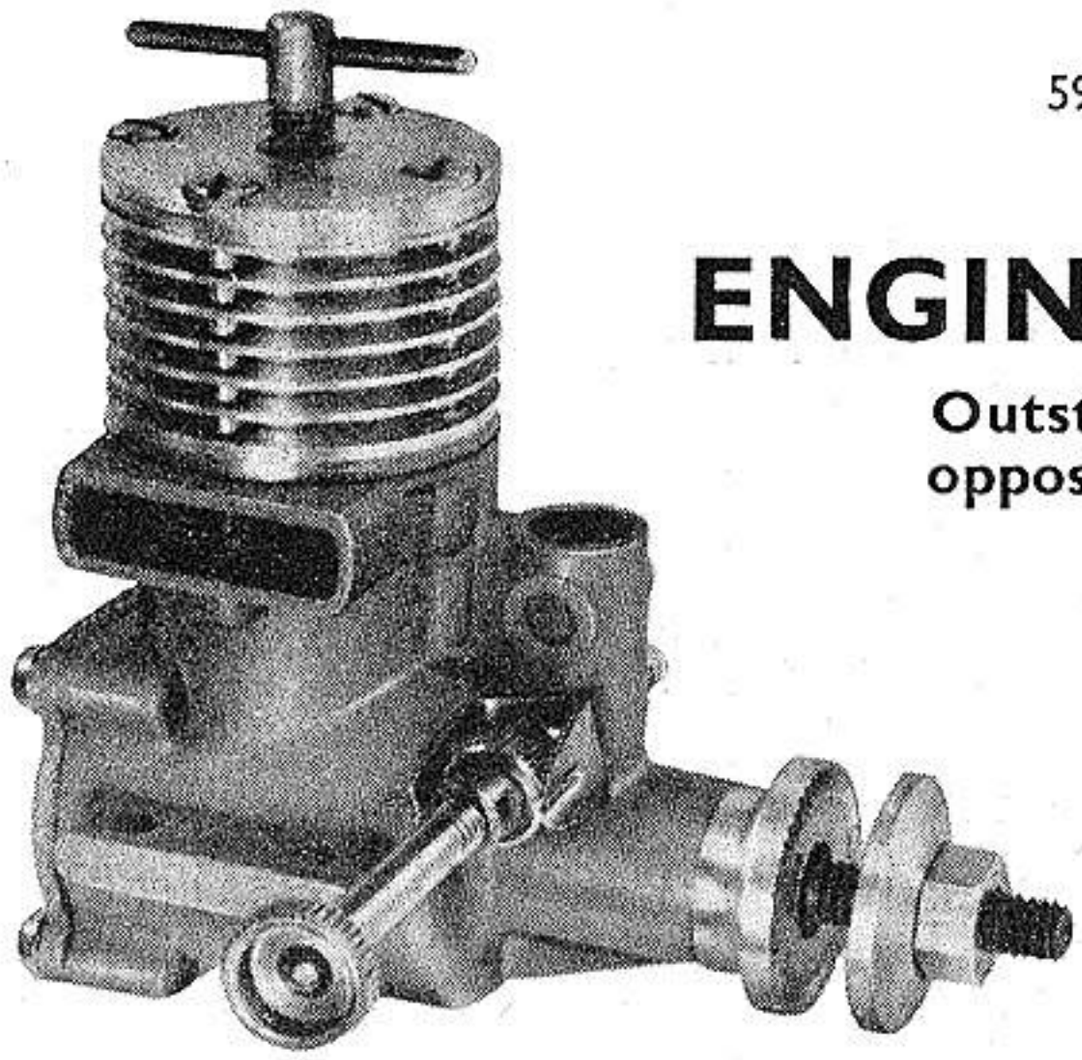


ENGINE ANALYSIS number 41

Outstanding 2.5 diesel from Japan with opposed porting and new design features

ENYA 15D

reviewed by R. H. Warring

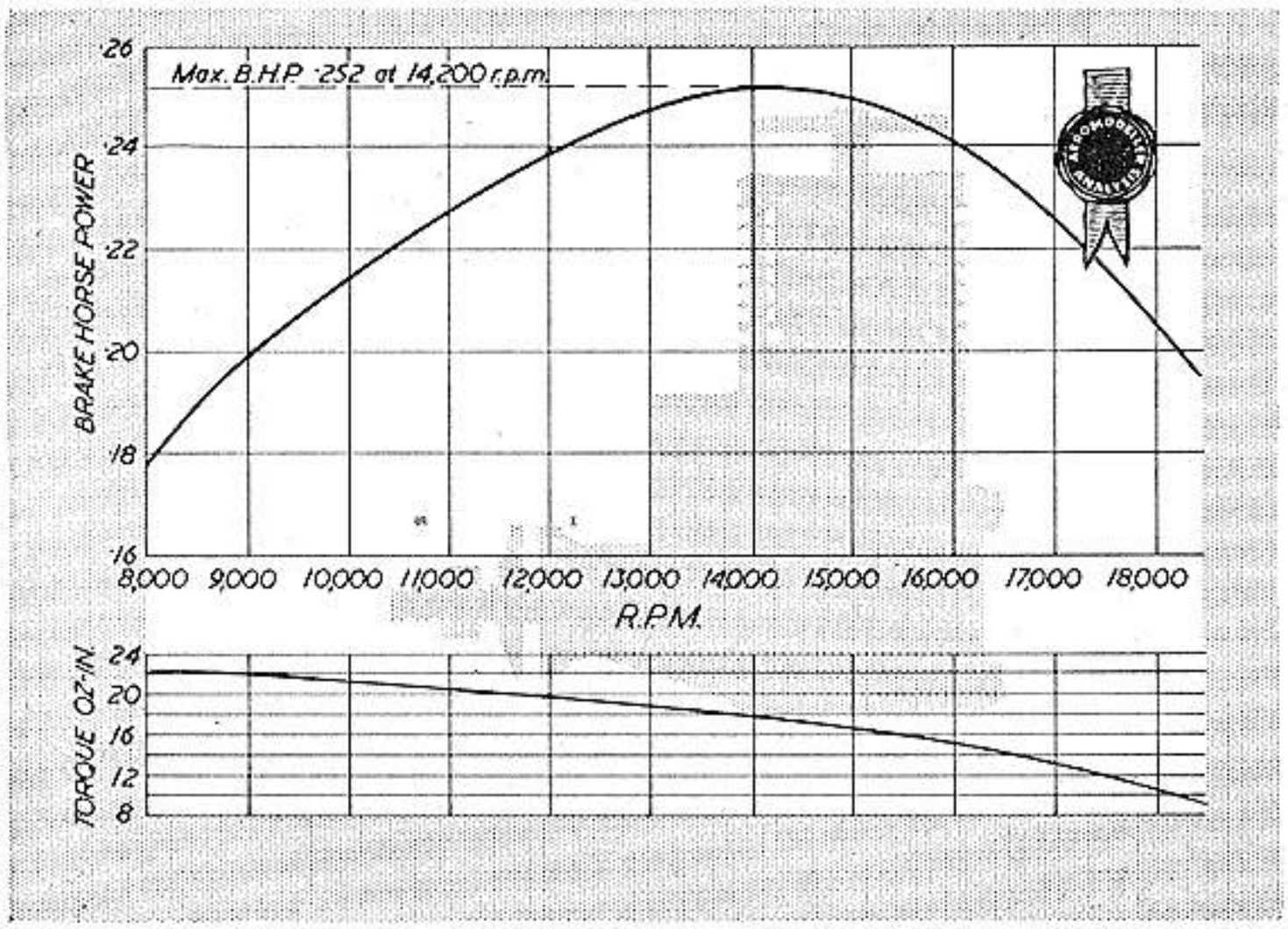
ONE HAS COME to expect outstanding engines from the leading Japanese manufacturers and the Enya 15 diesel is no exception. It is beautifully made, full of performance and especially interesting from the porting arrangement. It does, in fact, look more like a glow motor than a diesel in layout, but is actually quite different from its stable-mate, the Enya 15 glow.

Designwise the Enya 15 diesel departs from the usual circumferential exhaust and transfer porting arrangement and instead used diametrically-opposed transfer and exhaust ports of generous area, with considerable overlap, as on a typical glow motor layout, and the faster diesels. A difference, however, is that the transfer is not one main passage opposite the exhaust, but two passages cut in the lower cylinder casting in a fore and aft direction on what would be the side positions of a conventional transfer passage. These passages extend to the top of the casting and are sealed at the top end by the cylinder flange being bolted down (with two thin gaskets underneath). Insertion of the cylinder also effectively separates the two passages, except where they line up with the transfer port cut in the cylinder wall.

It is, of course, usual with this type of layout to have a deflector on the piston, but one cannot, however, be used with a contra piston, since the latter cannot be constrained against rotation and thus any "matching" shape would not necessarily stay "in line". A solution which has been tried in the past is to "step" the top of the piston as introduced by Mills Bros. to form the deflector. In the Enya the designer has utilised a conical topped piston—and quite obviously achieved a perfectly satisfactory gas flow throughout the cylinder.

Starting and general handling characteristics are excellent. Finger choking is adequate to prime. The exhaust note is peculiar, especially running rich and slow, but settles into a healthy roar. Hand starting remained easy right up to 6 in. diameter propellers and running was consistent and smooth at all speeds. The controls are nicely flexible and easy to adjust, optimum settings for any particular propeller load being obtained with a minimum of trouble. Peak power output on test was found to be slightly in excess of 14,000 r.p.m. but the excellent running characteristics are maintained up to beyond 18,000 r.p.m.

Workmanship is of the highest order throughout. The crankcase unit is a quite complicated pressure



SPECIFICATION

Displacement cement: 2·494 c.c. (·1517 cu. in.)
Bore: ·5895 in.
Stroke: ·5565 in.
Bore/stroke ratio: 1·06
Bare weight: 5⅛ ounces
Max. Torque: 22 ounce-inches at 9,000 r.p.m.
Max. B.H.P.: ·252 B.H.P. at 14,200 r.p.m.
Power rating: ·101 B.H.P. per c.c.
Power/weight ratio: ·049 B.H.P. per ounce

Material Specification:

Crankcase unit: light alloy pressure die casting
Cylinder: hardened steel (ground inside and out)
Piston: cast iron (honed)
Con. rod: light alloy casting; bronze big end bush
Bearings: Rear ball race; bearing sleeve brass or bronze (reamed)
Crankshaft: heat-treated carbon steel
Cylinder jacket: aluminium (turned) with steel insert for compression screw
Spray bar assembly: nickel plated brass (flexible needle valve extension)

Manufacturer:

Enya Metal Products Co.,
5533 Araicho Nakanoku,
Tokyo, Japan

die casting in light alloy. The main bearing sleeve is of brass or bronze cast in and merely reamed to size. A ball race press or shrunk fitted into the front of the crankcase forms the rear bearing and effectively takes most of the load, such is the shaft fit that one can spin assembly more readily than many a twin ball-race unit.

A generous diameter flange is machined on the steel cylinder to seat on the crankcase casting, with the two ports cut in the walls below the flange. It is an extremely close fit in the casting and the turned dural cylinder jacket a "plug" fit over the cylinder. Four assymmetrically placed screws through the cylinder head then hold the assembly in place, one screw being longer than the others and fitting on the exhaust side.

The cast iron piston is quite light in construction with a honed finish and is an excellent fit in the bore, its skirt is cut away on the transfer side to avoid masking the transfer passage at the bottom of the stroke.

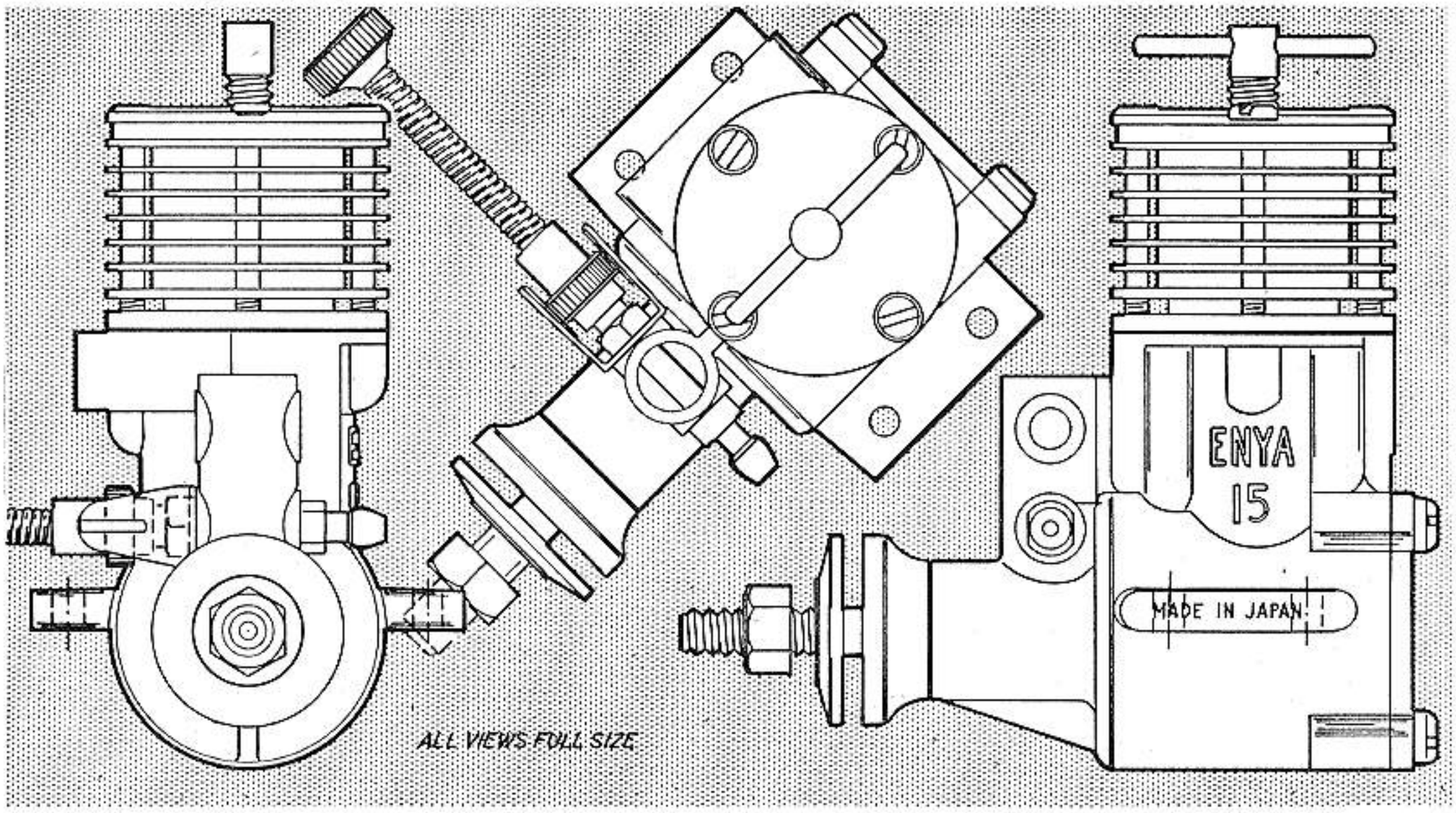
Connecting rod is a light alloy casting, with a bronze bush for the big end bearing. It is quite substantial in size to accommodate the ¼-in. diameter crankpin and ·197-in. (5 mm. brass end padded hollow gudgeon pin. Crankshaft diameter is ·3935 in. (10 mm.), stepping down to 5 mm., for the threaded length. The induction port in the shaft is circular and the shaft hole extends up the length of shaft past for lightening, crank web is partially machined away to form a crescent-shaped counterbalance.

Other interesting features are the fitting of a steel insert in the head to take the compression screw; the back cover (the fit of which, incidentally, emphasises the close tolerance held on the castings) attached by four short screws instead of screwing in; the use of typically Japanese nickel plated screws throughout and the nickel plated spraybar unit and needle valve assembly, and the really robust flexible extension of the needle valve. Provision is made for the fitting of a second spray bar and needle valve at the upper end of the intake tube for two-speed operation, although this is not drilled out on the standard model.

Propeller dia. x pitch	*r.p.m.*
9 x 6 (Frog nylon)	9,400
9 x 4 (Stant)	10,400
8 x 9 (Stant)	13,500
8 x 5 (Stant)	12,500
8 x 6 (Stant)	11,000
7 x 6 (Stant)	13,600
7 x 4 (Stant)	15,000
9 x 3 (Tiger)	12,200
8 x 3½ (Tiger)	15,000
8 x 4 (Tiger)	14,000
6 x 9 (Tiger)	14,600
7 x 9 (Tornado)	12,000
11 x 4 (Trucut)	7,600
10 x 4 (Trucut)	8,000
9 x 4 (Trucut)	11,200
8 x 4 (Trucut)	13,600
7 x 4 (Trucut)	16,000
7 x 3 (Trucut)	17,300

Timing is fairly conventional by modern high performance standards. The intake opens about 100 degrees before top dead centre and closes some 45 degrees after top dead centre. Both the exhaust and transfer open rather later, which is usually an advantage in extracting the utmost power from the charge and a feature which can be tolerated much more with the type of porting used. The exhaust opens approximately 120 degrees after top dead centre and the transfer approximately 20 degrees later. Bore and stroke approximate the E.D. Racer, but the use of opposed porting has given far greater over-lap.

Summarising: a truly excellent 2·5 c.c. diesel in all respects, and also a very rugged engine achieved at little or no weight penalty. It is also the first of the *high* performance diesels to appear with "glow motor" style porting—(not forgetting the much earlier Super Tigre 5 and 6 c.c. engines of moderate output)—a design feature, we feel, which will soon be followed by other engine designers, because in the Enya at least it certainly gives top performance.



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