

DH PUSS MOTH

An 18½ in. span
rubber-powered
scale model by
our scale
columnist
ERIC
COATES



BEFORE, during, and just after the last war, the *Puss Moth* was probably the most popular subject for a scale rubber powered model. Several plans, of varying scales, were published and quite a number of kits were marketed by a variety of manufacturers all, alas, now fond and distant memories. The most popular scale was ½ in.=1 ft. (1/24th). Examination of photographs of these old models, however, reveals that in many cases the designers took considerable liberties with the outlines of the *Puss* and virtually all paid scant respect for a scale structure.

In my model, the first rubber-driven scale model I have ever designed, I have tried to incorporate as near to a scale structure as possible, utilising some of the techniques evolved over many years of powered scale model designs, but also freely 'crib-

bing' methods employed by the acknowledged expert on this class of model - Doug McHard. The tail surfaces, however, are slightly enlarged from true scale and a small amount of dihedral is incorporated - this latter modification I personally feel is an improvement in the appearance of the full sized *Puss*; which always gives a droopy appearance with its dead flat wings! The wing section is also flattened on its lower surface to make for easier building and slow the flying speed down a bit.

Fuselage

Start with the fuselage, which is the simplest part. Two basic fuselage sides are made from medium-hard 1/16 in. square. Omit the stringer along the fuselage centre line at this stage (see sketch 1). I recommend PVA as an adhesive for most of this model, to eliminate structural warps. Cut out the fuselage formers F1 to 4, then join the two basic sides with formers 3 and 4 and fit all the intermediate cross braces between them (see sketch 2). Crack the longerons at former 3 and join at the nose with 1mm. ply former 1. Join the longerons together at the tail. Add formers 2A, 2P and 2S and the 1/16 in. sheet tailplane platform. Fit the remaining cross members followed by the centre line stringers - note these are carried over the cross members aft of former 3 but are flush forward of this point. The top and bottom stringers are now added; they are of a softer grade of balsa to allow them to bend edgewise on. The lower part of the U/C is now formed from 22swg wire and epoxied to the appropriate cross members. The fuselage structure is completed by adding the 3/32 in. sheet cowl bottom and wrapping 1/32 in. sheet round the nose between formers 1 and 2. This process is facilitated if the outer surface is thoroughly soaked first - licking is the best way of achieving this!

Tail surfaces

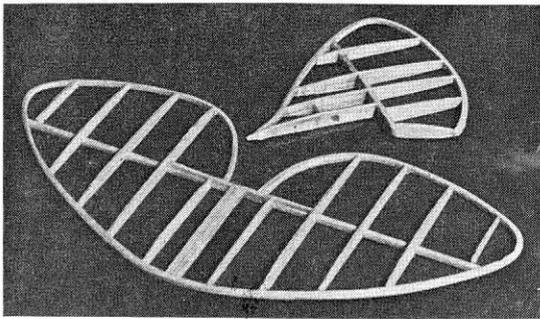
The secret of making a good job of the tail surfaces lies in the outlines. The sheet segments, beloved by the kit manufacturers, I find hideous, therefore I recommend everyone to have a go at laminated outlines. As many regular readers know I usually fabricate my tail structures on a centre core of 1/32 in. sheet but on a model as small as this such a structure would be far too heavy. I still use a centre core for the construction of the outlines though. Cut templates from 1/16 in. sheet to the exact shape of

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I am indebted to Vivian Bellamy, G.P., of the nearby village of Botley, Hants, who allowed me to crawl over G-AEOA to measure and take photographs. Dr. Bellamy virtually rescued G-AEOA from the scrapheap in the 1960s - completely remaking the wooden wings and tail structure which had rotted with the ravishes of time.

Although the model is no beginner's project it is not difficult for those with a delicate touch. If you have built nothing but R/C models for years though and fancy having a go I would suggest an intermediate model such as a Keil Kraft *Senator* or *Ajax*;



the *inside* contour of both the tailplane and fin then rub a candle round the edges. Cut several strips from 1/64 in. sheet (or 1/32 in sanded down) 1/16 in. wide. Thoroughly soak these, then wrap round the contour of the template – pinning where necessary. Apply PVA to the outside and apply a second strip. Repeat for a third strip and then put aside overnight to dry. When removed from the template after drying you will be surprised at the rigidity of the contour.

The tailplane is then constructed conventionally, the ribs being made from 1/8 in. strips of soft 1/32 in. sheet. Sand to contour after assembly. The fin is a little more tricky as the 1/16 in. square spar passes through the centre of the ribs. The fin post is formed by adding extra 1/16 in. sq. to either side of the spar up to the third rib.

Wings

The tips are produced over a template in a similar manner to the tail contours just described.

Three rib templates are required: 2 off R1 and 1 off R2. All ribs are from the lightest quarter grain 1/32 in. sheet. Eight off R1 are made for the in-board parallel portion of the wing. The root rib is merely a strip of 1/8 in. x 1/16 in.; the tapered ribs are produced 'block' fashion – 9 pieces of 1/32 in. sheet sandwiched between R1 and R2. The main spar and L.E. slots are cut in the ribs 'en masse' by means of a 1/16 in. diameter drill and a Swiss file where the trailing edges of the outer four ribs are individually modified to suit T.E. structure. The tip rib is fitted as a piece of 1/32 in. x 1/4 in. strip, sanded to contour, in situ, after the tips are fitted.

The T.E. is pinned down to the plan, and all ribs slotted into the 1/16 in. x 3/16 in. spar and spaced at their correct stations. The spar is then pinned to the plan and the T.E. glued to the ribs. The L.E. is then slotted in and glued to the nose ribs – note both the L.E. and T.E. have scarf joints in them. The preformed tips are now attached to the L.E. and T.E. and the leading edge is now sheeted on the upper surface. It is recommended that the contour is preformed by coating the inside face with balsa cement and allowing to dry before attaching to the ribs. The L.E. inboard of the last R1 is blocked in. The whole structure is now lightly sanded.

Prop Assembly

The propellor is carved from a block of light balsa. If the blank shown on the drawing is worked to and undercamber is incorporated an efficient propellor, of only 4 1/2 in. diameter, will be produced. It won't be very scale like in appearance but it will produce the required power for about a 30-40 sec. run. A commercial plastic prop is useless for this model. The noseblock is carved from soft balsa. The journal bearing is 18 swg brass tube epoxied in place with 3° downthrust incorporated and the 18

swg prop shaft incorporates a free wheel – a thrust race is preferable to a couple of cup washers. The noseblock is located into former 1 with a 3/32 in. sheet spiggot.

Covering

On the original the fuselage was covered with red lightweight Model-span, the flying surfaces with white Jap tissue, using thinned dope as the adhesive. The covering was water shrunk and given one coat of thin clear dope.

Final Details

The cabin is covered with very thin celluloid. Take a postcard and dope it aluminium on one side, then cut into strips with a balsa knife and glue them over the celluloid, with impact adhesive, to represent the aluminium framing. Wing struts are made from 1/8 in. x 1/16 in. balsa. Colour dope was used only on the sheeted nose and the struts, on the original, to keep the weight down, registration letters being cut from heavyweight black Modelspan tissue doped on. The fuselage registrations were outlined in white ink while the upper surfaces of the wing tanks were represented with white paper. The control surface hinge lines were done with a lining pen containing thinned grey dope.

Assembly

The whole model is assembled using balsa cement. Nothing knocks off as with a light model such as this one can fly into obstructions with impunity. For trimming purposes, however, I would recommend that the fin be attached to the tailplane but that the latter be held to the fuselage with rubber bands.

Flying

The model was designed for indoor flying in large hangars, though it will fly very well outdoors on a calm day. I would recommend in any case that trimming is carried out in the open over grass. Insert the motor and pretension. Ballast the model with plasticine to the C.G. position shown on the drawings then adjust rudder angle and tailplane incidence until a long straight glide is obtained.

Apply about a hundred turns and launch. Adjust the thrust line, by packing the nose block, until a straight flight with a slight turn to the left is attained – increase the number of turns slowly so that a left climbing turn is achieved. Using 1/32 in. Pirelli, 600 turns are about the normal maximum. For hangar flying aim to make the model turn in about 60 ft. diameter circles; climbing to about 40 ft. maximum the glide should be in wider diameter circles still to the left. When this has been achieved the tailplane can be glued permanently to the fuselage and any subsequent trim changes can be achieved by warping the tail surfaces and ballasting.

