

Free pull-out plans for a 29" wingspan indoor R/C model, designed by David Boddington



behave in a similar manner. 29" wing span was chosen as being the maximum size for the tiny, but potent Cox TD 010 engine. Keeping it reasonably large, the airframe sensibly light, and the radio to the minimum weight possible with commercial equipment would give a model with a sensible wing loading and moderate flying speed. No fantastic efforts were made to keep the model ultra light; it had to be reasonably rugged and be capable of flying outdoors on a calm

using a miniature jack plug socket wired into the power lead. The plug is removed for switching on and the same socket is used for charging. Rechargeable nicad batteries should be 50 mAh or larger.

Select your balsawood sensibly; you will probably have enough in the scrapbox for this little aeroplane. Cutting your own strip wood makes sense as you can be sure of having equal strength lengths from the same sheet. Construction of the airframe is

MICRO-BARNSTORMER

▲ *David's two year old granddaughter, Jenny, gives scale to this 29in micro model.*

▼ *You will probably have enough balsawood in the scrap box to build this little aeroplane.*

The announcement that indoor flying at the Model Engineer Exhibition is extended to small powered R/C models is really great news. At the last MEE the flying was restricted to the Handley Page Trophy entrants and a maximum of .010 cu.ins. capacity engines. Although I built a model of a Handley Page aircraft, I thought it would be prudent to also experiment with a 'known layout' model to get an idea of flying limitations and techniques - hence the 'Micro-Barnstormer'.

Having seen 'Barnstormer' models from 36" to 120" wing spans fly with very similar flying characteristics, I thought it would be reasonable to expect an even smaller example to

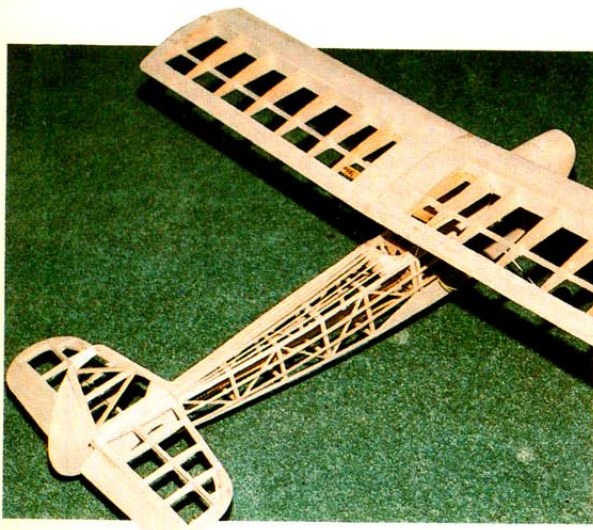
day.

Proof that the strength/weight ratio is about right has been confirmed on two occasions. The first flight in Olympia resulted in collision with one of the cast iron roof frames, with only a dent in the cowling as a result. Flying the 'Micro Barnstormer' at the ASP Small Models day, I launched the model only to hear an ominous click as the model left the hand. I had fitted a small toggle switche on the side and caught it as the model was propelled forward. Although quite well trimmed, the increasing left hand spiral eventually culminated in the left wing tip and ground meeting; all that was hurt was the strut fixings on the wing and my pride!

For outdoor flying I would suggest a Cox Pee Wee 020 (glow or dieselised version) and this would also be suitable for indoor flying - carry out test flights with the propeller on backwards. The only change I have made from the prototype model is to increase the dihedral slightly to improve stability and turning ability.

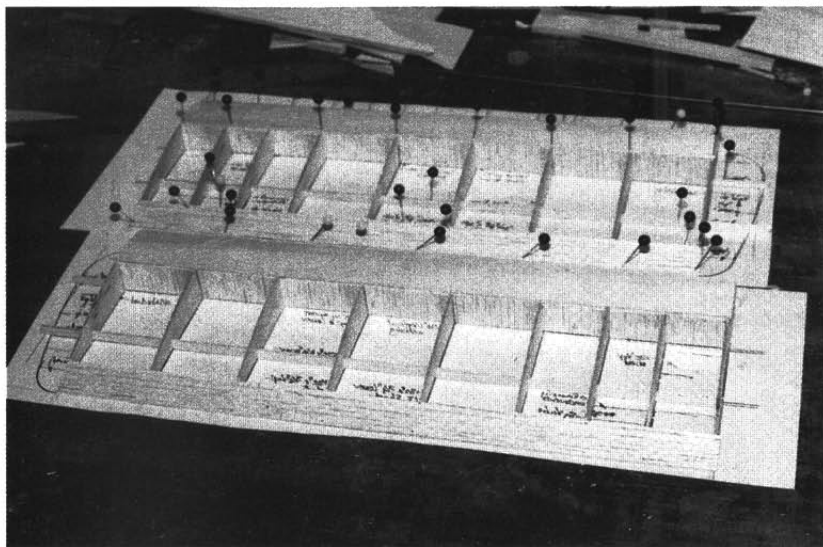
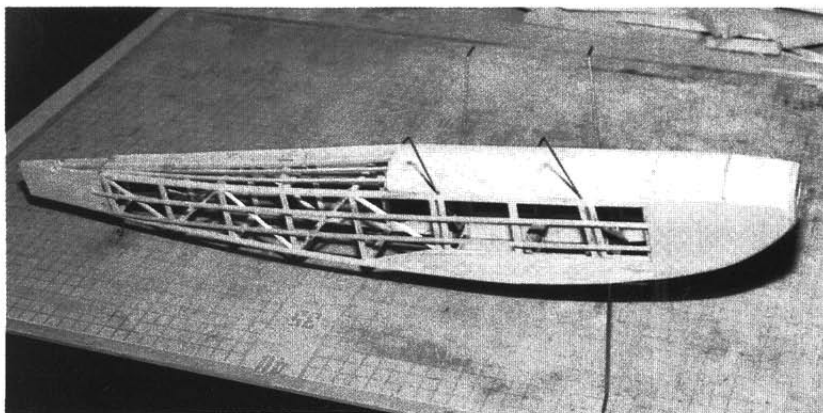
strictly conventional and is the larger Barnstormer in miniature. Check on the drawing for location of the engine and radio equipment. If you are using a four fixing point engine, modify the reinforcement to F2 accordingly. The plan is drawn so that you can cut out the rear of the fuselage, fin and rudder and fix it to the remainder of the fuselage drawing without destroying any parts on the reverse side. You may wish to take photocopies of the drawing and work from these; they are A3 size sheets. Fuselage construction follows the two fuselage frames being made and joined with the formers and crosspieces. Note: Centre section struts and the undercarriage wire and tailskid should be sewn and epoxied to the formers before joining the sides. Whether you choose to have the radio equipment accessible is up to you, suitable hatches will have to be provided if you want it removable, mine was built-in. My model required about 3 degrees right sidethrust; this was obtained by fitting washers under the left side of the engine tank. You could angle F2 to include the sidethrust offset.

Wing panels are constructed over the plan, either trace for the full port wing or obtain a reverse print. Pin down the lower front and rear spar and 1/32" trailing edge. Glue on the ribs and add the leading edge, top spar and trailing edge, followed by the leading edge sheeting - all very conventional. Remember to angle the root ribs for dihedral. You can make lightening holes in the 1/16" wing tips to save a



Mini-structure

Fleet Control Systems and Hitec (on 35 MHz) produce radio equipment suitable for indoor models. You can dispense with a switch by

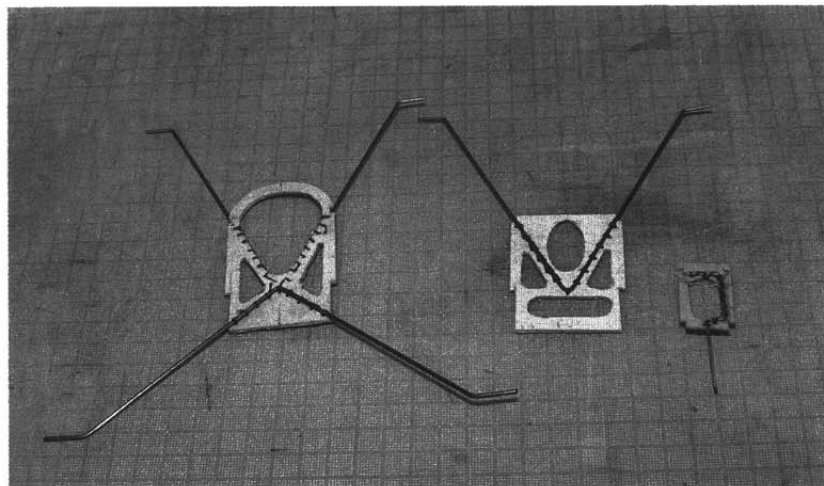


little weight. Join the wing panels with pins and clothes pegs and then add the centre sheeting and dihedral braces. Cut slots with a razor saw. The wings are fitted to the centre section struts by sewing and epoxying small lengths of tubing to 0.8 mm ply plates, securely glued to the underside wing ribs. If you use 18g tubing you will have to ensure that the strut ends are very accurately aligned with the tubing. It is easier and quite satisfactory to use 16g tubing. The ends of the struts are sprung into the ends of the tubes.

Build the tailplane frame and then add the top and lower 3/32" x 1/8" spars on the surface, plus the 3/32" sq. rib fairings. Note that the ribs at the centre are positioned for the fin (above) and to fit over the fuselage (below). Sand the tailplane to a symmetrical airfoil. The 3/32" sheet elevators are joined with a piece of 1/8" dia. birch dowel; sand it down to elevator thickness after joining with 24 hours epoxy. Fin and rudder are flat, again you can save a little weight by cutting holes in the sheet rudder.

Finishing

Install the radio equipment and linkages. I used 1/8" dia. dowel pushrods with 20 g pianowire ends and made small adjustments by



'tweaking' the angle of the bends. If the pushrod lengths give neutral rudder and elevator, the transmitter trims should be adequate for minor corrections.

Covering is a matter of choice, but do keep it light. I used Fibafilm as it is both light and in keeping with the model.

Fuel proof the engine bay area. For hinges I used the age old sewn hinge, in matching colour thread. One of the simplest ways and the best for this style of model, it is also almost weightless.

Keep the decoration to a minimum, it is not a design that needs to be plastered with paint and decals. Check the balance point, additional ballast was not needed on the original model, which weighed around 7.5 oz total.

◀ **Construction is strictly conventional and is simply the larger Barnstormer in miniature.**

Flying

It is sensible to carry out your test flights outdoors and in calm conditions - please don't leave it until the ME Exhibition for your first flights! With the engine singing and all systems go, have the model launched and stand by to make corrections; they shouldn't be great if the model is built accurately. On a TD 010 the climb rate is only modest (which is what you want when flying indoors) but check the trim change on transition from power to glide. You will need to be prepared for any change when flying indoors. The glide is flat and you will have to allow for this when operating in a confined space. Try to avoid last minute turns near the ground.

If you don't get a real kick out of flying a micro R/C model indoors, I will be very surprised. It really keeps you on your toes. When you are nearing the ceiling and still climbing, the best way of holding altitude is to carry out high bank turns. You can use elevator, but this will inevitably build up the speed and once you release the down elevator the model will 'balloon' upwards.

◀ **Centre section struts and undercarriage wire should be sewn and epoxyed to the formers before joining the sides.**

Finally, I don't want to hear any excuses for not building an indoor R/C model in time for the MEE. I built the 'Micro Barnstormer' in two days over last Christmas. There are plenty of other designs waiting to be miniaturised and free flight models to be adapted, either for I.C., electric or CO₂ power and R/C. My own view would be to limit the I.C. engine size to 0.5 cc at the maximum, both for safety and sound reasons.

See you at Olympia in the New Year! ●