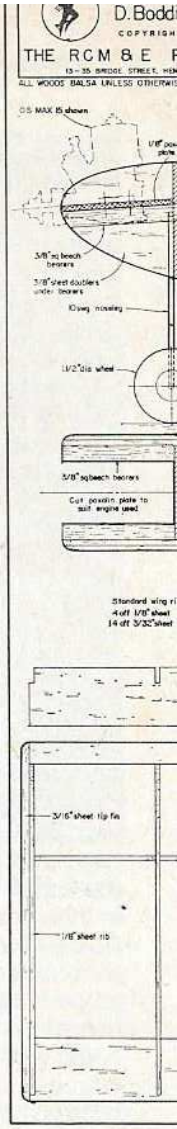
THE CRAFTSMAN

By
David
Boddington

A SINGLE CHANNEL ALL WEATHER SPORTS TRAINER



CRAFTSMAN – one who has learned his skills, art or trade. I hope that this model will help you to learn the skills and art of radio control flying.

Many beginners' models in past years have followed a pattern of lightly loaded, flat bottom winged designs. These are essentially a throw back from the days of free flight sports models when the flying characteristics of the model, slow stable flight with good lift weight ratio, were rather different to those required for a present day R/C model.

Although these models will perform well enough in calm weather conditions, (in the sense they are no more than guided free flight models), they have their limitations in windy weather. With too low an airspeed the model cannot make headway against the wind and so often we have the sorry sight of a model climbing steeply into wind but gradually drifting downwind despite the fact that no turns are made. In other words, the ground speed (flying speed minus wind speed) is a negative quantity – it is apparently flying backwards.

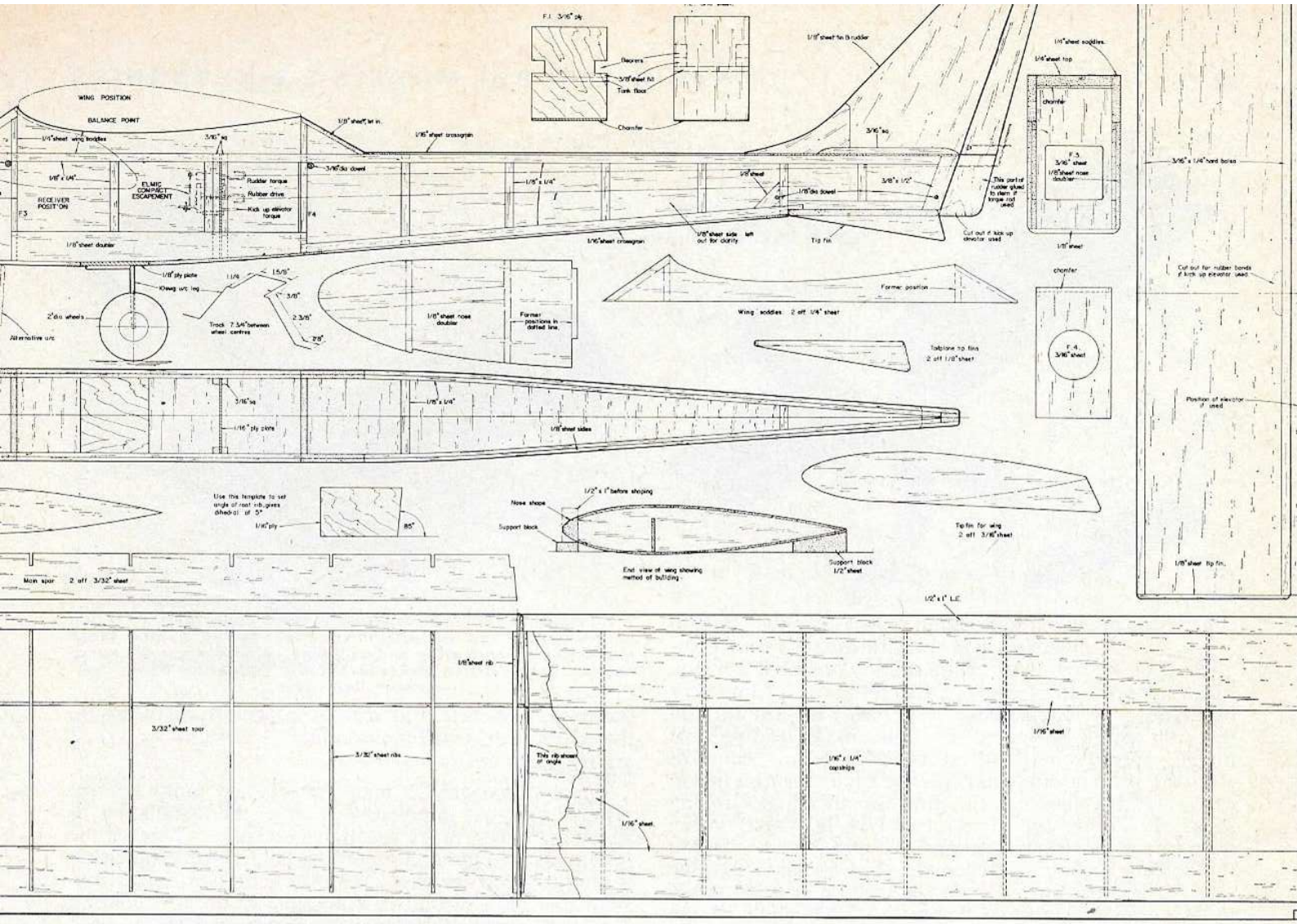
The Craftsman design is an attempt to reach a reasonable compromise between a model that remains stable and easy to fly but has sufficient speed to allow the average R/C pilot to fly in the moderate wind conditions so frequently prevailing in this country. It is not a small model since small models often finish up with a high wing loading which, for the novice, is an undesirable flight characteristic, particularly when the heavier motorised actuator equipment is used.

With nearly 400 sq. ins. of wing area the 'Craftsman' can carry a heavy radio load without its flying abilities being impaired. For all that, I would still recommend keeping it as light as possible – the heavier they are, the harder they fall. It is a tough model and therefore suitable for flying from rough grass fields. The undercarriage can be removed for this type of flying and it helps in preventing the model from nosing over on landing. Alternative two or three wheel undercarriages are shown. If you fly from runways you will find the three wheel version is much easier for take-offs as the model will track straight with little tendency to 'swing' off line.

Although primarily designed for rudder only and rudder/engine control, the Craftsman is also suitable for galloping ghost, or for that matter the new mini-multi equipments. The correct choice of engine is important and will depend on the type of radio equipment used. For rudder only control an averagely powerful 1.5 cc. diesel (Frog 150 or similar) should provide all the thrust necessary for normal flying. When rudder and engine is employed the .10 cu. ins. glo motors such as the *Enya* .09 or *Webra Sport Glo* are ideal.

With the down thrust as shown on the plan the model will gain height slowly, but with a reasonable forward speed, at about two-thirds engine speed and maximum revs. can then be used for aerobatic manoeuvres. Engines of up to .15 cu. ins. unsilenced or .19 cu. ins. silenced can be used for G.G. operation but I would suggest that the elevator is restricted to a $\frac{1}{2}\frac{7}{8}$in. wide strip hinged to the tailplane.

The design of the 'Craftsman' is not particularly original in its layout but it incorporates a number of features that I have found to work well on some of my models. I also acknowledge a certain '*Whiz Kid*' influence with regard to the cabin construction and for this I have to thank my good friend Owen Kampen (at least he *was* my good friend). The use of flat plate wing and tail tips was initially just for the sake of having a minor change of design. However, on comparative test flights with these wings and a pair with 'conventional' tips, it did appear that the tip plates had the effect of making the



Full size copies of this 1/6th scale reproduction are available from R.C.M.&E. plans service price 8/6 plus 6d. p & p

model a little more 'groovy'. The tailplane tip plates also have the desirable feature of helping to make the tailplane more rigid and less liable to warp.

So much for design, now on to building.

Fuselage

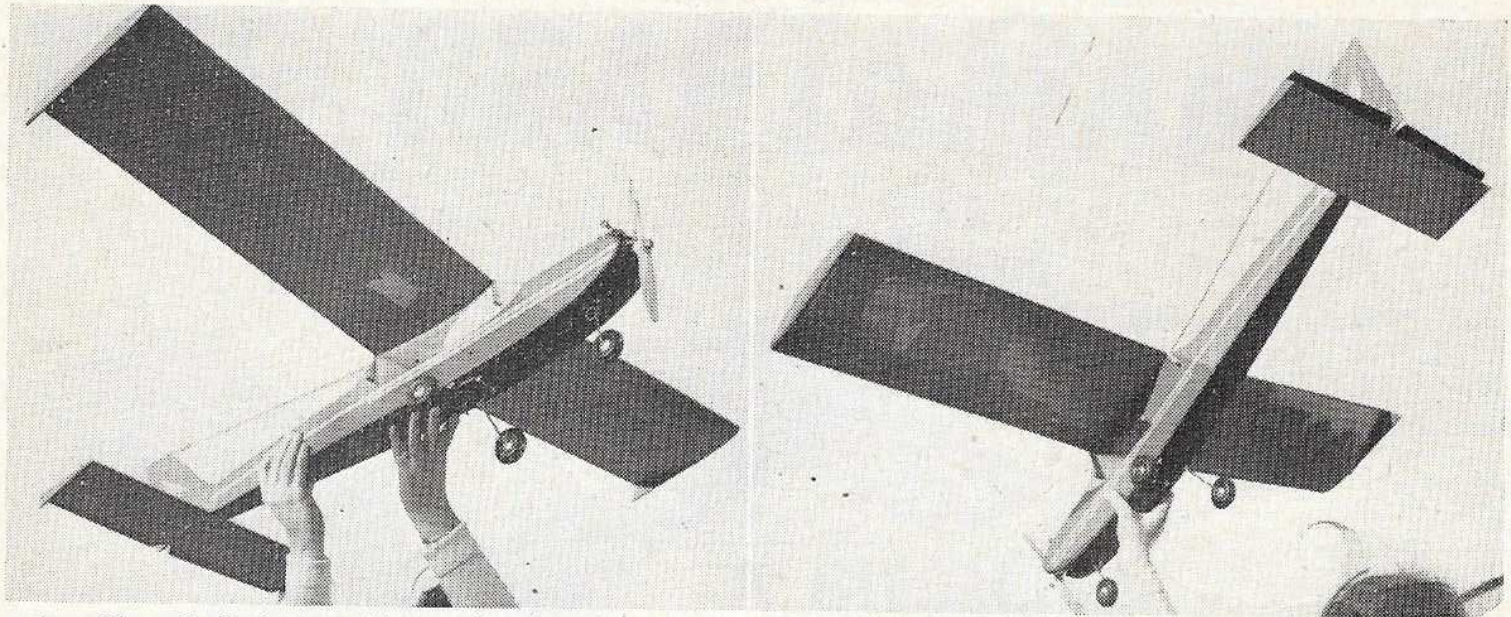
Mark with a ball-point pen, on the fuselage sides the position of all doublers, formers, etc. When marking the positions on the left hand fuselage side, first transfer the fuselage outline and doublers etc. to the back of the plan by using carbon paper (face up) under the plan and marking through. Glue the doublers and uprights and longerons in position. Mark the position of the engine bearers on the $\frac{1}{8}$ in. nose doublers and, after cutting the bearers to shape and drilling holes for the nose wheel leg and engine mounting plate screws, glue to the doublers. All holes drilled in bearers to receive wood screws should be considerably 'undersize' to allow the wood screw to obtain a good purchase, i.e. engine bearers drilled with a 5/64 in. diameter drill.

Before former F.1. can be fitted it must be drilled to receive the nose wheel saddles and throttle cable tube, if used. The position of the latter will depend on the particular engine you propose using and the side on which the throttle arm is situated. When the fuselage sides are completely dry, add the $\frac{1}{4}$ in. wing saddles followed by formers F.1, 2, 3 and 4, and glued to both sides making sure that the fuselage is true and square. Temporarily hold the stern posts of the fuselage together with clothes pegs to ensure accuracy at the tail end. Check from time to time whilst the glue is drying that the fuselage sides are not 'springing' apart, a good way of avoiding this is by wrapping around the fuselage, at former positions, with masking or drafting tape.

Taper the stern posts to mate accurately and glue permanently, pinning together until dry. Glue the $\frac{1}{8}$ in. plate to the bottom of the fuel tank compartment, it rests on top of scraps of $\frac{1}{4}$ in. x $\frac{3}{8}$ in. tapered fillets. Complete the fuselage construction by adding the top and bottom sheeting including the $\frac{1}{8}$ in. plywood for the main undercarriage. Sandpaper thoroughly, rounding off the corners of the rear fuselage slightly and rather more around the nose and cabin area where the doublers increase the thickness of the fuselage. Fuelproof thoroughly around the engine and tank bay both before and after painting, close attention to fuel proofing to all parts where fuel seepage might occur (including the inside of the fuselage at the wing seating position) can increase the life of the model considerably.

Wings

The absence of dihedral braces is *not* a mistake, the moderately thick wing section gives a good glueing area on the root ribs and makes the use of braces unnecessary. The full depth main spar, together with top and bottom leading and trailing edge sheeting plus capping strips to rib results in a light but strong wing panel. A big advantage with this form of wing is its rigidity, which can be useful when covering with materials such as *MonoKote* or *Solarfilm* or nylon. Pin the port wing main spar vertically in position over the plan (dry soaping the plan first to avoid sticking) and pin the scrap $\frac{1}{4}$ in. sheet leading edge packing in position as shown on the drawing. Cut seven trailing edge packing pieces from scrap and pin them in position between wing ribs. To these packing pieces pin the bottom 1/16 in. trailing edge and check that the wing ribs fit correctly on to the main spar and trailing



Two views of the Craftsman with trike undercarriage. Main undercarriage held on with Micro Mold saddle clamps. Note end plates on both wing and tailplane – elevator not of course necessary. Model also makes ideal multi trainer for lightweight proportional gear.

edge. Glue all ribs into position noting that the root rib is angled for dihedral. The dihedral angle may be increased to 7° for escapement rudder operated control. Mark the position of the wing ribs on to the leading edge by holding the leading edge temporarily in position and marking with a ball-point pen. Glue on the leading edge making sure the height of all the wing ribs is identical. Add the trailing edge and leading edge to sheeting top capping strips and centre section top sheeting. Capping strips should be cut from scrap 1/16 in. sheet. When dry remove the wing panel and pin and glue in position the bottom leading edge sheeting, centre section sheeting and rib capping strips. Trim the leading edge to shape using a razor plane and finally sand the whole of the wing smooth including the root rib which should be sanded on to a flat surface to ensure a true surface. Complete assembly by adding the wing tips.

Repeat the operation for the starboard wing. Glue the two wing panels together, checking for true alignment, and leave pinned together until completely dry. Note the P.V.A. glue can take a long time to dry where there is little air present. Add steel shimstock reinforcement to the leading and trailing edges, at the points shown on the plan, where the wing retaining rubber bands cross.

Tail Surfaces

The construction of the tail surfaces is straightforward and should be obvious from the plan. Sand all tail surfaces smooth, rounding off the hinged edges. Whatever form of hinge is used, it is essential that the control surfaces are absolutely free moving. No excessive stiffness in hinges can be tolerated, where single channel actuators are used, and for this reason it is suggested that sewn hinges are used as shown on the drawing. The hinges should be made *after* the surfaces have been covered and fuel proofed.

Check for true alignment of fin on fuselage before finally glueing in position with 3/16 in. sq. supports on either side.

Finishes

With so many alternative covering materials, paints and synthetic finishes available, no comprehensive intructions are given on applying coverings and finishes. It should be remembered however, that the two important considerations in applying finishes are strength and lightness. Tissue paper, even the heavyweight ones, are not recommended because of their poor resistance to tearing and if nylon is used do not overdo the paint decoration otherwise the weight will be too great. The other important consideration as mentioned before, is to ensure that the model is well fuelproofed.

Finishes

Again, there are so many alternative radio control systems that it is impossible to cover the installation of all types. It is strongly recommended that, whatever the system decided upon, a mounting board type installation is used to allow for easily removable units for servicing. With this form of unit it is possible to do all soldering out of the fuselage and make a neater installation, with a minimum of plugs and sockets, and, most important of all, a more reliable installation. Needless to say, it is essential that the radio equipment works 100 per cent, both on bench tests and under operating conditions on the flying field. Whatever the type of radio then, make sure it is installed neatly, with no loose wires hanging about, the receiver and batteries well protected and the actuator and pushrods all smooth and easy in operation.

Radio Installation

Before you get on to the flying field make sure the 'Craftsman' balances at the correct point and that all surfaces are free from warps or twists. It is impossible to obtain consistent flying with warped surfaces!

Glide tests may be made if grassed flying areas available but only limited results will be obtained from these tests. It should indicate however, if the model is over elevated and tending to stall. Avoid this condition like the plague, it is better on initial flights to be slightly under elevated than the other way, so, if necessary insert a piece of packing over the *trailing* edge of the tailplane. When a straight and shallow glide has been achieved commence power tests with the engine at about two thirds power (power reduced by throttling back on the transmitter if engine control is fitted). First power flights may be attempted with a take-off from tarmac or a hand launch by a helper. Note the attitude of the model both under power and on the glide and correct with engine down and side thrust and/or rudder and elevator trim. The problems of preparation for the flying field and problems of test flying will be dealt with in greater detail in next month Single Channel Chatter. If you cannot wait until next month before flying the 'Craftsman' and have only a limited amount of R/C flying experience – swallow your pride and ask a *really* experienced pilot to make the first few trimming flights.