

**BUILD FROM
OUR FULL SIZE
PRO-PLANS!**

*Mike Delacole
describes his mini
pattern ship for .30
size motors*

Chilli Breeze

The popularity of the small helicopter has encouraged model engine manufacturers to develop very compact, powerful units and the past couple of years has seen many new arrivals in the .28-.36 cu.in. capacity range. Two examples that immediately spring to mind are the OS 32F ABC and the Irvine 36, which weigh 8.1/4 and 9ozs respectively (without silencer), yet can turn useful sized props with great enthusiasm without having to resort to the use of a tuned pipe. This size of engine is ideal for a 'fun size' aerobat, so when I managed to liberate an OS 32F from the local model shop earlier this year, I was very tempted to draw up a smaller Chilli Wind (plans featured in RCM&E, May '91) to see if everything that I had heard about the little powerhouse was true. Some lightweight .40 cu.in. engines, such as the OS 40FP and the HP 40 Gold Cup, could also be used. These are slightly longer and heavier than engines in the .25-.36 band, so the nose should be shortened by 1/2" to compensate for the extra weight. Fun models start to lose their appeal if they can only accommodate specialist lightweight equipment so it was important that the new machine was big enough to take a standard set of radio gear with four servos. Good vertical performance is an essential ingredient in a model of this sort so I decided to use a built up wing on the prototype in order to keep the weight



down to the minimum. A foam wing will be only a little bit heavier, but is far easier to construct, so it really comes down to individual preference. Small models have a lot of things in their favour:

1. They have a high 'fun factor'.
2. They are inexpensive and quick to build.
3. They are easy to transport and will fit, fully assembled, into most cars.
4. The smaller engine uses less fuel.
5. They can be operated from small sites.
6. In the event of a crash you will not need a dustbin liner to take home the pieces - a Sainsbury's carrier bag will do the job just fine!

Building notes

Although the Chilli Breeze is a very simple model to build, it will pay dividends if you study the plans carefully before starting construction. Aerobatic models are much more satisfying to fly if they are accurately built, so approach each stage of the construction with care.

Wings

The first thing to decide is whether you are going for the foam wing or the built up version. If you are going along

the foam route make sure that the panels are accurate. Lose any slight difference at the root as the wings are joined, but badly warped panels should be discarded. Although the common material for reinforcing the centre section is fibre glass bandage, there are, in fact, many lighter substitutes which will do the job equally well (surgical bandage). It is a good idea to prepare the groove for the locating dowel and cut out for the aileron well before the wings are joined.

If you are opting for the built up wing then the first job will be to knock out a couple of sets of ribs using the 'sandwich' method. Make all ribs out of 1/16" sheet, but later discard W1 and replace with a 3/16" version. As a building aid I like to mark out the centre line on each blank and drill the holes accurately before loading between the templates. A horizontal centre line is also drawn along the 1/4" l.e. and t.e. so it is a simple matter to get everything accurately aligned. The construction sequence is as follows:

1. Pin the l.e. and t.e. over the plan, supported in such a way that the centre lines are the same height above the building board and use W2 and W10 in their respective positions as spacers.
2. Glue the ribs W2 - W10 in position, matching up the centre lines of the ribs with the centre lines on the t.e. and l.e. to get everything lined up correctly.
3. Glue 1/4" square main spars in place.
4. Fit W11 in position as shown on plan and add tip gussets.
5. Shape top and bottom of trailing edge to follow contour of the ribs.

We now have two basic panels which are joined together using the dihedral braces. It is a good idea to make a simple jig at this stage so that the wing structure can be supported accurately whilst the rest of the construction is undertaken.

The next jobs are:

1. Add the centre section ribs and plan the aileron servo well.

Prototypes had foam and built up wings. Foam wings are available from the ASP Plans Service for £19.25 inc. p&p (Order code FWTRC 1749).



2. Reinforce the leading edge portion of W2, 3 & 4 with lite ply and fit the undercarriage blocks, not forgetting to add the anti torque blocks on the inboard end of each.
3. Glue a small piece of scrap balsa block to the inside of the tip rib, W11, to receive the weight that will be needed to balance the finished model laterally.
4. Fit bottom sheeting.
5. With the wing supported in such a way that the structure is straight and true we can now add the top sheeting and the vertical grain spar webbing. Leave in supported state until the glue has thoroughly dried.
6. Add capping strips.
7. Epoxy torque rods in place.
8. The ailerons can be made from 1.1/2" x 1/2" t.e. stock, trimmed to suit and cut into three lengths as shown.
9. Glue fixed portions of the ailerons in place and don't forget to groove the inboard pieces to clear the torque rods.
10. Add 1/4" sheet tips.
11. Finish off centre portion of i.e. as shown on plan and glue wing locating dowel in place. The wing can be set aside for the moment and we can get to work on the fuselage.

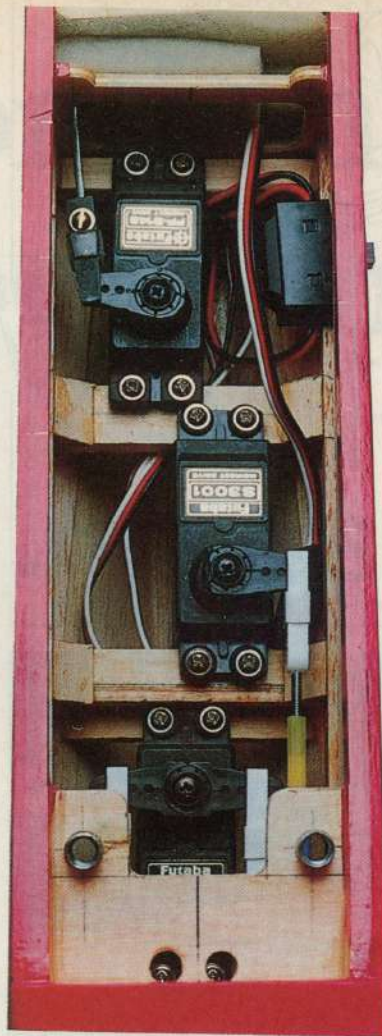
Fuselage construction

The first job is to make up a pair of fuselage sides. These are long, thin items and as balsa sheet has tendency to 'spring' as it is cut the suggested sequence of events is:

1. Make up two 3" wide balsa sheets of the required length.
2. Onto these sheets, using measurements taken from the plan, mark out a pair of fuselage sides, complete with the position of all doublers and formers.
3. Glue the doublers, longerons and triangular stock in place.
4. Now cut the sides to shape.
5. Mark the datum line on the inside of each side.

Next we can tackle the formers. These form the heart of the model, so do make sure that they are as accurate as possible. For future reference during construction clearly mark the horizontal datum and the vertical centre line on each former. Drill all necessary holes in F1 and check that all the formers are a comfortable (not tight) fit when placed in position on the fuselage side.

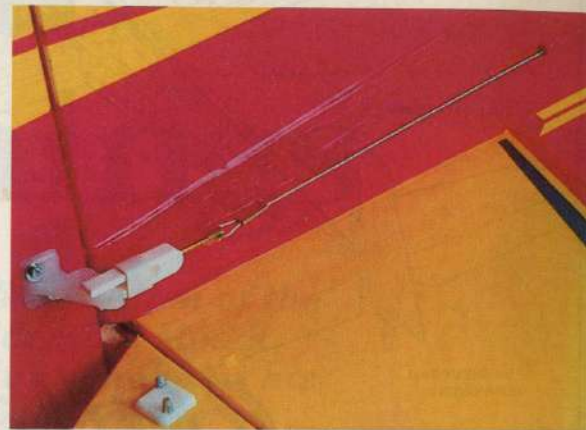
We are now ready to start putting it all together. Pin the left hand side to the board and glue F1, F2 and F3 in



place, not forgetting the right thrust when fitting F1. When the glue has thoroughly dried the right hand side can be added. Chamfer the rear ends to accommodate the fin post later on. With the sides held in a vertical position and centred accurately over a straight line we can fit F4, not forgetting the 1/4" spacer, and tack glue the rear together. Note that the only curved part of the fuselage sides occurs between F3 and F4, otherwise they are straight. With this in mind glue the captive nut plate in place and fit the gussets at the bottom rear of F4. Add the 3/32" crossgrain fin support, the 3/8" x 3/32" fuselage cross braces and the triangular stock to reinforce to rear of F1.

Things move on swiftly now and in the following order:

1. Install the tailplane, making sure that it is at the correct incidence, square in relation to the fuselage sides and also correctly aligned.
2. Tidy up the wing seat and make sure that the wing is mounted at correct incidence.
3. Hold the wing accurately in position over the fuselage and drill through for the wing bolts.
4. Remove upper temporary spacer at rear of fuselage and glue fin in place, again making sure that it is correctly aligned etc.
5. Glue F5, F6 and F7 in place and add 3/16" x 3/32" strip to rear of F4 at top.
6. Fit 3/16" x 1/16" spacer strip between



- F4 and the fin.
7. Fit rear decking.
8. Add 1/16" capping strip.
9. Fit front side and top sheeting.
10. Fit 'canopy' sheeting.
11. Add 1/16" crossgrain sheeting to rear underside of fuselage.
12. Fuelproof tank bay.
13. Finally add 1/8" crossgrain sheeting to bottom of fuselage at front.

The next job is to finish off the nose area and we will need to mount the engine for this and also have the spinner to hand. Be careful not to remove any material from the fuselage sheeting during this operation. The airframe can now be given a thorough sanding prior to covering. Things are now beginning to take shape.

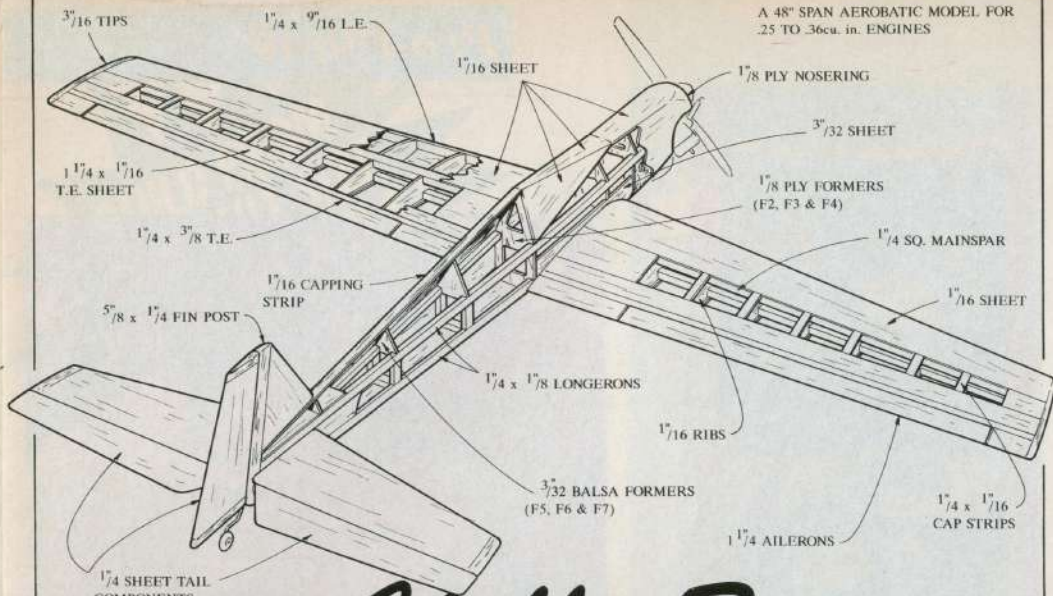
Radio installation

The prototype used a standard set of Futaba gear and, although there wasn't much room to spare, it fitted in well. The aileron servo was mounted in the normal fashion in the wing. The other three servos were mounted 'end to end' with the rudder servo being mounted slightly higher than the other two in order to give a bit more clearance for the elevator pushrod. A

Centre: Standard size R/C was used in the prototypes, but if you have some mini gear, then so much the better.

Top: Rudder hook up is via closed loop to the servo, with a good quality snake used for the elevator. Above: Mike's models have flown with both an OS 25 FP and an Irvine 36. It's great fun with a '25', the '36' being for more experienced pilots only!

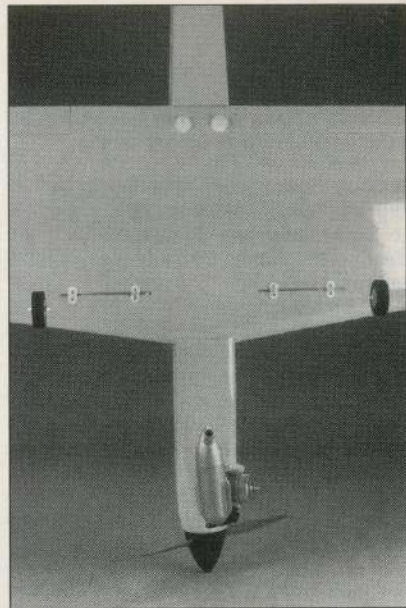
Breeze



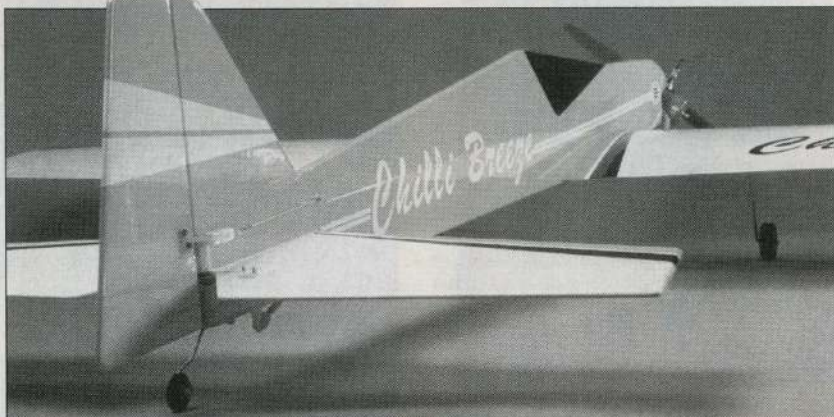
A 48" SPAN AEROBATIC MODEL FOR .25 TO .36cu. in. ENGINES

Chilli Breeze

Designed by MIKE DELACOLE



Far right: The wing is retained with two bolts and a leading edge dowel, capped with ali tube to prevent it charring from vibration. Right: Chillli Breeze inherits the angular good looks of its big sister, Chillli Wind, published in RCM&E in May 1991.



couple of holes will need to be drilled in the captive nut plate in order to gain access to the servo mounting screws. On a small model there is not a lot of space to move the gear in order to achieve the C of G, so I was pleased to

find that the finished model balanced at the C of G shown on the plan without having to add any weight. The rudder is operated by a closed loop system, but the individual builder may have his own preference regarding the elevator. If using snakes, or versions thereof, make sure that they do not flex. Likewise, if using a pushrod, make sure that it is as slop free as possible and if necessary build in some support inside the fuselage. With a little imagination and care this can be done when the model is completely finished, access being gained via a small incision in the rear underside sheeting. Recent experiences and conversations with fellow modellers have brought me to the conclusion that the connection between the elevator and the servo is something that is not always given the consideration that it deserves.

problem areas and is essential around the engine bay. We can now do all the odd jobs, such as the tail skid, undercarriage legs, hinge the control surfaces, finalise the installation of the equipment, fuelproofing etc. Finally, we can balance the model laterally and adjust the C of G as necessary.

Flying with the Breeze

After all the hard work it was now time for some fun, so everything was loaded into the car and off we went to Wroughton, home of the Swindon MAC. The completed model weighed in at 3lb 5oz, less fuel, so I was very interested to see how it would perform, especially as there was a choppy breeze. The OS 32 started second or third flick and ground revs, using an APC 9"x7" prop, were in the region of 14,000 rpm. This is a powerful little engine with very friendly characteristics and it is easy to understand how it has earned such a good reputation.

The model proved to be a very smooth flyer with good crisp responses to control inputs and had all the feel of a larger machine, handling the choppy conditions without any fuss at all. It has a good speed range and can be slowed right down without any problems. At the other end of the scale, even with the engine running rich, vertical performance was excellent.

Anybody with aileron experience will have no difficulty with the Chillli Breeze, but even if your other model is a full blown '61' size aerobatic machine, you will soon be having more fun than you ever thought possible from such a small package! So, if you want to practice aerobatics on a small site, or in the winter when the skies start closing in, or maybe you just like the thought of a pint sized aerobat, why not build a Chillli Breeze? You will not be disappointed.

Good luck and safe flying. ●

DATAFILE

Plan Specifications	
Name	Chilli Breeze
Designed By	Mike Delacole
Type of Aircraft	Sport aerobatic
Wingspan	48"
Wing Chord	10.34" root, 7" tip
Wing Area	417sq. ins.
Aerofoil	Symmetrical
Dihedral At Each Tip	13/16"
Fuselage Length	45.1/4"
Tailplane Span	19"
Tailplane Area	99sq. ins.
Tailplane Section	Flat
Fin Height	4.3/4"
Engine Range	25-36cu. ins.
Fuel Tank	6ozs
Rec. Number of Channels	Four
Control Functions	Aileron, elevator, rudder, throttle
C.G. (from L.E.)	4.1/4"
Elevator Throws	3/8" up, 1/2" down
Aileron Throws	1/4" up, 3/16" down
Rudder Throws	1.1/4" each way
Sidethrust	2.1/2 degrees
Downthrust	None
Materials used in Construction	
Fuselage	Balsa, ply
Wing	Balsa, ply or foam
Tail Surfaces	Balsa sheet
Weight Ready to Fly	53-58ozs
Wing Loading	18-19.5ozs/sq. ft.

Covering

The prototype was finished and trimmed with Solarfilm, which gives a cheerful appearance with the minimum of mess. It also adds very little to the all up weight of the completed aircraft. When choosing a colour scheme try to avoid colours that blend in with the sky, otherwise you will be playing 'Spot the Plane' on those grey winter afternoons! Clearcoat is very useful for helping to get the film to stick down in