

The venerable *BEDE!*

John Rutter's exciting little Bede BD5 offers full slope or power options.

The BD5 first caught my eye in an *Aeroplane* magazine of the early '70s. It struck me as a beautifully streamlined, but simple aircraft. I saw one (static, unfortunately) at the Farnborough airshow in 1978-80 but I didn't finally get the bit between my teeth until I bought a 1/72nd scale kit (all 3.6" span of it!) at a rally this year. By this time I had also become a fairly experienced R/C modeller, so I dusted off the TD .051 and got busy.

My models are invariably pretty simple to build so a week later it was ready to fly. I had one or two problems with it at first caused by that fat (for the size of model) fuselage and the high mounted engine. It was distinctly tricky to launch, the motor pushing the nose into the floor, so, rather than break it, I chucked it off the local cliffs! The problem became immediately apparent; the CG was too far aft. The other problem was tip stalling but twisted-in washout soon cured that. The model was now transformed into an exciting and acrobatic power/slope soarer depending on the strength or direction of the wind.

The only deviations from scale that I know about are that the motor fairing is a little fatter than it should be to hide the tank and the wing has 1/2" more chord to give a little more area. The real aircraft has strip ailerons and used a tail plus elevator set-up experimentally though it now has an all-moving tail.

Construction: Wing

The wing is made from a single piece of medium 1/4" balsa 4" wide or a combination of smaller pieces. I cut the outer parts of the taper off and glue them to the inner sections to make up the width. Once the blank has been produced, the underside of the outer 6in is carved and sanded to give washout before the normal section is carved in. This done, the wing is cut across the centre and the strip ailerons cut away. The wing can then be rejoined to give 3" dihedral under one tip. The aileron torque rods are 16 gauge piano wire bent to an 'L' shape and the torque arms are 16g brass tube. These are flattened at one end and drilled with 1/16" holes to take metal clevises.

This end is then bent to an 'L' shape ready to be soldered to the rods. The ailerons are top hinged so they need a wedge planed off their lower leading

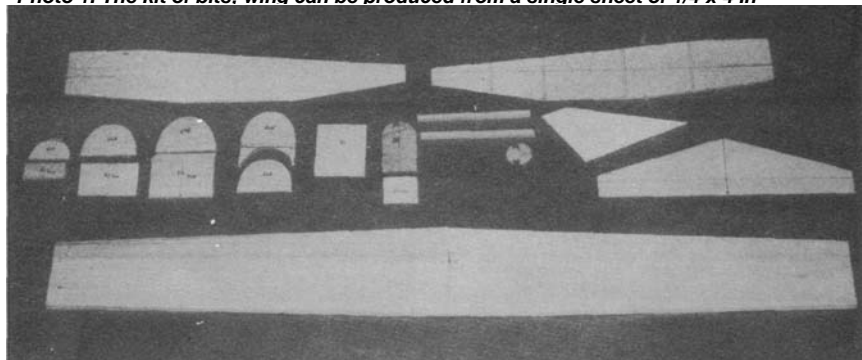
edge before Solarfilming them in place. Cover the wing at this point, but leave the centre section bare. The 1/4" locating dowel is glued onto the wing before the centre section is reinforced with a narrow strip of wing covering type glass cloth.

The tail surfaces are 1/8" sheet planed and sanded to section. The elevator is top hinged, again with film. I covered the surfaces at this stage as I am hopeless at getting film to stick in the corners of a finished model; they are epoxied in place later.

Fuselage

The fuselage is the trickier bit. As can be seen from the drawing, there isn't a straight line in sight so it can't be pinned to the board. The formers could be cut across the horizontal centre-line along with the fuselage sides, enabling you to build it in top

Photo 1. The kit of bits; wing can be produced from a single sheet of 1/4 x 4 in



and bottom halves, but I built mine in the air using a straight line on the board as a reference.

To build it my way, I first marked the position of the formers on the fuselage side and, using CA, glued F3 and F4 in place. I then drew the tail together and glued it, followed by the nose and F1. F2, F4 and F5 were then slid into place and glued. The canopy formers are tack glued into place, the engine bearers and support are glued firmly, taking care not to build in any side thrust (**photo 2**). The tank is held in place with silicone (**photo 3**). The fuselage is planked with 1/8" x 3/16" balsa, finishing with the underside of the motor fairing. The noseblock and front bottom block can also be added at this point. Carve and sand this lot to shape (**photo 4**) then cut away the canopy/hatch (you did remember to mark it out as you planked, didn't you?)

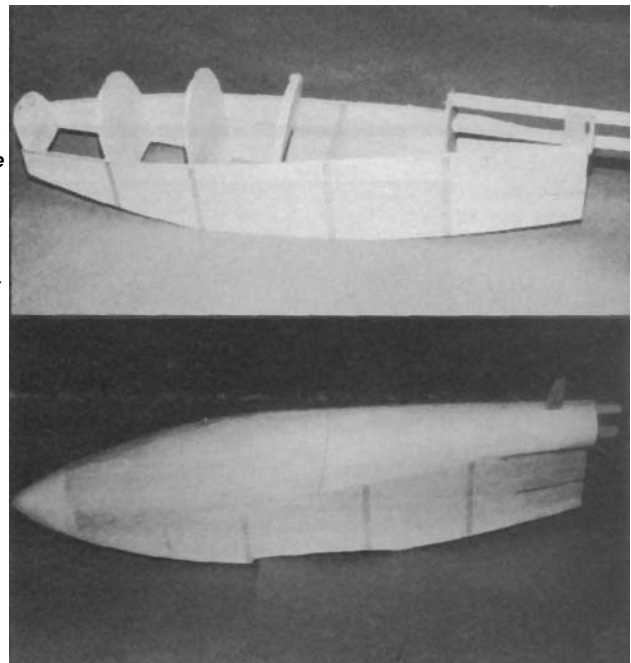
I installed the gear before planking but, being clumsy, kept knocking the formers off; I reckon that it is easier the other way round. Temporarily fit the wing to the fuselage making sure to install the reinforcement plate for the locating dowel. Install the servos and their mountings - they are offset to give straight runs to the ailerons. I used a 14g bike spoke for the elevator pushrod and 16g threaded rod for the aileron (**photo 5**). The elevator pushrod exits via a slot cut in the centre of the fuselage join under the elevator itself. Once you are happy with the controls, the rear bottom block can be added and carved to shape.

The ply wing retainer plate can now be added (internally) as can the wing underside fairing. Cover the fuselage in film without the tail or fin in place, cutting the slots out again afterwards. The tail and fin are epoxied in place when the covering is finished; it looks much neater that way - don't forget to cover the wing fairing. All the trim I used on my model was film and there are many schemes available, so make it bright. I used silver film on the canopy and airbrushed the shadow lines. The canopy is held in place by a small elastic band between the pins shown on the plan and small scraps of thin ply to stop it moving about. The Rx and battery are held in place by putting them in foam rubber blocks, cut to fit the fuselage or canopy. I used a 225 ma battery but if you are building the power version then the extra weight of a 500 ma pack might be useful for balance.

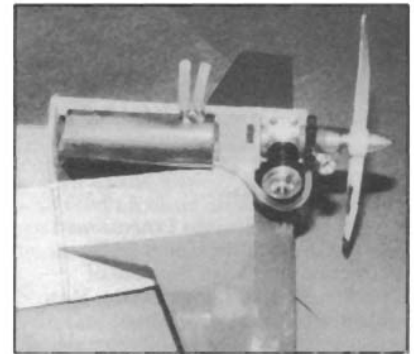
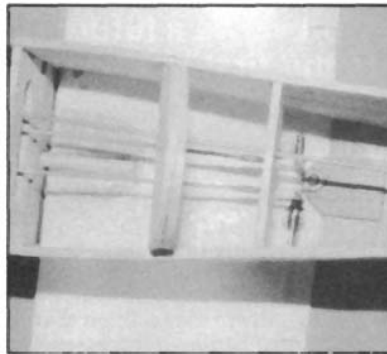
Flying

Now for the best bit, flying it! Check the control surface throws first, though - they should be about 1/8" in each direction which doesn't sound a lot but certainly has the desired effect. The balance point should be 1" behind the leading edge; I know that this looks a long way forward, but the fuselage has a lot of effect and things get a bit too

Top right, photo 2. Fuselage halves are drawn together onto main formers; prototype fuselage was 'built in the air' using a straight line on building board for reference. Centre right, photo 4 shows sanded and caned fuselage and marked-out canopy/hatch ready to be cut away. Below left, photo 5 shows R/C installation details; elevator pushrod is from a bike spoke. Below right, photo 3 shows home-made tinfoil tank (from a cleaned up bean tin!) and Cox .051 on bearers. Aerial on power version should be led out to a wing tip.



exciting if it's any further back. I



didn't glue the lead in place so that I can fly either power or slope.

Power...

The power model needs a healthy motor run and a firm push into wind to take off. The elevator doesn't have a lot of effect till flying speed has built up. I hold the model just behind the trailing edge to launch. Once in the air the model is fast and aerobatic and this is where the bright colour scheme comes in useful - it stops your losing sight of the thing! It will do all the aileron/elevator maneuvers I can think of but the tank and lifting section wing make prolonged inverted flight difficult.

.. or slope?

The slope soarer is about 6oz lighter than the power job but this still means about 16oz/sq ft so it needs a 20mph wind to fly well, on our slope at least. I launch by holding the model just in front of the wing and usually just need to let go. (Our slope site is a 200 ft or so sheer cliff). The model performs well enough for a scale job though it's somewhat 'draggy' and loses speed a bit quickly compared to the 'kippers'. Both versions were prone to tip stall in very hard turns; should this happen to

your model, the cure is to warp in some extra washout or reduce elevator movement. In a strong enough wind the extra weight of the motor and ballast does make the power job into a faster sloper.

There is a shorter wing version of both models. I haven't tried this but it would work out at 28" span and should be appreciably quicker in all respects.

Unlike most powered gliders, this one stays pretty clean under power with the rear mounted motor blowing the majority of the gunge clear of the plane. If it's too windy to fly power, just take it to the slope. Not enough wind at the slope? Stick the motor back on it! It is a handy size for a second model being small enough to leave in the car fully assembled. I take mine apart by removing the servo disc from the servo before removing the wing. Leaving that little screw out gives a measure of crash resistance, provided that the disc is a tight fit! (A wind of about 35-40 mph seems to be about the limit for the soarer, with the motor and balance weight as ballast; after that, penetration is zero. Surprisingly, the looping performance in this configuration seems to suffer compared to its minimum weight condition.)