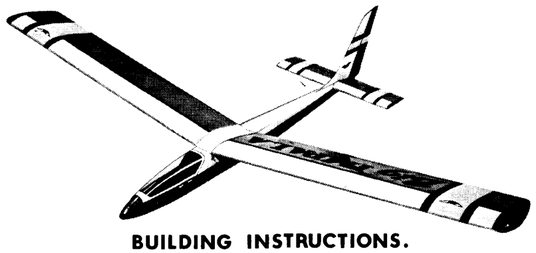
VERON BIG IMPALA 74"



BUILDING INSTRUCTIONS.

The "BIG IMPALA" at 74" (1880 mm) span has been introduced as a larger development of the phenomenally successful 52" IMPALA which set the original standard and form for a stable, dependable, tough and compact One or Two Channel Radio Hillside Soarer.

A great innovation is the use of uniform plastic wing (and tail) ribs designed with T-girder flanges for rigidity and to hold to even camber the highly successful high - lift medium speed aerofoil section; also the two basic formers in rigidly designed plastic to simplify construction and assembly of the fuselage.

The alternative options with the design are for 2 Channel Radio with Standard Dihedral for Rudder and Elevator, or for 3 Channels with reduced Dihedral for Rudder, Elevator and Ailerons. Substantial trailing edge material is provided for the ailerons to be cut out of the balsa wing structure and hinged on.

Also the nose-block is designed to be secured with a nylon bolt and removable to permit a nylon or metal motor mount for converting to auxiliary power by fitting a Diesel or Glow-Motor of up to 1.8 c.c. (.11 cu. ins) capacity. The motor mount is not provided. Power can be applied to both versions.

Simple tools are needed. For the general balsa and plywood structure use "BRITFIX 55" White P.V.A. Adhesive. For A.B.S. Plastic ribs and Formers to Balsa or plywood use a heavy grade of Contact Glue (as used for bonding 'Formica') used as a normal glue by application when wet, not tack dry, or "HUMBROL 66" Balsa Cement. "BRITFIX 88" Epoxy glue will also be necessary in a very small quantity. "HUMBROL" Clear Shrinking Dope is used - with "HUMBROL" Coloured Dopes or Enamels for decor - for lightweight nylon, Chiffon - nylon or the "Modelspan" tissue supplied. Iron-on Mylar sheeting is also recommended such as "SOLARFILM".

The following sequence for assembly is allied to the numbered diagrams on the plan and should greatly facilitate construction. The decimal figures after all sizes are millimetres conversions. Any VERON or commercial accessories recommended but not supplied in the kit are marked as "N.S." The basic accessories only are supplied for the conventional 2 channel version only. The Modellist may care to acquire commercial Tube and Cable controls in place of the balsa-rod and wire supplied for linkages to servos. 2 K-links are supplied primarily for use as connectors between fulcrum and aileron horns but may be used as end connectors to balsa actuating rods between servos and rudder & elevator on 2 Channel only.

1. FUSELAGE SIDES

A template is provided on the die-cut ply to cut and a fish-mouth joint between the front and rear panels of the 3/32" x 4" (2.5 x 101.6) side sheeting. Glue together, securing to a flat surface whilst drying. They are SUPPLIED OVERSIZE and must be judiciously trimmed and edge sanded AS A PAIR to coincide with the plan. See Diag. 1. With ruler and pencil, mark out positions of longerons, crosspieces and 2 formers from extension marks shown against outer edges of fuselage side outline - at top, bottom and ends.

Please note disposition of 3/16" x 3/16" (4.8) lengths supplied and select grades accordingly, especially those for the wing spars, which should be straight grained and hard.

Glue centre longerons in place above sides - making LEFT AND RIGHT HAND SIDES, noting that top edge of front longeron coincides with cockpit edge, then lamination of longerons from cockpit and area between formers, with single longeron to top edge of tailplane bay at rear. NOTE HOW LONGERON AT FRONT OVERHANGS FUSELAGE BY 1/16" (1.5) - DIAG. 2.

Locate and laminate ply doublers as shown in Diags. 1, 2, & 3. Locate, BUT DO NOT GLUE, Plastic Formers in place to check fit over longerons and to understand how upper and lower triangular edging balsa will have to be set to create 1/16" (1.5) slots into which flange corner of formers will locate with triangular edging balsa fitting tight under the diagonal cornices of the formers at their lower edges.

Trim away top edge of side-sheeting to conform to edge of ply saddle (which sets the wing incidence).

Diag. 13 shows two strips, 3/16" x 3/16" (4.8) and 3/16" x 3/8" (4.8 x 9.5) glued to top of former 'B' one trimmed out to match dihedral angle of wing. NOTE THAT THEY ARE 1/16" WIDER THAN FORMER TO FIT INTO KEYING RECESS ON UPPER DIE-CUT PLY LAMINATE.

2. FUSELAGE FORMERS

Glue two plastic formers to one fuselage size (Balsa Cement or Contact Glue), then add second side, securing with rubber-bands around until set, Diag. 4.

Whilst drying, prepare nose former, Diag. 6 and 8. A sandwich is made of 1/4" (6.4) end grain balsa between die-cut ply formers N.F.1 and N.F.2 (DIE-CUT FORMERS ARE NOT MARKED BUT CAN BE IDENTIFIED FROM DIAGS. 6, 7, 8 and 9.) Rounded edges of N.F.1 give shape to which fuselage may eventually be trimmed and sanded. Glue nose former in place, again securing with rubber band whilst drying, Diag. 5. Chamfer rear end of fuselage sides, draw together and glue. Underside of nose to Former'B' is 1/16" (1.5) plywood. Rear underside of fuselage is crossgrained 1/16" balsa - cut from 4" (101.6) wide sheet. Add 3/16" x 1/2" (4.8 x 12.7) behind nose and across tail-bay, then upper rear 3/16" (4.8) soft tapered sheeting, Diag. 14. Add 1/4" (6.4) top sheet above Former 'A', Diag. 11.

3. NOSE-BLOCK

Nose-block plywood former N.B.1 now has holes drilled; a central 3/16" (4.8) and three or four 1/8" (3.2). The four 1/8" holes are BEST MADE IN REGISTER WITH ATTACHMENT HOLES ON ENGINE MOUNT INTENDED TO BE FITTED. The holes may then be used for 1/8" dowel locating pegs or 6 B.A. or 1/8" Whitworth engine mounting bolts. Locate N.B.1 against N.F.1 and drill right through. Cut recess in rear face of balsa nose-block and locate 'T-nut', securing with Epoxy glue - Diag. 7. Glue nose-block to N.B.1. 1/8" dowel pegs are now glued into holes in nose-block. When all is set and dry, secure nose-block with Nylon Bolt from inside fuselage, and carve and sand to shape and streamline.

4. FUSELAGE SHAPING

This is entirely optional as to what degree it may be carried out. Use a small block plane or balsa knife and pare away the edges, top and bottom, to create a streamlined fuselage - as in Sections A-A, B-B and C-C. Most certainly the nose-structure must be streamlined to match the outline of ply nose-former N.F.1.

5. COCKPIT

Trim 1/16" (1.5) plywood base to fit edge curvature of fuselage cockpit area - Diag. 9. Add N.F.3 and end grained balsa block at front and rear 3/16" (4.8) sheet with chamfered or angled base edge. Pin structure in place whilst drying. Trim and sand rear to conform to fuselage outline. Paint inside area any desired colour - black, grey, green etc. Add 3/32" x 3/32" (2.5) edging strips. Trim away surplus flash of oversize cockpit supplied and gently trim to match the lower edge contour of the base. Roughen surface at edges of canopy and epoxy in place. Cockpit may be located by dowel peg at front into N.F.3 and cellotape at rear, etc.

6. FUSELAGE DETAIL

Hardwood skid is prepared from 1/4" x 1/4" hardwood - taper with a block plane. If desired bind a 16 s.w.g. wire hook to rear end - see plan - for towline application. Epoxy skid to underside of nose. Die-cut ply tail skid is attached with epoxy glue, set into a slot cut through lower sheeting.

Dowels for wing attachment are 3/16" (4.8) - fix tightly but do NOT glue. 1/8" (3.2) dowels may be fitted if removable tail is intended otherwise whole tail assembly is best glued in place later.

7. WINGS

Construct over a flat building surface with waxed or greaseproof paper to preserve the plan. Pin trailing edge and lower spar in place. Examine ribs NOTING THAT INNER 3 RIBS AT ROOT ARE NOT FULL DEPTH AFT OF SPAR AND ALLOW FOR TOP SHEETING. 6 INNER RIBS AND 26 OUTER FULL DEPTH RIBS ARE SUPPLIED FOR WINGS. Glue upright in place 13 outer ribs and 1 inner rib at stations slotted on leading and trailing edge. Next add top spar, then leading edge. Allow glue to set. Build the second side. The Port (left hand) wing panel is not drawn in completely but there should be no difficulty in constructing, because trailing edge slots for ribs are pre-slotted and accurate.

At this stage it must be decided whether ailerons are to be fitted or not. If not, dihedral gussets to give 5½" (133.5) each side are used; if yes, gussets are provided for reduced dihedral of 2½" (63.5). Raise both halves from the board and trim root ends of leading edges, trailing edges and spars to fit accurately, using mainspar gussets to check angle of dihedral. When satisfied join two wing halves - one side flat to the building board, the other supported - until quite set. Check both sides are level and without twists.

Diag.21 shows how balsa fillets are cut from 1/16" sheet (1.5) using die-cut ply templates, and trimmed to fit inside flanges of ribs - this to facilitate jointing of two centre ribs and outer ribs by creating adhesion surface , also for wing tip blocks

Diag.20 shows suggested location of servo in a cut-out bay. Decide what bay size is required and cut rear of centre two plastic ribs to suit. Front and rear sections of remaining centre ribs are cut and trimmed to butt firmly between plywood gussets - See Diag.22 - at rib stations 1 and 2. Note triangular bracing gussets 3/16" (4.8) at trailing edge of ribs supporting them prior to applying upper sheeting, and also at the leading edge. Cut from 3/16" x 1/2" (4.8 x 12.7).

The front leading edge sheeting is now contact glued in place. Fine needle point modelling pins may be used to temporarily locate sheet against leading edge and spars whilst setting - or better still, rubber bands at each rib station. Also add centre-section top sheeting between spar and trailing edge. There is no sheeting on underside leading edge of wing, but panels are cut and INSET LEVEL with ribs on underside of centre-section, only where wing rests on the fuselage or the root-end bays.

Finally tip-blocks are added. These are light balsa (internally lighten if in doubt) triangular in section. When set, trim down to conform to top camber of wing section and outline shape will automatically be created and only needs edge sanding to form a streamline shape. This shape of tip creates positive anti-stall characteristics - probably the most efficient shape known with model soarers.

Sand and smooth all surfaces with fine garnet paper wrapped around a hardwood block. A specially shaped piece of 3/8" (9.5) balsa is provided to cut and trim to form a shoulder fairing which is glued above trailing edge of wing at centre to fair the wing into the fuselage. Check the wing for balance laterally, add ballast to one side if necessary.

8. WINGS WITH AILERONS

These wings are identical in construction except for the joining plywood gussets, those imparting 2½" (63.5) dihedral under each wing, See Diag.19.

The aileron sections are neatly cut out with a sharp balsa knife and steel rule. They are then laminated with 1/32" (.8 mm) plywood strips along their whole length - plywood to their topside, Diag. 21. Pin down firmly whilst setting to prevent any warps or twists. They are now hinged with nylon tape, epoxied into knife slots and pinned with wood pins.- 1/16" dowel or toothpicks etc.

Diag.23 shows how fulcrum platform is constructed of 1/16" ply (1.5) against balsa 'fill-in' to ribs. K-links connect fulcrum to bolt-less nylon control horns on underside of ailerons. Link wires, 16 s.w.g., are threaded through holes in ribs, connected to fulcrums with simple right angle bends - see Diag.24.

Connection of link wires to servo's is optional, but recommended method is shown in Diag.25. Servo's are screwed (with grommets) to 2 hardwood blocks, Diag.20.

SPECIAL NOTE

The slightly dihedralled aileron wings are ideal for lateral control, especially with the powered version. But the high-lift soaring section does not make this a speed penetration model nor capable of all the attributes of a model with symmetrical section stuntability.

9. TAILPLANE

Laminate 1/8" x 1/4" (3.2 x 6.4) to rear lower edge of shaped balsa leading edge. Pin in place over the plan - laminated leading edge, two 1/8" x 3/8" (3.2 x 9.5) spars and 1/2" x 3/16" (12.7 x 4.8) slotted trailing edge. Plastic ribs supplied, (14) are cut into two along rear spar line and glued firmly into place. They are slotted into the T/Edge, & butted elsewhere . Slot and glue in place 3/16" x 3/16" (4.8 x 4.8) top spar. Laminate inner faces of central two ribs to make a positive jointing surface for the fin. Two tip blocks are added, and when dry, carved to streamline. 14 s.w.g. wire torque link (through 12 s.w.g. brass tube) is made, Diag.10, as connector between two elevator halves. All details of completion of structure are given on the plan, Diag.12, including final 1/16" (1.5) top sheeting.

10. FIN AND RUDDER

Are constructed of pre-cut 1/4" (6.4) sheet. These have the fin leading edge sanded to streamline. The rudder is tapered in section.

The fin base has cut-outs prepared to fit between centre two ribs of tailplane and over the mainspar and rear spar with clearance for the torque link movement. See sketch on right of plan and note that top sheet on tailplane is also cut away between leading edge and spar. Note that front fairing to fin is cut out of 1/4" (4.8) triangular piece supplied. The forward continuation of this is glue permanently to the fuselage. Both are trimmed and sanded to neat outline shown. Fin is best covered before gluing in place - with covering material removed where jointing occurs.

Rudder has 1/32" (.8) plywood laminate on lower edge - opposite side to control horn dependant upon servo action. Cover rudder, before attaching with 3 nylon tape hinges, epoxied into knife slots and pinned, Diag.26.

Diag.15, shows how two 1/2" x 1/2" (12.7 x 12.7 x 38) blocks are shaped to glue to tailplane either side of fin to trim and fair nicely into continuity with rear of fuselage.

11. SERVO AND RADIO INSTALLATION

Diag.27 shows alternative Radio installations - that for 2 or 3 Channel Soarers with 2 Servos set side by side on 3/8" x 1/2" (9.5 x 12.7) hardwood blocks firmly epoxied between fuselage sides in the under-cockpit area. Deacs and Receiver are secured within cut-outs in blocks of foam rubber or plastic set within nose area. Alternatively, a tray is made, Diag.17, to similarly house Deac and Receiver in the underwing area to counterbalance an engine mounted on the nose. Introduction gives types of nylon or metal engine mounts for up to 1.8 c.c. motors. Diag. 18 gives details of tank installation.

Diag.16 shows method of linkage with hard balsa rods inside fuselage with 16 s.w.g. end wires with 20 s.w.g. "keepers". At rear, pass through slots cut through fuselage sides set relative to the nylon horns on elevator and rudder. Alternatively, if not fitting ailerons, use 2 K-links provided as end couplings to rudder and elevator horns. Commercial tube and cable controls may be fitted - Veron units are available.

Diag.25 shows simple friction free linkage between aileron servo in wing and two control wires. Tubing is supplied, cut into 1¾" x 1/4" (44.4 x 6.4), for soldered joiner and crosspiece as shown.

12. MOTOR INSTALLATION

Details are given in Paragraph 3 'NOSE-BLOCK' for attachment of nose-block with nylon bolt and "T-nut". Engine mount should be firmly bolted with blind nuts epoxied against inner face of nose-block N.F.1/2. Bolts are screwed through from the engine side. Diag. 27 and 18 details this.

13. COVERING AND FINISHING

Modelspan tissue is provided for covering the model. Adhere to wings and tailplane with tissue-paste or photo-paste ("Gripfix" or "Bondfix"). Water-shrink with water sprayed on (not brushed) and when dry, give as many coats of Clear Shrinking Dope as is necessary to impart a gloss or fill the tissue.

Modelspan is best adhered to the fuselage and fin/rudder with Banana Oil (Dope with plasticizer) brushed on and rubbed down with a pad soaked in Banana Oil to stretch the tissue as applied and remove wrinkles. Lightweight Nylon or Nylon-Chiffon is recommended as a more durable covering - or 'Mylar' Iron-on sheeting such as "SOLARFILM".

Colour Dopes or Enamels are best sprayed on - but must essentially be lightly applied.

14. BALANCE AND FLYING

The balance point of the model shown on the plan is the same for whether powered or not. The model must hang in a slightly nose down attitude - natural gliding angle - when supported under the wing on the balance line shown. Deacs, Receiver etc. are movable to aid ballasting - the prototype model only needed 1¼ ozs. (35.3 grms.) to achieve balance in the soaring version. Engine weights in powered version will vary considerably, so adjustments will have to be made by position of trav under the wing. The best ballast is achieved by cutting sheet lead up into very small chips and mixing with plasticine. Wings are best secured with 1/4" (6.4) wide rubber bands, duplicated for safety. The whole structure must be warp free and all flying surfaces squared up. THIS MODEL DOES NOT NEED WASHOUT AT THE TIPS.

With modern Proportional Radio Control, glide testing is not necessary - but it IS RECOMMENDED that initial flight testing be carried out by a competent pilot if you yourself are a newcomer to Hillside Soaring, so that a balance and incidence check may be made and any trim to controls that are necessary can be made on the adjustable linkages, or the control-stick trims.

For first hillside flights, choose a situation where a good breeze flows square-on to a reasonably inclined obstruction free hillside slope - but more essential, one which has a flat terrain behind where every chance of a safe landing is possible. Check radio range and positive servo and control surface action. Check amongst other flyers that your frequency is free before launching. Launch model straight into wind, preferably a little lower down than the crest of the hill. Areas of lift in relation to breeze and terrain can only be judged at the time - but do not fly too close to the hill. Keep the nose at all times into the wind, moving the model sideways by "crabbing" sideways into wind. UNDER NO CIRCUMSTANCES turn the model downwind, unless well out to the forward extremities of the lift area or higher than the crest of the hill, and then only in a wide and flat gradual turn.

Once soaring, the problem is not to keep up, but to get it down ! Bring the model down into wind out of the lift area and ENSURE YOU MAINTAIN A REASONABLE FLYING SPEED TO ENSURE FULL CONTROL OF THE MODEL - DO NOT ATTEMPT TO "BALLOON" THE MODEL DOWN. Also beware of any "rolling" tendency of the airflow over the hilltop causing down currents.

The model may be launched by catapult or "Bungy-tow" over flat areas for thermal soaring - or the motor fitted for power flying with long extended gliding and soaring periods.

No matter what mode is used, flying the BIG IMPALA is your best teacher and a most rewarding experience.

DO NOT FORGET THAT TO FLY SOARERS YOU NEED A RADIO LICENCE from:-

THE HOME OFFICE, RADIO REGULATORY DEPT., WATERLOO BRIDGE HOUSE, WATERLOO BRIDGE, LONDON S.E.1.

HAPPY LANDINGS.