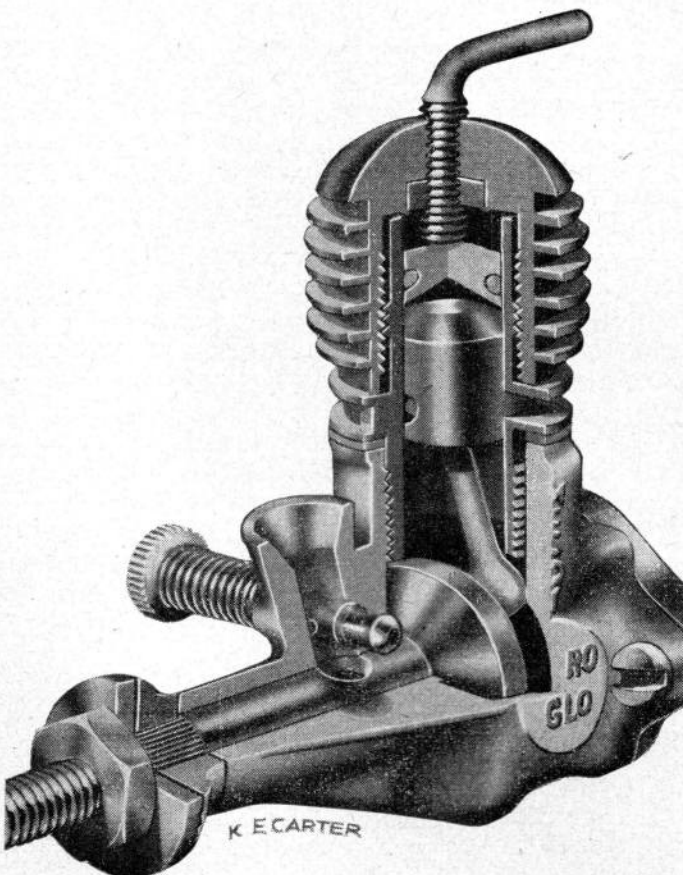
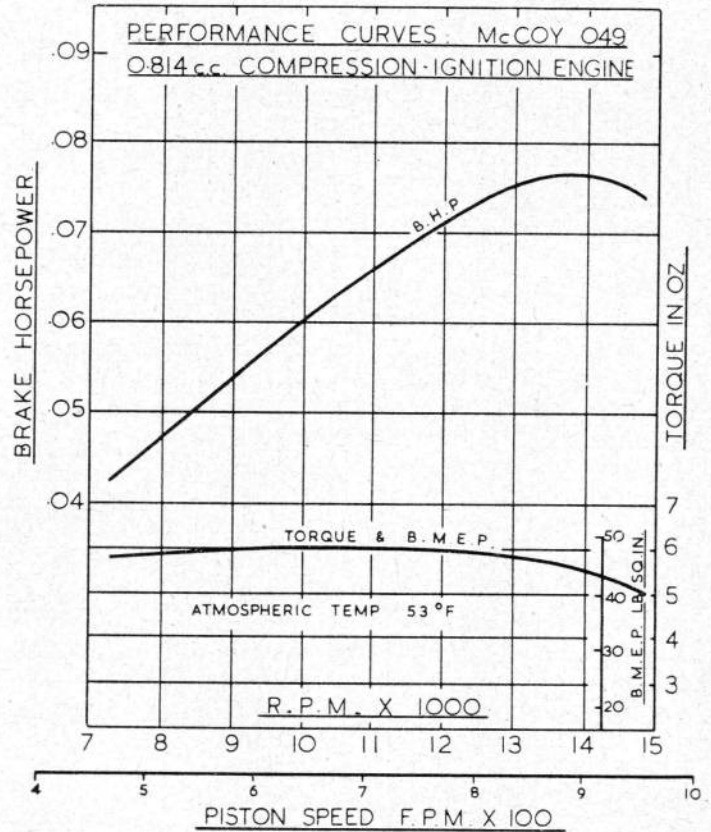


ENGINE TESTS

No. 55. The McCoy .049 Diesel

THE McCoy .049 diesel is the first new American compression ignition engine to appear for more than five years. During 1946/48, several U.S.-built diesels appeared on the market, in response to the interest which this then new type had aroused, resulting from its wide acceptance in Europe, but, in general, were unable to compete with the highly developed spark ignition engines available in the U.S. Then, with the advent of glowplug ignition in mid-1947 and its rapidly gained popularity during the following twelve months, the American diesel faded further into the background and its production virtually ceased.

In Europe, however, the superiority of the new glowplug motors served to encourage many c.i. engine manufacturers to modernise the design of their diesels and much development work has since taken place. Thus, combined with the worldwide tendency toward smaller cylinder sizes (which

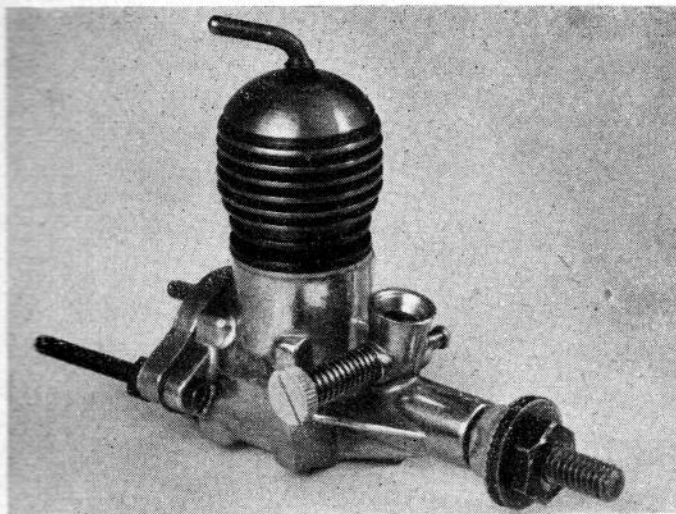


favour the model c.i. engine combustion process) the diesel has re-emerged as a worthy contender in the competition field with particular advantages in regard to specific power output in the under 1 c.c. sizes.

The .049 cu. in. (0.8 c.c.) "half-A" class having become the most popular capacity category in the U.S.A., it has been frequently prophesied in MODEL AIRCRAFT during the past two years or so that the Americans would eventually re-admit the compression-ignition motor and bring out a .049 cu. in. diesel and the McCoy is the first confirmation of this.

The unit now featured in this month's test has been in our possession for the past six months, during which time it has been used in a team-racer and a PAA-load model and entered in competition; which activities have aided us in our overall assessment of its qualities.

This particular engine was first described in "Accent on Power" in the August 1953 issue, and



Externally and internally the .049 is well finished.

we will not, therefore, repeat earlier comments on its design except to remind readers of two unusual construction features—the use of a plastic compression-ring instead of a close fitting lapped surface, on the contra piston and the useful fibre insert in which the compression screw is fitted.

Specification

Type: Single-cylinder, air-cooled, two-stroke cycle, compression ignition. Crankshaft type rotary valve induction. Circumferential exhaust and transfer porting with sub-piston supplementary air induction. Domed piston crown.

Swept Volume: 0.0497 cu. in. (0.814 c.c.).

Bore: 0.405 in. Stroke: 0.386 in.

Stroke/Bore Ratio: 0.953 : 1.

Compression Ratio: Variable.

Weight: 1.5 oz.

General Structural Data: Pressure diecast aluminium alloy crankcase with integral main bearing and detachable rear cover. Heat treated steel cylinder screwed into crankcase and seating on Vellumoid gasket. Two transfer passages formed in crankcase sides and opening into annular chamber feeding three cylinder ports. Hardened steel piston with bronze gudgeon pin and duralumin connecting-rod. One piece counterbalanced crankshaft. Steel contra-piston with heat-resistant plastic compression-ring. Red anodised duralumin finned cylinder barrel with fibre friction insert on compression screw threads. Spray-bar type needle-valve. Two point bulk-head type mounting.

Test Engine Data

Total running time prior to test: 1½ hours.

Fuel used: 40 per cent. ether, 30 per cent. Shell "Royal Standard"

kerosene, 30 per cent. Castrol "R" plus 2 per cent. iso-amyl-nitrite.

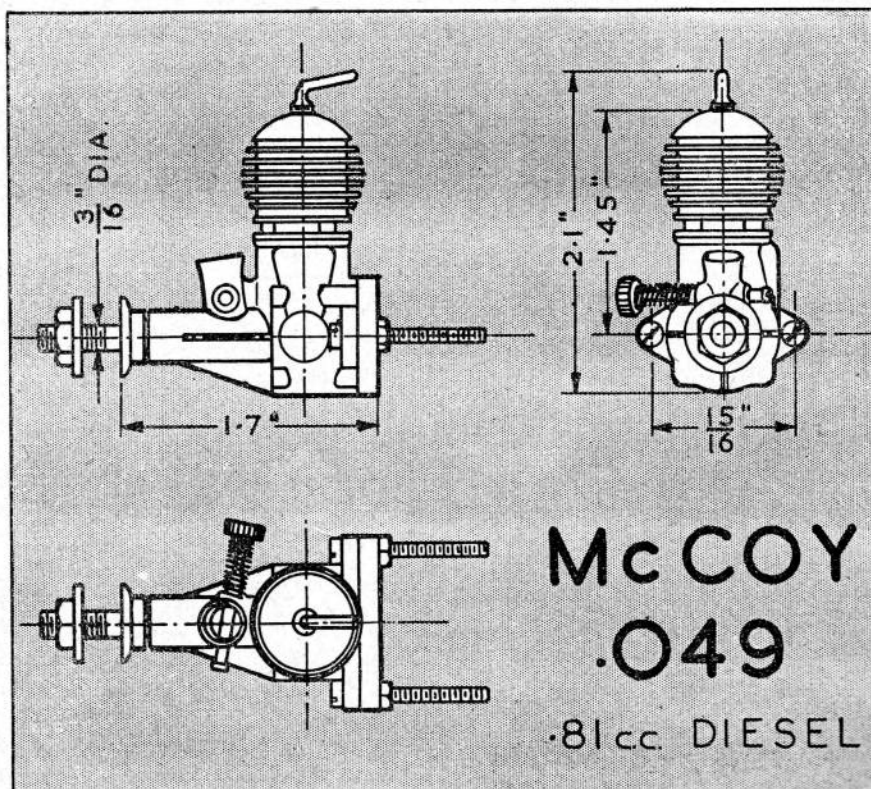
Performance

We have heard very conflicting reports of the "startability" of the McCoy diesel. When we first reported on this engine, we compared its starting qualities with those of existing British ½ c.c. diesels—neither foolproof nor instantaneous but not difficult. In three published reports from other sources, however, the McCoy was considered very easy to start, whereas, from two others (unpublished) it was thought to be "tricky," in one case, and "an absolute XYZ!" in the other.

Testing our own example again after a period of some weeks, we came to the conclusion that our original assessment was still right and this was confirmed by a well-known team-racing enthusiast to whom we had loaned the motor during this period and who had entered it in the Cambridge Team Race Rally. In this event, the McCoy powered racer had lapped at 50-51 m.p.h. on 30-ft. lines using a 6 × 6 Stant propeller. This was the highest speed of any "half-A" class model present and the McCoy was overhauling its slower competitors every fourth lap, but more frequent re-fuelling stops and slightly reluctant starting robbed it of a place.

The McCoy seems to like to be fairly wet for starting and we found that, even when hot, priming through the ports was the best method of obtaining a sure start. Actually, the engine is not critical to the actual starting drill adopted and does not flood easily, but the "suck in and one flick" type of start is not one of its attributes.

(Continued on page 31)



McCOY
.049
.81cc DIESEL



Engine Tests

(Continued from page 14)

Modern American "half-A" class engines are noted for their ability to rev at really high speeds and to deliver useful power at such r.p.m. This means that these engines are designed to maintain an even torque at the expense of low speed pulling power and the result is that the .049 engine is invariably operated at five figure r.p.m. and as high as 15,000 for competition purposes. The McCoy, although a diesel, maintains these traditions and is, quite definitely, a lot happier above 10,000 r.p.m. than below it. In fact, our own test engine fluctuated a good deal at lower r.p.m., making accurate test readings difficult and necessitating some "smoothing" of the performance curves.

Thus, the McCoy's maximum b.h.p. was realised at close to 14,000 r.p.m. The makers have claimed that the engine's output is 50 per cent. up on an equivalent glowplug engine and this is borne out by our test. The average conventional "half-A" glowplug model gives around 0.050 b.h.p., and the McCoy recorded just over 0.076 b.h.p. This is, of course, entirely due to the higher b.m.e.p. realised with the c.i. motor. Incidentally, with this engine

there is not a great deal of difference in starting qualities with light or heavy loads, whereas most diesels' starting qualities deteriorate badly when fitted with light, high-speed props.

The general running qualities of the McCoy diesel are good. At low speeds, after some 1½ hours' running time, there was still an appreciable power loss between initial cold starting and reaching normal running temperature but this was not applicable at peak speed. The engine remained remarkably free from vibration except when 15,000 r.p.m. were exceeded on one occasion and some difficulty was then experienced in holding compression settings despite the fibre compression screw thread insert fitted.

On our particular McCoy, there was a good deal of liberty in the main bearing and this resulted in considerable quantities of oil being sprayed out behind the prop. This would, of course, partly account for a seemingly high fuel consumption.

In conclusion, it should be mentioned that, although the makers strongly recommend the sole use of the McCoy fuel especially blended for this engine (and not available for our test) no deterioration of the plastic contra-piston ring sufficient to affect its excellent compression sealing properties, occurred during our tests using standard British fuels.

Power/Weight Ratio: (as tested): 0.81 b.h.p./lb.
Specific Output: (as tested) 93.8 b.h.p./litre.