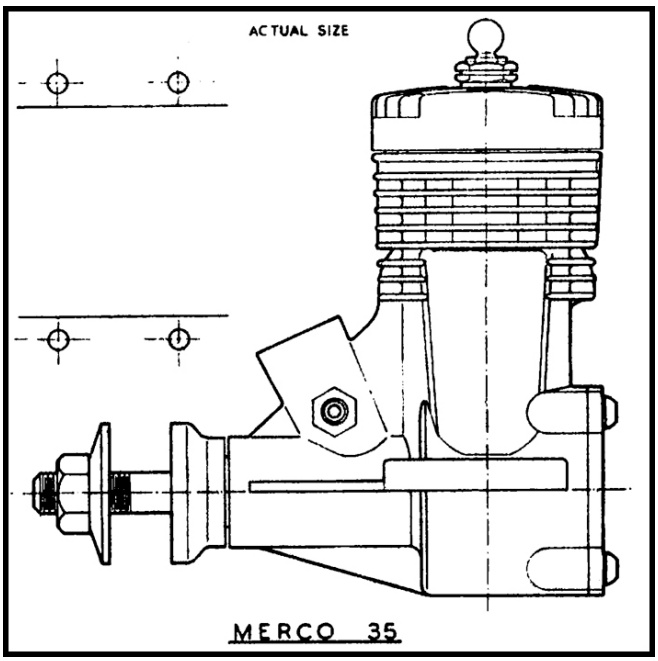
These figures compare very favourably with those recorded for other 35 class engines previously tested in M.A. during the past two years.
The maker's recommended prop size for stunt work is a 10 x 5. With such a prop, depending on make and type, anything up to 12.000 r.p.m. can be expected.

The Merco ran very steadily and smoothly and this was particularly noticeable at the lower speeds (8.000 - 9.000 r.p.m.) where some glow engines tend to become slightly erratic. Fuel draw appeared to be very good and there was excellent response to the needle-valve, facilitating quick and positive adjustment.

Stunt motors are, perhaps, the most difficult type of model engine for which to assess practical (flying) qualities from a bench test. Nevertheless, on the basis of our findings on the Merco, we believe this to be one of the best engines of its type yet offered to the British modeller.
It is encouraging to find that this first essay into the 35 class by a British manufacturer has resulted in a product that shows every sign of being able to compete with the best of its class.

Power / Weight Ratio (as tested): 1.2 0 b.h.p./lb.
Specific Output (as tested): 99 b.h.p ./ litre.





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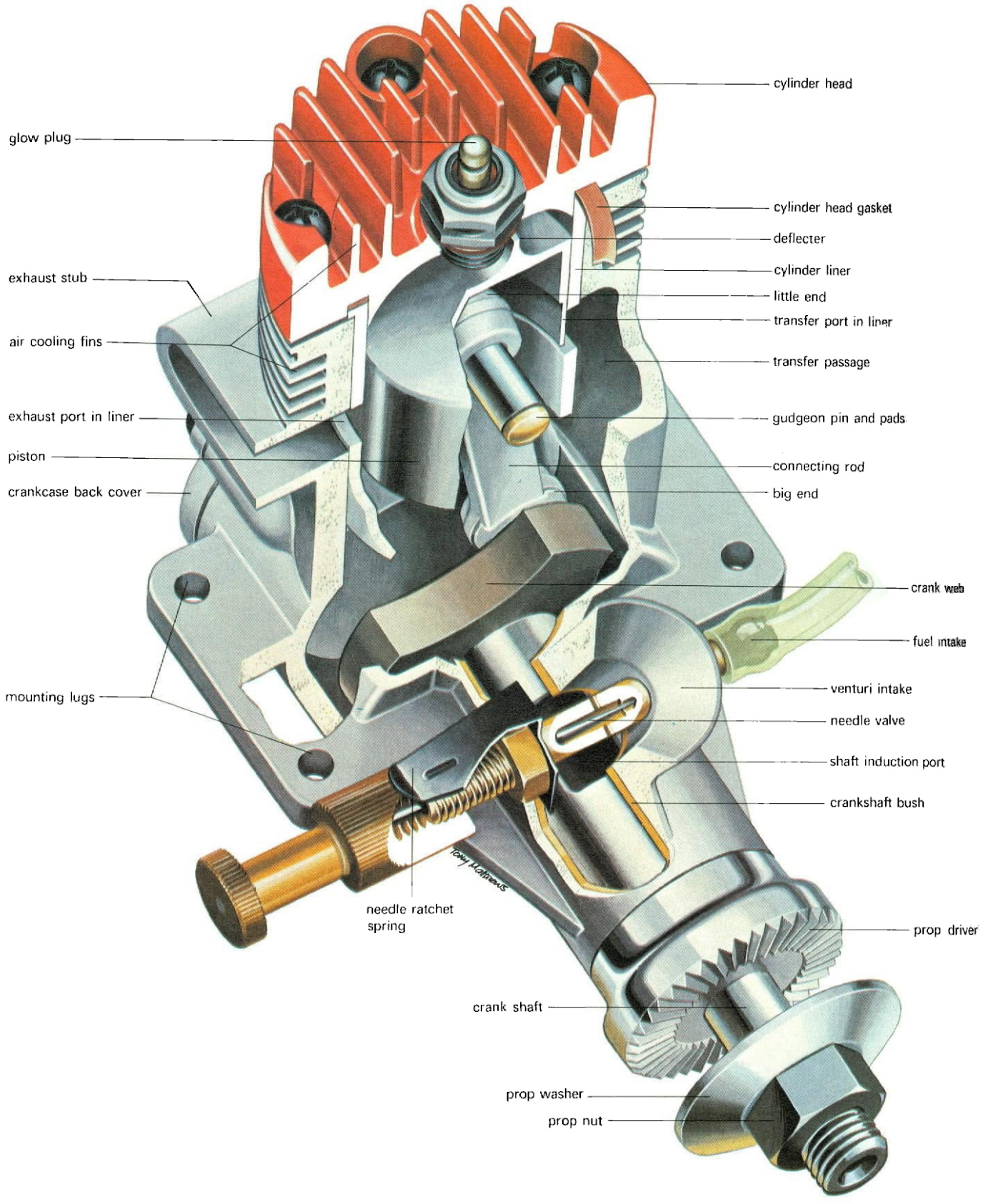
Engines

A TYPICAL GLOW-PLUG ENGINE



Model Aircraft Magazine January 1960 by Hlsat