



BAe HAWK

Red Arrows Jet profile control-liner for 1.5cc engines designed by Bill Burkinshaw

IT HAS BEEN some years since I last designed and constructed a control-line model, not quite so many since I last flew one, so the challenge of producing a workable profile scale BAe 'Hawk' quite got my adrenalin going.

After looking at a 3-view drawing of the BAe 'Hawk' it was obvious that some slight modifications would have to be made in true semi-scale tradition. A slight increase to wing and tail areas and a mite off the nose length and the outlines began to look about right. Scaling up to a wingspan of 20in. would provide enough wing area for a 1-1.5cc power model so the die was cast.

I resolved to start building the model straight away and leave details of bellcrank position, line guide and balance point until the model was roughly constructed. Once assembled and with a P.A.W. 1.49 bolted to the front, a trial balance showed the balance point to be well in front of the leading edge. Not unexpected, but just confirmed! Looking under my work bench I found a box of lead weight and a little experiment showed 2oz or so to be sufficient to bring the balance point at least behind the leading edge. With bellcrank fixed, it was time to find the best position for the leadout guide.

Easy enough, just hang the model up by two lengths of line from the bellcrank and slide a temporary line guide backwards and forward until the model was suspended straight up and down from bellcrank to suspension point.

Once finished, flight trials proved totally uneventful. Although the elevator is small and the balance point still a little forward of the desired point the little swept-wing jet flew away smoothly from the launch and ran the tank out without any fuss whatsoever. So, some six or more years since my last control-line flight and the model flew, and I could still fly it!

Build your own Red Arrow

You will need:

- 1 sheet $\frac{3}{8}$ x 4 x 36in. Medium Balsa
- 1 sheet $\frac{1}{4}$ x 4 x 36in. Medium hard Balsa
- Small piece of 0.8mm birch ply
- $\frac{1}{8}$ sheet (for the fin & tailplane)
- 12in. x $\frac{3}{8}$ x $\frac{3}{8}$ in. hardwood engine bearers
- 2 $\frac{1}{2}$ in. bellcrank plus mounting nuts and bolt
- 16swg piano wire
- Elevator horn & keeper (plywood could be used)
- Small fuel tank (15cc)

Mark out the wing outline noting the join lines for 4in. sheet shown on the plan followed by the other parts. Note that the 0.8mm ply fuselage doublers are fixed to the basic fuselage underneath the dummy jet intakes for their full length.

Cut the $\frac{3}{8}$ in. square hardwood engine bearers to length and glue into position in the balsa fuselage profile followed by the ply doublers.

Taper the rear end of the dummy jet intakes down then sand to section before gluing in place. Carve and sand the wings to section then carve out the recess for bellcrank ply mount, wing tip weight and line guide before gluing into the fuselage slot.

Slot the fuselage for the fin and tailplane, carve out the fuselage for the balance weight and fit all the remaining parts.

Bolt the bellcrank to the ply mount and glue this firmly to the prepared recess in the wing underside followed by the dummy wing fence line guide.

Hinge the elevator to the tailplane using Terylene thread hinges and fit the control horn of your choice. Bend up and fit the pushrod.

Finishing

A coat of clear dope followed by one coat of sanding sealer and two coats of red dope overall, well sanded between coats provides the basis for the colour scheme. Mask the white stripe and paint this on. Draw the roundels with a ruling pen fitted to a pair of compasses, fill in with a small paint brush. The whole model should now be given a coat of clear fuel-proofer.

Bolt on the engine and mount the tank with spring curtain rod and woodscrews, check the controls for freedom of movement and you are ready to fly.

Flying your 'Red Arrow'

With a P.A.W. 1.49 for power, 40ft light 'Lay Strate' lines seemed just about right. A smooth level launch and she should be away. Control response is quite adequate, line tension is fine. The model will perform quite reasonable wing-overs and large loops. Once the engine has cut, full-up elevator produces a $\frac{1}{2}$ -lap glide. This model is tough and easy to fly and looks great in the air. It should make quite a good trainer.

It doesn't cost too much and is quick to build, what else can I say other than why not build one yourself? If you can persuade a couple of mates to build them too you should be able to put on a spectacular three-in-a-circle 'Red Arrows' show!

Below left: line guide position is critical, bellcrank not so much of a problem - make sure 'Hawk' balances where shown though!

Right: P.A.W. 1.49 provided ample power for 'Hawk' to fly on 40ft. steel lines. Trim these down a little if lower power motor is used.

