DOUBLE DUTCH

build from our full-size **PLANS**

Tecspecs

Name:	Double Dutch
Designer:	Peter Holland
Model type:	Fair weather sports biplane
Wing span:	38.1/2"
Motor:	Speed 400 electric, direct drive 6 x 3 folder
Power:	7 x KR-600 AE Sanyo cells
Construction:	Fully built-up balsa
Covering:	Litespan
R/C functions:	Three - rudder, elevator, motor switch.

A 38.1/2" span lightweight sports biplane for electric power, designed by Peter Holland

If you want to have a quiet, relaxing flying time in those not too blustery summer days to come, this is the model for you! 'Double Dutch' was the natural name for a double winger by that chap Holland, and in the air, it is steady and leisurely, viceless and attractive. One might say reminiscent of those free flight days, but with the assurance of being able to put it where you want to, and to keep it near enough to appreciate its lines. Peter tells you how to make it from your full-size plan. Ed.

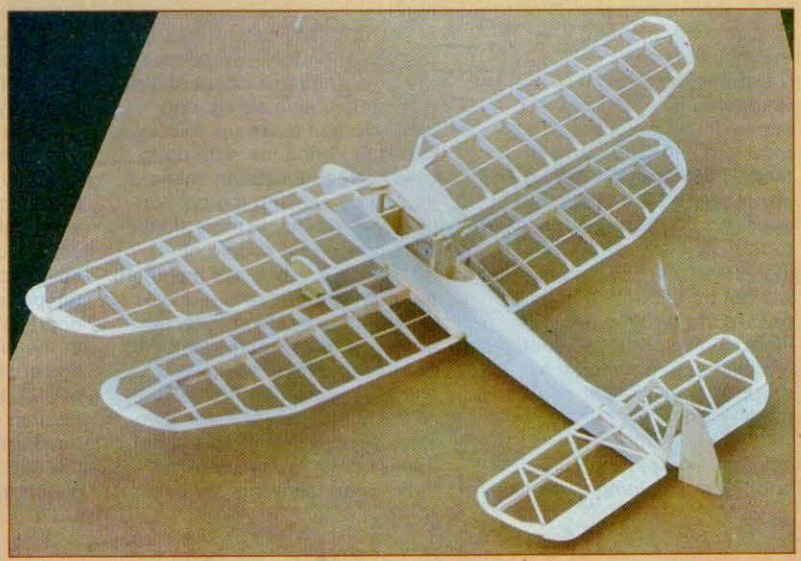
Unusual double-stagger wing arrangement shows well in this shot of the uncovered prototype.

Many older modelling friends remember 'Bi-Play', one of my free flight model designs, popular in the Aeromodeller Plans Service. It was built in the mid 1950s. A little .8 cc. D.C. 'Merlin' diesel would get it way up, more by using the large wing area and light weight, rather than by speed, in fact, we would play tricks like making drastic trim changes so that we could fly it without the top wing, or without the bottom one. The four panels were of the plug-in type, so I even tried port upper and lower starboard panels together, with tip weight and rudder (because the top wing was longer span than the bottom one!) Eventually it was lost in a thermal, which had no respect for light sports models...

What sparked me off?

Now, flying R/C electric, I was encouraged by the editor to revive the design for R/C. A look at the old Plans Service drawing showed that a straight conversion would not get the best out of electric power, if some of the old floaty flights were to be made controllable.

For a start, a cabin biplane, streamlined as the 'By- Play' was, still had too much fuselage drag, and the wing area was a bit more than would be needed, even with the payload of light radio and simple up to date electric flight gubbins, to increase the



flying speed a bit. I did not want to find it going backwards in a light breeze, so 'Double Dutch' was born.

Weight for it...

The construction of the predecessor, though light, was a little over designed for its earlier task. The wings are now to be one piece each, saving weight. But, with no down wind cartwheel free flight arrivals, the only stress point would seem to be near the flight pack which, being external, does its own thing, rather than pushing the model if put down too heavily.

You may ask "Surely a little free flight job will have to be beefed up to carry the gear and battery". Will it heck! More beef weighs more. More weight brings more stress, more inertia, and less performance for a given motor/battery combination.

Now I like the lines of that old model, so I set about changing the rigging angles, a very slight reduction in dihedral, a bit less span and a more forward C.G. to make it radio controllable.

A slim chance

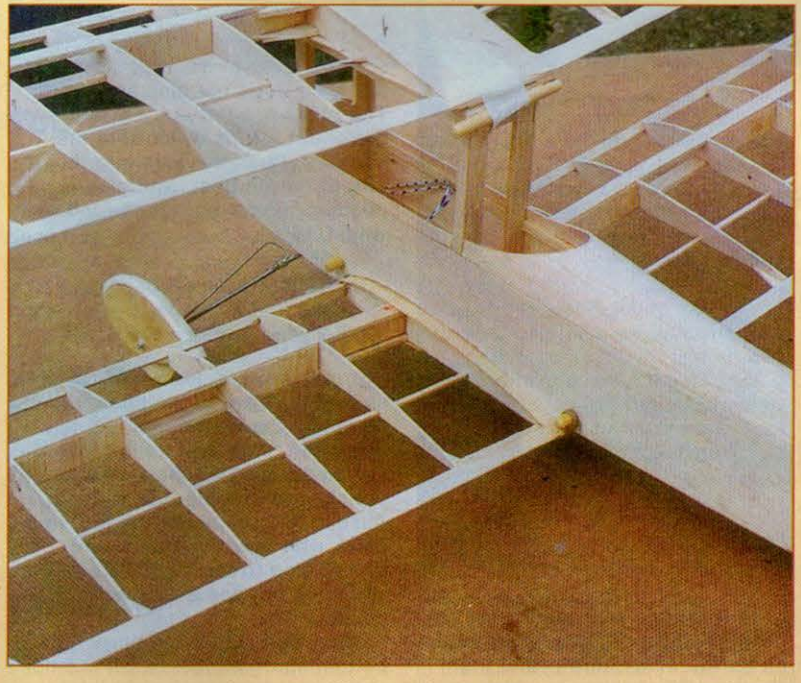
The fuselage front view has been on a diet (half the width). One might have called it 'Anna Rexic'... Now the width is just right for P-SD 3000 servos mounted crosswise, and because access can be gained above and below, you do not have to possess violinist's fingers to get at 'em.

Wheel meet again

I know wheels are a luxury for those performance electrics, but I think a biplane looks funny without them. In any case, the C.L.A. had been sorted out in the old design. The new wheel spats are dead slim, thinner than a standard wheel alone, thanks to the use of thin ply instead. This combination slips through the short grass too.

Get motorin'!

I wanted the minimum of complication and a low cost method, so a Speed 400 was housed in a paper tube up front, driving its own 6 x 3 folder prop. This would improve any glide stage of the flight. Now with a slow speed model such as this, a small prop is not so efficient as a larger, geared combination on the same motor. That is the price of simplicity. There is plenty of depth in the nose, however, should you wish to use the geared S 400.



Fuselage ready for cabin glazing - note the alternating front and rear vertical spar webbing.

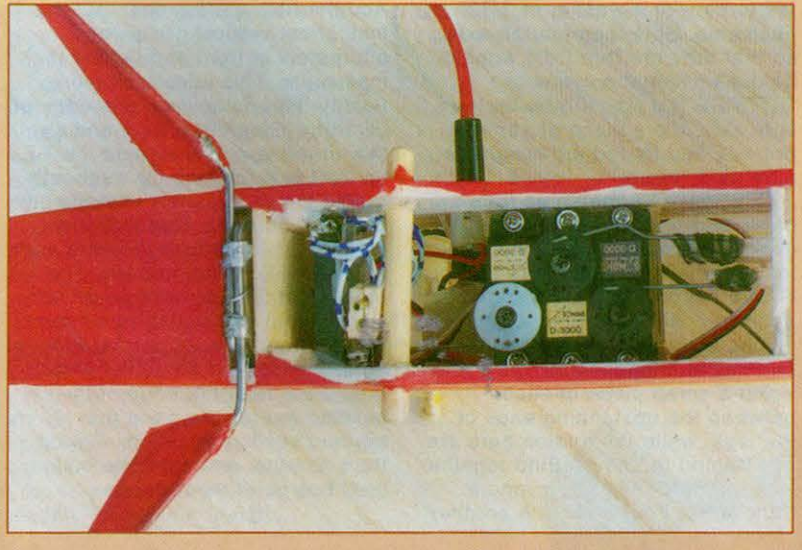
Start aeromodelling

Prick through the plan to mark the outline of two fuselage sides, which come easily from a 4" wide sheet of firm, but not over hard 1/16". Cut doublers from one edge of a 3/32" sheet, so that you can strip some for other parts at the other edge. Add 3/32" square strip at the bottom rear edge and 1/4 x 3/32" along the top edge. Glue small doublers at the nose too. Weight down as a pair to set. Now make the formers from sheet and strip and fret Lite ply to make F1 and F2. (If you are an oily fingered type, F1 should be hard ply for the engine mount bolts, but that's rather against the idea behind the design).

Tail

What, now? Well, save time while the sides are setting. The main outline is 1/8" light strip and sheet. Pin down over your polythene while the joints set and add the Warren bracing all flat. Infill the centre and glue a top spar over the lot. Fill fore and aft at the centre to make the fin easy to seat. When that tail is set, flip it over and add the other spar. The covering only touches this and the outline.

Make the fin without the rudder post. It will need to be covered and joined to the latter AFTER the tailplane is in position, because the elevators are to be film hinged before installation on the fuselage.

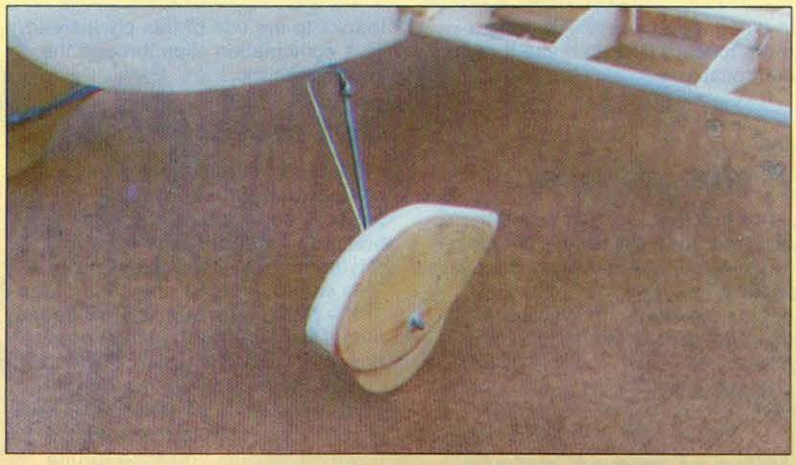


A tight fit! R/C installation in 'Double Dutch' features a trio of mini servos sitting transversely in radio bay.

Fuselage assembly - stage one

Sorry to keep hopping about like this, but time is saved when you build bits while others are drying. O.K., glue those formers in and put masking tape around near each to clamp the sides and aid rigidity.

Glue the rudder post between the sides after chamfering the top and bottom strips at that point. Note that the bottom of the post has to be cut at an angle so that, later, the skid ➤



The ultra slim spats before sanding to rounded edge final shape.

Flight pack can be moved fore and aft for C.G. trim - thicker rubber bands are used during flight, naturally...

can have some extra gluing area by means of a scarf joint. Check that the post is vertical, measured from the top edge of the sides. Leave it to set and tackle some wire bending.

Undercarriage

Bend the legs so that a torsion bar is formed in each, rake them forward per the side view. (Now turn the soldering iron on) Put a light smear of grease, wax or oil on the two torsion bar bits, then bind them together using three straightened paper clips. Solder the turns of each paper clip wire together and, hey presto; three oval tubes, which would have been a brute to fit while bending the wire.

The whole thing is quite floppy, but the torsion bars can turn in the bindings. Clean away the oil, etc., and add an 18 g wire fairing and spat support to each leg. Bind these with fuse wire, and solder.

Cut short pieces of brass tube to run on the axles, and cyano them into the 1/8" ply wheels which you reinforce with a washer of 1/32" ply each side. Spin them on the axle so that they are free from wobble before wicking the cyano in OUTSIDE the tube. To be on the safe side, dip a piece of string in hot wax and thread it through the tube as a resist.

Now make up the spats from balsa and ply, drill for the axle and insert the wheel. Thread the whole lot onto the axle and cyano the 18 G wire support to the ply spat side. Follow up with more cyano and baking soda as a fillet. Sand to a streamline shape.

Put a scrap piece of sheet between the upstanding ends of the legs, while the torsion bars are one behind the other. Bind together with strong thread and cyano in front of F2. Follow up with another piece of Lite ply in front, and add scrap strip against the sides.

Finishing the fuselage

After a dry run with a paper template, cut the top decking piece from 1 mm. sheet and glue one edge in place. Secure with pins and put some narrow strips of masking tape across the grain. These will prevent cracking while you bend it over. Adjust for a good fit before repeating the fixing. Trim the rear piece to a curve near F3 and take the front piece up to F1, then install the motor and wiring. Plank over the top forward of F1.

Install the two pushrods, servo rails, and two servos temporarily, to check clearances. Sheet across the bottom with 3/32" back to the undercarriage, then from the trailing edge of the wing to just in front of the rudder post with 1 mm. thick balsa.

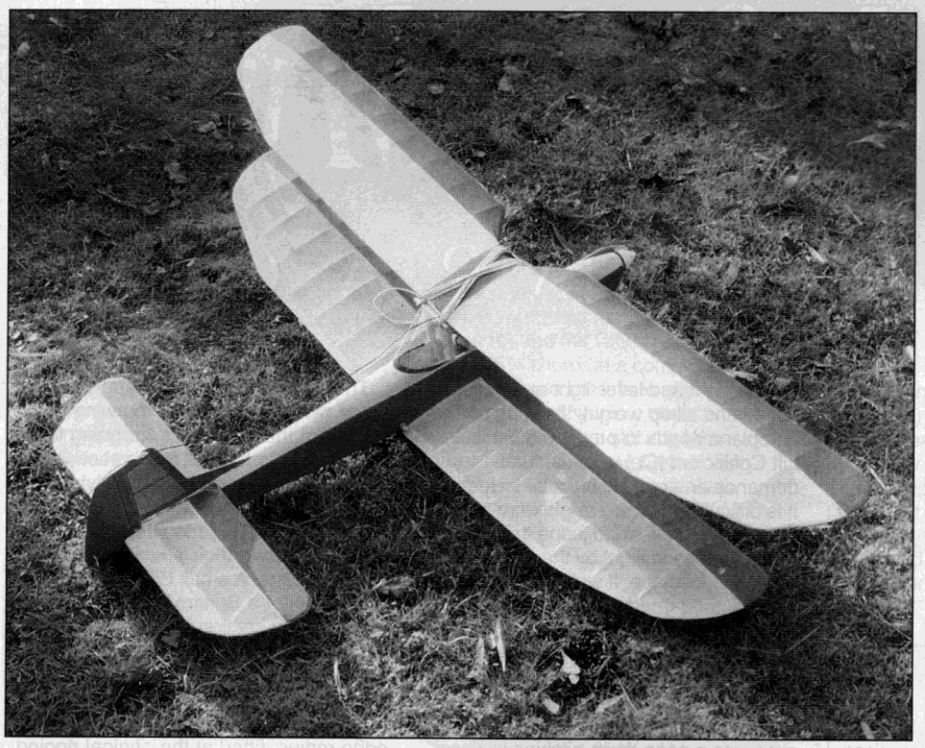
Add the dowels and 1mm sheet strips to trim the sides of F1 and F2. When dry, wrap the acetate screens over at the top, so that the wing does not displace them. The sides are flat pieces, laid over the sheet strips which trim the opening. Push the skid into the end of the fin post, and glue in position. Sheet across the tail seat with 1/16".

Wings

Strip the spars from 3/32" sheet so that they are of uniform strength. Cut all the ribs, pin down the lower spars and trailing edges stripped from 1/8" sheet (but not yet shaped to a taper in section). Assemble the tips flat (all four in a stack with polythene between), but do not glue to the main T.E. until you have put some washout packing down.

You will find that the tip of the bottom spar lies just below the tip, so leave it free and adjust later. Add the ribs and top spar, put the 1 mm. sheet vertical grain webs alternately in front and behind the mainspars. This adds a bit more rigidity than doing it on one edge or centrally. Glue the L.E. in and tilt the tip to meet it. Now glue the T.E. tip joint with packing for washout.

Join the wing panels with the ply braces, and make sure that the diagonal splice edges of spars and L.E. and T.E. meet properly. The braces set the dihedral, so do not worry about calculating he amount for that shorter span bottom wing. Finally, place the wings flat with their T.E.s near the edge of the building board, and sand the tapered section into them. Round the L.E.s too, and coax the bottom spar tips up to meet the tips.



Top centre section

The recessed leading edge here is a feature that allows plenty of wing stagger and a long looking nose. It does need some extra reinforcement; as the top spar will be trimmed to give a rounded shape. The dihedral brace does its stuff O.K. but add hard 1/8" sheet doublers behind the spars and infill with a sloping piece of 3/16" in front. Sand to blend in with the angle of the windscreen, then cover both centre sections top and bottom right over the L.E. and T.E. with 1 mm. sheet. The covering material will blend the surface at the joint.

Covering

Sand gently all over, but go very gently on the 1 mm. sheet areas. I used Litespan applied with Balsaloc throughout. Those wide spars are a good position to join different colours. Check that warps do not creep into the flying surfaces during the shrinking process. Luckily, Litespan does not give the same warping potential as tissue and dope, and is more quickly and easily corrected.

On the fuselage, make the joint at the edge of the decking, and cover the edges of the glazing where it lies on the framework of the cabin.

Flight electrics

Use a small micro switch, wired as shown on the plan. The motor will be shorted to stop it when 'off'. This enables the folder prop to do its stuff. (You've got a glide potential with this model). Remember that the COMMON switch tag goes to the motor, not the battery; otherwise you will blow the fuse by shorting the battery instead of the motor. A fuse is important in case the motor is stopped in a nose over with power on. There is no main power switch on my model, I do not plug the flight pack in until just ready to get airborne. Use thick enough wiring in the most direct route. It has to pass enough amps to make the most of the available power. Several thinner wires in parallel are more easily bent in the confines of the fuselage.

Radio power

In the prototype 'Double Dutch', the radio has its own small 110 mA NiCad, and is switched on by the receiver battery charging socket. The normally closed contacts of this are in the Rx positive wire. If you want to lose the weight of a radio switch in this way, get these connections right - see the Rx charge sketch on the plan.

The four function Mini Hitec Rx is turned off when a jack plug is inserted. I use an unconnected (dead) plug as an 'OFF' switch, of course the Rx is also off when a charging plug is in. Fit an acetate washer to reinforce the fuselage side where the jack socket is secured. Repeated use would otherwise loosen it.

As long as you can see the brightly coloured ribbon on the 'switch' jack, you know that the radio is off and the motor will not start. This is always provided you follow the safety procedure for electrics, and set the throttle to 'off' and turn the Rx off, before you change or connect the flight pack. You could have 'belt and braces' by fitting a main power switch, as well as keeping the flight pack unplugged until ready to take the air. Even a power switch could get knocked on. (This happened on an ornithopter I'm fiddling with and caused no end of a flap!)

Up and away

The wing loading is light. I made a test glide with all at neutral, just like the old free flight days. She floated straight and rolled to a stop on the lawn. Off to the field then (with longer grass).

Radio check, pack plugged in... Throttle open and shove gently. No loud noise, no oil, but a steady and gentle climb away. A click of right rudder trim and just watch. No stick movement until it was time to head back and do some 'S' turns, a low pass and another leisurely climb. This is R E L A X I N G . Stall? Soft, prompt recovery. Loop, after a dive from a safe height, straight exit. Barrel roll? More speed, try again. Yes, but not like an aerobatic job. Motor OFF, it behaves a bit like a thermal soarer on a dull day. In warm weather one might save some power. Motor ON, for more old fashioned flying where you can get close enough to appreciate it, then go round for a slow approach... That was 'mush' more like it. Had it been breezy, she could have landed backwards. You need very little space to enjoy 'Double Dutch'. RM