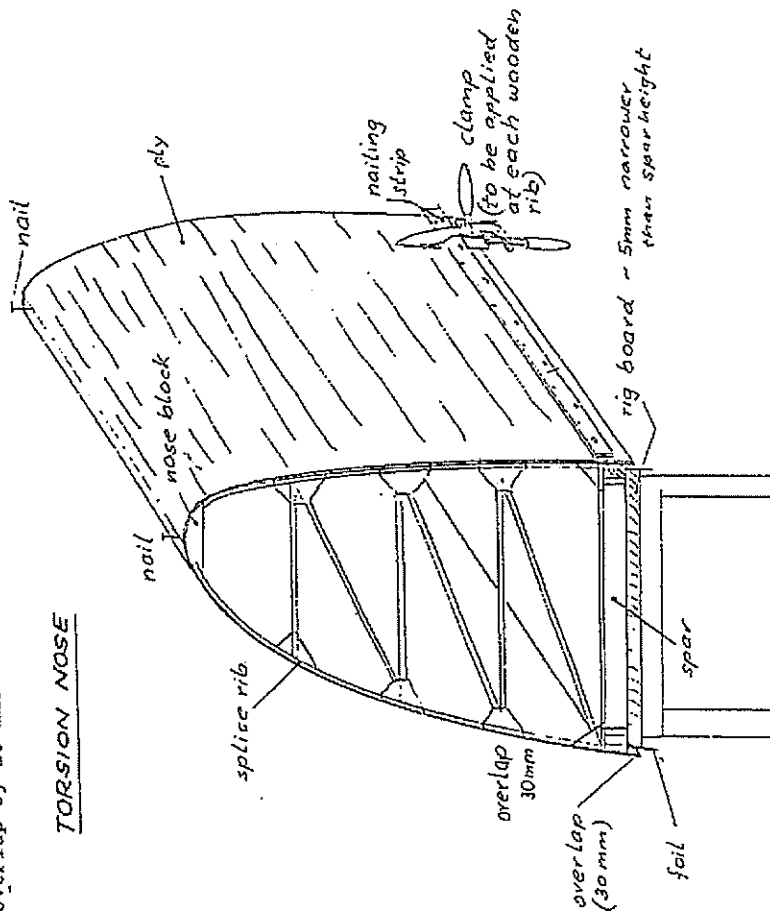


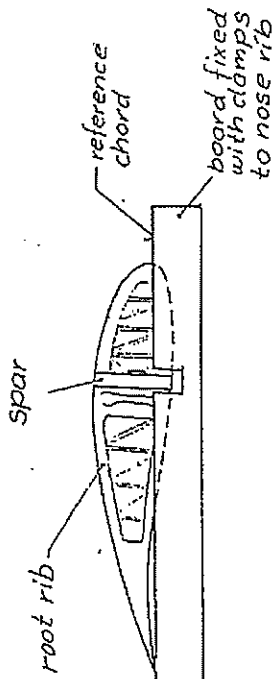
Now the plywood is cut again to proper size and then fitted. It must extend at least 30 mm beyond the spar, so that clamps can be put on. The splicing is done before the plywood is glued on. It is not absolutely necessary to splice because the plywood may overlap by 20 mm.

TORSION NOSE



Before gluing, the nose section is again placed on the wing. Hereby tighten nose clamps so that the plywood rests evenly. Mark position of clamps. Apply 2 clamps on each wooden rib. Now remove plywood and put on glue. Apply thickened resin to spar and ribs. On the plywood between the impregnated areas thinly brush on pure resin. The plywood is now placed on top of the ribs and tacked down. Now bend plywood over ribs and put clamps on marked positions. The glue reacts like grease so that clamps need not to be fastened too tight. Under no circumstances is the plywood to bulge inward between the ribs. On the outer ribs tighten clamps until glue squeezes out everywhere. On the other ribs it can be felt with fingers whether plywood rests tightly on ribs. It is necessary to tighten the clamps evenly one after the other in sequence. Now shove a nailing strip (5 mm plywood or hardboard) under clamps. The strip should be about as wide as the spar in this section. Now nail every 20 mm in a zig zag line. Again check that glue is squeezing out. Possibly put in more nails. The nails should not be longer than 12 mm. In this way the wing is skinned section after section. The nose can now be taken off the rig. The section leading edge - spar is now already rather stiff. Now the splicings for the plywood fussets to be used at the trailing edge of the spar can be made. Also the splicing root rib and

Then the root rib is fitted and glued on. To do this use a board as a picture. This board is placed on the reference chord at the nose rib and fixed with clamps. Now put root rib with reference chord on the board. Adjust and glue to spar. Without removing the assisting board adjust the diagonal spar and glue on.

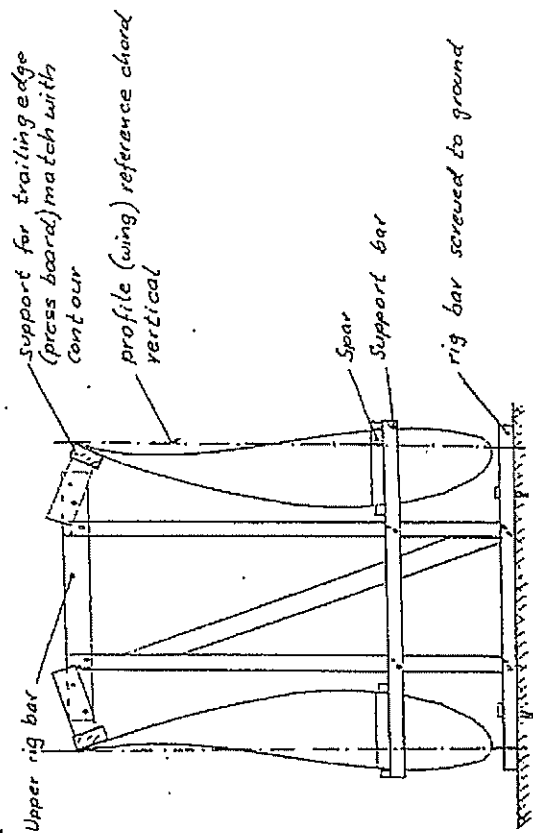


ALIGNMENT OF ROOT RIB ON SPAR

CONSTRUCTION OF WING RIG

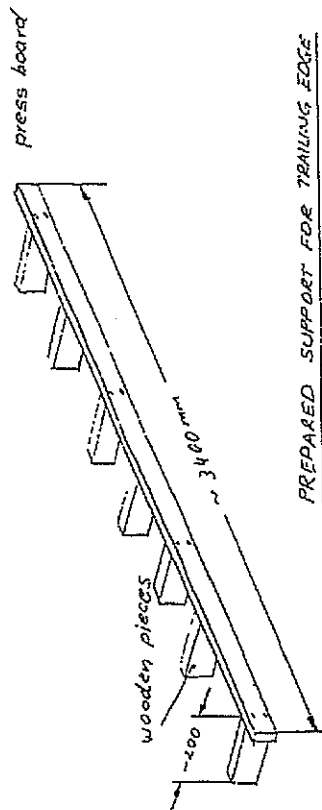
The wings are placed down vertically with underside of wing pointing outwards. The rig is constructed as shown in drawing, with wooden boards. At the root rib the spar can be placed on a supporting bar. At the wing tip the nose is fastened with a template. Adjust profile reference chord of root rib so that it is exactly vertical. The adjustment of the support for the trailing edge is rather difficult.

Following points have to be observed when fixing the points of support:



WING RIG

- the height above rear edge spar has to be common to the reference chord length of the specific rib
- the perpendicular from the upper edge of support has to meet the reference chord exactly at the spar
- the slant of the support has to fit into the contour of the upper side of rib (check by holding on to finished rib)
- the support has to be level across full length

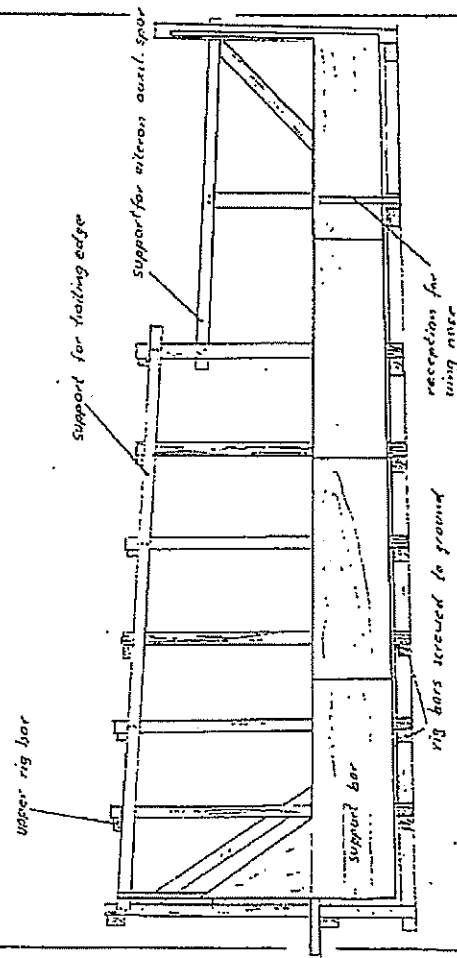


PREPARED SUPPORT FOR TRAILING EDGE

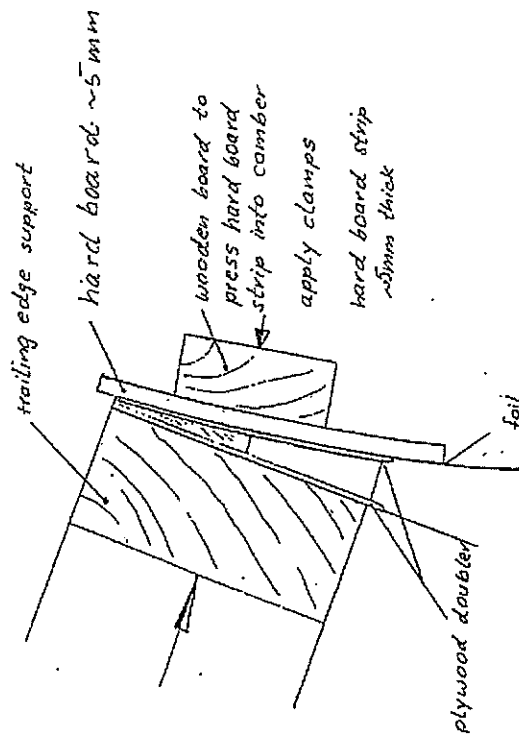
The easiest way to adjust the support is to glue short pieces of wood to it in the same distance of rib bars (rib distance) (see drawing)

The support can be fastened and adjusted to the upper rig bars of the rig with clamps. After the support for both wing halves is adjusted it can be glued. In the aileron section the support for the aileron auxiliary spar is adjusted according to the upper side of ribs 8 and 13. Now all end ribs can be fitted. Before the ribs are glued in the plywood-doubler for the upper side of trailing edge ledge is spliced and fixed to the support with Scotch Tape.

WING RIG



Now the ribs are glued both to the spar and the plywood-doubler of trailing edge ledge. The ribs have to be totally without tension, otherwise the trailing edge is not straight after removing wing from the rig. The trailing edge is filled up with balsa wood. Now close under side by glueing on another plywood-doubler. To keep the chamber on under side, press a strip of hardboard into cavity. (see drawing)



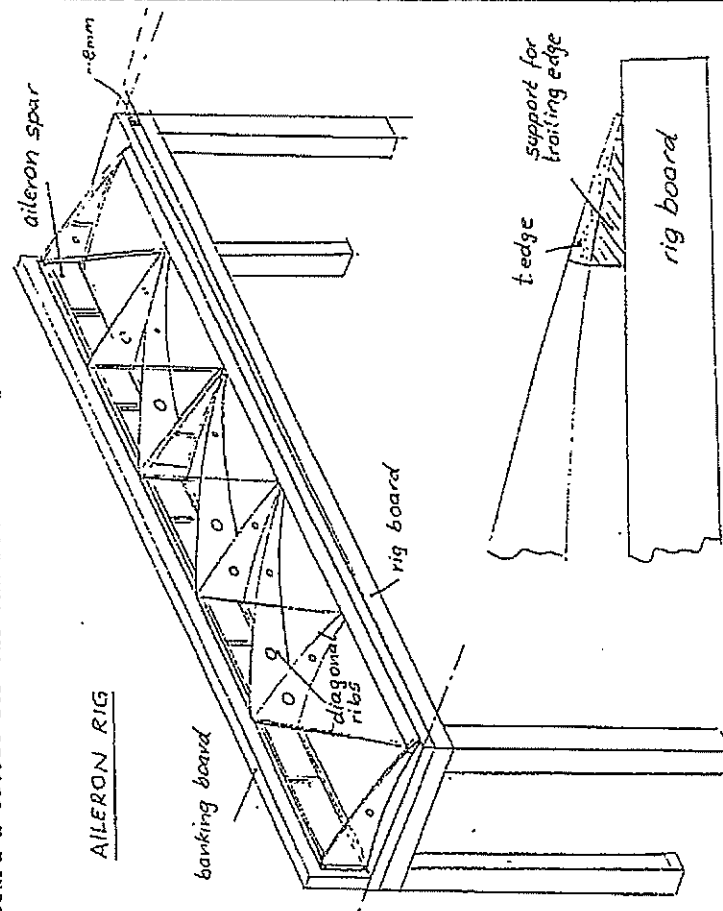
GLUEING OF TRAILING EDGE

The aileron auxiliary spar is assembled and planked in a template. The lightening holes are put into the plywood before planking. The slants on upper cap and lower cap are cut with a tilting disc saw after planking. Then the aileron auxiliary spar is glued to the ribs on the rig. After the plywood-doublers in the section of the aileron auxiliary spar are glued on, the wing can be taken off the rig.

AILERON

The aileron spar is constructed in the same manner as the aileron auxiliary spar. The ribs are made in the customary way. The diagonal ribs are cut from balsa. To get more strength the balsa is coated with Epoxy resin on both sides. The wing geometry causes a light twist of the aileron. Therefore, the board on which the aileron will be assembled has to be twisted as well. Underneath the front end of the aileron trailing edge ledge put a triangular shaped ledge so that the trailing edge ledge lies within the profile contour. Take care that the angle at the end of the aileron matches the corresponding angle in the wings. The aileron should have space of about 5 mm between the wing ribs 8 and 13. The Aileron is fixed to the front banking board with clamps. The trailing edge ledge together with the triangular shaped ledge is tacked to the rig-board with nails. Now the ribs are fitted and glued in with thickened resin.

After plywood-doublers are glued on and the trailing edge ledge is planed the rig can be twisted into the other direction to build second aileron. The aileron rig is later used to cover and lacquer the ailerons. Only the front banking board is removed. On the rig-board a cutout for the aileron actuating horn is made.



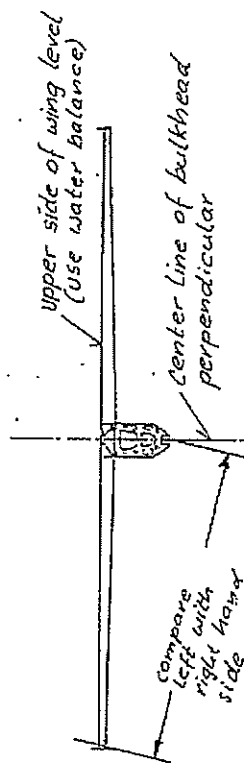
FUSELAGE

The fuselage is constructed as a framework of spruce and balsa ledges. The forces and moments of wing and seating-beam are led into both main bulkheads. Start by transferring contours of bulkhead to a pressboard. The upper cap on the front bulkhead takes over the function of the lower spar cap of the wing. Use the same quality wood for this cap as has been used for the wing spar. The cap consists also of 10 mm lamellas which have been glued together. The board on which the bulkhead is built is covered with foil. Along the contour lines nail wooden blocks of appr. 20 mm. Then all ledges (stiffeners and caps) and blocks are fitted and located by nailing down small blocks. The measurements for the seating-beam cutout have to be exact. Use hard balsa wood for the balsa ledges in bulkhead. All ledges for the front bulkhead are cut to 31 mm width. After all parts are glued together using the template, the entire bulkhead is carefully planed and then roughened up with a fine plane. Be careful not to loosen the stiffeners or to feather the edges. For now the bulkhead is planed with plywood on one side. Before doing this the cutouts have to be put into planing. It is advisable to use an adjustable holecutter for this work. The plywood is secured with pins against slipping and pressed down with a matching wooden board. Use enough large clamps so that pressure is not just applied to the edges but in the center as well.

After one side is planed start drilling all holes for controls and harnesses. (But not the holes of the main fittings) On the inside the bulkhead is impregnated, then planed and roughened. Now the other side is planed and after that the doubler for the main fittings are glued on. The thickness of doublers has to be matched with the wing fittings so that wing fittings and fuselage fittings fit into each other.

Before the bulkhead is glued into fuselage structure, the wing attachment fittings have to be rivetted on. For this the wing spar or the finished wing has to be available. The spars e.g. the wing is aligned together with the main bulkhead. Then the fittings of the spar and the bulkhead are connected with 3 assembly bolts of 11,5 Ø mm. The upper edge of the wing spars is aligned exactly horizontal. The center line of the main bulkhead has to be vertical to it. Bulkhead and wing can be aligned with the help of a water balance. The fittings on the bulkhead are now bolted with 6 mm bolts. Now remove wings, loosen fittings and after applying UHU Plus screw back together.

After glue has set, they are rivetted like the fittings on the wings. Hereby one screw after another is replaced by a rivet. The rear main bulkhead is constructed in the same manner. But the rear wing attachment fitting is drilled during frame assembly.



ALIGNMENT OF MAIN BULKHEAD

SEATING BEAM

The seating beam is a relatively high stressed part. It has to take the pilots weight up to 450 lbs. In addition the force of the cable hook is led into it. The landing impact is also transferred over the seating beam into the fuselage structure.

The four longerons are planed to size. The side parts are glued and planed using a template. Both side parts are then placed on a board in a vertical position. Make 5 to 6 auxiliary bulkheads (formers) and put them between both side parts, fixing them with clamps. In the width the formers have to match exactly. The whole structure is aligned to a centerline. Now all stiffeners are glued in.

The upper side is cleaned (planed) and planed with plywood. The arch on the upper side is relatively small so that a board to press the glueing can be pulled into it. On the underside spacers have to be placed under.

Now mount the fittings for the harnesses and pedals. After that the underside is planed. To press use nailing strips.