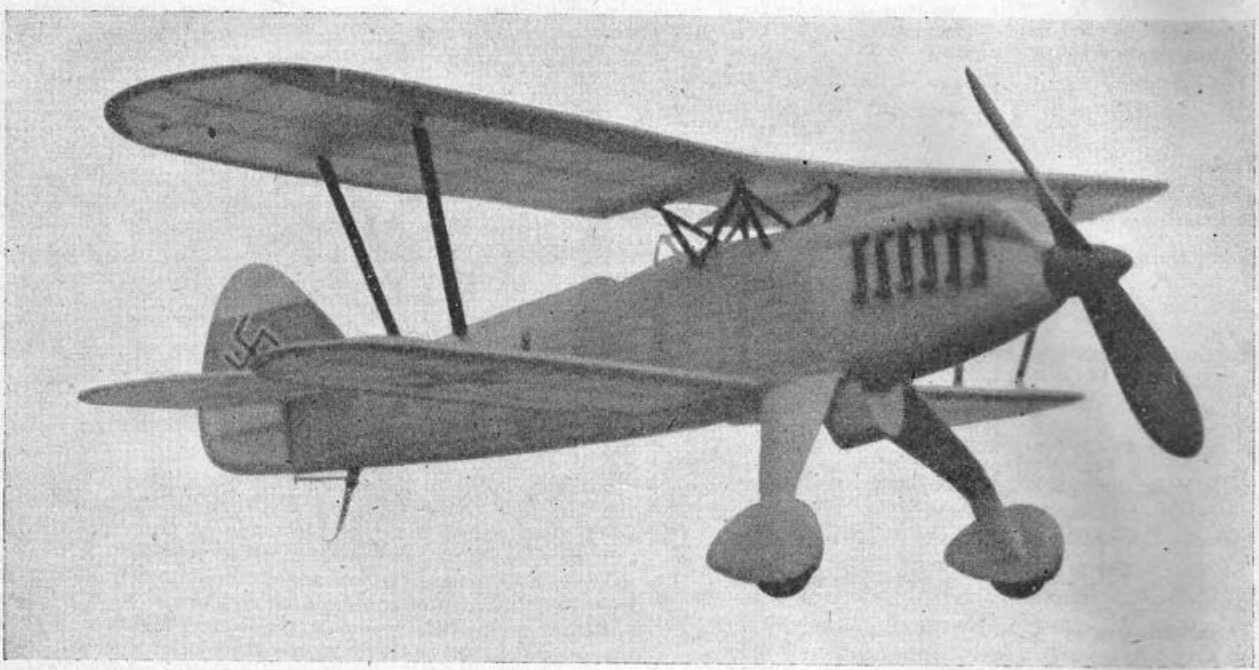
A 30" Span Flying Scale HEINKEL HE 51

BY G · R · WOOLLETT



THIS model has proved to be a steady flier and is capable of average flights of 30 secs under normal conditions, though it is definitely a fine weather model and should not be hurled into the air when its performance cannot be appreciated.

An unexpected freak of versatility in its make-up was discovered when, during gliding experiments, it was tested with a few turns on the motor and the lower planes removed. It put up a steady flight of a few secs! This was increased upon further turns being applied and a little alteration in trim will give good flights in this form. But beware gusty days!

BUILDING THE MODEL.

Fuselage.

Commence construction on the fuselage. Cut out of 1/16 in. hard balsa sheet all formers and fit with cardboard templates having a square hole in the centre for mounting on assembly jig in the usual way. Mark position of all stringers. Sew and securely cement the brass u/c tubes in position on F3 and mark on F4, 3 and 5 positions of c/s strut supports. Now fit root rib spars in position. Note that there are two spars on F5—one each side. Shape and attach the wire tailskid to F9, then assemble all formers on wooden jig and mount in a vice.

Cement 1/16 in. sq. hard balsa stringers in position and u/c spruce bracing struts from F 4. Before cementing top stringers fit accurately Sp. 1, 2, 3 and 4. The paper tubes for bracing threads may now be secured in position and the nose and top decking planked in with soft 1/16 in. balsa. The cockpit is cut out after the fuselage has been sanded. Shape now and fit the two cylinder blocks and fill the " vee " in, when dry, with a third block of soft balsa.

Particular care should be exercised when fitting the tailplane datum spars to give +1 degree incidence as shown. Fit the 1/16 in. ply bamboo motor peg anchorage after drilling $\frac{1}{8}$ in. diameter hole for the peg.

The bottom stringer S 15 severed at the front of the skid is reinforced by a wedge of 1/16 in. scrap balsa cemented to F 9. The rear continuation of this stringer is similarly braced. When dry complete the skid fairing and fit balsa wedge to retain elastic band from fin.

The planked portion of the fuselage can now be sanded dead smooth and the cockpit cut out, also the holes for the c/s struts. Give two coats of banana oil sanding in between and two coats of yellow gloss dope after covering entire fuselage with superfine tissue.

Assemble the c/s struts and bind and glue securely (seccotine). Fit and align on the fuselage securing to decking and Sp. 1, 2, 3 and 4 with seccotine. Put aside the completed fuselage to dry. The tissue covering is of yellow superfine, water sprayed and coated with one application of banana oil. Fit root ribs at this point.

Undercarriage.

The construction should give little difficulty if the wire assembly is bent and soldered correctly then marked on each fairing sheet so that when the grooves are sanded to take the wires (16 g.) the alignment is accurate. Ensure that all joints are liberally cemented and both spats fitted square. Sand smooth and finish as for nose planking—tissue cover.

Mainplanes.

These follow usual construction, the top plane being sheet covered from leading edge to front dual spars (1/16 in. square) while the lower ones have a solid balsa leading edge which can be hollowed to a channel section.

A trimming tab is fitted to port top plane in order to counteract airscrew torque. Flutter is prevented by packing between tab and ribs M 7 and M 8.

Complete both top planes and c/s, ensuring that strut attachments are aligned correctly and securely. Cement both planes to c/s to give 4 degrees dihedral. Glue a small patch of card over all strut lugs before covering with superfine yellow tissue to rib M 8. Use separate piece for tip. Water spray and give two coats of banana oil.

With the lower planes, ensure that dowels are positioned squarely and securely. No washout is necessary on any plane. Fit lower c/s dowel tubes over dowels in bottom planes, coat with seccotine, and position in fuselage. Set planes to 2 degrees dihedral and allow tubes to set before removing.

The interplane struts are of balsa 3/16 in. by 1/16 in. with end fittings shaped from domestic pins bound and glued in position.

Tailplane and Fin.

This is of relatively small area but stability is not affected owing to the difference in c.p. position of top and lower mainplanes. The tailplane is of non-lifting section set at + 1 degree $\propto$. After completing and covering as for mainplanes, cement a small balsa block under the leading edge to prevent rocking on the datum spars. The fin is cemented to the top of the tailplane fairing with its flat surface (starboard) parallel to longitudinal axis. The fin outline of balsa is pinned over the drawing and fin post and ribs cemented into position. Fit bamboo locating dowel and pin for retaining tail unit on the fuselage. Shape and fit tab, the top bamboo hinge being fitted to its hole in R 2 and glued to a slot in tab.

Cover fin with red tissue on both sides between ribs R 1 and R 3. Remainder as for wings. Give one coat of banana oil. Fit assembly and align on fuselage.

Airscrew.

This is of normal construction employing a free wheel in the spinner. Carved from hardwood, polished and given one coat of black cellulose.

Testing.

The motor (10 strands of 3/16 in. flat rubber) is previously tensioned in the fuselage. Assemble mainplanes and tail unit.

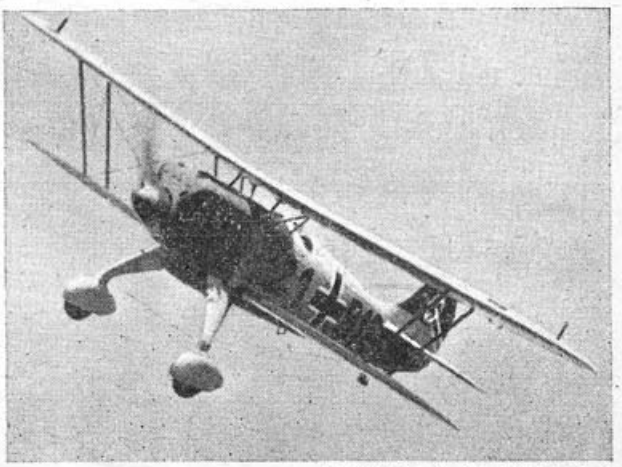
The top plane is attached by balsa dowels through the lug eyes, these dowels trapping lengths of waxed thread pushed in position with them. The ends of thread can be knotted to the remainder of thread. Fit port interplane struts and thread to top plane. Pass thread through paper tubes in fuselage and attach to top of starboard interplane struts on underside of top plane. Now fit lower planes and bottom ends of interplane struts and bracing thread from c/s struts. The lower planes are held to fuselage by an elastic band passing through fuselage tube and anchoring to bamboo pegs on root ribs of planes. Do not forget interplane strut incidence braces. Tension must not be excessive. Loose ends of thread should be neatly cut off.

Secure the undercarriage as follows: Slide into position, over each undercarriage plug-in wire a $\frac{1}{2}$ in. length of aluminium tube, then push undercarriage home in its tubes in F 3. This increases effective length of undercarriage and reduces the risk of excessive springing which might allow the undercarriage fairings to foul the bottom of the fuselage.

Check for glide over long grass with as little breeze as possible. Check trim in the usual manner. No efforts should be spared in getting absolute gliding trim before attempting to power flight, as a model of this type demands great care in trimming.

Wind on a few turns and launch. Do not use tabs until near trim has been obtained by inserting a lead pellet in a hole in the cylinder block as shown on the drawings. Seal hole with balsa plug when trim is correct.

The model averages 25 to 35 seconds and the longest flight recorded was of 48 seconds. It has a smooth take-off from the board and has been flown with interplane struts and thread bracing removed. Do not attempt this, however, except under ideal conditions with plenty of long grass.



[*Real Photographs Co., Ltd., Southport*