

Das Kleine Biipe

by
Geoff Dallimer

**A sporty little
biplane with a 36 in.
wing span and
W.W.I appearance
for 2.5-3.5 c.c. motors
and small multi radio**



Take a Double Elephant!

Designing a model on a blank sheet of paper, and then building the creation is a very rewarding, if time-consuming activity. Fortunately, I am one of those who believe very much that not a small part of the enjoyment in our hobby lies in the design and construction of the model, indeed perhaps as much, if not more, than can be had on the actual flying field. I fear so many of those reaching for the 'RTF' or 'Kwik-bilt' models miss the very essence of our hobby—the satisfaction of creating from a two-dimensional drawing something of character and with the ability to move in three dimensions under the direction of its earthbound master.

In designing a model aircraft we are usually putting the cart before the horse. The full-size design team would commence with a specification; move X people at Y m.p.h. for Z pence per mile—and might then find themselves designing an aeroplane or missile depending upon where the mathematics led them! How unlike is the model designer who first determines how the final product will look, adjusts the mathematics to suit the size of his car boot, and then thinks of some reasons to justify the choice!

The Vital Spark!

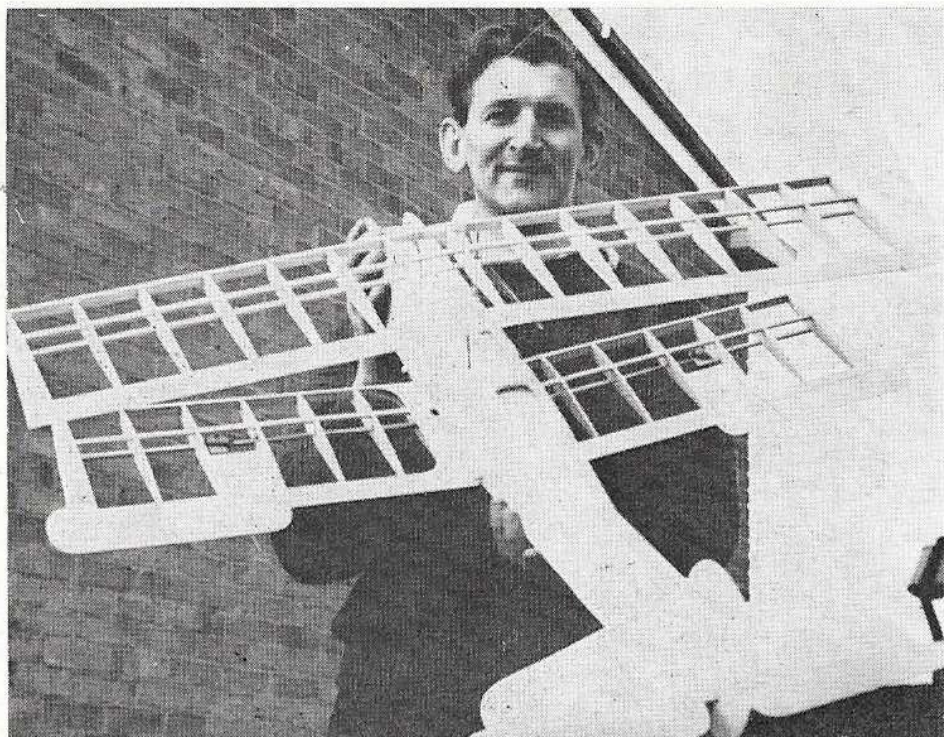
In the case of 'DKB', since my preference is for small models and the club flying field is sufficiently rough to discourage much detail on the model, this

was kept fairly simple and I set out to build a W.W.I type biipe without actually modelling one particular type. There is quite a lot to be said for a 'full house' biipe that can be thrown in the car boot in one piece and still leave room for all the other paraphenalia that normally collects in that space! Those with a thirsty 61 motor using a $\frac{1}{2}$ pint of fuel a flight will also recognise the economy of a 2 oz. tank with a 2.5 c.c. power plant.

Trial and Error!

'DKB' is essentially a sport model—that is to say it cannot be expected to perform the FAI Aerobatic schedule—on the other hand it will do all that a weekend flier might ask of it. I cannot say that 'DKB' actually 'flew off the drawing board' since it did at first exhibit some vices, ground looping on take-off, being very sensitive in pitch, and having a severe 'barrelling' roll. What else might you expect of a W.W.I airplane! The pitch sensitivity was cured by reducing the elevator throw and moving forward the C.G., at the same time this improved the ground looping tendency which I cleared completely by moving the undercarriage further aft nearer the C.G. Increased differential on the ailerons reduced the tendency to barrel roll but I must admit it is not completely cured, but then, maybe W.W.I bipes never did axial rolls!!

One point worth mentioning in regard to the ailerons is the 'balance' area beyond the wing tip.



Scared out of its skin when Snoopy appeared in his Sopwith Camel, the Kleine Bipe airframe displays simple structure which should be popular with the built-this-week, fly-next-week set. Designer Geoff has that 'will it or won't it' expression.

This is on the model purely for 'effect' and has proved rather troublesome since being on the lower wing it makes the aileron rather vulnerable when landing. For this reason wing tip skids are shown on the plan and I recommend that these small but important features are not omitted.

Another small problem on the prototype caused through oversight on my part arose through omitting to web the mainspars on the upper wing. After some dozen or so flights I noticed wrinkling of the covering near the centre section following a particularly violent bout of aerobatics. This was due to the balsa ribs beginning to fail in compression under the load of the spruce spars, and serves as a gentle reminder that no matter how strong the components, a structure is only as strong as its weakest point! So much for hurrying to finish covering the wings—before the structure was complete!

No apology!

Perhaps you might be surprised I mention so many 'defects' in the original design, however, the airplane that was 'perfect' straight off the drawing board has yet to be built, or if it was, then its designer was wearing rose tinted spectacles! I would rather you know the development that goes into a new design—as I said earlier this is part of the challenge!

The Labours of Hercules (Construction!)

Building DKB should present no difficulty even to

the less experienced at the hobby, the building techniques I use are quite straightforward and the structure is the traditional rib wing and box fuselage. I usually build the wings of a model first since the most important part is then completed whilst one has the most enthusiasm! This helps to ensure that the wings are built free from warps, and allows them to 'age' before use.

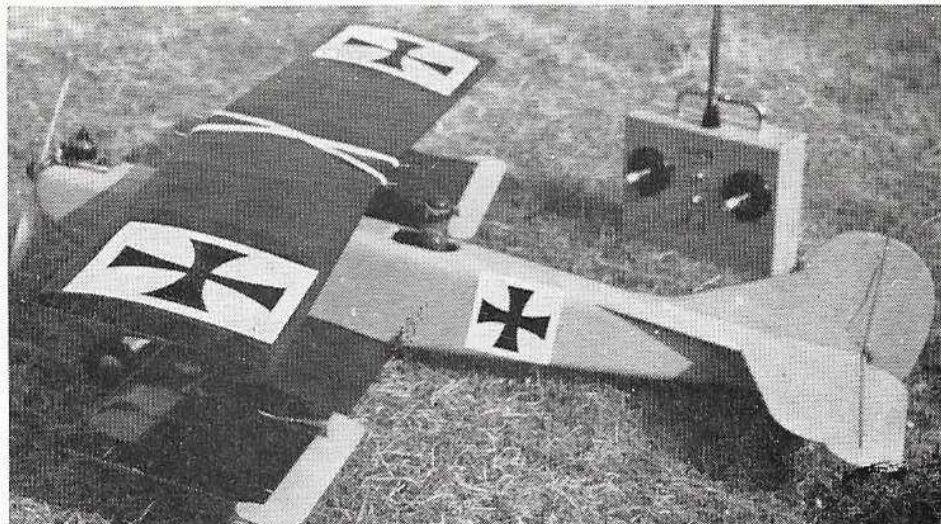
The wing construction needs no explanation, but perhaps I may impress upon you the importance of push rods that move freely without backlash, and the need for differential bellcranks. Incidentally, I have always made a thin brass template of the rib section as a cutting guide and find this the best way of ensuring that all ribs are identical—not necessarily right—but identical! Cut out the template with tinsnips and smooth to size by draw filing. Drill two holes in the template and solder a modelling pin in each so that the points protrude 1/16 in., cut off the surplus flush to the solder joint. These points will now grip the balsa sheet whilst the cutting tool—razor blade or modelling knife—is run around the template. Choose 1/16 in. medium balsa and cut 40 ribs.

Assembly of the wing is carried out with the lower spar laid out on the plan whilst the leading and trailing edges are blocked up to their correct height so that the ribs may be cemented in place. Complete the assembly with aileron push rods and bellcranks etc., before covering with *Solarfilm*, or more prefer-



You just can't keep a good bipe down! Red Baron in the cockpit adds air of realism. Aileron balances are for effect only—take care not to knock them off.

Geoff's prototype used home-built Classic R/C system with which he is well pleased. Model employs 2.5-3.5 c.c. motors and 2 oz. fuel tank. Just how economic can you get?



ably, nylon. *Solarfilm* or *Monocite*, certainly are a quick way to produce a fine finish on the model, but I personally find that with usage these coverings so often wrinkle at leading and trailing edges due to tension from the rubber bands; for this reason nylon is now my preference on open structures.

The fuselage is built in the usual manner by cutting sides and doublers from $\frac{1}{8}$ in. sheet and bonding them together with PVA adhesive. The plywood bulkheads are glued in with epoxy, note front bulkhead is double and set to give right sidethrust. Pull the rear ends together and cement, then add top and bottom sheeting.

Wire Cabane

Forming the upper wing cabane from 12 s.w.g. wire is perhaps the most difficult part of the model, however, patience and care will bring its reward! First, form the top two cordwise members to fit the upper wing; do ensure that both pieces are the same.

Take the two main strut members and mark off with a spot of paint the centre of each bend that has to be made. (This will help form each side equally.) If you have a wire bender then this will make the job much easier; if not, then a small vice and pliers will have to be used to make the bends. After making each bend check for squareness with a set square and bend the angle using a cardboard template. Don't worry if you cannot exactly duplicate the struts as shown on the drawing - it is more important that each side is identical, and that the width is a snug fit to the fuselage sides. Repeat for diagonal struts.

Assemble the cabane by binding all the joints with

5 Amp fuse wire. Keep this as neat and tight as possible. Adjust the unit until you are satisfied it is 'right'. Now solder the joints using a 60 Watt iron with acid flux (or Bakers fluid) and 60/40 soft solder.

Drill holes in the top fuselage planking and slide the unit in place, ensure the wing will be at correct incidence and level. Apply a liberal coating of epoxy to all joint surfaces and wedge the wire in place against the fuselage sides whilst the epoxy is curing.

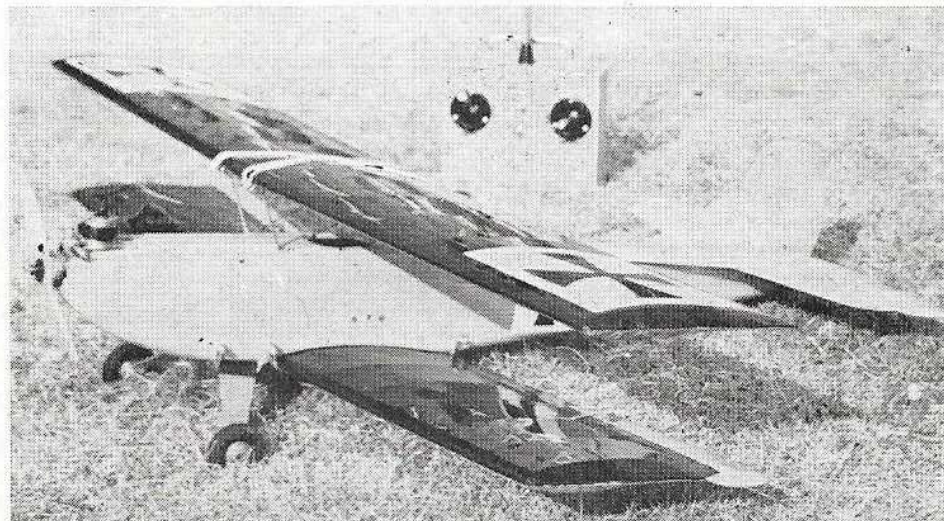
Finishing

Cut out and cement in place the tailplane unit, then sand down the whole model and apply two coats of grain filler to the fuselage before applying top coats of polyurethane. The original had all red fuselage with wings red underneath and black on top and black crosses on white background. Probably not very authentic but quite pleasing!

Flying

Alas - I am but an engineer - what can I tell you about piloting a biplane?! You, gentle reader, perhaps know more about the art of flying than I do! However, when I keep a touch of right rudder on to stop the swing, and keep my finger off the other stick, 'DKB' flies off the runway on her own. On the other hand, if you want to emulate the late Herman von Splatten, lift her off with elevator before the flying speed is high enough for aileron control!!

'DKB' is lively in the air, and like all biplanes has an atmosphere all of its own that makes simulated dog fights with those rival newfangled British type monoplanes a delight to behold!



DKB tended to ground loop on take-off until designer Geoff Dallimer moved the undercarriage back a bit. No problem now. Decorative colour scheme aids visibility in the air.