

**RCM&E's tribute to the return of the Mills**  
**75cc diesel engine – a simple 31 in. wing span**  
**stick and sheet, two function model.**

**Designed by David Boddington.**

**W**HEN I RECEIVED MY IRVINE MILLS .75 replica it didn't take long to fit a 7 x 4in. prop, mount it in the test stand and fill the tank with fuel. One choked turn to suck in the fuel, one sharp flick and away she went. Turn back the compression lever and the Mills was gently popping away - just as they did 35 years ago. For modern generations with no experience of a good quality Mills engine all I can say is 'You have a real treat in store'.

To celebrate the return of the Mills .75 I drew up the 'Mills-beam', a fun machine that is quick and economic to build. The prototype turned out a little tail heavy, so I have lengthened the nose to counteract this tendency. Do use light balsawood for the tail surfaces and keep the battery well forward. I used Fleet radio with mini-servos, you may have to widen the fuselage for standard servos, 250 mHh or 125 mAh nicads are recommended.

Cut out all parts before commencing construction, this is particularly important for the fin, rudder and F1, which drawings will be cut through when joining the fuselage drawing. General construction should be

obvious from the drawings and photographs. The fin and tailplane are glued together **before** fitting to the fuselage and rudder and elevators hinged afterwards.

All wing ribs are identical in shape, the tapered trailing edge has wash-out automatically incorporated on the ribs. Trim the leading and trailing edges of the ribs after construction. After epoxying the two wing panels together (the root ribs are angled to the template) strengthen the centre section joint with glasscloth and resin or nylon doped in position.

I chose to finish the model with clear dope, sanded between coats, and limit the decoration to Solarfilm patterns ironed onto the surface. One coat of matt polyurethane was applied for fuel proofing. Closed loop rudder control and pushrod operation of elevator were fitted. The undercarriage is sprung by small rubber bands taken from the woodscrew around the front of the pianowire undercarriage.

Balance the model where shown and start with  $\frac{3}{16}$  in. elevator movement each way and  $\frac{1}{4}$  in. rudder each way (measured at the maximum chord). Hand launching is

suggested for first flights. Get the Mills singing away — not difficult — and launch straight and reasonably fast. What can I say about the prototype except that it went away smoothly, with no hint of a wing drop. The Mills was at about  $\frac{3}{4}$  power — and still not run-in — and she potted around in very pleasing fashion. If you do build a 'Mills-beam' for free flight, keep the engine rev's down until you have sorted out the trim.

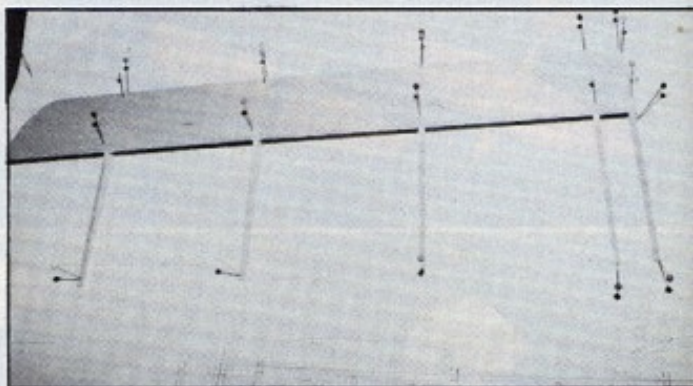
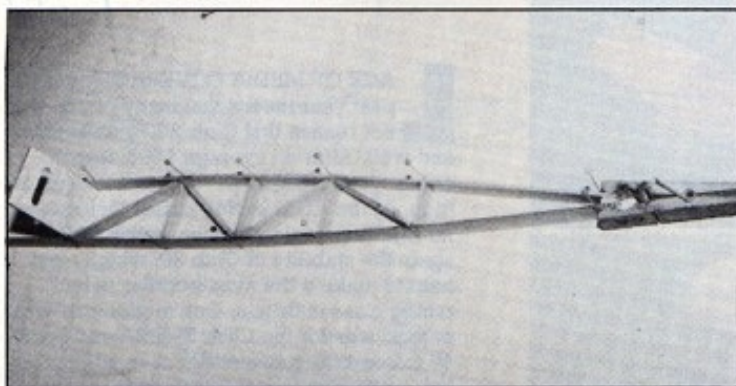
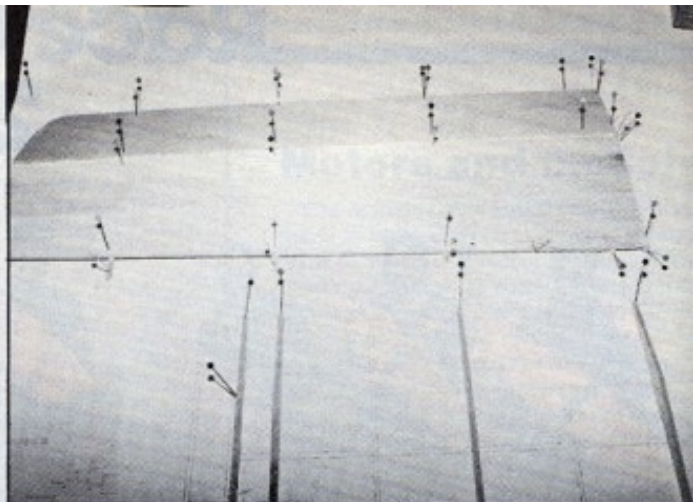
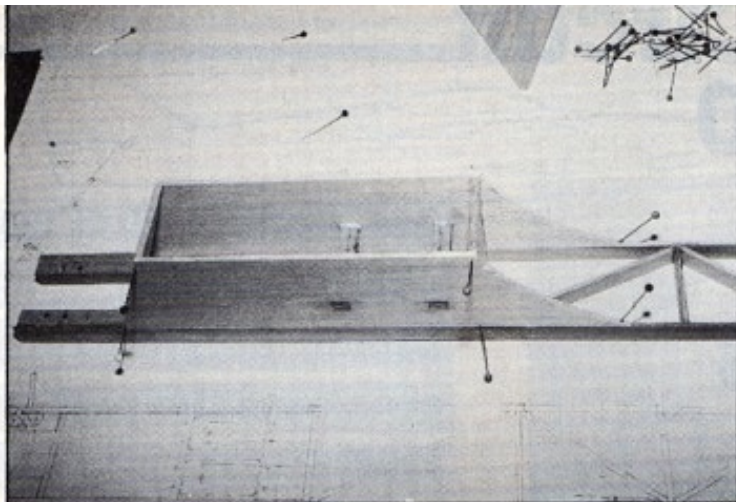
One improvement I would suggest and that is to fit a larger fuel tank between the engine bearers, the Chart MicroMold 10cc tank (J-FT351) should fit nicely.

When you have got used to flying the 'Mills-Beam', you can adjust the engine, by decompressing to reduce the revs, and have the model pottering around at about ten feet height. Do watch out for other fliers, however! For the more adventurous why not try a free flight version. Glue the control surfaces in position except for small trim tabs.

PS. For those who must know, the prototype model weighed just under one pound complete - the ballast weight increased this by a further 2oz. or so.

*Irvine Mills .75 replica performed sweetly, location is moved forward on drawing to reduce the need for nose ballast.*





*Fuselage is constructed from a spruce strip framework, assembled over the drawing, with engine bearer reinforcement and sides from sheet balsa and 4mm plywood. Jedelsky wing construction gives a strong and efficient wing that is easy to build. Tapered wing automatically introduces wash out. Make a template to check the aerofoil section, below, and sand the root rib to dihedral angle (Sandvik Sandplate is an excellent tool for this and other sanding jobs). Closed loop rudder linkage is used, but pushrod for elevator. Note the rubber-sprung undercarriage fixing.*

