D.H.60 Moth

A 48in. wingspan near scale D.H. 60 'Cirrus' Moth for .15-.20cu. in. engines and 3-function radio control

Introduction

The D.H. 'Moth' was one of the most successful light aircraft of all time and was used to break many of the existing duration and distance records for aeroplanes of that category. Few changes have been made to the model to affect scale accuracy, a revised wing section is used and the nose cowling has been simplified (the 'Cirrus' engine version has been selected, although the model could be adapted for the 'Gipsy' or 'Hermes' versions). No ailerons are fitted, with the scale dihedral used, the rudder gives excellent control and ailerons would have only limited effect. The prototype was flown with a Veco 19 engine and this proved to be more than adequate in power, a high performance .15 would certainly be sufficiently powerful and a '20' size four-stroke engine ideal. Use a large diameter fine pitch propeller (i.e. a 9in. × 4in. or 10in. × 3½in.) to keep the engine speed low and provide good ground acceleration.

Construction

Read the instructions through completely and check through all the parts and identify them with the plan. White glue (PVA) may be used for all construction except for wood/metal joints, where a slow drying epoxy should be used. Excessive application of glues adds unnecessary weight — the strongest joints result from accurately mating surfaces and minimum adhesive. Protect the plan with clear plastic or wax rubbed on the drawing.

Wings

The upper and lower wings are basically the same except for the centre section units, the outer panel root sections and the interplane strut fittings. Note that the lower wing spars extend to the wing tip, top spar terminates at the tip rib. Upper and lower wings are constructed in three panels — port, centre and starboard — and joined with dihedral braces at a later stage. Pin down the 3/16in. sq. lower spars and lower 1/16in. × 1in. trailing edge strips to the port and starboard panels for the lower wing. Glue the 1/8in. wing ribs and 3/32in. ribs ensuring that all ribs are vertical, except the root rib which should be angled to the dihedral template. Glue the 3/16in. sq. top spar and leading edge into position plus the 1/16in. × 1in. top trailing edge. The 1/16in. × 1in. vertical grain webbing is fitted to the first two root rib bays and thence and thence in alternative bays. Butt joint the 1/16in. × 2in. leading edge sheeting to the top spar glue to the ribs and to overlap the leading edge. Join 1/8in. wing tip pieces and set aside to dry. Fill in between the trailing edge strips at the two root bays and tip area with 1/4in. × 3/4in. trailing edge stock reinforcement. Build up the lower spars at the tip with 3/16in. × 1/4in. at the front and 3/16in. sq. at the rear spar to give the wing tip a cambered section, (this improves the appearance of the model when viewed from the side). Add 3/16in. × 3/8in. fairing pieces to the upper surface of the tip. Interplane strut fixings are produced by drilling a small hole (1/32in.) in the 1/4in. sq. hardwood crosspiece inserting a small split pin bending over the ends of the pin above the hardwood and epoxying in position. When the panels have been removed from the building board — when the glue has thoroughly dried — and sanded, the strut fixings can be glued in position with the upper surface of the supports lining up with the upper edge of the ribs and sheeting. Reinforce the ends of the hardwood with scrap balsawood where they butt joint onto the ribs.

Make up the port and starboard upper wings in a similar manner but with the addition of 3/16in. root fairing to allow the curved rear root outline. Glue the strut fixings to the underside of the wing panels, flush with the ribs.

The lower centre section has a similar construction to the standard wing section with the addition of the grooved 1/4in. × 1in. undercarriage support — cut slots in the ribs to house this support. Construction of the top centre section follows the same procedure, using 3/16in. × 3/8in. rear and top front spars, 1/8in. ribs, 3/8in. × 3/4in. leading and

Pretty as a picture - and functional too! The '20' size Moth is ideal for weekend sports flying, small enough to fit in the boot of the car, large enough to fly realistically.

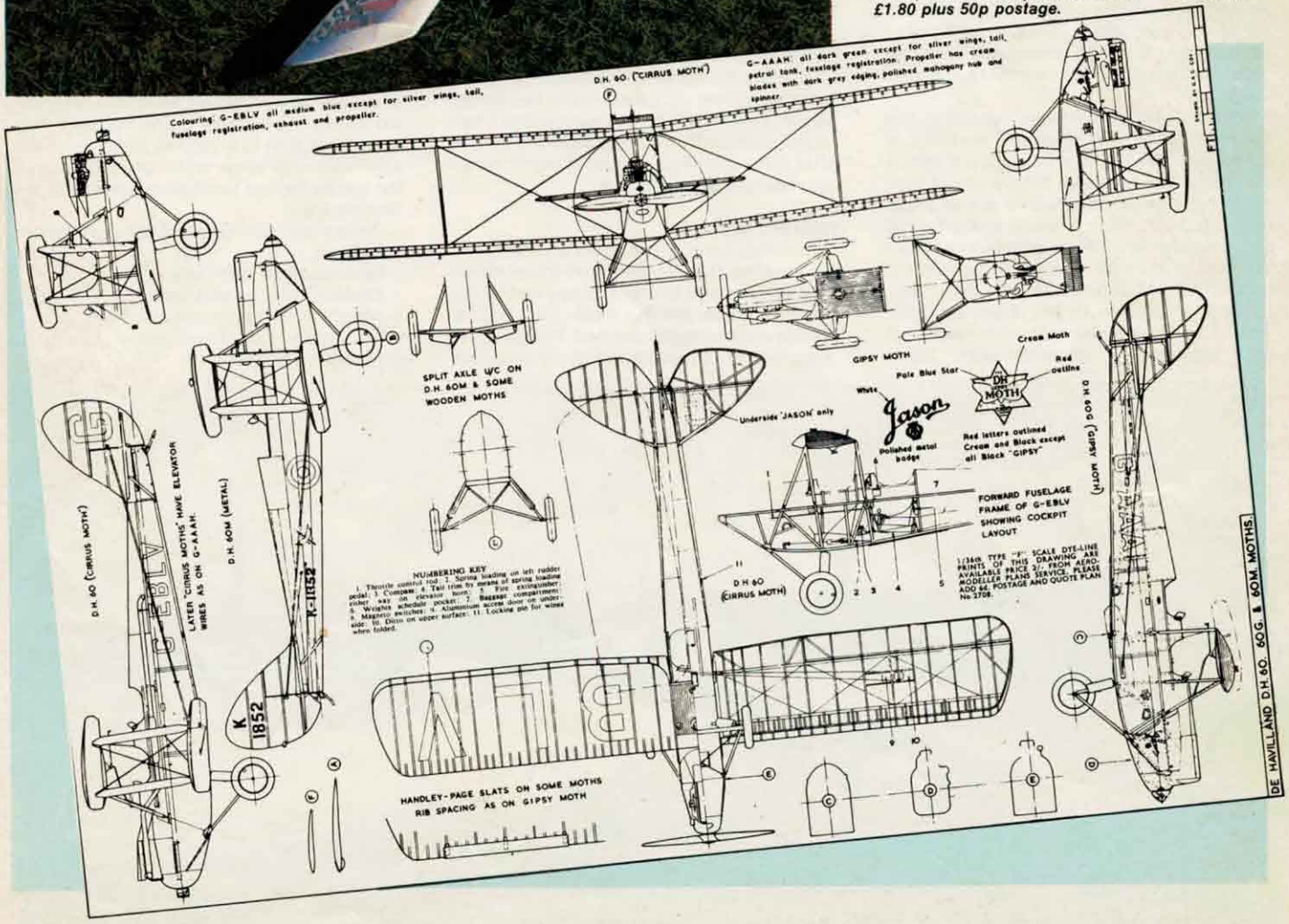
Moulded ABS cowling for the Cirrus type Moth are available from MAP Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts. HP2 4SS.
SEE NEXT MONTH FOR SPECIAL OFFER OF COWL AND DECALS.

For details of a full kit for the 'Moth 20' write to Sport and Scale, 3 East Street, Irchester, Northants NN9 7AQ.

trailing edges. Sheet the top of the section with 1/16in. balsa and add the vertical 1/16in. webbing between the top and bottom main spars. Drill wing fixing locating holes in the 5/16in. × 9/16in. beech cross piece to accept the pianowire spigots, and glue to the underside of the centre section. A length of 4BA clearance tubing is glued to the trailing edge and reinforced with scrap 3/16in. sheet. Sand the centre section to the profile shown on the side view, the front of the underside is left open to receive the pianowire front wing fixing and 1.5mm plywood reinforcing plate.

Cut slots in the appropriate ribs in the centre section and outer panels for the 4mm plywood front and 1.5mm plywood rear dihedral braces — a razor saw is ideal for this operation. Check for the fit of the braces and glue them to the centre sections only with the correct alignment. When these have set the outerpanels may be glued to the centre section and dihedral braces. Aim for a close fit between root ribs and prop the wing tips up by 1in. under the tip ribs for the correct dihedral.

Copies of Plan Pack No. 2708 (1/36th, 1/48th scale drawings and history) are available from MAP Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead, Herts HP2 4SS, price £1.80 plus 50p postage.



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Free decals for the Moth 60 in the January RCM&E

Fuselage

Plan your radio equipment installation to ascertain the positions of the 3/8in. sq. beech servo bearers, holes for the throttle linkage, switch and rudder and elevator linkages — closed loop linkage may be incorporated if preferred. The cabane assembly has been simplified by using 1/8in. × 1/4in. beech cabane struts but these must be firmly anchored at the fuselage and top centre section support. The struts can be strengthened by the addition of 18g pianowire vertical supports if desired. Cut the beech struts accurately to length and round off corners of struts except where there is a joint. Pin down the 1/8in. fuselage port sides and glue the cabane struts into their slots. Do the same for the starboard side. Mark on the inside of the fuselage sides, the positions of 1/4in. nose doublers, 1/8in. top doubler — with slots cut for servo bearers — 1/8in. bottom doubler, 1/8in. × 3/8in. uprights, and 1/8in. × 3/8in. stern post. Glue doublers, uprights and 3/16in. sq. bottom longeron to the sides, and mark the positions of 3/8in. sq. hardwood engine bearers and 3/8in. balsa doubler. Pre-drill pilot holes for the engine mounting plate in the bearers and then glue them, and the 3/8in. doublers, to the 1/4in. doublers. Glue former F2 to F1 and this combined former plus formers F3, F4, F5, F6 and F10 to the fuselage sides, checking for 'squareness' by bringing together the sternposts temporarily. Sand the stern posts until the inside surfaces meet correctly and glue these surfaces together after fitting formers F7, F8 and F9 with 3/16in. sq. crosspieces in place. Bend the pianowire tailskid to shape, cut the 1/4in. balsa wood filler piece and house the end of the tailskid in the filler piece. The vertical area of the tailskid can be epoxied to the sternpost and reinforced with scrap balsa or by binding with thread. The 1/8in. skid fairing may be glued and bound to the pianowire at a later stage.

Glue the pre-drilled servo bearers to the fuselage sides and doublers — there is sufficient room to fit three standard servos abreast in the fuselage. Fit a piece of 1/8in. sheet between the bearers to act as a fuel tank bay floor, there is ample space for the 4oz. fuel tank to fit in the compartment, but the tank should be positioned *before* the engine is fitted. Bind and solder the undercarriage as shown in the drawings, later 'Moths' had split axles more reminiscent of the 'Tiger Moth' undercarriages. 2 3/4in. balloon wheels may be used or 3 1/4in. diameter vintage style wheels. Sew the crosspiece of the front strut to the bottom edge of former F3. Slow drying epoxy may be applied to this joint *after* the 3/8in. lower sheeting and rear sheeting but the front strut must be rotated occasionally as the adhesive is drying, to allow for eventual movement when fitting the wings.

Check the .4mm plywood front decking for fit around the cabane struts, and when satisfied with the accuracy of the fit, glue the decking to the formers and fuselage sides (with an overlap of about 1/8in.). The cockpit openings may be marked on the decking but the holes should not be cut until the decking is glued in place. Fit the .4mm plywood rear decking also. Sand the fuselage rounding-off the nose area, and drill holes for the lower wing retaining dowels and fit the 1/8in. infill behind the lower wing.

Screw a 4BA anchor nut to the underside of the 1.5mm plywood top wing platform to coincide with the 4BA clearance tube in the centre section. Glue the 1.5mm plywood plate to the top surface of the platform, bend the pianowire spigots and bind and epoxy these to the platform and plate. Glue the 3/16in. fairing to the underside of platform and sand to blend with the top centre section. Epoxy (24 hour) the platform to the cabane struts, filleting the joints for an extra strength.

Mount the engine and engine plate onto the fuselage and trim the cowl moulding to fit over the engine. The cowl overlaps the fuselage sides and decking can be fixed by a dowel into a balsa fairing and small wood screws into hardwood blocks. Reasonable inlet and outlet areas for engine cooling must be retained. Undercarriage fairings are constructed from two pieces of 1/8in. × 5/8in. balsa wood joined around the rear U/C leg.

Tail surfaces

All of the tail surfaces are from 3/16in. sheet balsa wood and only require joining, lightly sanding, and the edges rounding off to a half round section. Control surfaces are hinged after finishing, with pieces of mylar hinge cyanoacrylated in position.

Interplane struts

Accurate sizes of the struts are shown on the drawing, the 20g pianowire lower hooks may be bent and bound and epoxied to the struts — these are cut from 1/8in. × 9/16in. spruce and the edges rounded. The top of the interplane struts are permanently anchored to the upper wing by slipping the split pin through the strut fixing pin in the wing before epoxying the ends of the pin into the hole drilled in the top of the strut. A small rubber band may be needed to retain the hooks in the pins at the lower fixing — a slight kink in the hook should also assist in the retention.

No rigging is required structurally but decorative rigging in the form of elastic cord, may be added. There are a number of books, plans, and plastic kits dealing with the D.H. 'Moth' to use as guides for decoration and detailing. Pack No. 2708, available from MAP Plans Service, PO Box 35, Wolsey House, Wolsey Road, Hemel Hempstead HP2 4SS, price £1.80 plus 50p postage gives full details.

Finishing

With such a great variety of commercial finishing materials now available, it is impossible to go into all the alternatives. For maximum strength it is preferable to use nylon covering as this is both durable and cheap. Do make sure that the interior of the engine bay and fuel tank area are well fuel proofed, and drill a small hole in the underside sheeting (just forward of F3) to drain off the excess oil and fuel.

Add period details of your own requirements i.e. insignia, pilot (1/8th scale) exhaust manifolds, etc.

Flying

Providing you keep within the C of G limits and have flown training and sports R/C models before, the 'Moth' should give you no worries. Despite its biplane configuration, this model can be hand launched quite easily. This is a great advantage when flying from rough grassed sites.

Take-offs from tarmac and smooth grass pose no problems, but avoid the instinct to over correct on steering. Well trimmed, this model requires very little rudder correction on take-off. Landings with power on or 'dead stick' are comparatively slow, but with the extra drag of a biplane, the rate of descent is quite high. Aim to bring the 'Moth' in on the approach with some motor on, reducing to the lowest setting just before you reach the landing spot.

Control surface movements suggested are as follows:

Rudder: 1 1/8in. each way;

Elevator: 1/2in. up and down;

Weight of the prototype was 3 1/2lb.

We hope you have many hours of enjoyment with the 'Moth'.