FROG TRADE MARK

"TUTOR"

39" SPAN FREE FLIGHT MODEL
FOR FROG 80D AND 100 MK II ENGINES

CAT No. 676KP.

SPECIFICATION	
LENGTH (O.A.)	26 in.
WING AREA	216 sq. in.
WEIGHT	11 ozs.

R. S. P.

ALL PARTS ARE BALSA UNLESS STATED OTHERWISE

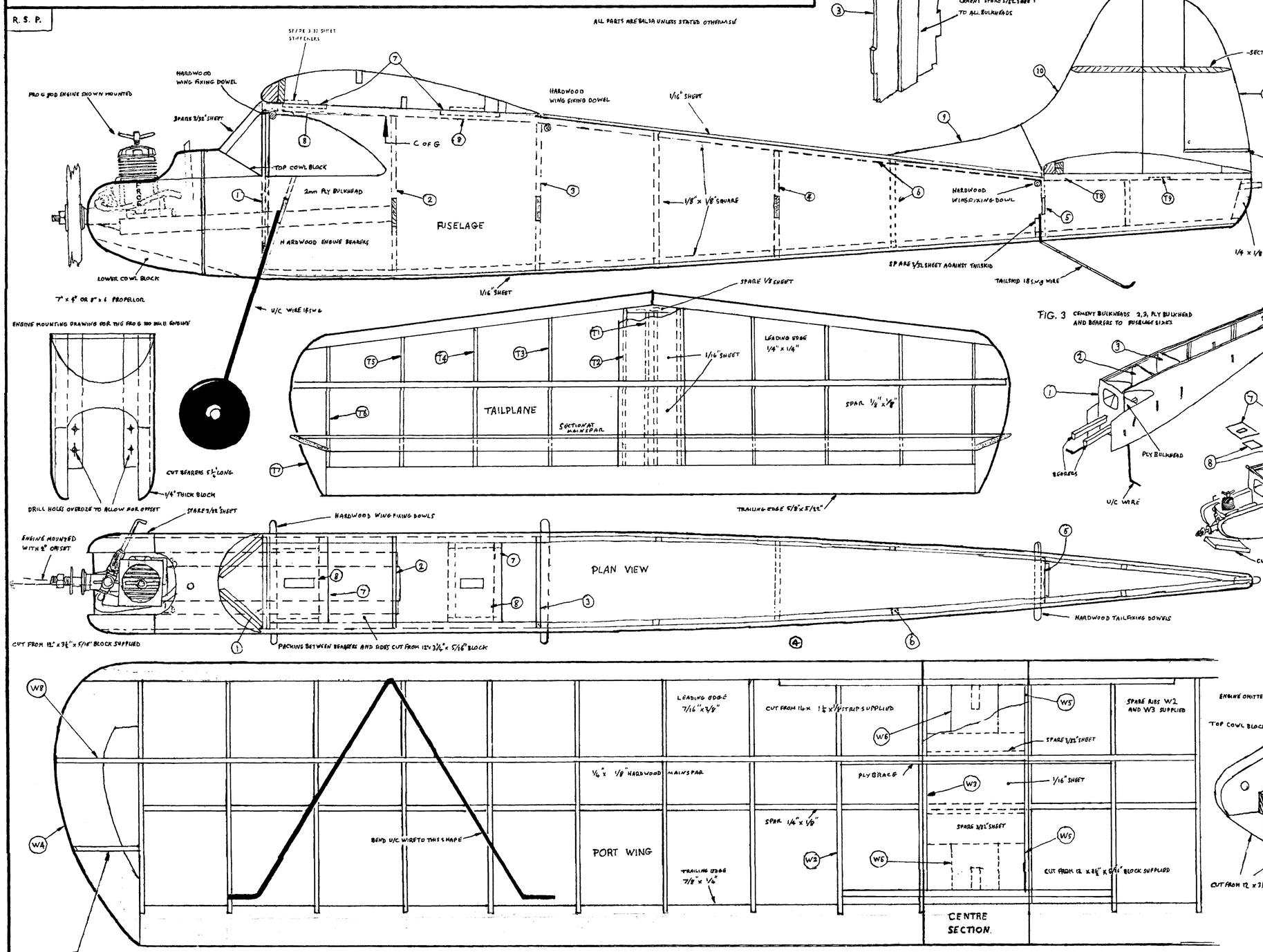


FIG 1 CEMENT 1/8" x 1/8" STRIP TO FUSELAGE SIDES

FIG 2 BIND AND CEMENT U/C LEG TO PLY BULKHEAD

FIG. 3 CEMENT BULKHEADS 2,3, PLY BULKHEAD AND BEARERS TO FUSELAGE SIDES

FIG 4

FIG. 5

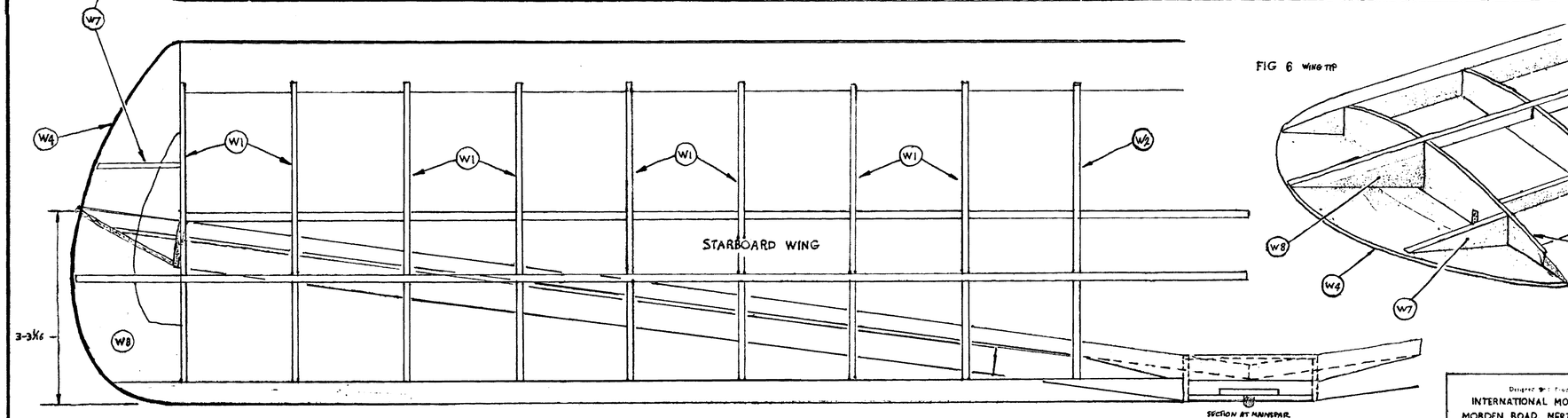


FIG 6 WING TIP

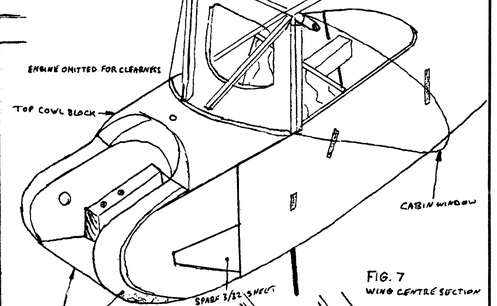
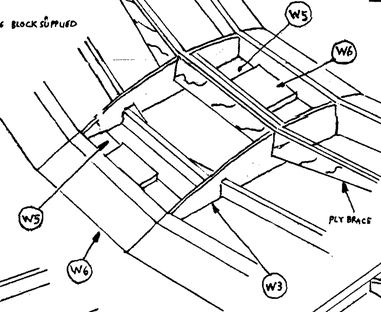


FIG. 7 WING CENTRE SECTION



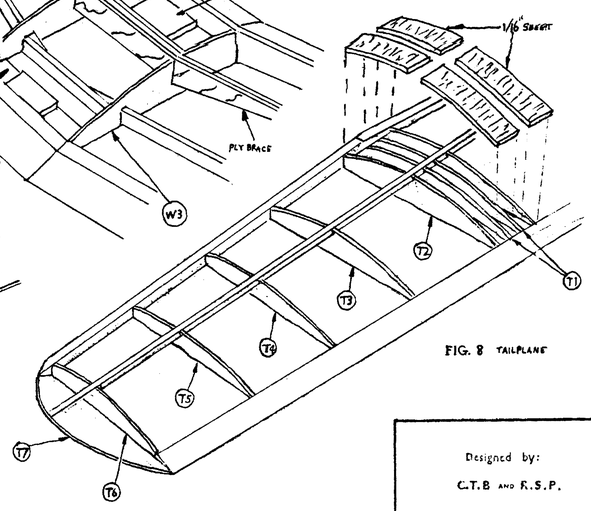


FIG. 8 TAILPLANE

Designed by: C.T.B AND R.S.P.

Designed and Engineered by
INTERNATIONAL MODEL AIRCRAFT LTD,
MORDEN ROAD, MERTON, LONDON, S.W.19.

BUILDING INSTRUCTIONS.

Read these instructions carefully before commencing.

FUSELAGE. Remove fuselage sides from their panels using a sharp razor blade or balsa knife. Check that they are identical. (It may be necessary to sandpaper one to match the other). Cement 1/8in. x 1/8in. strips to the sides, as in Fig. 1 (shown shaded on the side view drawing). **Make sure to build one side opposite to the other.** While these are drying, cement lengths of scrap 3/32in. balsa sheet to all bulkheads to stiffen them. Bend the undercarriage wire to the shape shown on the drawing and mark its position on the ply bulkhead. Drill holes where indicated, Fig. 2, then bind the undercarriage wire to the bulkhead using strong thread. Assemble this unit to the fuselage sides together with bulkheads 1, 2, and 3. When these have set, cut the engine bearers to length and cement them in place, Fig. 3. Chamfer the rear ends of the fuselage sides as shown on the plan view of the fuselage and cement together after the bulkheads 4, 5 and 6 have been assembled, Fig. 4. Drill the holes in the bearers and mount the engine — with the throttle needle removed. Cut the cowl side blocks to shape from the 12in. x 3/4in. x 5/16in. block supplied and cement them in place between the engine bearers and the sides back to bulkhead 1. Scrap 3/32in. sheet fills in the space from the fuselage sides to the front. Bend the tailskid to shape; this is made from the small piece of 18 s.w.g. wire supplied. Cement it to bulkhead 5 with a piece of scrap 3/32in. sheet to hold it in place. Fix parts 7 and 8 together and cement them in place between the fuselage sides. The spaces between bulkheads 2 and 3 can be filled in with 1/16in. sheet if desired. Cement the fin part 9 in position. The rest of the fuselage can now be covered with 1/16in. sheet cross grain. Shape the lower cowl block and cement it into place. Cut the wing fixing and tail fixing dowels to length and cement them into position. Shape the top cowl block, Fig. 5, and cement it in place. The tank for filling the fuel tank is optional; as an alternative the top cowl can be cut away until the tank is accessible. Cut the front cabin struts to length from scrap 3/32in. sheet and cement in place. Shape the front of the fuselage with a balsa knife, and sandpaper the whole structure smooth. Trim the cabin window to fit round the wing-fixing dowel and cement in place, starting at the centre.

WINGS. Commencing with the Port wing, pin the leading and trailing edges down onto the drawing. Lay a piece of greaseproof paper over the drawing to prevent the structure sticking to it and cement ribs W1 in place. Then, fix parts W7 and W8 to the wing tip W4 and cement this unit to the last rib, supporting it in an uptilted position, Fig. 6. Cut the hardwood mainspar accurately to length, chamfer the ends to match the wing tip W4, and cement it into position. Build the starboard wing in the same manner. When Port and Starboard wings are set, remove them from the drawing. It is easier to fit the lower spar after assembling the wings. To build the centre section, pin the leading and trailing edge pieces down. Cut a block 3/4in. x 1in. x 5/16in. and cement it to the trailing edge, also a piece 8in. x 1/2in. x 1/8in. and fix it to the leading edge. Cement ribs W3 in place, cement parts W5 and W6 together, then cement them between ribs W3, Fig. 7. Leaving the centre section pinned down, cement the wings in place with the tips raised to the required dihedral, 3 1/2in. at the tips. Fix the pre-cut ply brace behind the mainspar, and cut a piece of scrap 3/32in. sheet and cement it in front of this spar. Remove the assembly from the drawing, fix the ribs W2 into position, and cement the lower spars into place, followed by a piece of scrap 3/32in. sheet to join them. Cut the piece of 3/16in. dowel into two equal lengths and cement them into the slots in parts W5. Cover the top of the centre section with 1/16in. sheet. Shape the leading edge, as shown in the side view, and sandpaper the whole structure smooth.

TAILPLANE AND FIN. Pin the leading and trailing edges of the tailplane to the drawing, cementing the two leading edge parts together at the centre. This joint is braced with two pieces of scrap 1/8in. sheet cut to shape. Cement the ribs T1 to T6 in place. While this is drying fix the fin parts 10 and 11 together, holding them down flat to prevent warping. Cut the spar to length, chamfer the ends to fit against the tips T7, then cement the spar and tips in place. Cement the fin to the tailplane, Fig. 8, and cover the top centre part with 1/16in. sheet. Shape the leading edge of the tailplane, and shape the fin to the section shown.

COVERING. Apply a coat of clear dope to the structure before covering, to seal the grain of the wood. The fuselage, wings and tailplane are covered with tissue paper, using paste or dope as an adhesive. Use a separate piece for each side, and aim at getting an even surface without any large wrinkles. Do not attempt to pull it tight, the water-shrinking and doping afterwards will ensure a good finish.

Start with the fuselage. Cut two pieces of tissue for the top and bottom first, allowing about 1/2in. overlap all round. Apply paste to the outer edges only of the fuselage, then lay the tissue over the structure, pulling gently all round to even it out. Trim off the excess, and smooth down the edges. Repeat this for each side, then put aside to dry.

Cover the wing, starting with the underside, and adopting the same method as with the fuselage. The top surface requires a little more care, to prevent the paper sagging between the ribs. Fix the tissue over the structure, pulling gently all round. Trim off the excess paper, and smooth down the edges.

Follow this method for the Tailplane covering. If Dope is used as an adhesive, allowance must be made for it drying very quickly, so apply it to a small area at a time. When the paste is quite dry, spray the tissue with water, and leave it to dry. Spray one half of the wing at a time, and pin it down to a flat board to prevent warping when it dries out. Apply a coat of Dope when the tissue is thoroughly dry, and several coats round the engine mounting and cowl, rubbing down lightly between each coat.

DECORATION. The model can be painted according to the builder's taste, but it is advisable to restrict it to the fuselage, and the edges only of the wing and tail unit, to save weight, unless the paint can be sprayed on very lightly. Otherwise it should be applied with a soft brush. Use cellulose lacquer, and apply it quickly and evenly. It is advisable to proof your model against the fuel. Use a well-known fuel-proof Lacquer.

Contrasting colours can be used for lining, as shown in the illustration, using "Scotch" tape for masking the edges, to get a clean finish.

Fix the Frog transfer to the fin or wing, and **a label with your name and address in a convenient position.**

WING AND TAILPLANE. Before assembling the wing and tailplane, check that they have not warped in any way. If they have, they can be corrected by gently twisting the components the opposite way in a jet of steam, or in front of a gas or electric fire. A few seconds at a distance of 18in. or so, is sufficient.

Assemble the model for testing. Check the balance of the model before flying. To do this, support the model under each wing at one of the rib stations, find the balance point and mark it. This should be close to the C. of G. position shown on the plan. If it varies more than 1/4in. either way, add some ballast to the other end of the fuselage to correct it. Otherwise a small tail adjustment may be sufficient. This can be checked by a test glide

FLYING. Make sure that the wing and tail are "in-line," and the fin upright before attempting to fly.

Choose a fairly calm day for the first tests. Glide the model into wind, if any, and preferably over short grass with no obstructions. The model should glide straight and flat, and any tendency to turn is due to a warped wing or fin. Correct this as described above.

If the model tends to **nose-up and stall, raise the leading edge** of the tailplane about 1/32in. with a piece of balsa strip. This is a **positive angle** adjustment, and is limited to this amount. If this is insufficient to correct the trim, a small amount of ballast weight can be added to the nose of the fuselage; but **this should not be required**.

If the model glides too steeply, or dives, **raise the trailing edge of the tailplane.** This is a **negative angle** adjustment, and can be increased as required, but if a large trimming adjustment is necessary, a small ballast weight should be added to the tail end to keep the tailplane near the original angle.

When you are satisfied with the glide, try a short flight with the engine running at half speed, by reducing the compression. It should make a wide left-hand turn, induced by the torque of the motor. If the turn is too tight, bend the trim-tab about 1/16in. the opposite way. Another method is to increase the offset of the motor to the **right.** This is done by enlarging the holes in the bearers and twisting the motor to the right when remounting.

A small amount of "wash-in" on the **Port** wing near the tip, or "wash-out" on the **Starboard** wing will also help, and also prevent the model banking too steeply.

When the trim seems right, gradually increase the speed of the motor with each successive flight, making further adjustments if necessary.

It is advisable to meter the fuel out in small quantities for testing. A 20 secs. motor run is sufficient.

Alternatively, a mechanical timer and fuel-cutout can be fitted if obtainable.

Caution should be exercised when flying on a public ground. Take special note of the pamphlet concerning Insurance, which is included in this kit.

Do not forget to put your name and address on the model.

INSURANCE.

Note. — All power models should be insured against third-party risks, and it is your responsibility to get this arranged before flying, either through your local club, or write to — The Secretary, S.M.A.E. Londonderry House, 19, Park Lane, London, W.1.

INTERNATIONAL MODEL AIRCRAFT LTD.,
Morden Road, Merton, London, S.W.19, England.

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