Heinkel He51

36 inches of all-sheet fun with John Rutter's latest

Despite simple construction, Rutter's He51 makes a convincing finished model when fully rigged. Power in the prototype is an HP 21 four-stroke but really any motor of similar size, two or four-stroke, will do.

Some aircraft seem as though they were designed with modelling in mind, their lines are simple but attractive, their moments give the proper c.g. easily and their colour schemes are bright. The He51 is one of those aircraft, yet despite this there are relatively few models of it and it remains 'different'. During the early part of last year I was looking for a model to put a four-stroke motor into; it virtually had to be a biplane and one that would fly on very little power as the motor hadn't got a lot! The Hawker Fury that I built a couple of years ago came to mind but then I spotted a plastic kit of the He 51 in a paper shop and was hooked!

The Fury had performed well enough on an OS 10 FSR with all sheet wings so I reasoned that even a four-stroke should be able to pull a similar model into the air. As it turned out the Heinkel performed in a very scale-like fashion and was even better than the Fury. It sounded nice too!

There are few deviations from scale in the outline of the model (well, none that are deliberate but I drew it up from the kit!) but I kept things simple and left off things like gun troughs and exhaust pipes which I am sure could be added easily enough by a more fastidious scale modeller than I. The sheet wings are obviously less efficient than built-up wings but are not a lot thinner than scale and are very easy to build and repair.

Getting started

Construction started with the flying surfaces; these were simply drawn onto sheet that had been made up to the required width and cut out. The aerofoil section was planed and sanded and the control surfaces cut away and chamfered for centre hinging with mylar strip. This should take about an hour from start to finish which has got to be the easiest way to get a pair of wings, a tail and fin! For scale the top wing should have dihedral but I kept it straight for ease and strength – it's hardly noticeable. As I used a heavy motor I made the tail from fairly heavy 3/16in sheet but, with a lighter two-stroke motor on the front, 1/8 in should be adequate and would avoid the need for a large amount of lead in the nose. At this point I covered the tail surfaces with silver film (I think the true colour should be light grey but Solarfilm don't have any and silver looks OK) and installed the elevator horn and hinges then put them aside until the fuselage was built up. The wings can't be covered until the fuselage is finished in order to get the struttery in the right place.

Now the fus.

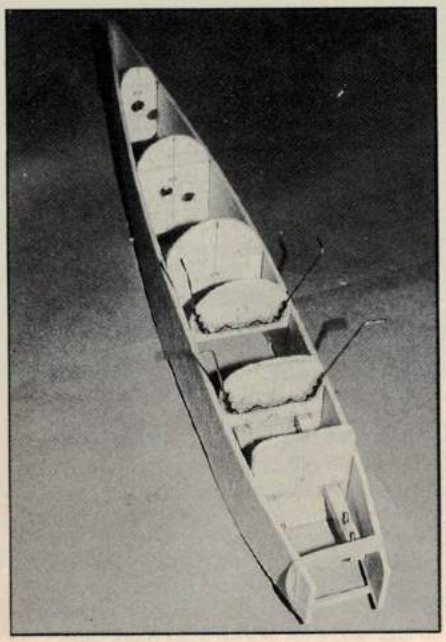
Having disposed of the wings, etc., in short order the fuselage has to be next on the list and this follows more normal practice. I personally like to cut a kit of bits before I glue anything together and that seems as good a way to start as any. Bend the wire struts from 16G piano wire (this is quite thick enough without being hard to bend) and bind them to formers 3 and 4. I then glued them in place with 24 hour epoxy, heated the lot up with a heat gun which makes it flow lovely and sets it in half an hour or less! The motor was then fitted into the bearers which in turn were fitted into formers 2 and 3. Check the alignment very carefully against the drawing and repeat the epoxy trick. While you are waiting for the epoxy to go off you might as well glue the thin ply reinforcement to the fus. sides – I used Evo-Stik impact. Don't be tempted to use 1/16in ply or you won't get the nose pulled in and, anyway, 1/64in adds more than

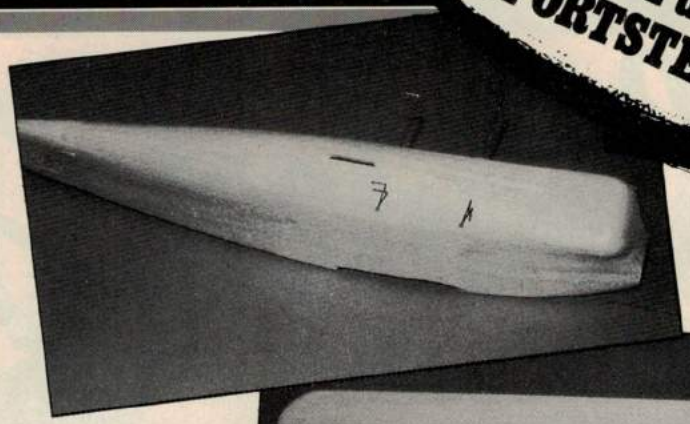
enough strength.

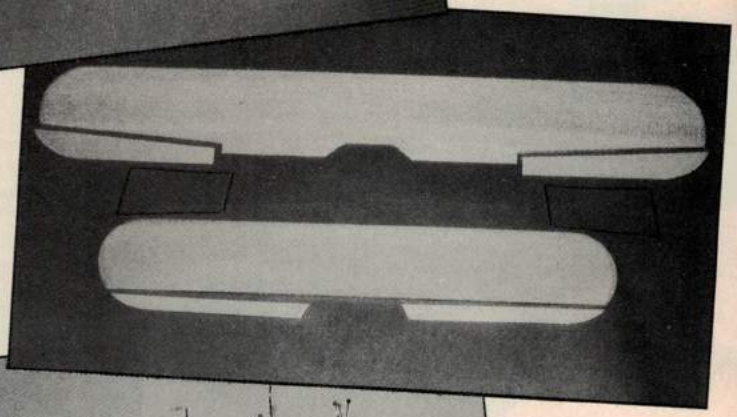
Make sure that formers 2 to 5 are the same width and glue them to one fuselage side, carefully align the other side and glue this too. When set, draw in the tail end (keep it straight) and glue the rest of the formers. Cyano speeds things up a treat here. Pull in the nose and fit the front blocks; the motor should have been removed by now, incidentally. Add the triangular strips to the rear end and instal the servos. Put the tail surfaces in place temporarily and make up and fit the pushrods. Remove the tail again and sheet the underside front and rear. I like the next bit but I'm told that a lot of people are put off by it. Plank the top of the fuselage. Chamfering the edges of each piece of woods as it's glued in place avoid lots of gaps and glue and cutting the strip from one sheet of wood makes sure that it bends consistently. If you don't own a balsa stripper, go out and buy one, it will last for years and you will never regret it. I don't know how I ever managed without one.

The front of this model is a bit peculiar in that the cowling around the full-size motor was very close and this means that the top of the cowl is very wide. I used a combination of block, sheet and trailing edge stock to get the 'V' shape that gives this aircraft its distinctive appearance. Oops, I nearly forgot, the fuel tank should have been installed before the top decking completely covers in the tank bay. I used a home-made tin tank as there is not really the room for a clunk. Don't forget to fuel-proof the tank bay too.

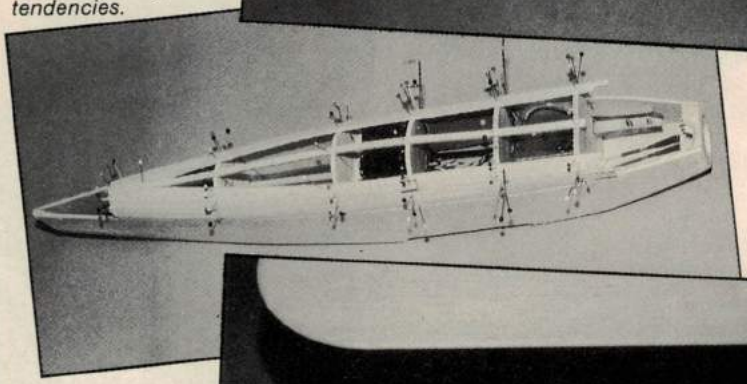
Back to the nose. Once you are happy with the shape of the cowl, cut it away from the rest of the fuselage, reinstal the motor and cut away the appropriate holes for the intake, exhaust, plug access (unless you are using a diesel), needle, cooling air inlet and outlet and any other block you need to remove to avoid entangling the motor. You will now be left with a very fragile piece of balsa that just cries out for a bit of thin glass cloth and resin on the underside.



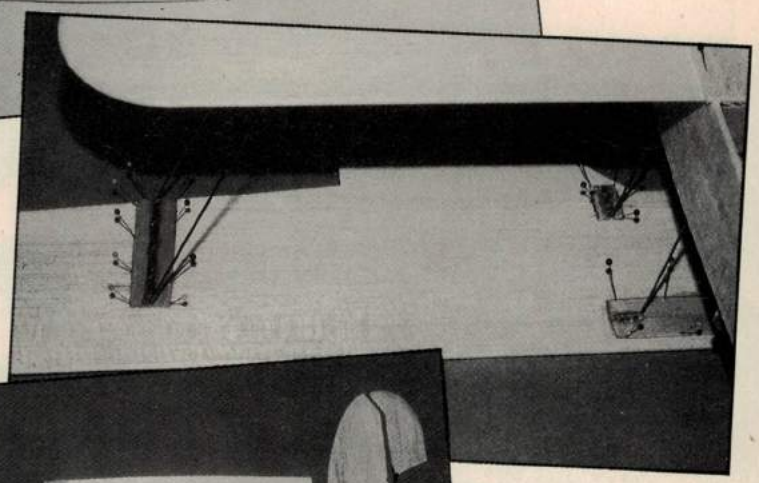




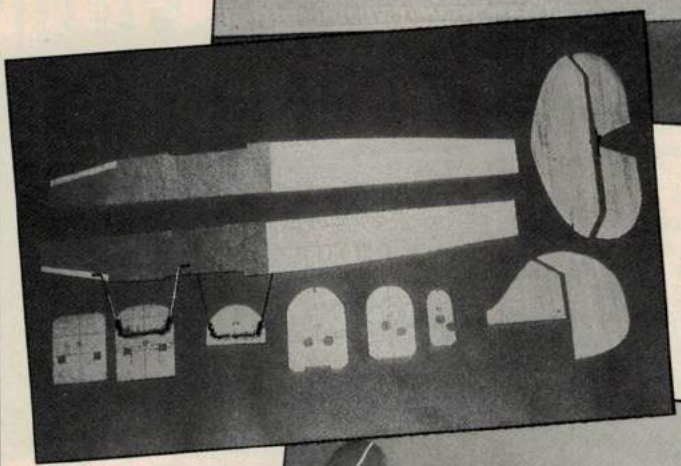
Fuselage top decking is planked – a satisfying constructional procedure which is made even easier if you strip your own planks from stock sheet so that they all have similar bending tendencies.



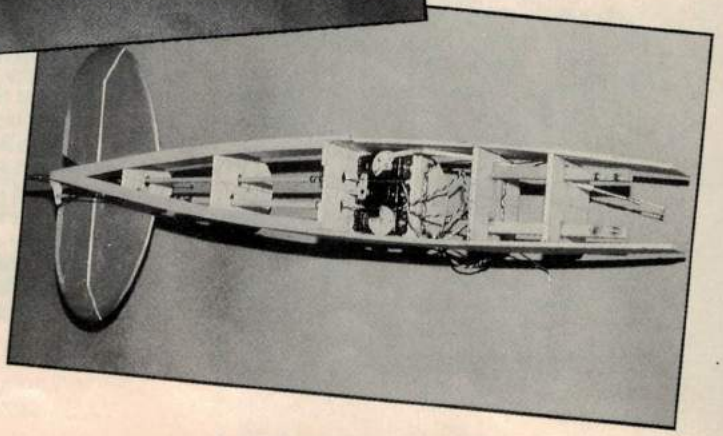
Wings couldn't be easier! Simply mark them up and cut them out of sheet.



Wing alignment on biplanes is important; here thin ply carries retaining tubes, pinned while epoxy sets.



Start with a 'kit' of parts, it's much better that way. Note ply doublers on fuselage halves.



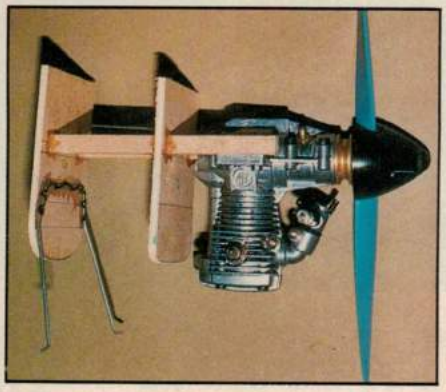
Fuselage goes together and servos are installed. Model takes modern standard R/C gear.

While you are at it, remove the motor again and use any excess resin to fuel-proof the engine bay. Cover the engine bolts with short bits of fuel tubing to avoid gungeing the threads up. Cut away the cockpit and add the floor if you hadn't already done so. On my model the cowl couldn't fall off as the silencer went through it so I merely pinned it in place to stop it rattling but press-studs or screws might make a better job, I'll leave that up to you.

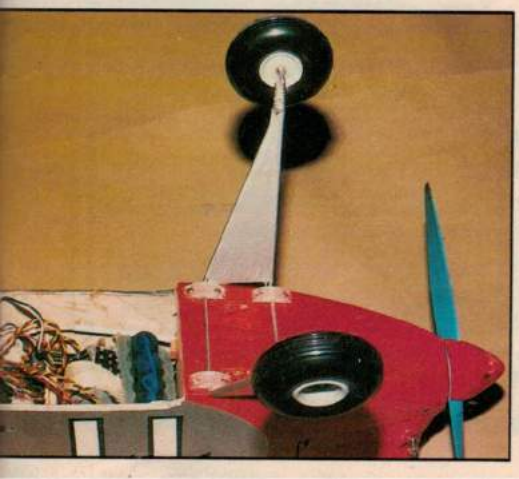
Wings re-visited

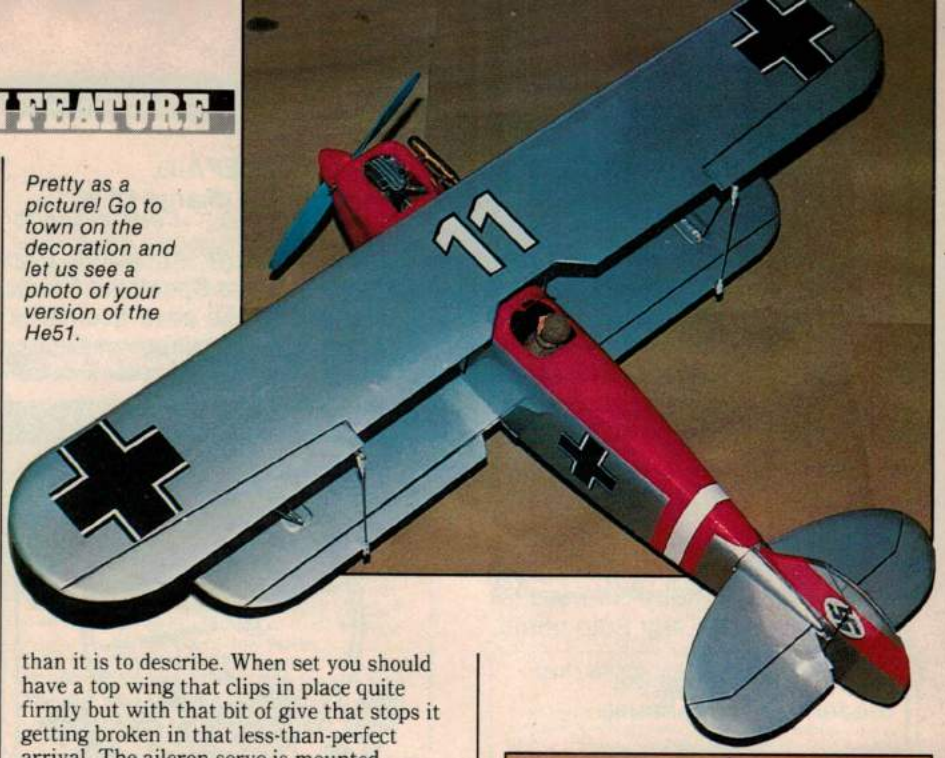
Back to the wings. The bottom wing needs a dowel glassing in place and the wing set and/or hole in F3 will need adjusting to get the wing nice and square. The piece of thin ply and underside sheeting can now be added. Drill through this and into the ply wing retainer in the fuselage to get perfect alignment for the wing retaining bolt. Drill out the fuselage mounted ply to take a blind nut then put the wing back on. Check the top wing for being square and parallel and mark where the retaining tubes are to go. On my model I put the tubes onto thin ply to give more gluing area and simply glued these pieces of ply to the wing surfaces using hot 24 hour epoxy again. I'm sure it would look neater if the wings were recessed to take the ply.

The last bit of alignment can be done all in one go if the interplane struts (the ones near the ends of the wings) are epoxied to the bottom wing at this point. The struts are not removeable from the model, they simply hinge out of the way, the top ends clip in place in the top wing tubes. When all the bits of tube and ply are ready, epoxy the lot together with the model inverted as per the photo again making sure everything still lines-up properly. It's much easier to do



Engine mounting is entirely traditional with hardwood bearers and ply formers. Undercarriage has 1/8 sheet infill.





Pretty as a picture! Go to town on the decoration and let us see a photo of your version of the He51.

than it is to describe. When set you should have a top wing that clips in place quite firmly but with that bit of give that stops it getting broken in that less-than-perfect arrival. The aileron servo is mounted sidewinder fashion on the bottom wing and drives simple torque rods to the bottom set of ailerons. These are connected by a rod to the top wings. I flattened a piece of tubing in two directions so that, while it would fit happily in a slot in the edge of the aileron, it presented a vertical edge to the clevises on the end of the rod. A bit of sheet metal with the end twisted 90° (and drilled, of course) would do the same job. Cyano holds these bits of metal in place as well as hardening the surrounding wood.

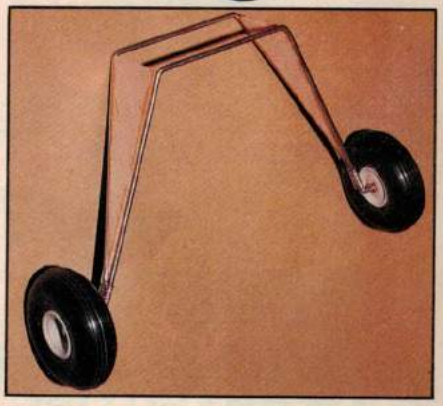
Finishing

Bend up the u/c from wire, or thin dural if you can get hold of any, and attach it with screws and clamps temporarily to the fuselage. Cover the entire model with film using one of the many bright schemes available. I even cut the insignia from film though I'm sure that there must be some suitable decals available somewhere. Once the fuselage has been covered the tail can finally be glued in place, cutting the film away from the joint first. All moving surfaces were centre-hinged with mylar as I mentioned before. Herman the pilot was carved from a block of styrene and painted with Humbrol paints. He was fun to make, adds no weight or cost and really adds to the character of the model. *Do* fit a pilot.

And now, the time has come...

Having checked the c.g. control throws and directions and said the appropriate prayers it's time to fly the beastie. The motor I used was not incredibly powerful and contributed a fair bit to the near 2.1/5lb the model weighed so I hand launched for the first flight on a less than flat calm day (I would have had a long wait last summer for one of those!) and was pleasantly surprised at the result. No, it didn't scream off into a vertical climb but it gained height in a very stately manner. If a bit overfast for scale the model nevertheless looks well in the air and the four-stroke motor makes the model sound right too even though the performance with a two-stroke would be much livelier.

Rolls can be done from level flight as can stall turns but looping manoeuvres need a dive to gain speed. The model spins well and



Undercarriage is 14g piano wire.

recovers as soon as the controls are neutralised though it loses altitude far faster than it gains it. My favourite manoeuvre with the model is the flick roll, which is very quick and positive, especially to the right. It flicks very nicely from level flight without losing altitude if it's only a single manoeuvre. The stall is very gentle but there is a tendency to gently fall away to one side or the other. This can usually be controlled with the rudder but might cause it to flick in the opposite direction.

Landings are a bit fast, unfortunately, but, apart from that, are not too difficult. Take-off from the ground took me a little while to get the hang of. On fairly short grass the best method seems to be to give the model a bit of a push start (not a lot of power for acceleration) LEAVING THE ELEVATOR ALONE and countering any tendency to swing with the rudder, which, incidentally, is very powerful. If you hold elevator in the model will tend to veer off uncontrollably in either direction but floats off the ground nicely without it. Wierd.

The model has proven itself to be very tough, if unlucky, with a series of accidents due to equipment failure. The wings are simply glued back together with cyano giving a stronger joint than the surrounding wood and only the latest of four bad crashes has damaged the fuselage at all. I'm tempted to try built-up wings to see how much of an improvement they make – the wings are not very complex in outline after all. Sounds *too* sensible for me though...