SPACEK s.r.o., Lesní 25, 695 01 Hodonín, Czech Republic,

tel:+420605409539, e-mail:info@sdplanes.com

LICENCE AGREEMENT

This agreement dated 6.11., 2020 by and between SPACEK s.r.o., Lesní 25, 695 01 Hodonín, Czech republic, hereinafter referred as **Seller**, and

Name: ALEŠ KRAJNC

Address: ULICA HEROJA ROJŠKA 70

Telephone: +386 40 360 512

Email: ALES@KANARDIA.EU

hereinafter referred to as **Purchaser**;

NOW, THEREFORE, the Purchaser and Seller do agree as follows:

1. Seller agrees to sell and Purchaser agrees to buy one set of plans for the SD-1 Minisport aircraft
2. Seller hereby authorizes the Purchaser to built one SD-1 Minisport aircraft. The plans license number is 344 The airplane SN conforms to the Basic kit.
3. Purchaser will not allow another party to use of these drawings and manuals to build a second plane or part thereof
4. Purchaser will not transfer these drawings to another party without prior approval of Seller
5. Purchaser will not allow these drawings and manual to be duplicated
6. Purchaser will not use or permit the use of these drawings in the design, construction or manufacture of another aircraft
7. The purchase price for one full set of plans and right to build one SD-1 Minisport aircraft is **230. 00 Eur less VAT (compulsory for EU citizens only) and shipping cost**
8. Purchaser hereby agrees and recognizes: (a) that Seller does not represent, guarantee or warrant the structural integrity, performance, safety or airworthiness of the SD-1 Minisport to be assembled pursuant to this Agreement, and that **SELLER GIVES NO EXPRESS OR IMPLIED WARRANTIES OF ANY KIND,** (b) that the aircraft so assembled will be operated entirely at the risk of the Purchaser, (c) that the **PURCHASER SPECIFICALY ASSUMES ALL RISKS WHATSOEVER OF LOSS OF LIFE, INJURY, OR PROPERTY DAMAGE, ARISING OUT OF CONSTRUCTION, OPERATION, OR USE OF THE SD-1 MINISPORT AIRCRAFT**, (d) that the Seller assumes no liability for any loss of life, personal injury, or property damage resulting from construction, operation, or use of such aircraft
9. For a period of two years from the date of this agreement, Seller agrees promptly to notify the Purchaser by letter addressed to Purchaser´s Email as set forth above, of any change in the design, or defect in which the airworthiness, safety, or structural integrity might be a factor
10. Purchaser agrees to notify Seller promptly of any design defect, structural failure, or any other factor adversely affecting the safety, structural integrity or airworthiness of the aircraft

I have read all the provisions of this agreement and agree to all of them

PURCHASER: _____ Date: 6.11.2020

SELLER: _____ Date: 11.11.2020

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SPACEK s.r.o.
Lesní 25, 695 01 Hodonín
IČ: 277 57 641, DIČ: CZ27757641

INSTRUCTIONS

Fill, sign and date two copies of LICENSE AGREEMENT and send to address of Seller. Your copy of the executed Purchase Agreement will be shipped with the plans.

Content

1 Introduction

The SD-1 Minisport is a single-seat microlight/SSDR/experimental airplane that will provide you very good service economy and performance. Wood is a primary construction material with composite parts used in the places where they are effective. Some controls and undercarriage parts are machined and welded to achieve low empty weight even if plane is equipped with the engine starter, battery or parachute rescue system. Design of lift and control surfaces is the same - a composite or wood spar with attached foam ribs. Whole airframe is covered with plywood.
The main wing, horizontal tail and fin spars are delivered ready to use in the **Basic Kit** due to minimum weight and maximum strength requirements. These parts are made of certified materials using vacuum bagging technology and high temperature curing.
An average skilled builder can build this airplane in around 900 hours if prefab parts are used. Study the drawing and manual thoroughly before construction beginning. If there is anyone building a wooden homebuilt airplane in your area, visit him and get a good look at his work. The construction of SD-1 is not unlike constructing a flying model airplane, just scaled up a bit. If you don't have any experience with wooden kits, we recommend you to buy the **Starter-rudder kit** so that you can gain needed skills. The kit contains all materials for construction.

Foam used is very easy to saw, carve and sand into any shape. Any complicated and elaborate jigs or holding fixtures are not required during construction. You will need a properly sized work table, adjusted to a working height that best accommodates to you. While applying glue or epoxy resin, care should be taken to observe the instructions provided by the manufacturers of these materials. Adequate ventilation and hand protection are strongly recommended.

WARNING: MODIFICATION OF THE BASIC AIRPLANE STRUCTURE AND PROPORTIONAL CHANGES ARE NOT ENCOURAGED.

If considering modifying the pilot's cockpit, instruments, and other airplane components keep in mind, that **higher empty weight degrades performance** and changes the C.G. range, etc.
Glue is very important. It is a primary bonding agent. Surfaces must be CLEAN and be in good CONTACT to achieve a good bond between them. Epoxy is used for all bonding.
CLEAN – no old glue or paint on surface to be glued. Wood surface should be rough if possible.
CONTACT– at least 90% or more contact between surfaces to be epoxied. In addition to contact, pressure must be applied. Pressure can be supplied by the clamps, nails, staples, or screws. Apply pressure as soon as possible. Most epoxies won't wait while you break for lunch or get hooked into answering a long-winded phone call. Wipe out all excessive glue from the components. We wish you lot of patience and endurance if you decide to build. If you bought these plans for the study only, we wish you lot of inspiration.

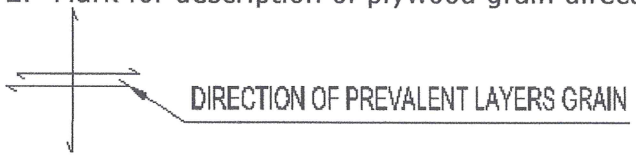
2 Technical Data and performance

Wing span	5,98 m
Length	4,35 m
Wing area	6 m^2
MTOM	240 kg
Empty weight typical	120 kg
Wing loading	40 kg/m^2
Fuel capacity	35 l
Design speed Va	156 km/h
Stall speed clean Vs	78 km/h
Stall speed with flaps Vso	63 km/h
Never exceed speed Vne	210 km/h
Ultimate load factor	+7,5 –3,75
Limit load factor	+4 -2

Important notice to drawings and manual

The drawings are drafted in accordance to ISO standards. There are some conventions and marks used in drawings which are not covered by this standard.

1. If there is cross hatching used to denote a layup, the direction of the real layup should conform to the cross hatch.
2. Mark for description of plywood grain direction

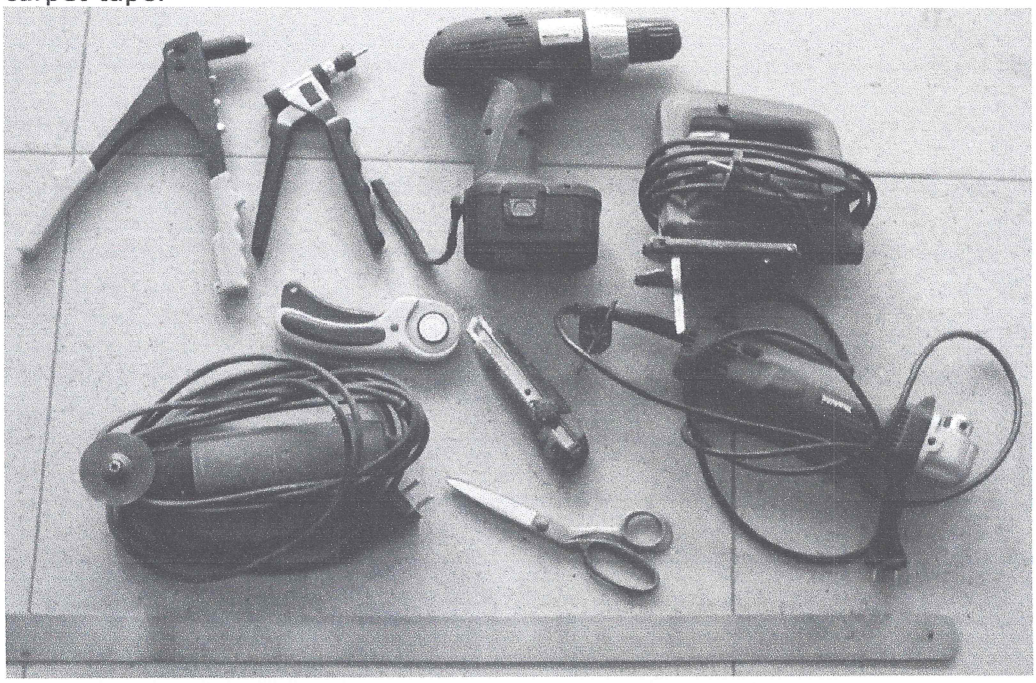


3. If not stated otherwise all dimensions in the manual and drawings are in mm

3 Used Tools and Materials

3.1 Tools

Most of the tools required are common and you are likely to already have them in your work shop. You will need a sharp knife, fine hand or power saw, power drill, angle drill, set of files, hand riveter, nut riveter, hot glue gun, level and lot of sandpapers. Oscillating saw is perfect tool for work with composites. Buy a stiff sanding block or stick sandpaper on suitable piece of wood using carpet tape.



Plastic cups are most suitable for mixing of epoxy. Throw them in the garbage after use. You will need a small (up to 500 g is sufficient) digital kitchen scale with the 1 g precision for weighing of epoxy. The metal metric linear is best for measuring.

Clecos
Used intensively in the building of metal planes are also very useful for attaching sheet on something as fast as possible. The clecos can be used in the construction of the SD-1 canopy and at firewall forward works.

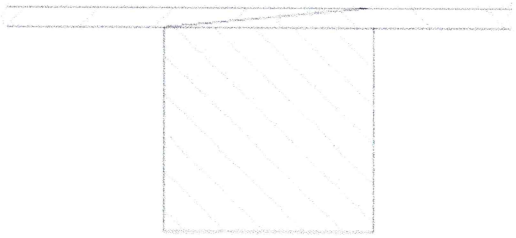
Work table
The entire SD-1 can be built on a work table of dimension 900x3200 mm and adjusted to the height comfortable for you. Use the blackboard or plywood board for table construction.

3.2 Basic materials

Wood
The stress analysis of the SD-1 wooden airplane structure was performed with a requirement that the tensile strength would not exceed 60 MPa in tension and 40 MPa in compression. That corresponds to the second class spruce. Make sure that the number of year lines is not less than 5 per 1 cm width of specimen when selecting spruce. It is possible to use the pinewood also which is stronger, but heavier also. We recommend study more sources about aviation grade wood when you will perform selection and cutting yourself.
SPRUCE OF SATISFACTORY QUALITY

Plywood
The best option is the finnish birch plywood. Beech plywood is also usable, but it is heavier.

Plywood bonding
The so-called scarf joint is used to connect plywood sheets. The sheets connect directly over frame members in the fuselage. The plywood sheeting must be joined prior the attachment to the airframe in the construction of wings, horizontal tail, and flaperons. Use wide tape, carefully check an alignment, apply glue on both sides and press against a firm foundation when joining these large plywood pieces.



There is lot of ways to scarf sheet material, one of which is with a sanding disc in a power drill. The sanding disc must rotate from thick side to the feather edge side.

SCARF MAKING USING HAND BELT SANDER

Beveling of wooden beam edges

It is necessary to bevel edges of wooden beams under different angles during the building process. It is possible to make it by hands, but it is arduous. Another way is using a miller or a sharpener. It is a builder choice; the most accurate beams shapes are desired.

Gluing of wooden spars

Wooden spars are used in all airplanes' surfaces and control units. They consist of a plywood web and caps, made of wooden bars. We recommend to cut webs precisely, and to glue caps on the web edge. It is not possible to get the beams in needed length usually. They have to be jointed to the web by bevel bonding. Fix the beams with clothespins during curing.

Foam

An extruded polystyrene (XPS) is used for wing ribs, flaperons, elevator, fin, rudder, and for the fuselage bulkheads in the airplane construction. It is necessary to use foam with density at least 28 kg/m^3. You can buy this kind of foam from different producers in your local building store. They are sold under brand names like Floormate™ from company Dow Chemicals, Styrodur™ from BASF, BACHL XPS™ from BACHL, Austrotherm and many others. The XPS foam could be cut using a hot wire, or a sharp knife. **DO NOT** use expanded-white polystyrene, which crumbles itself into small balloons.

It is necessary to use hard polyurethane (PUR) foam with density at least 30 kg/m for the manufacturing of upper part of the tank and fuselage. The PUR foam **cannot be** cut by hot wire. Toxic gases are produced when high temperature is applied to it.
The PVC foam of lightest possible density is used in the seat sandwich. You can substitute PU foam in all places. It is more expensive but has better mechanical properties. This foam is marketed as Klegecell™, Conticell™, Airex™ or Herex™.

3.3 Other materials used

Steel
The AISI 4130 (25CrMo4) chrom-molybden steel alloy is used for all welded parts. This material requires autogen or MIG method for welding. It is not problem to find a shop with such equipment in your town today.
Prevention of corrosion
It is needed to protect all steel parts against the corrosion by primer and final paint. It is possible to buy both paints in a spray can.

Aluminum alloys
Control parts are made of AW 2024 aluminum alloy. The aluminum alloys AW 6061 or 2007 could be used for parts machined on a turning lathe.

Plastics
Bushings of controls are made of POM (Polyacetal) which is marketed under name Ertacetal™ but could be used any other. Some parts could be alternatively done from phenolic block which is also used on parts which have to be glued.

3.4 Hardware

The metric hardware in accordance to DIN is used in the construction. See detailed list in attachment. The lug riveting nuts should conform to any metric aviation standard.
It is possible to use the AN hardware which could be of nearest lower size. When shortening the bolts always keep it for thread in the gripp.
Even if it is not clear from drawings the rule is that always use big washers (DIN 9021) when you bolt something on the wood construction.

3.5 Glue and resin for composite lay-up

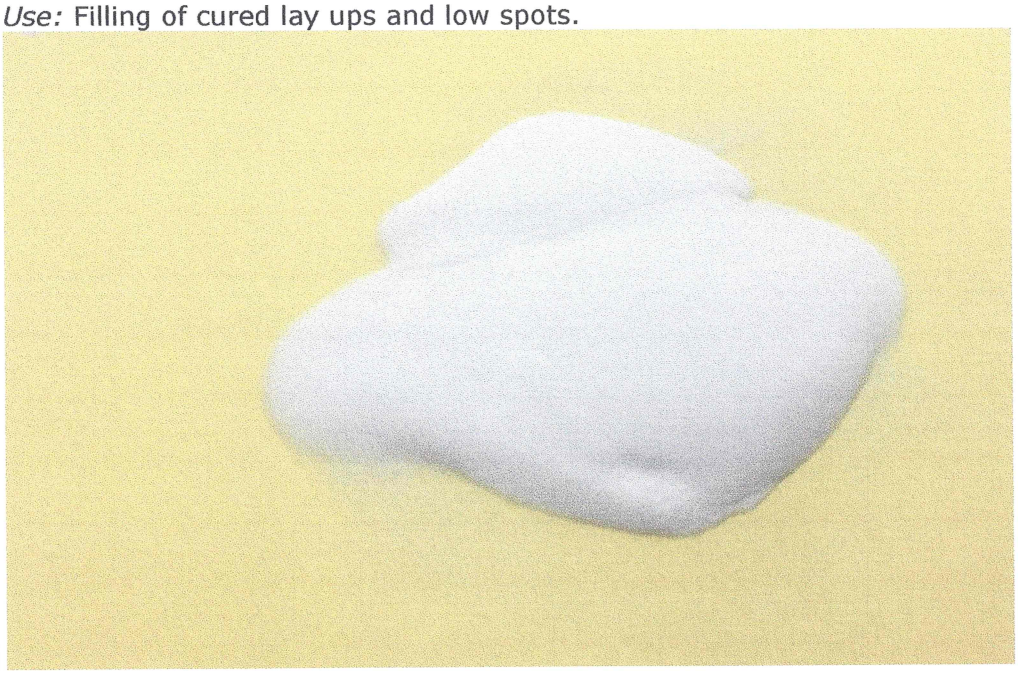
We recommend using of Letoxit epoxy produced by the Czech company, *5M s.r.o.,* for gluing wooden parts together. This glue is mixed in the weight rate of 100:50. It may be prepared in very small batches. It is possible to use other glues for wooden aircraft constructions such as Aerodux 500, Resorcinol, T-88, etc. The resins for lay-up (e.g. MGS L 285) can be used as glue when thickened with a mixture of cotton flox and cabosil (see "cottoncab" in further text). The lay-up resin has low viscosity and will flow from the glue joints. For gluing of wooden, foam and composite parts together is necessary to mix lamination resin and cottoncab. The appropriate mixture is mentioned hereinafter. We recommend the proven MGS L 285 with MGS Hardener H 286 for composite lay-up works.
Keep in mind when gluing wooden parts, that wood is an absorbing material. Therefore, always first apply a glue layer and the wait few minutes for it to absorb, and then apply additional glue on areas that appear dry. During covering with plywood keep the humidity in the workshop at least 60 %, to avoid later distortion of the plywood. Because cured composite material is non-absorbing, you don't have to apply glue in two stages like on wood.

Lamination Epoxy
The "lamination epoxy" in this manual means a mixture of a resin MGS L 285 and MSG Hardener H 286. The weighed mixing ratio is 100:40. The cleanest and most precise way to take the resin and the hardener out of their (plastic) bottles is to install an aluminium (tube) outlet to the cap. Mix the components together for at least for 2 minutes. Temperatures below 18° C should be avoided for good cure. Epoxy is used for bonding and also lay-ups. Wet both bonded parts with clear epoxy

then add some mix to both surfaces so that glue does not run away. Then apply pressure. Lay up is done using clear epoxy. Use a fine brush for the application of epoxy. You can save the brush for next work if you dip it into an acetone bath between jobs. Protect your hands using latex/vinyl etc. gloves when working with epoxy. The 5 minute epoxy is used when a fast **not structural** bond is required. Its advantage is that the bond can be solved using a hot air gun.
Use: Lay up of glass and carbon, gluing in combination with cotton cab, and filling in combination with microballons.

Lay-up
Even if you use our manufactured composite parts produced in negative moulds, you will need to blend them into the surrounding airframe. Practice lay-up techniques on a piece of glass web if you don't have prior experience or see related YouTube videos. Always use a flat brush of an adequate size for the lay–up job, but not wider than 40 mm.

Microbaloons
Micro balloons are very small glass beads which take on a texture and color approaching talcum powder. They are used to thicken the epoxy and as a filler. They are very light and totally **non-structural**.
Use: Filling of cured lay ups and low spots.



Dry micro
By adding micro balloons to lamination epoxy you will get dry micro – a very light sealant and filler. Apply a thin layer of epoxy on the surface before using dry micro. **It is non structural.**

Wet out
The best remedy for very uneven surfaces is dry micro. Be sure and wet with epoxy before applying the dry micro.

Cotton flox
Cotton flox are chopped cotton fibers. They look very much like the micro balloons. The difference is that cotton flox **is structural**. It is used for strengthening glass to glass corners and bonding cured glass elements to another one, etc. Cotton flox is heavier than micro balloons.

Cab-o-sil or Aerosil
Cabosil or Aerosil are both tixotropic fillers used for thickening of laminating epoxy. They are used in combination with cotton flox for better mechanical properties. Both are **structural.**

Cotton cab

Cottoncab is abbreviation for a mixture of cotton flox with cabosil. It is used for thickening epoxy so that it does not run away from a joint.

Mix

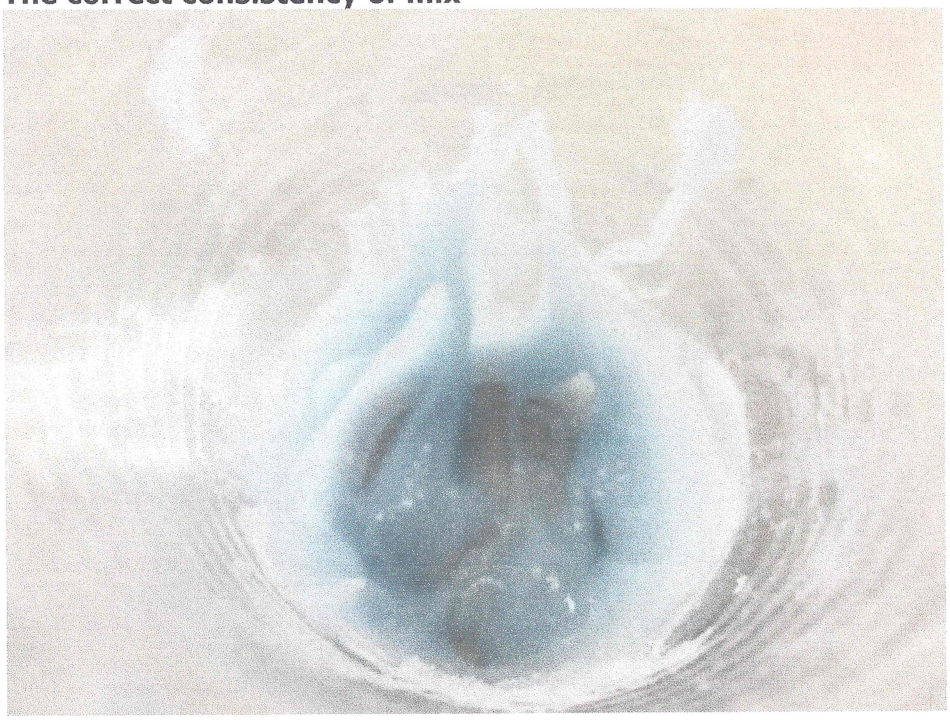
By adding cottoncab with laminating epoxy until the desired consistency is achieved you will get "mix" which is used in bonding of different materials and composites. The ratio of cottoncab and epoxy is not critical - simply add cotton cab until the desired consistency is achieved.

It is **structural**.

USE: Bonding of parts.

HINT: When performing lay-up in a sharp corner put some mix in the corner so bubbles will be avoided. Bubbles are caused by course cloth.

The correct consistency of mix



3.6 Reinforcements

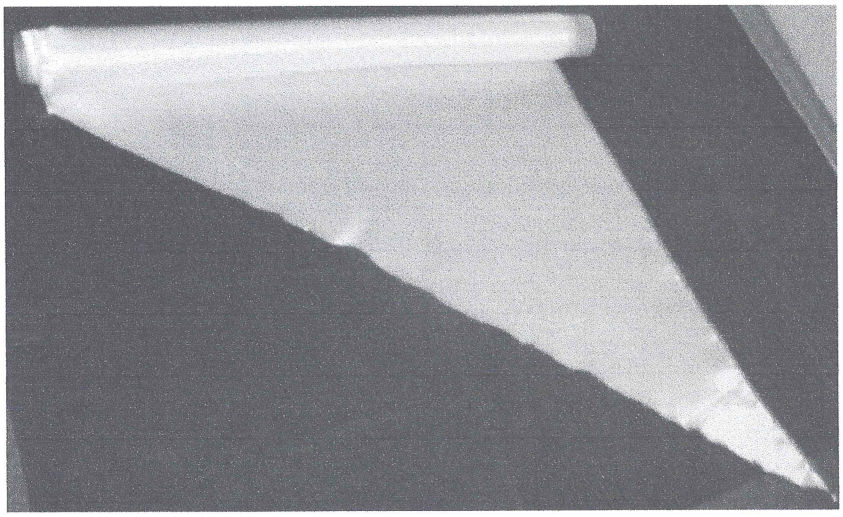
If possible, use the aviation certified glass clothes, or at least clothes with the SILAN finish. The wet out of these higher quality clothes is much easier. The not certified carbon cloth may be used.

Glass cloth
The abbreviation "G" means glass cloth in the drawings. Use only bidirectional cloths (BID). BID means that 50% of the fibers run one direction, and 50% run 90° in another direction. There are various fiber glass cloth textile styles. Twill cloths of with a weight of 50, 80 and 160 g/sqm (Interglas 92110) are used in the SD-1 construction.

Carbon cloth
The abbreviation "C" means carbon cloth in the drawings. Twill cloth with a weight of 200 g/sqm is used in the SD-1 construction.

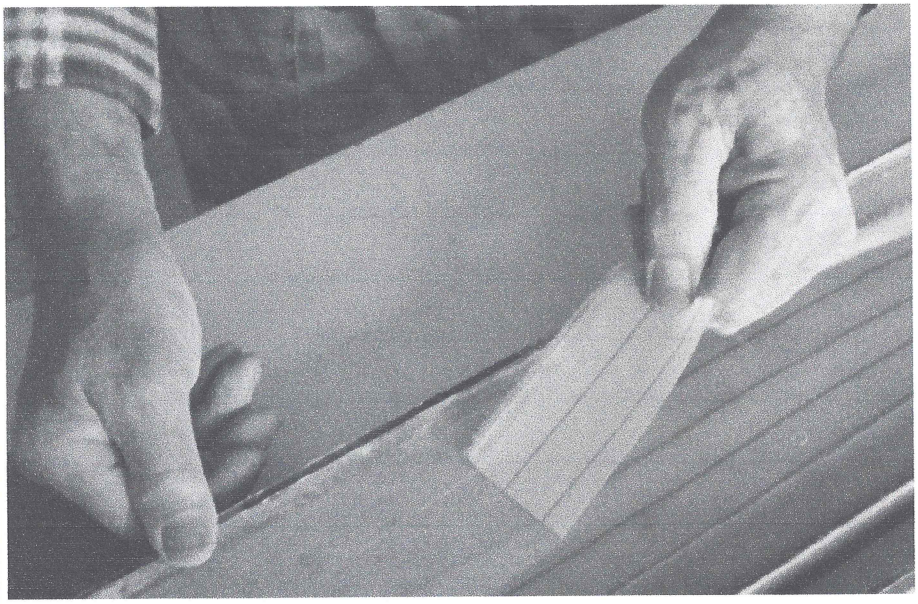
Cutting and marking the clothes
It is possible to cut the glass and carbon cloth wuth scissors or a sharp knife on a rubber mat or soft wood. It is possible to mark both textiles with a felt marker pen. Felt marker will appear through multiple layers of G cloth but not C cloth.

Cutting cloths on the bias
Cutting BID cloth on the bias leaves the fibers on a 45° angle to the edge. This way of cutting is used in places, where maximum tensional strength is needed. Use this method for smaller radius, etc.



Separators-waxes, PVA
It is necessary to use a separator wax on screws and pins during some operation for later easy removal after epoxy curing. The floor wax is efficient enough for this. Simply apply 2-3 coats of wax on screw or pin. Let the separator to dry between each coat. Use the PVA (polyvinyl alcohol) on the mould surface. It can be washed away using wet towel.

Peel-ply
The spars in the Basic Kit and edges of tank, wing tips etc. are provided with an outer layer called peel-ply. You will get ideal surface for further lay-up or gluing after its removal. Remove the peel-ply just prior gluing or lay-up. The right way how to remove peel-ply is shown in the picture below.



4 Preparation jobs

4.1 Surface treatment

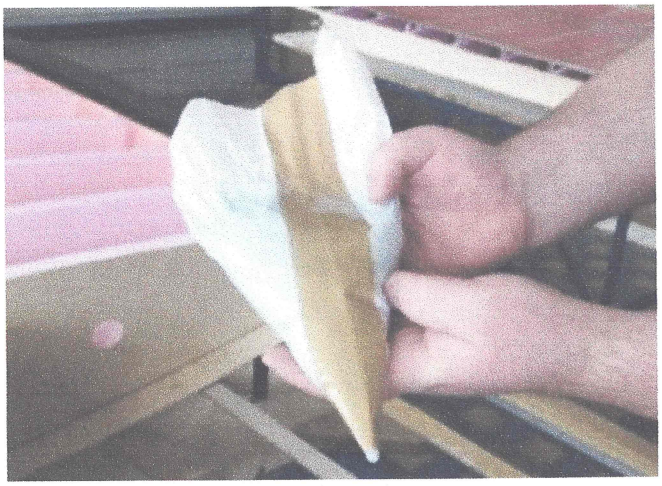
Foam: Use brush, air or vacuum to remove the dust. Fill big pores with dry micro before lamination (not valid for vacuum bagged or pressed parts).
Composites: Use peel ply where possible. You may sand surface with 100 grit paper and wash with acetone. Be careful to not damage fibers.
Metal: Apply suitable paint when scratched.

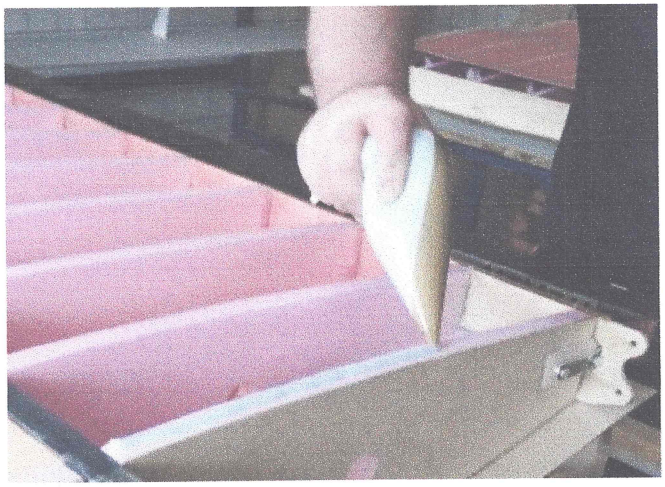
4.2 Lay-up process

You will achieve the best conformity and fastest wetting of cloth using a roller on plastic film laid down on a table. You can cut cloth to the final shape before wetting or to cut after wetted using a sharp knife. For layup on complex foam shapes, we recommend you trial fit of dry cloth before wetting. Pour a small amount of resin in the middle of layup then and squeegee it towards the edges. Eliminate air bubbles using a brush. Wipe away excess epoxy. Additional epoxy means higher weight but no additional strength. Make sure there are no dry places or white spots on the cloth. Dry places will not have the required strength. **Apply peel ply where possible.**

4.3 Confectionary piping bag

It is used during gluing of plywood skin on the structure. Buy the disposable ones or make it of foil and tape as shown on the bellow picture. Fill it with mix and apply the "caterpillar" on the ribs and spars.





4.4 Riveting

Metal parts are attached on plywood ribs with break stem rivets. Break stem rivets are applied using a hand riveter. Keep riveted parts together as tightly as possible during riveting.

4.5 Trim off

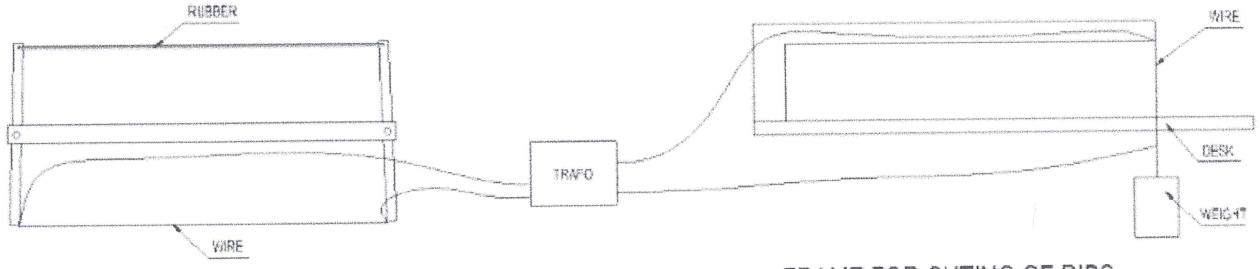
Do not let cloth overhang the component more than 10 mm to prevent from the cloth from lifting off the surface during lay-up process. You may trim the excess cloth with the scissors after lay up or with knife after gelling or with an oscillating saw after cure.

4.6 Cleaning of brushes after lamination

Soak brushes in a closed container containing acetone. Dry them using paper towels before reuse. Protect your hands with rubber or latex gloves.

4.7 Foam cutting

Use a hot wire or a sharp knife for cutting extruded polystyrene. You can use a charging transformer for producing current in the wire. Prepare a frame for long cuts. Use rubber or a long spring for tensioning of the wire. Prepare the frame so that the wire is perpendicular to working templates. The PUR foam should be cut using a sharp knife or can be sanded – **do not use a hot wire.**



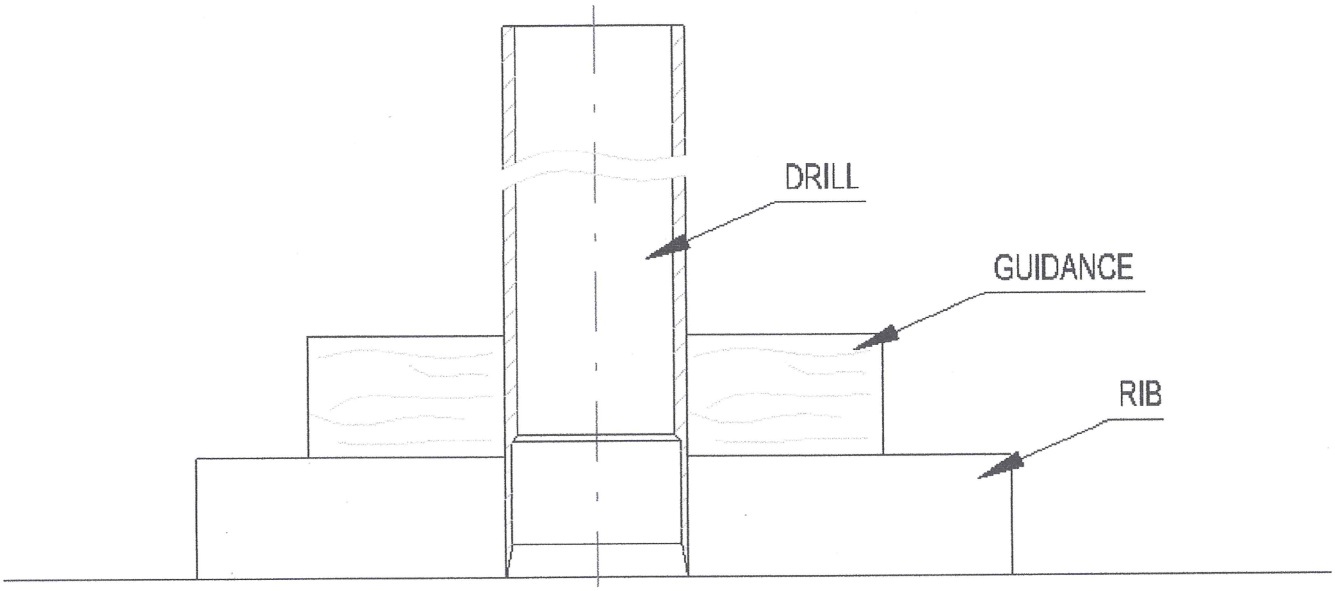
FRAME FOR LONG CUTS

FRAME FOR CUTING OF RIBS

4.8 Drilling holes in foam wing ribs

You have to drill holes to run setting tubes for easy assembly of ribs on the spars. For the wing ribs this can be a tube within the limits of 25-30 mm. For ribs of horizontal tail units the limits are 10-

18 mm. Tubes must be straight and preferably made of aluminum alloy. Fabricate a drill from the same tube that will run through drilled hole. The drill should be app 200 mm long. Use a lathe to machine the cutting edge with an acute angle of 5-8°. If the tube thickness is greater than 2 mm then turn the last 25 mm of drill so that wall thickness of 1 mm only. Make the wooden guidance block for holes drilling that match your foam drill size. We recommend to make the rib outline shaped block to ensure that hole is drilled in the same spot on each rib. Hold the block firmly on the rib, turn drill alternately and press it to the foam. You need sharp drill and a little practice to get perfect result.



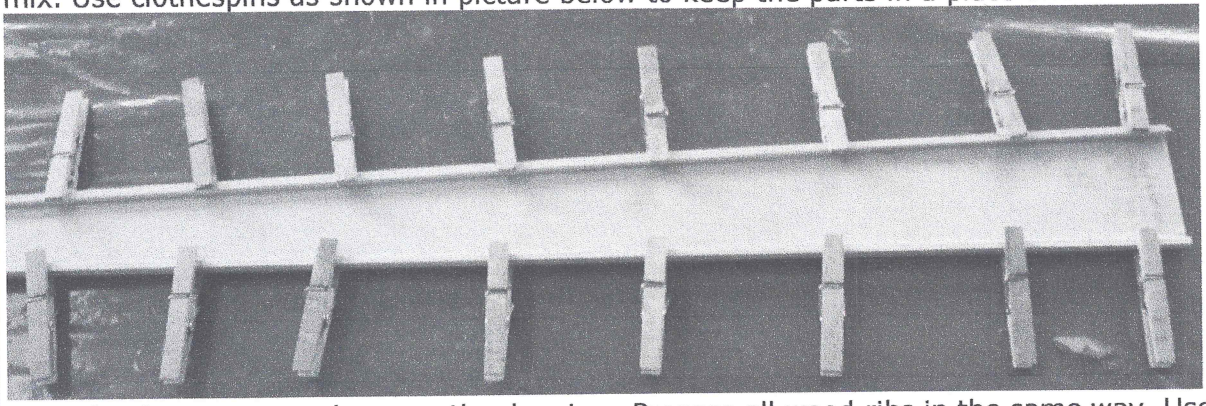
4.9 Wood varnishing

Use the water based single component polyurethane varnish if possible. It does not solve the XPS and does not stink as the epoxy or acetone based varnishes. Do not apply more than two layers of varnish. You can lose a lot of useful load by not keeping this rule in mind during construction. Put a little red pigment in the varnish applied in the inside structure so that is easy to recognize where it has been already applied.

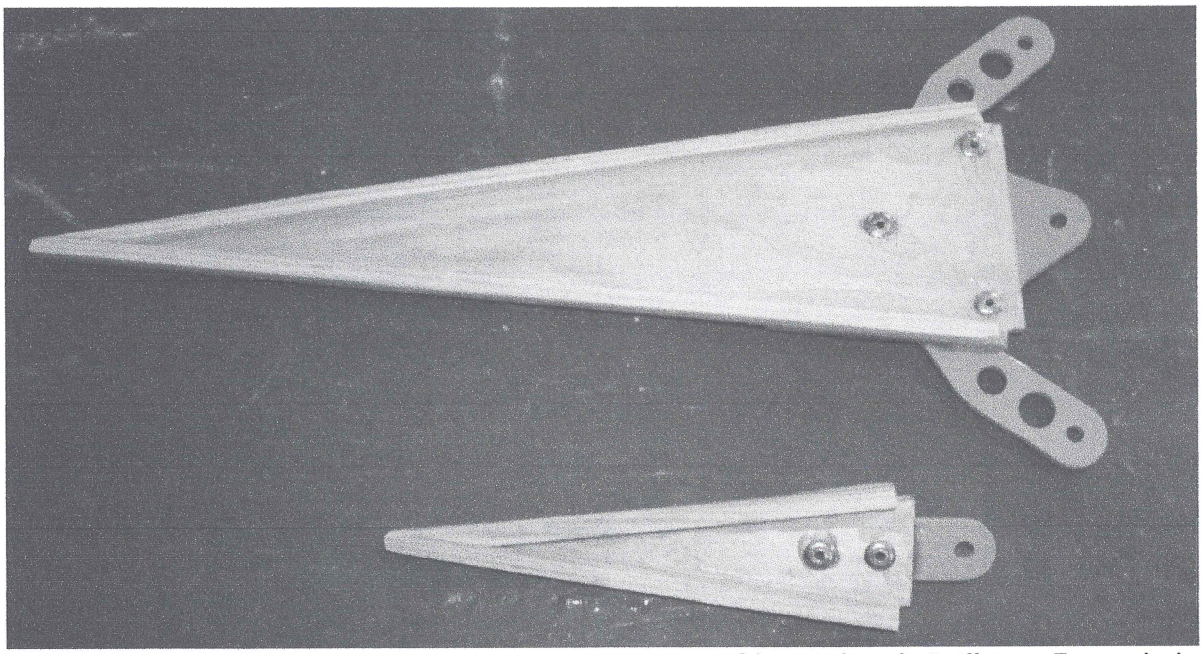
5 Construction and assembly

5.1 Rudder, SD1-55-000

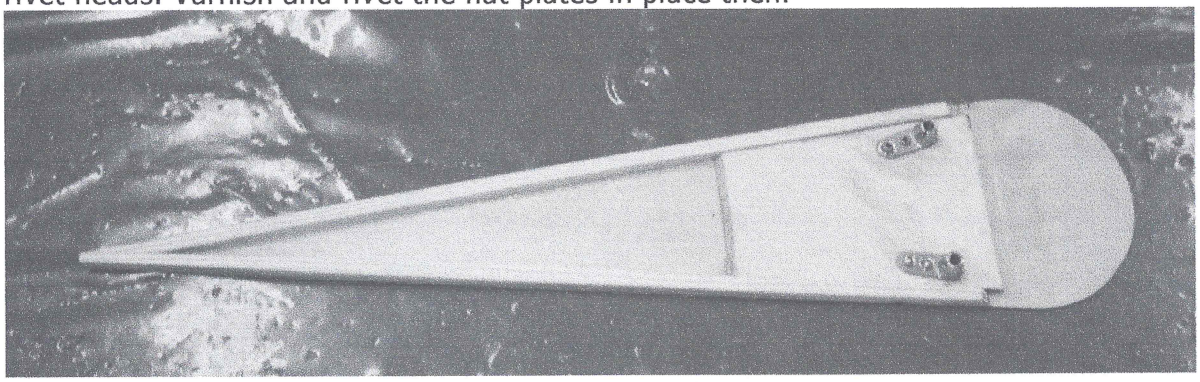
It is necessary to prepare the skin, spar and ribs before the assembly of rudder. Cut the spar web from the 1 mm plywood in acc. to drawing. Bond the 5x5 mm spruce caps on the spar web using mix. Use clothespins as shown in picture below to keep the parts in a place and let it cure.



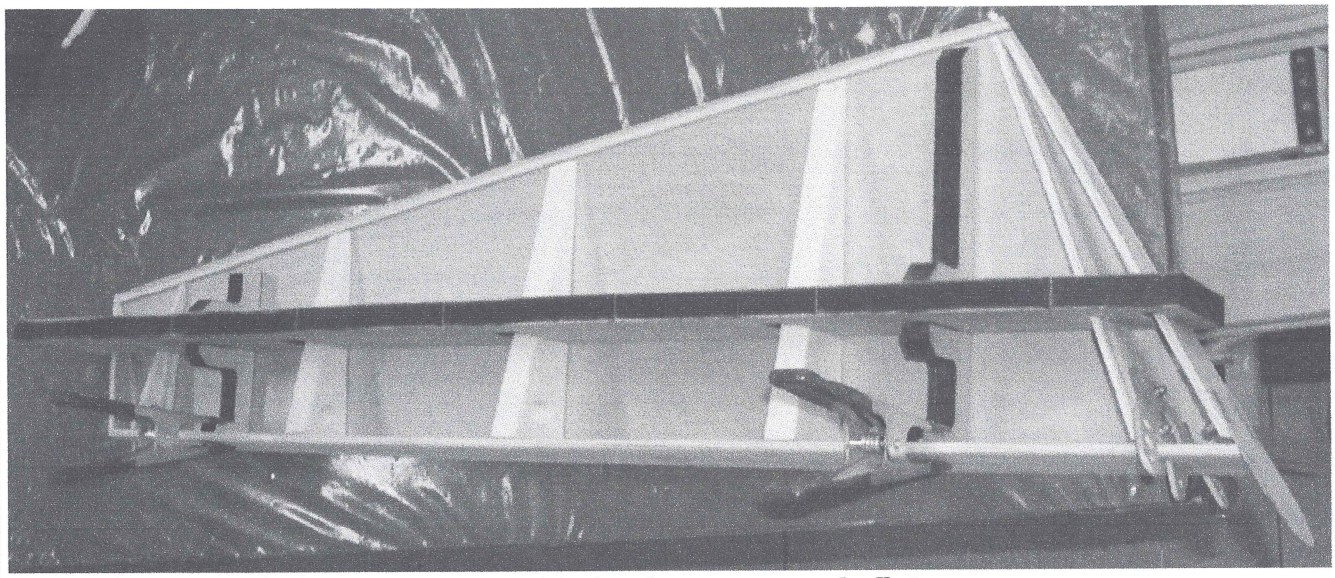
Chamfer the spar cap edges per the drawings Prepare all wood ribs in the same way. Use the metal hinges as templates and drill holes for rivets into the ribs. Apply varnish into the holes and under hinges before riveting. Rivet hinges on ribs.



Check the drawing to assure the proper orientation of hinge bend. Drill two 5 mm holes in the rib number 2. Use M5x10 bolts to keep the M5 nut plates in the place. Countersunk holes edge for the rivet heads. Varnish and rivet the nut plates in place then.



Cut rudder skins from the plywood sheet 0.8 mm thick. Draw position of the spar and ribs on the skins. Cut the slots for levers of lower hinge. Bond the 5x5 mm spruce on left skin in the place of trailing edge per the drawing. Chamfer it in per the drawng after cure. Bond the spar and ribs on the left skin using mix. Wipe out excess glue from the corners of bonded parts. Use clamps, weights and tape for securing of ribs and spar in the correct position. Mark the outlines of ribs and spars on the right skin. Apply varnish on all inside wood surface and inside surface of right skin. Bond the right skin on the assembly using mix. Use tape to keep the skin on the assembly. Apply pressure over the spars and ribs using pieces of metal or books and let it cure. Fill the trailing edge gap with dry micro filled in syringe and let it cure. Sand the trailing edge to a proper aerodynamic shape per the drawing. Bond a block of XPS on the leading edge of the rudder using dry micro. Bond the plywood end plates in place using micro. Use them as a guide to sand the leading edge shape after cure. Trim to required shape with some margin for final sanding using a hot wire or a knife. Sand it to precise shape. Blow away all dust from the leading edge. Chamfer the plywood skin in depth of one ply (on the edge) along a 10 mm wide at the leading edge rudder junction.

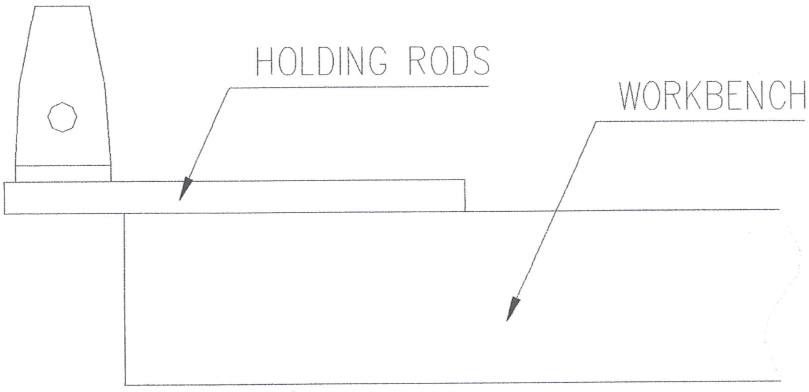


The rudder on this picture is assembled using company's fixture.

Perform lay-up of 2 the 50 g/sqm glass cloth layers over the leading edge of the rudder. Trim edges and sand to the final shape. Apply varnish on the rest of wood surface. The rudder is ready for primer paint now.

5.2 Horizontal tail (elevator) and anti-servo tab, SD1-30-000, SD1-35-000

Use the spar delivered in the Basic Kit for construction of horizontal tail. Using thin metal sheet template cut all 20 mm ribs from XPS. Make the central 40 mm rib by gluing two 20 mm ribs together. Make the nose and rear spars. Lay the main spar on rods attached to table in accordance to picture below.

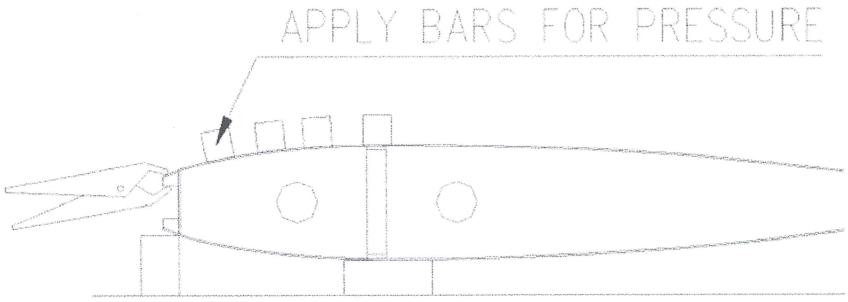


Slide the ribs on auxiliary tube. Align the ribs on auxiliary tube with the positions marked on the main spar. Put the nose spar on ribs and check if everything fits. Take the nose spar off the ribs, and the ribs and tube assembly off the main spar if everything is OK. Prepare 30 g of laminating epoxy.

Spread clear epoxy on the places where spar contacts ribs. Add cotton cab to epoxy until a middle thickness is obtained then spread the epoxy on the rib surfaces to be glued. Assemble everything again. Put some weights on nose spar and check if everything fits. Check the position of nose to main spar. Wipe out superfluous glue in the corners between ribs and spars. Glue rear ribs in the similar way. Place the ribs on the spar carefully. Make sure that the airfoil is straight. The rear spar is in the length of the anti-servo tab only.

Use a glass fiber or carbon rod Ø4 mm to align the bearings pos. 3 and the hinge pos.2 so they have a common axis of symmetry. Prepare the upper and lower plywood skins and glue the spruce 5x5 mm trailing edge to the upper skin as shown in the drawing. Chamfer it after cure. Draw positions of spars and ribs on both skins. Apply varnish on the inside surface of both skins where glue will not be applied. Prepare the structure so that it is straight supported for gluing on the upper skin. The rear ribs out of tab spar should be supported using wide bar. Perform trial fit of upper skin using spruce and weights to see how it conforms to the structure. Make sure that

assembly is straight and not twisted. Remove the upper skin and prepare 80 g of clear epoxy and spread it on the surfaces to be glued on the skin. Add cotton cab to the rest of the epoxy and spread it on the ribs and spars. Replace the skin on the structure and apply pressure. Use clamps on the nose spar as shown in the picture below.



Wipe out superfluous glue if possible. Check the assembly after cure to be sure that is straight and OK. Cut the tab skin out of the upper surface. Glue lower skin on the structure using the same process used for the upper skin. Cut the tab skin out of the lower skin after cure. Glue the insert on the inner side of the upper tab skin where the control lever is fixed. Place the lever on the top of the skin and drill the mounting holes. Varnish the inside surfaces of both skins of tab where glue will not be applied and install the rivet lug nuts used for the control lever assembly. Glue the lower skin on tab. Trim the skin after cure and glue balsa/XPS nose on the tab and horizontal tail. Sand the leading edges of tail and trim tab in accordance to the template.
Glue the blocks of XPS if you will not use prefabricated tips. Cut and sand the tips to shape and perform lay-up required by drawing. Perform the lay-up of elevator leading edge and trim tab. The cloth should overlap the plywood skin for a minimum of 10 mm. Spread dry micro over lay-ups after cure and also fill the trailing edges of the tail and tab. Trim and sand to final shape after cure. Apply varnish on wood surfaces.

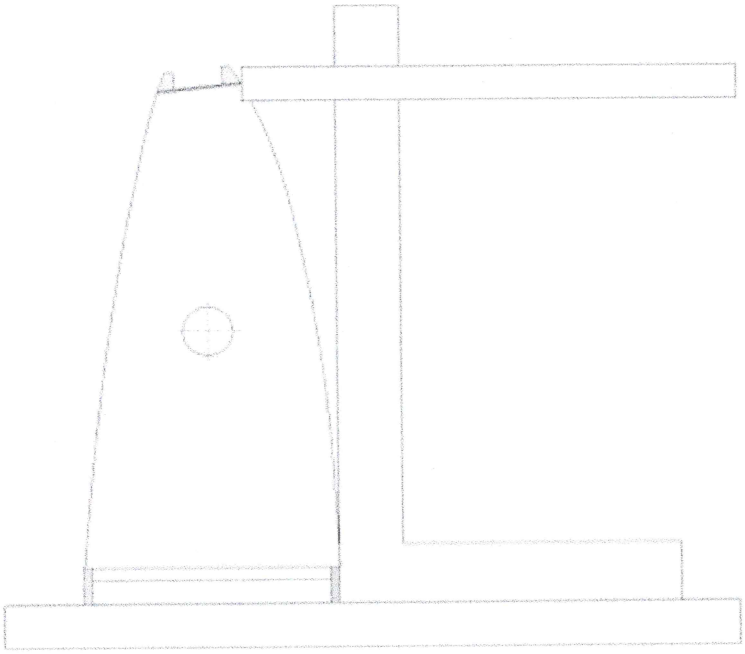
5.3 Flaperons, SD1-25-000

Prepare the flaperon spar, ribs and skins. Glue spruce on edges of the plywood ribs and attach the spruce stiffener under the lug riveting nut plate areas. Drill the appropriately sized hardware mounting holes in accordance to drawing. Center the nuts with shorter bolts so that the securing part of nut will not be affected. Prepare lower skin and glue spruce 5x5 in place of trailing edge. Chamfer spruce in accordance to drawing. Glue the spar and wood side ribs on lower skin checking distance between them and verifying that they are parallel with each other. Glue the middle rib in the next step. Check if mounting holes in all 3 ribs are coaxial using a string or wire inserted thru. Glue the XPS ribs using mix. Mark position of ribs and spars on the upper skin and varnish areas where glue will not be applied. Varnish internal wood structure of yet glued parts where glue will not be applied. Glue the upper skin on the rest of structure in the usual way and let cure. Glue nose half ribs on the spar and let cure. Fill the flaperon trailing edges with dry micro and let it cure. Shape the leading edge according to the drawing template. Perform lay-up of 2xG50 over the flaperon leading edge and finish in the same way as rudder.

5.4 Wings, SD1-20-000L,R

Use the main spar delivered in Basic kit for construction of wing. Cut all ribs from the T. 20 mm using the templates. Drill holes into ribs in accordance to chapter 4.7. Main spars of left and right wing are moved to each other in longitudinal direction–ribs are different. The height of spars is also different so that are spars marked L-left, R-right. Bond front ribs on the **Right** spar and rear ribs on the **Left** spar in the first step. Start with the right wing. Peel out the peel-ply from spar. Measure and mark position of ribs in accordance to drawing. Bond reinforcing plywood on the root nose rib and three rear ribs to which the hinges of flaperons are attached. Pull the ribs on tube as described in chapter 4.7. There is the tube of dynamic pressure line incorporated into nose ribs of right wing. Prepare the aluminum tube 6x1 in accordance to drawing. Drill the hole Ø7 into first 10 ribs from the root one distance shown in drawing. Put on the tube thru ribs and nose spar before bonding.

Set the distance between ribs in accordance to drawing. Lay this assembly on the main spar. Lay the nose spar on ribs. Put some weights on nose spar to simulate the bonding assembly. Prepare app. 80 g of laminating epoxy and varnish spars in the place of rib contact areas.
Add cottoncab to the rest of epoxy till mix is thick enough and pour it on bonding surfaces of ribs. Put assembly together and apply weight on the nose rib. Fix the nose spar with tape to prevent floating on the glue. You can fix the position of ribs on the main spar using straight bar higher than spar and to rest the ribs on it.
Wipe out superfluous glue using rounded piece of thin plywood. Check the position of nose spar against the main one using square and linear as shown in bellow picture.

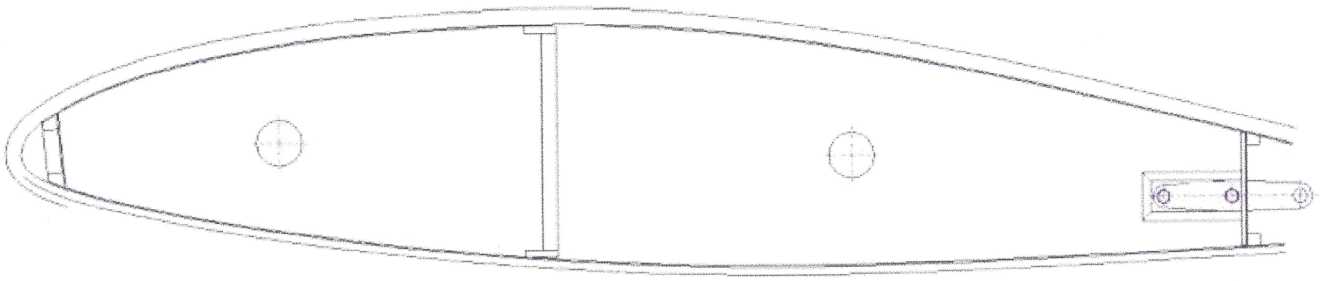


Trim excessive glue after cure. Prepare auxiliary spar including root reinforcement made of plywood T.3. Complete the middle rear rib including flaperon hinge. Prepare all 3 hinges at once. Lay the main spar on bars similarly as during elevator construction. Put the rear ribs on tube and continue as on the nose part. Be careful when positioning reinforced ribs on which flaperon hinges are attached. Keep distance among them as precise as possible. Check symmetry of axis when drilling holes for flaperon hinges using string. The left wing inside structure is made in the opaque process.

Bonding of skins on wing structure

Disassemble desk from your working table if possible. This allows wiping out superfluous glue during upper skin bonding. Prepare the support for structure of wing using 3 pcs of straight wood or metal bars placed alongside the chord at the ends and in the middle of wing. Support the wing structure in the place of spars. The structure **cannot** be twisted! Mark the position of spars and ribs on both prepared skins before bonding. Varnish the surface out of bonding areas. Check assembly before real bonding. Use clamps for attachment of skin on nose and auxiliary spar. Put the metal bar (L section is the best) between the skin and clamp jaws so that pressure is applied equally.
Bond the upper skin on wing structure in usual way if everything is OK. Perform this step with assistant if possible because pot life of laminating resin is app. 40 min. Wipe out superfluous glue with piece of plywood (small radius on the working edge) after pressure application. You can save some empty weight and improve bond of skin to the structure. Turn wing upside down after cure and check if glue is in all bonded areas. Fix imperfection using thinner mix. Varnish rest of internal wood structure.
Make the walk side on the first field between rear root rib and following one of left wing. Turn wing bottom up and fit the piece of XPS T.20 sheet between ribs and bond on dry micro. Apply pressure using weights. Perform lay-up of 2xG160 in this area with app. 40 mm overlap to the ribs.
Bond the lower skin in the same manner as upper one. Trim skins in accordance to drawing after cure. Use middle soft balsa or XPS for fabrication of leading edge. Glue the balsa/XPS using micro.

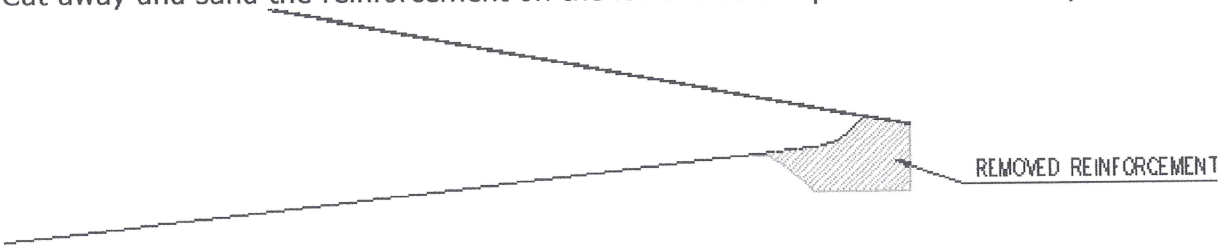
Trim it roughly using knife and then sand to the shape with at least 1 m long sanding bar. Check the shape of leading edge using template from drawing SD1-20-500. Be careful, because shape of leading edge has influence on the stall characteristics of airfoil. You can save lot of sanding time if you will make the sanding block from XPS in the negative contour of the edge. Do not forget to modify it on the thickness of sand paper. Perform the wing tip attachment (see next chapter).
We recommend to perform the lay-up of 1xG50 over whole wing skin for better resistance against moisture. The order of layup is on picture bellow. The lay-up must be performed to the wing tips also.



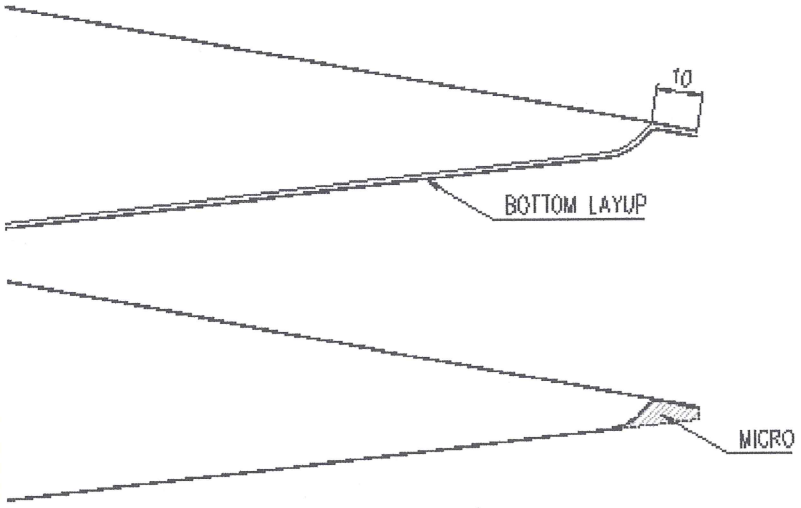
If you will not make lay-up over whole wing make it over leading edge in accordance to drawing. Fill cured surface with dry micro where necessary. Sand it to smoothness.

5.5 Wing tips, SD1-20-600

You have to prepare the semi product of tip from the XPS block of 100 mm thickness in the case that you will not use premolded wing tips. Make templates gluing drawing on the thin plywood. Cut the sections using vertical hot wire in accordance to templates. Glue sections together with dry micro so that it is applied 10 mm from outline and do not flow from the joint after pressure application. This assures later good sanding conditions. Glue finished semi product on the wing using dry micro. Cut to rough shape using long knife. **Warning: Do not cut away reinforcement on the trailing edge at this moment**.
Sand the upper side and leading edge then with sand paper from 100 to grit 280. Do your best to achieve as smooth as possible surface so that later filling is minimal. Perform lay-up of 1xG160 and 1xG80 over the upper side. Cut the cloth so that it overlap edge to the lower side in 20-30 mm. Trim lay-up on the trailing edge and chamfer its rim up on the rest of tip after cure.
Cut away and sand the reinforcement on the lower side of tip in accordance to picture.



Perform lay-up on the lower side of tip. Fill with dry micro and sand the trailling edge in accordance to picture.



Fill low spots with dry micro and sand to smoothness. The wing is prepared for filler paint.

5.6 Assembly of auxiliary spar hinge

Perform reinforcement layup of 2xC200 among the root rib, main and auxiliary spars in accordance to drawing. Drill one marked hole for the hinges pos. 4 and bolt single hinge on with the simple nut. Drill the second hole through the hinge. Check if the hinge (SD1-40-503) has enough clearance against the auxiliary spar. Install both hinges using the HW required by drawing if everything is OK. Have the pin (SD1-40-502) inserted in both hinges during assembly.

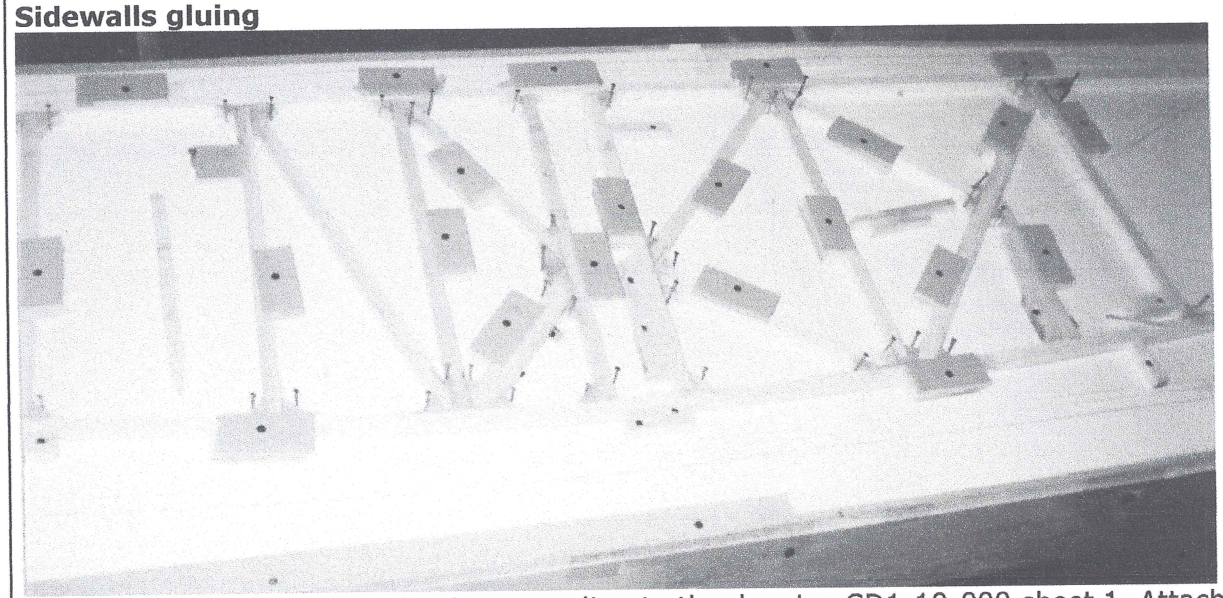
5.7 Assembly of flaperons on the wing

Fabricate the bearings pos. 2, 3 from drawing SD1-25-500. Put the bearings into flaperon-wing hinges. Put the flaperon on wing and insert the end bolts first to keep it in place. Insert the middle bolt and tight all bolts. Check free and light movement of flaperon. Modify if necessary.

5.8 Fuselage, SD1-10-000

The fuselage is a frame structure and is covered by plywood of different thickness.

Sidewalls gluing



The fuselage sidewalls are glued in according to the drawing SD1-10-000 sheet 1. Attach the paper of minimum size 3200x400 mm made by gluing few of sheets together or from the plotter paper roll to the top of working table. Redraw the sidewall from the drawing SD1-10-000 page 1. You can

use the drawing **FS** in the full scale, which you can buy with the plans for extra fee. Put on and fix transparent foil over the paper to protect it from damage. Screw the 15x15 section spruce on the basement longeron outer side. This defines longeron position. Screw the rests made of garbage spruce or plywood on the lower longeron inner and outer side to settle its bent and position. Make the lower longeron bend simply by putting it among the rests. Prepare the rests for all crossbars in the similar way. Cut and sand the vertical and diagonal crossbars in according to an actual size and shape. Glue the gussets in the same time as crossbars. Maximum gap between the glued parts should not exceed 0,5 mm. Screw the splices out after gluing completion and take sidewalls off the working table. Get rid of the spare glue using the rasp or harsh sand paper. Glue the second sidewall in the same way. Make sure, that you use a different size and kind of used wood of upper gusset on the bulkhead 9 if will be airplane equipped with the parachute rescue system.

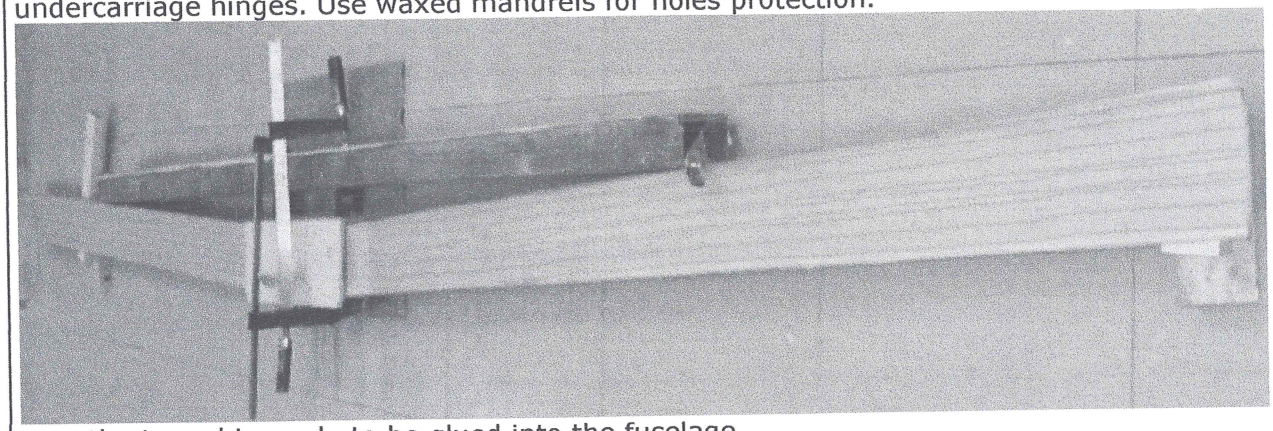
Fuselage tunnel, SD1-10-100

The tunnel pos. 1 (SD1-10-000_2) is the most important part of the fuselage. The upper hinges of the main landing gear, pins bushes of the main beam as well as front bushing of the control stick console are fixed to the tunnel. Fabricate upper hinges of the main landing gear SD1-70-503 before the tunnel construction. Prepare the front plywood wall pos. 1 of T. 11 thickness by gluing of T.5 and 2x T.3 mm together. Use hinges SD1-70-503 as template for drilling of holes. Using the control stick bearing (SD1-60-516) as template, drill holes ∅ 6 mm. Screw on the one lug riveting nuts M6. Glue the washers pos. 8 from the inner side of the tunnel front panel before its assembly. Prepare aft wall pos. 2 gluing 2x T.3 mm plywood together. Glue reinforcements pos. 6 on the pos.2 Glue the bushings pos. 9 and 10 in the walls.

Glue inserts pos. 3 and one insert pos. 4 on the pos. 1. Glue the second insert pos. 4 to the pos. 2 at the same time. Varnish the inner side of the tunnel except of gluing areas. Using 2 bolts M6x80 inserted thru bushings pos.9 and 10 glue both walls together. Do not tight the nuts on bolts too much. You can distort walls. Finish the upper T.3 plywood web. Clean the tunnel with fine sandpaper, make radius R3 on the web.

Mount the front bushing including the stick console just for try and check free movements of the console.

Lay tunnel on the mat and put in the main wing spars in accordance to drawing. The tunnel should be supported so that it is possible to get over bushing hole with small drill stand. If you do not have such stand you will need helper who will check axis while drilling. Set dihedral on spars and fix them to checking bar so that they cannot move. Check mutual positions of spar and tunnel bushings. Fix one bushing row putting the bolt M6x80 thru if possible. There could be up to 0,5 mm play between bushings. Drill Ø8 hole through whole assembly in the opposite bushing row. Continue the same with the Ø11,7 drill. Then ream the hole with Ø12 H7 reamer. Put main spar pin SD1-40-501 into the reamed hole. Drill and ream second hole in the similar manner. Glue stoppers position 7 after disassembly. Perform carbon cloth reinforcement lay-up over stoppers and undercarriage hinges. Use waxed mandrels for holes protection.



Now the tunnel is ready to be glued into the fuselage.

Bulkhead gluing position 2, SD1-10-200

Bond the flanges and gussets T.13 to the plywood web T.1. Trim run out glue after cure, dope inner space except of gluing areas and glue on second web skin. Drill the holes. Bond the stiffener to the web. Trim the webs on outline.

Bulkhead gluing position 6, SD1-10-300

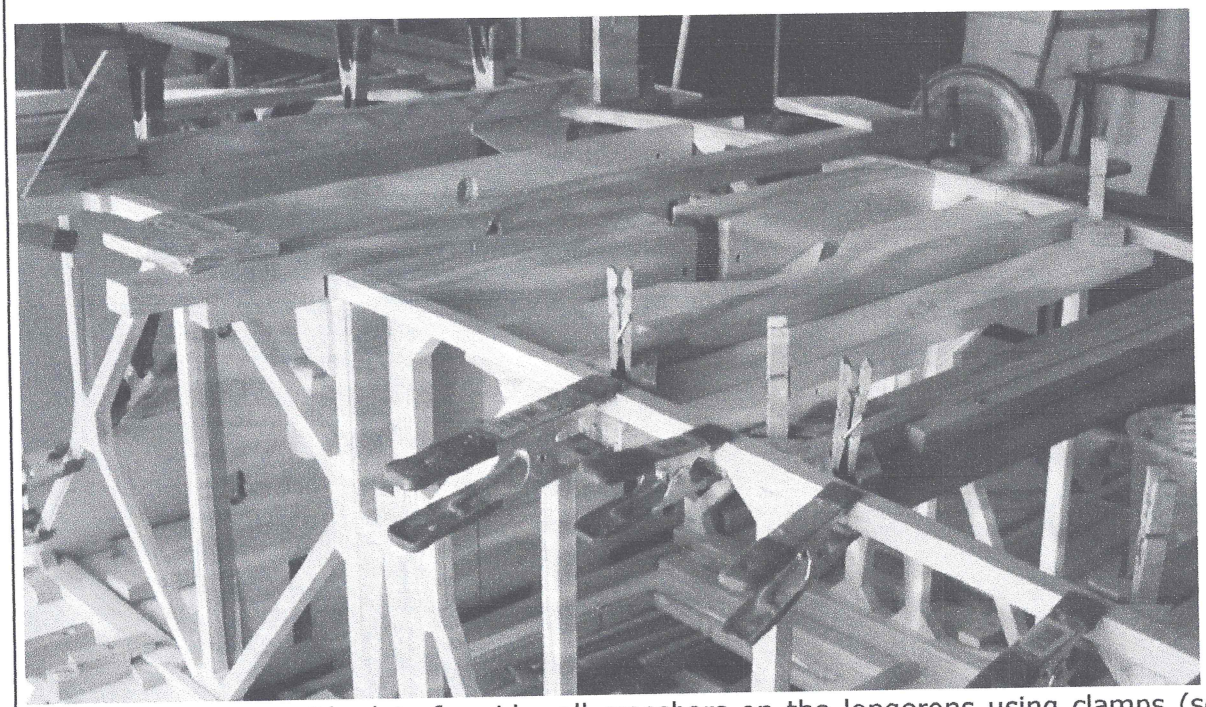
Copy the shape of bulkhead from the drawing SD1-10-000T. Make a template for hem bending using an appropriate material (chipboard, etc.). Section shape of the hem depends on aircraft version. The section shape is simpler with the version without an emergency rescue system. Pad the upper strips using spacers to make space for ropes of the rescue system.

Longerons bending and fixation

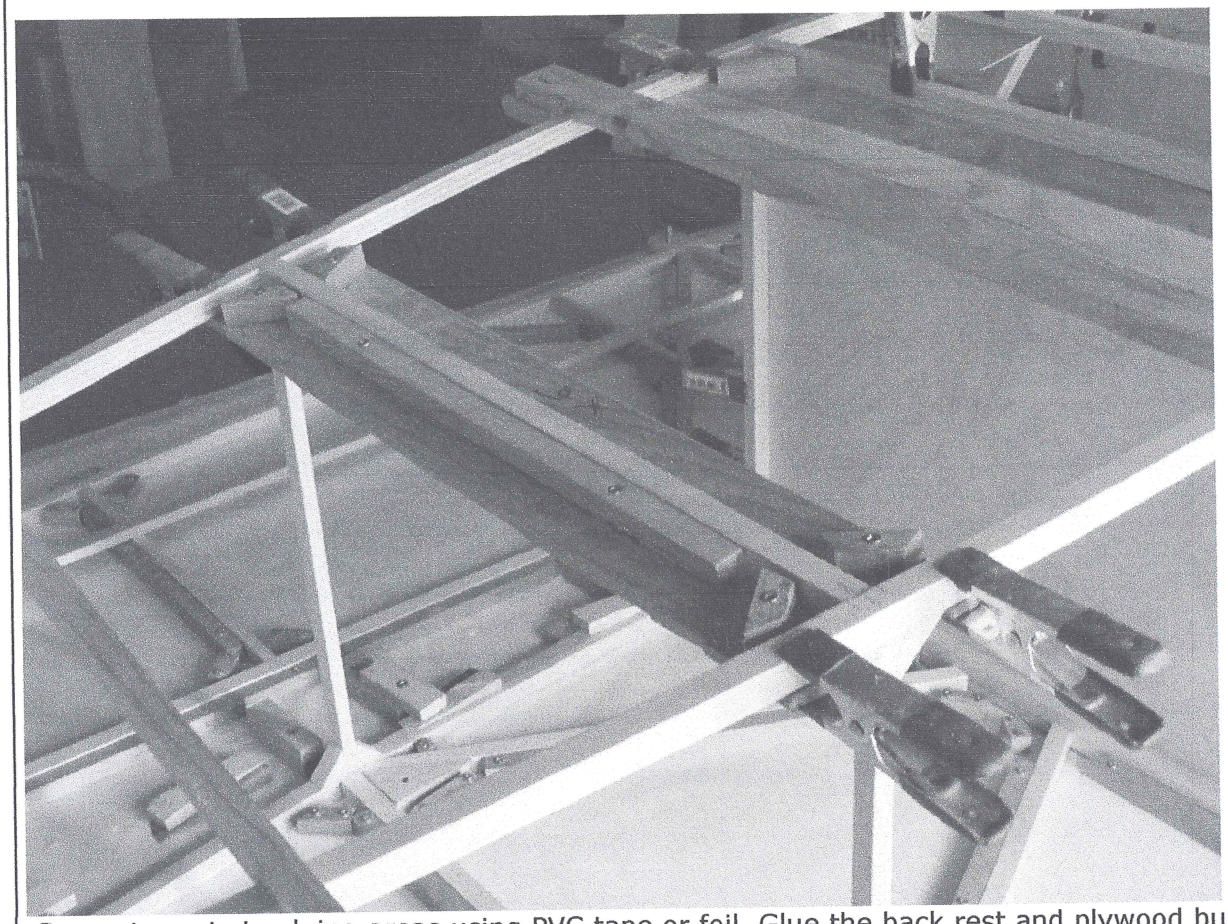
Before bonding laths 15x10 and 15x5 on the upper longeron (drawing SD1-10-000, step 2) it is necessary to bend the longerons. Attach the longerons in their straight area to work table using clamps, as shown in drawing. Bend longerons gradually. Rate of bend is set by the height of spacers. Bond the laths on. Fix them in the same way as for bending. Use other clamps to fasten longerons with laths.

Truss frame assembly

Prepare the full scale plan of view P from the sheet 2 in the same way as at side wall. Fix it on table and cover with transparent foil. Prepare rests for the structure in the same way as during sidewall construction. Start the fuselage assembly by setting sidewalls on main longerons as shown on the drawing SD1-10-100 sheet 2. Check the fitting of tunnel in sidewalls and fix it on holder for gluing. Check square position of the tunnel against sidewalls in vertical and horizontal plane using diagonal measuring. Bond the tunnel to sidewalls and fix sidewalls to table. Check geometry of structure again. Continue with bonding of pos. 2 and crossbars between the bulkheads 1 – 9 in the next session. Check geometry before the end of each session. Make sure that fuselage stays absolutely symmetrical during gluing. Continue with the bulkhead 10 to aft progressively.



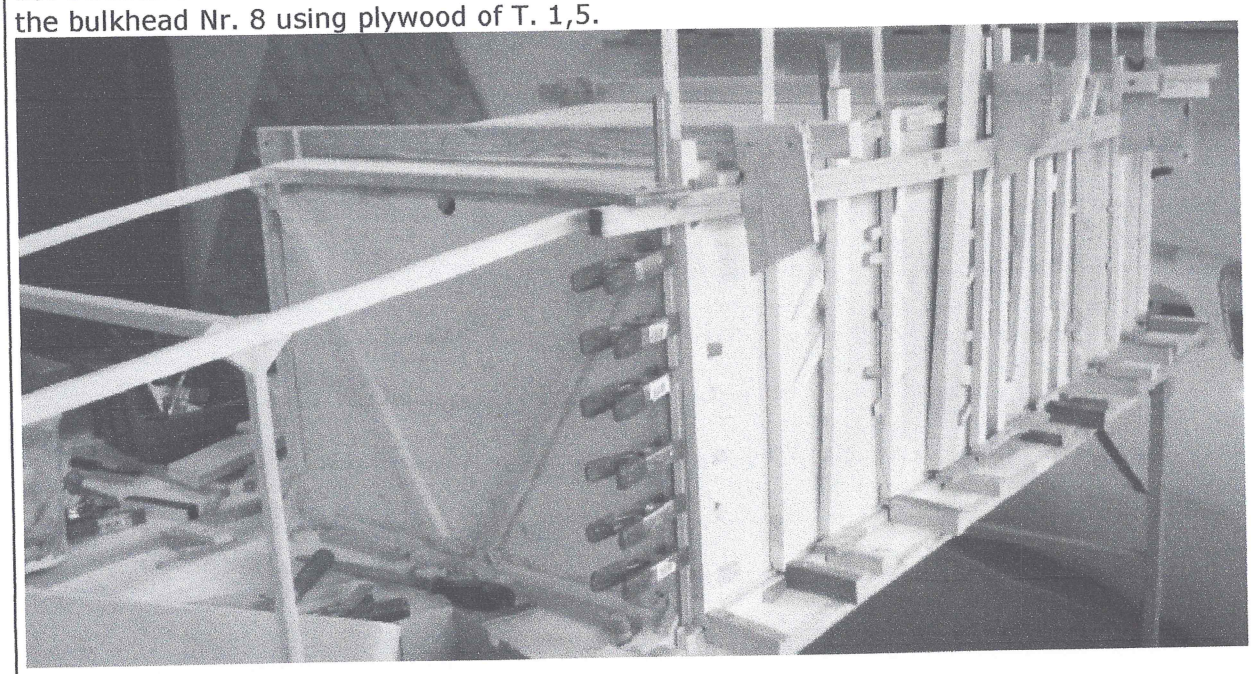
Attach small mats with slots for sidewall crossbars on the longerons using clamps (see following picture).



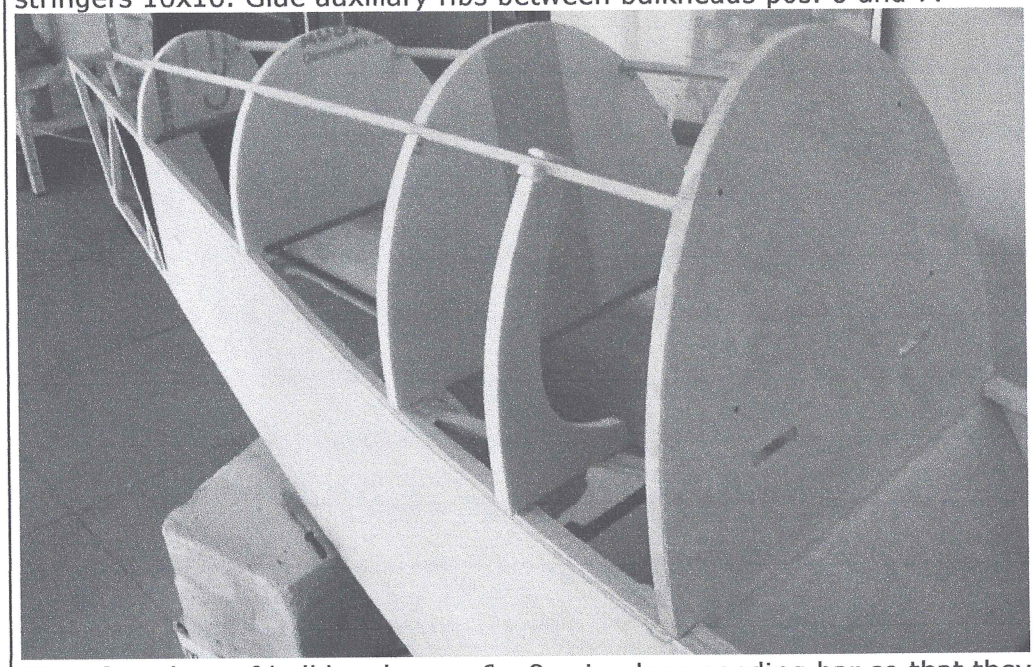
Separate mats in gluing areas using PVC tape or foil. Glue the back rest and plywood bulkhead 10. Do not forget to dope places under back restraint and plywood bulkhead 9 before covering. Glue all members and gussets. Sand the bottom of fuselage using long sanding bar to get straight plane before covering. Be careful behind the bulkhead 12 especially so that skin can adhere on its whole surface. Put attention on the crossbar 14x20 on the bulkhead 4. You have to bond two carbon strips delivered in basic kit to reinforce it before its assembly. Perform C200 reinforcement as shown on section D-D sheet 3.

Fuselage covering

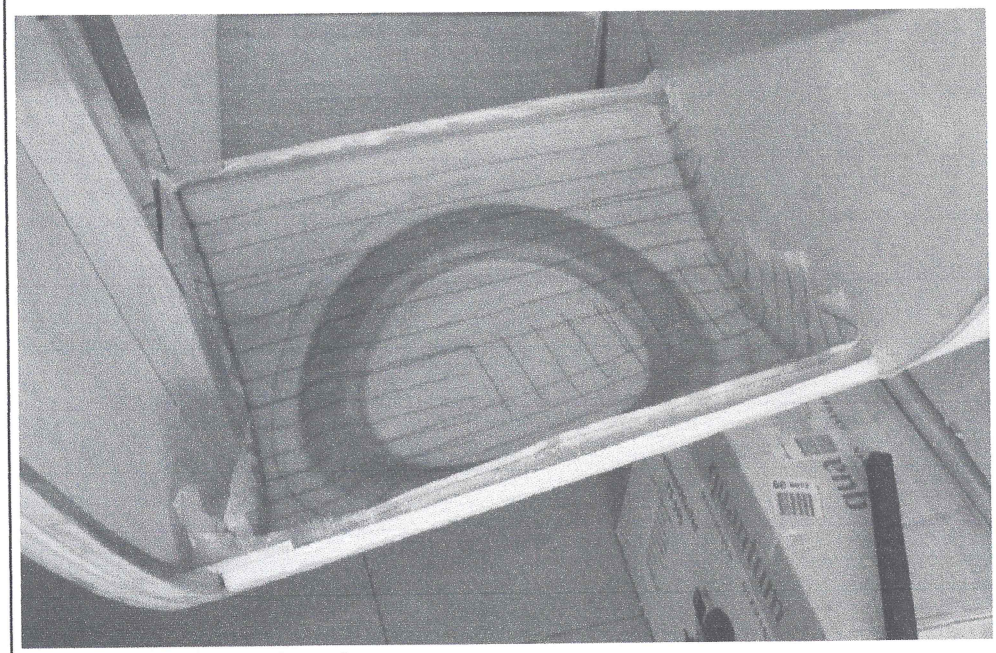
Let structure fixed to the table. Start the covering with the fuselage bottom from the front up to the bulkhead Nr. 8 using plywood of T. 1,5.



Do not forget to make a scarf joint for connection of following skin part. This will be bonded after controls mounting. Use clamps on the longerons and some long weights on the crossbars for perfect bonding. Wipe out superfluous glue. Remove outline rests from one sidewall and cover it from the front up to the bulkhead 13. There is couple of ways how to keep plywood on the construction during cure. You can use staple over string on the strip of wood. The string assures staples removing after cure. Use sufficient pressure on the staple gun so that you squeeze out glue from joint. Put staples maximally 25 mm from each other. You can also prepare "pressure" fixture as shown above what will save you time from staple removing and later filling.
Continue with the sidewall cover up to bulkhead 13. Cover the second sidewall in the same way. Keep the fuselage in the fixture during covering to advert from its collapsing.
Remove the fuselage from fixture and sand off excessive glue from the bonding contacts. Bond bulkhead position 6, prepared in advance. Fix it in its position using a wire anchored on frames or with simple wood fixture. Bond the bulkhead 9. Fix bulkheads pos. 7 and 8 between spruce stringers 10x10. Glue auxiliary ribs between bulkheads pos. 6 and 7.

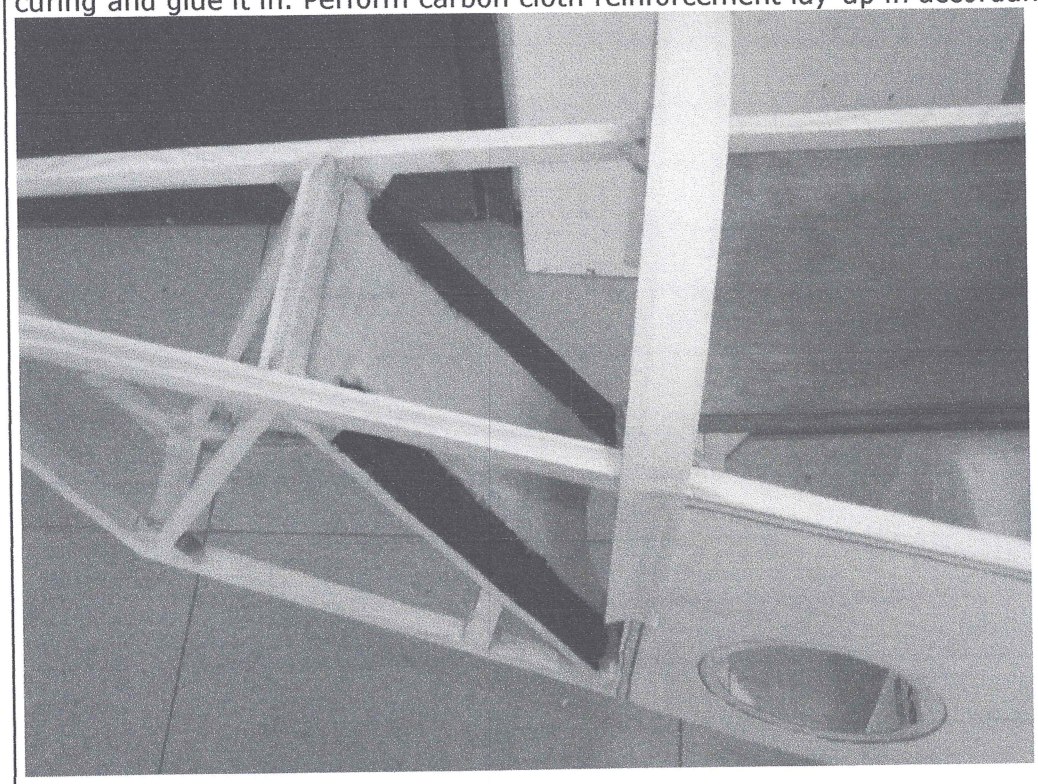


Chamfer edges of bulkheads pos. 6 - 9 using long sanding bar so that they are prepared for perfect skin fit. Check chamfering with the long bar during work. Cover the fuselage step by step from pos. 9 to the front. Use tape and rubber band eventually for fixing of skins. Make scarf joints carefully for minimal additional filling. Make lay-up of cover stiffener before closing side skins in the case, that you will make opening for the parachute rescue system (see picture below).



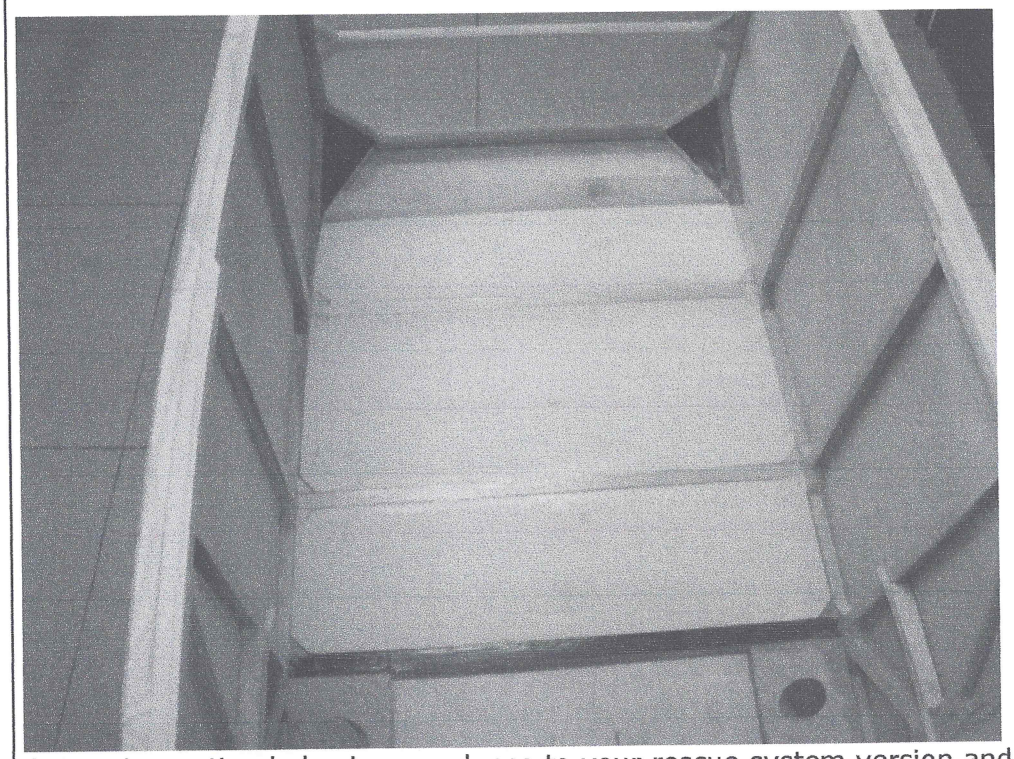
Sandwiched bulkhead

The main spar of fin is bonded on a sandwiched bulkhead 14. Prepare bulkhead bonding the PU or PVC foam T. 5 between two plywood sheets T. 1 mm using epoxy. Put the sandwich between two mats separated with plastic foil and clamp together. Finish its shape according to the fuselage after curing and glue it in. Perform carbon cloth reinforcement lay-up in accordance to the drawing.



Reinforcements and directional control guides

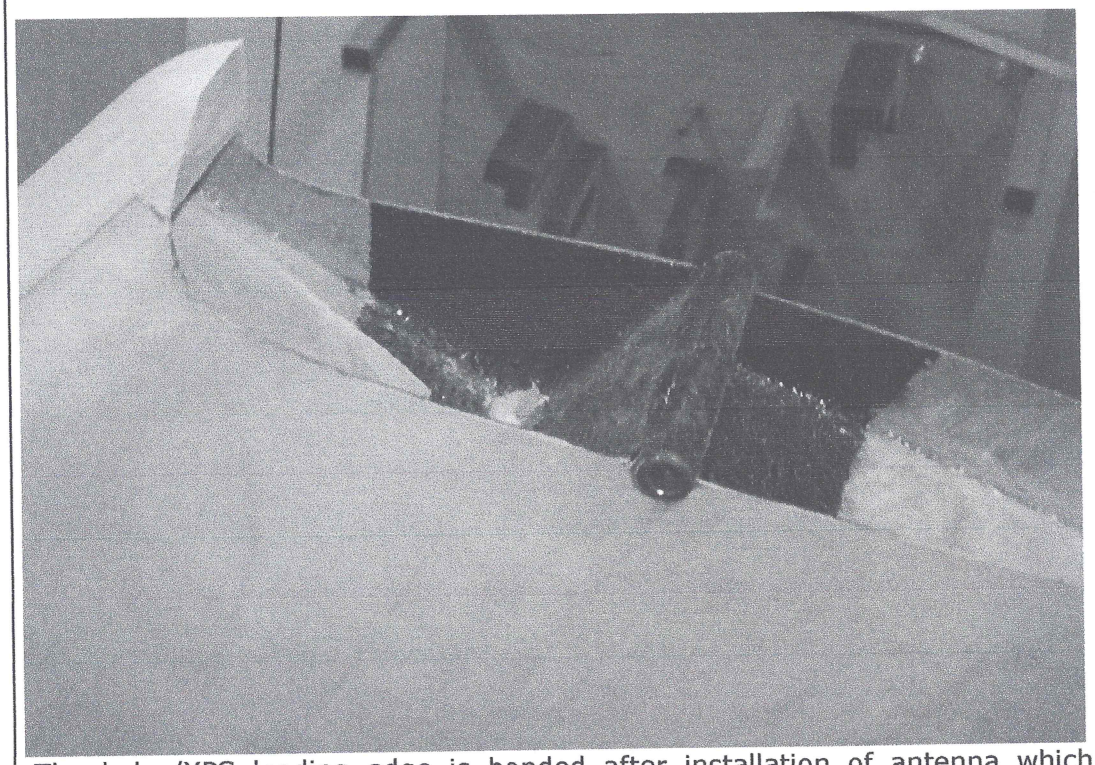
Bond the PU foam on the floor among crossbars on bulkheads 1-4 using dry micro. Sand the foam in accordance to height of the frame after cure. Blow and vacuum dust out and perform lay-up 2xG160 finished with peel ply according to the drawing SD1-10-000 S4. Perform lay-up of corner reinforcements in engine hinge areas as shown in SD1-10-000 S3 view G.



Cut an inspection holes in accordance to your rescue system version and bond T.1 fillet around the holes. Prepare sandwiched sheet 300x100 mm made of T.1 plywood and T.5 PU or PVC foam between. Cut the brackets for directional control hoses from the sheet according to the drawing SD1-10-000 S3 view I-I. Sand the slot for embedding of hose Ø6x1 on the edge of brackets. Bond the brackets on the fuselage sides according to section L-L. Check mutual position of brackets and side walls using rod Ø6 any similar bar. Bond roughly sanded Teflon or PVC hose on the bracket using 5 minutes epoxy and make lay-up including brackets using crossway cut strips 1xG80 in accordance to drawing SD1-10-000 S3 section O-O. Install the hose in the rear part of fuselage in accordance to section R-R. Perform the rest of reinforcements. Dope the fuselage with varnish outside the fuel tank, wing fillets and the rest of skin attachment surfaces.

5.9 Fin, SD1-50-000

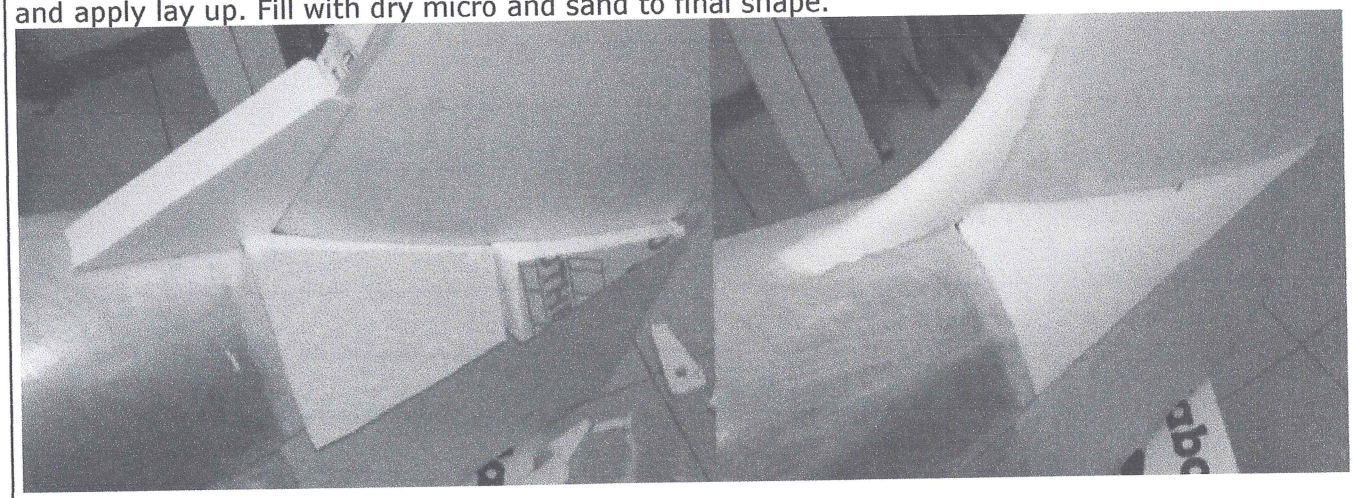
The fin main spar is included in the basic kit. Start to build the fin by preparing plywood and XPS ribs according to templates from drawing SD1-35-100. Bond the plywood ribs on the XPS ones. They serve as sanding templates to enable the XPS ribs edge beveling according to the drawing. Set the position of nose ribs on the main spar and bond them in vertical position using mix.
Remove superfluous glue. Fix the accurate position of ribs by appropriate weights. Make the leading edge spar by gluing spruce of 8x8 mm size on already prepared plywood web.
Chamfer the caps edges according to the drawing. Chamfer the contact surfaces of nose ribs so that nose spar lies on the ribs perfectly. Bond the spar to the ribs. Check and fix the side position of nose spar against main spar. Turn the assembly and set main spar on rods similary as on horizontal tail. Mark the ribs position on the spar and bond them on rest of ribs. Fix the accurate position of rib 10 using e.g. XPS template. Prepare and bond the rear spar in similar way as the front one. Bevel side edges of XPS ribs according to the plywood templates using long sanding bar. Draw position of ribs and spars on the prepared plywood T.1 skins and varnish inner surfaces. Do not paint areas above the ribs 9 and 10 because there will be performed reinforcement lay-up later. Bond the left skin. Clamp the skin to the spars similary as on horizontal tail using spring clips. Bond the right skin then. Set the fin on the fuselage according to an appropriate drawing and bond it using mix (see following chapter). Perform lay-up of reinforcements carefully using C200 between the main spar and sking.



The balsa/XPS leading edge is bonded after installation of antenna which is performed after bonding of fin on fuselage. Use templates for shaping of leading edge. The lay-up of G80 over leading edge of fin is done after installation of fuselage-fin fillet.

5.10 Fin mounting, SD1-11-000

Sand bulkhead 15 till the fin fits to fuselage in accordance to drawing. The rear fin spar should be very tight to the frame. Check position and fixing of the fin with elevator installed. Use clamps for fixing. The elevator should be in level against logerons in the cockpit area. Bond the fin on fuselage using mix. Install antenna in accordance to drawing. Bond the balsa/XPS leading edge. Bond fuselage side skin behind bulkhead Nr.13. Trim skin after cure and bond blocks of XPS in accordance to picture bellow using dry micro. Cut and sand blocks and leading edge of fin to shape and apply lay up. Fill with dry micro and sand to final shape.



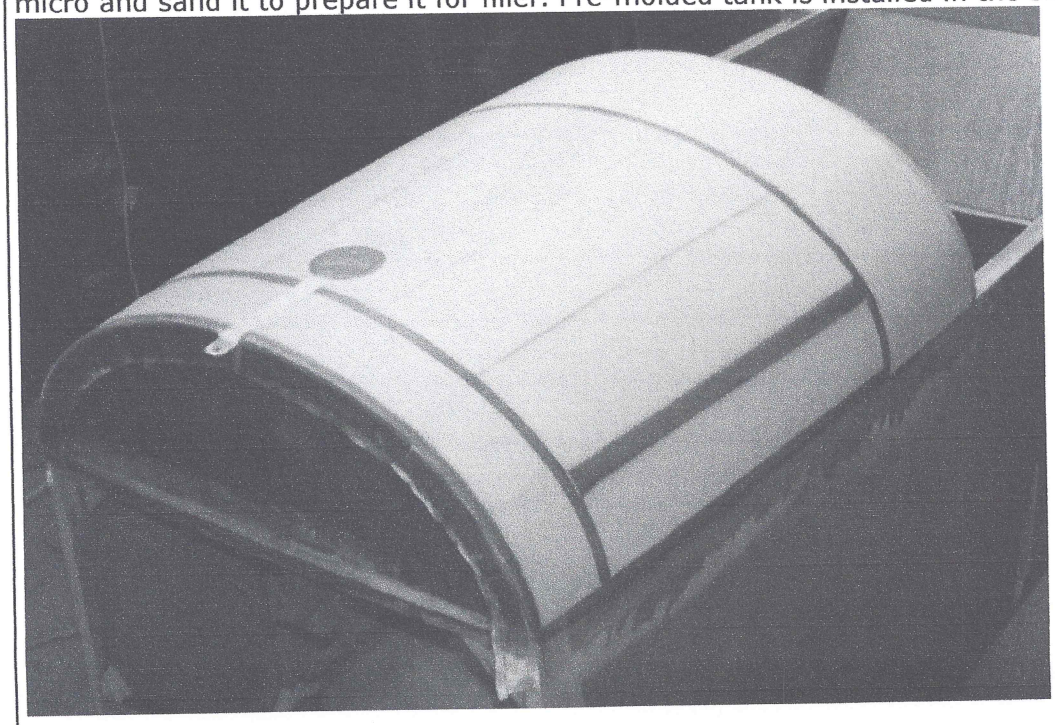
5.11 Fuel tank construction, SD1-15-000

You have to prepare the raw tank if you will not use the pre-molded one. Start with the bulkheads and bottom, which are made as a sandwich of fiberglass and PVC foam.
Cut the parts from T. 8 PVC foam according to the templates. Prepare two mats with smooth surface (it is good to use white lamina) and separate them using wax and PVA. The sandwich surfaces must be under constant pressure during cure. It is possible to apply the pressure using

weight, clamps or place the mats into vacuum. It is necessary to place the peel ply on at least 30 mm wide rim around the outer side of all parts edges for the next layup. Do not scant with resin during the lay-up of inner tank surfaces and finish with the peel ply all over. Trim the fiberglass skin according to the shape of foam after cure. Put the partial bottoms TEMP. 3 on the foil masked mat and bond the bulkheads on them in accordance to the step 1. Fix the bulkheads using simple wood fixture. Do not forget to remove peel ply from bottom parts. Cut the strips from PU foam T.20 according to the step 2. The strips will be used for skin of the tank. Check matching of all strips together using long thin nails before gluing. Bond the strips on the frame using dry micro then. Wipe out all leaked glue using round edged plywood of R4 from all joints. Do not forget to remove the peel-ply from bulkheads before gluing.
Turn the assembly and perform lay-up of the inner surface using 2xG160 in accordance to step 2. Chamfer the connection edges of bulkhead and partial bottom under radius R2 and perform the lay-up over them in accordance to step 2. Prepare the bottom from two sheets prepared in the same way like bulkheads. Bond them on masked tank and perform lay-up on their connection in accordance to step 3 after cure. Make hole and modify wall for the fuel cap flange so that the flange edge fits well with the final tank skin. Cut and sand the slot for putting grounding cable or strip cap flange. Bond the fuel tank cap flange with riveted grounding cable using mix. Perform lay-up around flange in accordance to step 4. Prepare the air vent and fuel gauge tube outlets from the aluminum tube size 6 x 1. Drill holes for these tubes in the bottom and rear bulkhead of fuel tank and get rid of foam in the 4 mm width. Sand tubes surface with sandpaper grit 100 and wash them using acetone. Glue the tubes in using mix. Perform lay-up around them on the outer side of the fuel tank after cure. Bond the insert made of aluminum sheet T. 10 on the bottom in the place of drain. Remove all foam under insert and fill it in accordance to step 3. Clean it and perform lay-up in accordance to drawing after cure. Drill hole Ø11.5 mm through the bottom and thread 1/4" UNF for the fuel valve. The fuel tank is ready to be closed now. Mix app. 100 g of laminating epoxy. Thicken it with Aerosil or Cabosil and add an appropriate pigment for epoxies. Apply this mixture on fuel tank inner surfaces and bonding areas. Put on the bottom the upper part of the tank and load by weight. Wipe out excessive mixture carefully. Place the peel ply on all connections and apply pure epoxy. Remove the peel ply after cure, chamfer edges and perform lay-up in accordance to the step 6.

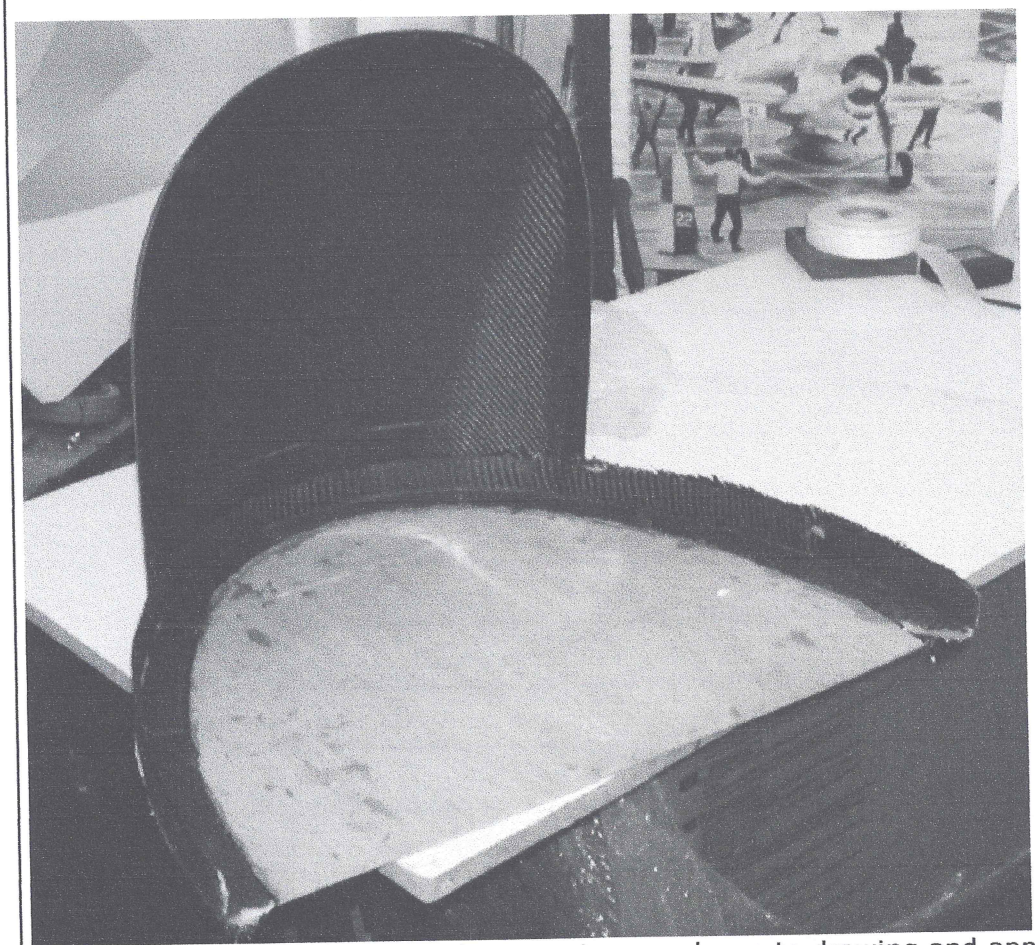
5.12 Fuel tank installation, SD1-11-000

Set the fuel tank on fuselage and bond it with mix. Put the fuel cap on flange and mask it using tape. Sand the tank to shape in accordance to templates of firewall and instrument panel. Blow away and vacuum dust when finished. Perform lay-up in accordance to drawing. Seal it with dry micro and sand it to prepare it for filler. Pre-molded tank is installed in the similar way



5.13 Canopy frame construction, SD1-16-600,

You have to build the canopy frame if you will not use the pre-molded one. Building of the canopy frame starts on the fuselage with finished fuel tank. Cut the templates for over-head cover from thicker plywood. Bond the vertical template on the horizontal template using hot glue. Using template 1 from drawing SD1-10-500 cut the rear frame from plywood T. 3 mm. Do not make it 30 mm wide only as shown in drawing! It will be trimmed later. Reduce its outline for 1 mm in the place of over-head cover and 2 mm in the place of a glare shield. Bond the rear frame to its future position on fuselage using hot glue. Bond previously prepared overhead templates on the rear frame using hot glue. Bond the XPS blocks on both sides of the vertical template so that they fit on horizontal template and also the rear frame without big gap. Cut and sand the XPS block so that it follows nicely the fuselage and the future glare shield. Simulate glare shield shape using straight piece of spruce bar. Be precise so that you will have not to put too much filler on finished part. Remove whole assembly from the fuselage. Cover XPS with plastic tape, separate using PVA and perform lay-up of 4xC200 in accordance to drawing. Put a peel ply of 40 mm width on the place of glare shield connection before layup. Trim the overhead cover on rear frame and horizontal template edge after cure. Carefully remove the templates, XPS core and the rest of tape then. Lay down the assembly on the table. Wash the inside surface of cover with wet towel and remove peel ply on the edge. Prepare the strips made of plywood T.1 app. 15 mm wide which fit to the edge of cover and glue them in place as shown in detail C. Bond the strips in the same place which over lap edge of cover outside for app. 20 mm.



Chamfer inside edge of strips after cure in accordance to drawing and apply prescribed layup. Trim the edge in accordance to drawing.

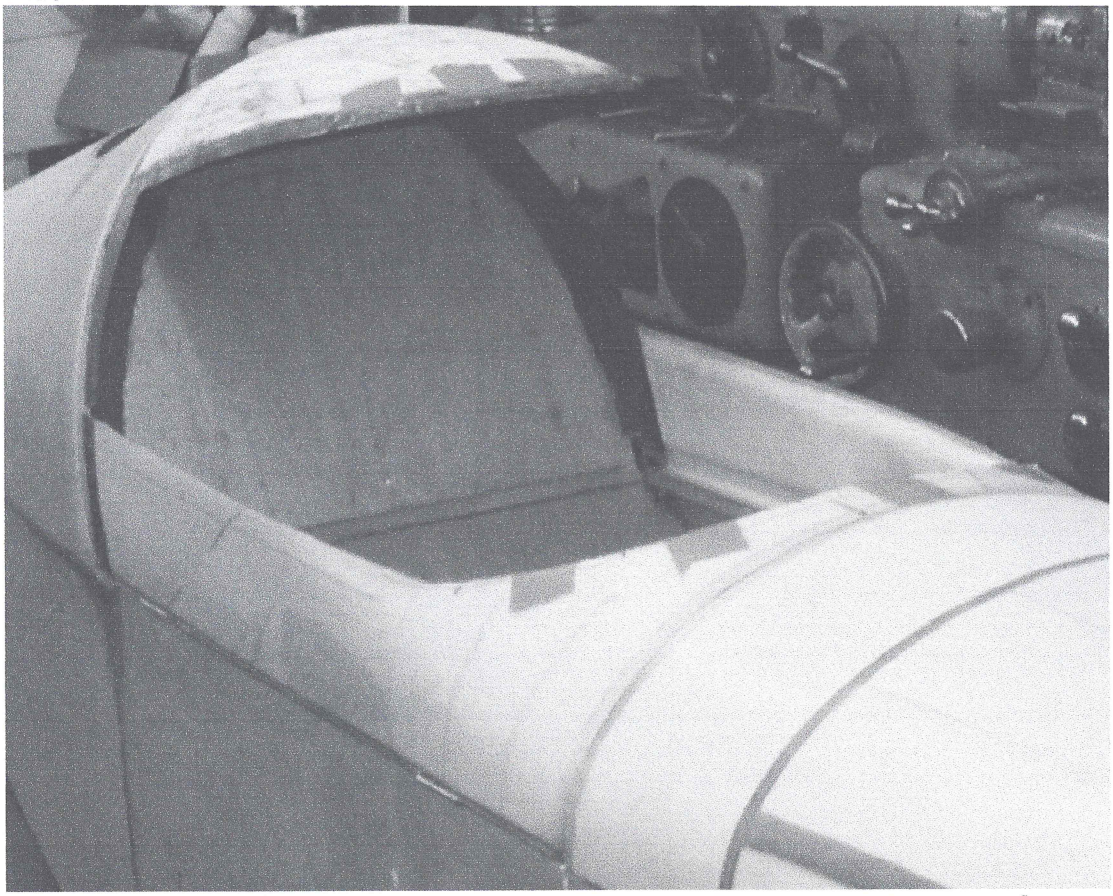
Cut and sand exactly the negative outer shape of rear frame in the place of glare shield and connection to low frame from XPS T.40. Cover prepared surface with plastic tape and attach XPS "mould" and frame to the flat underlay using hot glue. Perform lay-up 4xC200 of frame collar finished with peel ply over whole perimeter of rear frame.

Remove the "mould" and trim the collar in accordance to drawing after cure. Mask longerons of fuselage in the cockpit place, rim of instrument panel and the rest of effected structure using

plastic tape so that parts of canopy frame will not bond on it during another step. Prepare diagonally cut app. 12 mm wide strips from plywood T.1 which will fit in the place of instrument panel hem as shown in the section F-F. Glue the strips together on the hem and trim to prescribed dimension after cure. Attach assembly to the fuselage frame using hot glue. Apply hot glue in the place of overhead cover and inside the cockpit so that the rest of frame will be free for another work. Prepare the longerons of low frame from plywood T.3 plywood and bond them to the front and rear frame. Make the low frame hem from T.40 XPS blocks. Bond blocks to construction using dry micro. Use waxed thin nails to join the blocks together. Remove the nails and sand the whole frame to the shape after cure.

Prepare the glare shield template from pasteboard according to drawing. Put plastic tape on the edges in the 20 mm width at least. Put the glare shield template on and finish the shape of the lower hem. Take off the glare shield template and the semi-canopy from the fuselage. Prepare the T. 20 mm spacers on the table and lay the canopy frame-longerons on them. Perform lay-up 2xG160 on the lower hem. Trim edges after cure.

Cut the glare shield from T.1,5 transparent PET or polycarbonate sheet (VIVAK™, MAKROLON™) in accordance to a pasteboard template using sheet metal cutting scissors. Cover lower glare shield edge using plastic tape. Attach the glare shield to frame using clecoes. Use wood screws app. Ø3 for attachment of lower glare shield rim to the frame. Perform lay-up of 2xG180 diagonally cut stripes over the canopy low hem and edge of shield in app. 30 mm with. Do not make lay-up over screws. Remove the screws after cure and make lay-up over former screw places. Carefully remove the glare shield from canopy frame and trim the laminate on the perimeter to the same width.

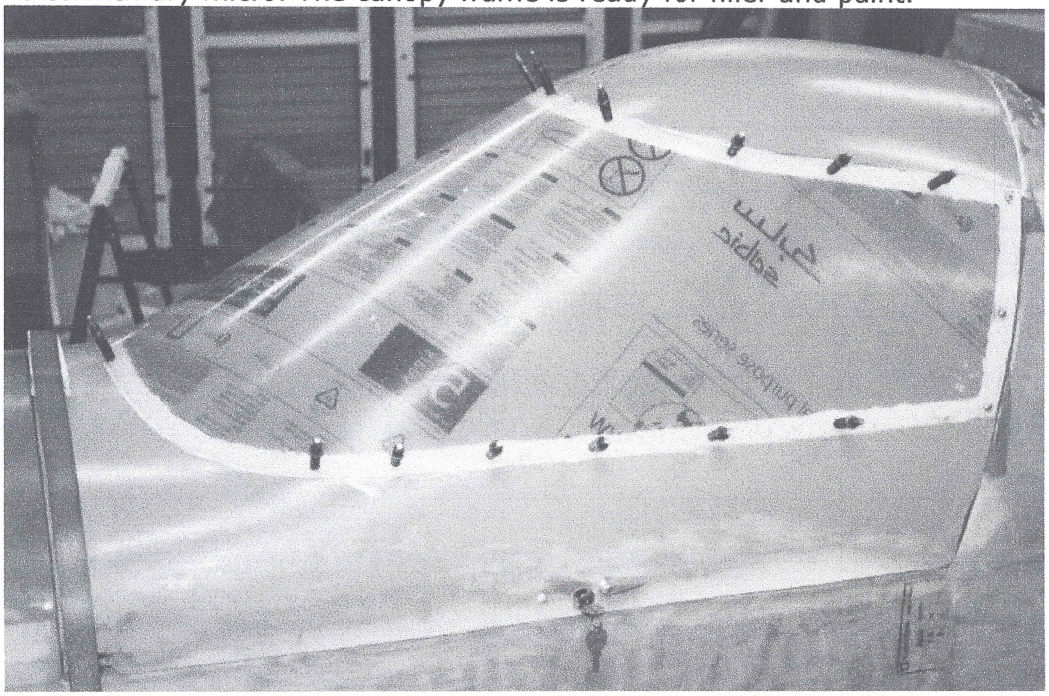


Sand inner core of lower hem in accordance to step 3, section B-B. Do not forget on cavities for the rods position 8, 9 drawing SD1-16-000. Cut out the square hole to XPS core on the right side of frame for the NACA fresh air intake in accordance to drawing. Sand the shape of air intake from XPS, lay it on the desk and perform lay up of 2xG80 over it with adequate collar for future gluing. Remove the intake from the desk after cure, clean from the rest of core and trim edges. Bond the intake in its place. Cover the entrance by a block of foam so that only the exit is opened as shown in section D-D. Cut out the foam in the place of the handle bushing position 1 and bond the bushing on outer skin and longeron using mix. Perform layup of the inner low frame surface

including plywood longerons front and rear frames and shield collar in accordance to step 3. Trim it after cure and put shield with masked edge on the frame again. Cleco shield on the overhead cover and rear frame collars. Keep edge of shield pressed to the collar of lower frame using wood wedges as shown on view S. Perform lay-up in accordance to step 4. Remove shield, trim collar and fill outside surfaces with dry micro. Cut the opening of NACA inlet. Fabricate the slider pos. 7 from drawing SD1-16-000. Wax it alongside of longer edges an fix in the place with hot glue. Perform lay-up 4xG50 of its rails as shown in the view P. Slide out the slider after cure and trim rails. Sand the surface to perfect fit with adjoining parts after installation of frame on the fuselage.

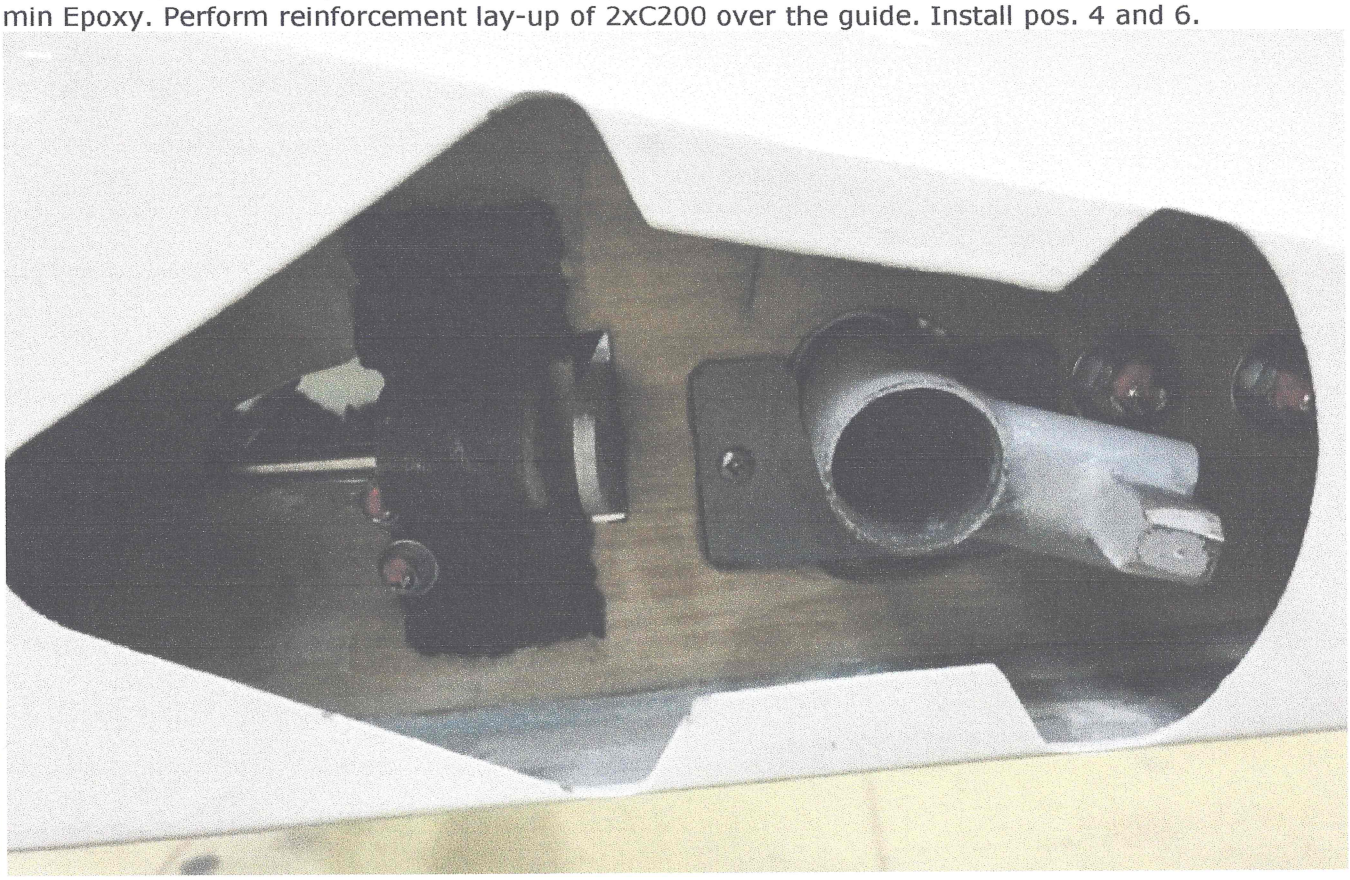
5.14 Canopy assembly SD1-16-000

There is a special manual for the bubble canopy installation. You have to build the front and rear frame and longerons in very similar way as in previous chapter when you will use the pre-molded canopy frame. All frames are delivered CNC cut in the **Material kit** up. The front frame is made of carbon. The fuel tank has to be attached to fuselage before start of work. Put the pre-molded frame on fuselage and trim it to perfect fit. Mask the longerons of fuselage in the cockpit place, rim of instrument panel and the rest of effected structure with plastic tape so that parts of canopy frame will not bond on it during another step. Prepare longerons of low frame and rear frame from T. 3 plywood. Prepare front frame in the similar way as in previous chapter (see section F-F). Bond the frames and longerons on the fuselage using hot glue and then bond composite canopy frame using mix. Remove canopy frame from fuselage and perform lay-ups of carbon cloth in accordance to drawing. Bond the handle bushing pos. 1 and NACA inlet and make slider rails in the similar way as in previous chapter. Mount the piano hinges on the frame carefully so that they have common axis. Drill holes for tubes pos.12 in the instrument panel frame and fuselage bulkhead 6 as shown in the drawing and glue them on mix. Use longer waxed pieces of rod Ø6 as a leader for the perfect alignment. Put the cabin frame on fuselage and set its perfect position. Attach the not moving part of piano hinge (the lower one) to the side of fuselage using hot glue. Ask an assistant to hold the canopy frame in the opened position and drill holes for the lower part of piano hinge attachment into the fuselage longeron. Install the bolts gradually during drilling (temporary-use common nuts). Wax the holes of tubes pos. 12 and using the same rods Ø6 install tubes pos. 11 on the longeron of canopy frame in the similar way as pos. 12. Install the assembly of lever pos. 2, 3 after cure. Put the pins pos. 10 in place and measure approximate length of rods pos. 8 and 9. Finish the first end of rods in accordance to drawing and measure precise distance of holes. Finish the second ends of rods. Install the lock and lever spring. Verify function of whole assembly. Paint inside surface of frame if you want. Finish the NACA intake slider installation. Repair any surface imperfections using dry micro and sand it to finished shape. Mount the glare shield on SIKAFLEX 221 (or similar) sealant. Use waxed clecos for attachment. Remove the clecos after cure and fill holes with dry micro. The canopy frame is ready for filler and paint.



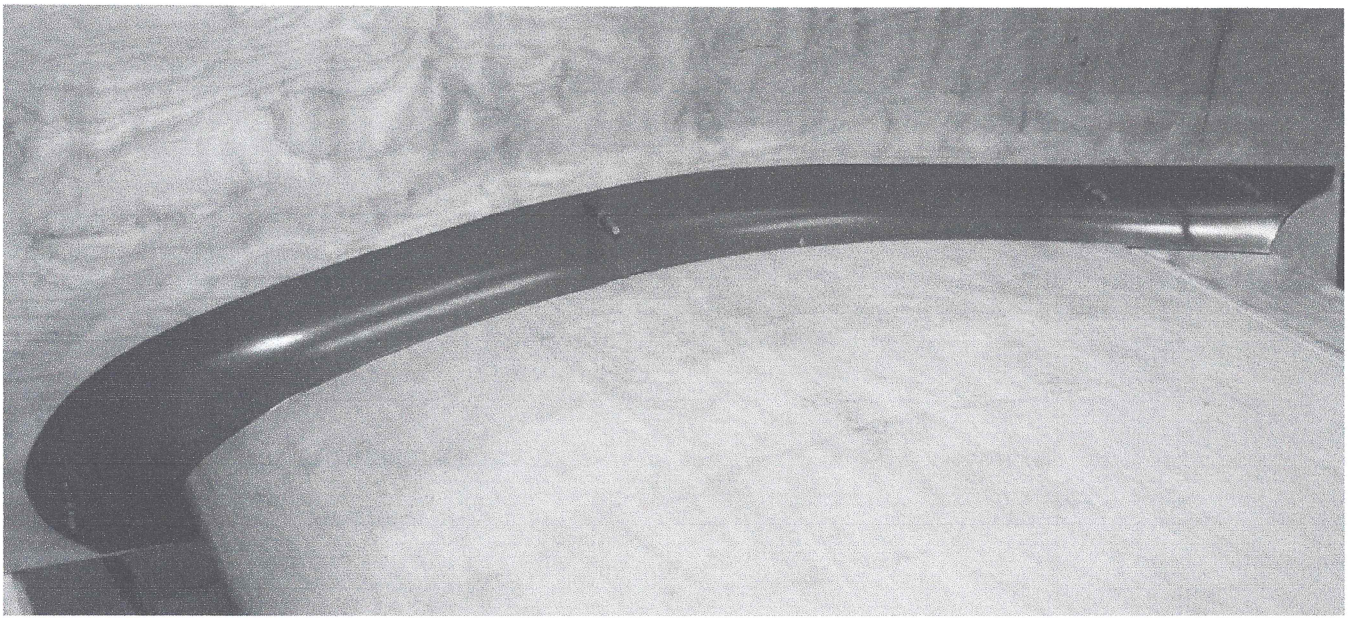
5.15 Adjusting of wings on fuselage, SD1-40-000

The adjusting of wings (the auxiliary hinges) on fuselage is necessary to perform before mounting of the roll control mounting. Put the wings on the fuselage and insert the main pins. Put the hinge pos. 3 thru slots in the fuselage skin and further between the wing auxiliary hinges. Attach hinges with pin pos. 2. Set position of auxiliary spar in accordance to drawing and fasten the fuselage hinge pos. 3 to gusset on bulkhead 8 using clamp. Place clamp so that one hinge hole is free for drill. Drill hole into the gusset thru hinge hole and install bolt. Move clamp so that second hole is free and repeat the step. Make the slot for pin handle and bond the pin guide pos. 5 using the 5 min Epoxy. Perform reinforcement lay-up of 2xC200 over the guide. Install pos. 4 and 6.



5.16 Wing – fuselage fillets, SD1-40-000

If you did not use offered wing–fuselage fillets, make them according to the following instructions. This step could follow after adjusting of wings on fuselage and installation of roll controls. The wing skin at root must be trimmed already. Draw the wing root position onto fuselage side. Measure horizontal distances of points between the wing root and the fuselage in app. 100 mm spacing and write these values on the fuselage plot lines. Remove wings from the fuselage. Mark the position of opening for the wings spars on the fuselage bottom-out of future fillet. Cut the sections from the XPS T. 20 so that they copy the shape of fillet in accordance to the drawing. Lay fuselage on the side. Bond XPS sections on marked places using dry micro. Put weights on sections. Cut openings for wings spar and rear wing hinge using long sharp kitchen knife. Hang the wings on, draw down the shape of the root rib. Cut the fillet shape cross way to the fuselage with 5 mm margin. Using a long sand paper smoothly Sand the fillet surface until you can connect the wings together with the fuselage by pins. You should keep a space 1 – 2 mm wide between the wing root and the fillet.
Mask skin of wing with tape for protection during next sanding. Cut and sand the fillets after wings mounting to the fuselage. Stick sand paper grit 80 and then 150 on the Ø80 plastic tube using carpet tape for fast work. Put the wings off when the fillets are sanded. Sand app. R5 radius on the edge contour of root rib and perform layup in accordance to drawing with the 10 mm overlap to fuselage. Fill whole fillet with dry micro and sand to smoothness. Cut out holes for the wing spars, the rear hinge and flaperon lever.
The pre-molded fillet is shown on bellow image.

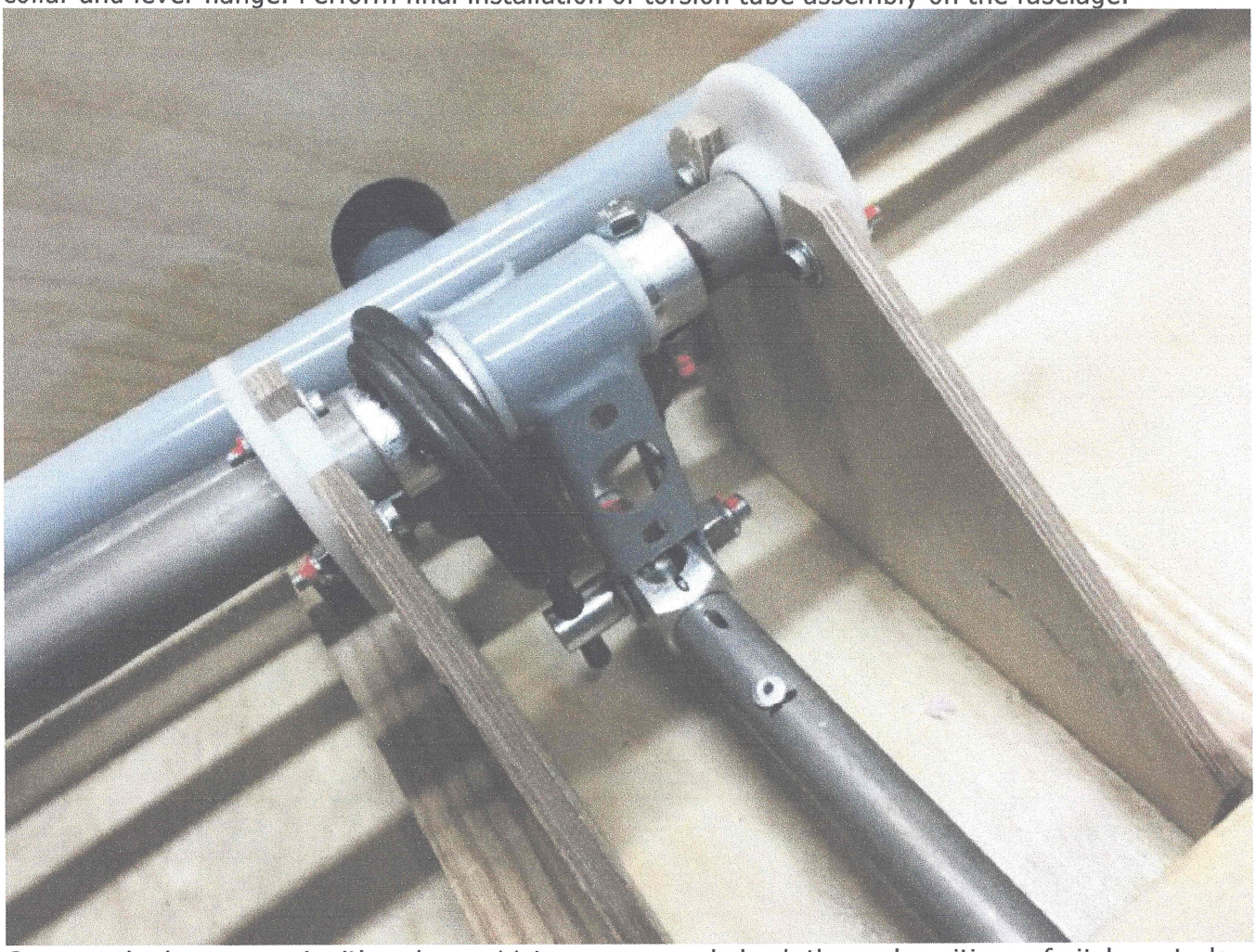


5.17 Pitch controls assembly, SD1-60-000

IMPORTANT NOTICE TO METAL CONTROL RODS. All end nuts/parts of control rods must be bonded into tubes using epoxy or special glue before riveting. Riveting could be performed after epoxy cure.

Mount the middle lever pos. 8 on brackets pos. 19 and install the assembly on fuselage.
Mount the rear lever pos. 9 on brackets pos. 10. Measure positions of holes for pos. 10 assembly on the bottom of fuselage and drill them.
Close the fuselage bottom skin behind bulkhead 9 in accordance to drawing. Redrill holes for the lever assembly into skin.
The rest of installation should be performed after airframe painting and final undercarriage installation.
Mount the control stick pos. 2 on stick console pos. 1. Attach complete rod pos. 11 on stick and front bearing pos. 16 on stick console. Put whole assembly into fuselage and install on front bearing. Mount the rear bearing pos. 17 on console pos. 3 and slide it on the back of stick console. Check the position of console pos. 3 on the fuselage structure and free movement of stick console to the sides. Drill holes for mounting of console pos. 3 and mount it if is everything OK. Remove 3 pcs. of washers from bolts of front bearing and tight them fully. Mount the lever pos. 4 (with bearings pos. 24 installed), collars pos. 27-28, bearings pos. 23 and 39 on torsion tube pos. 25 and place assembly to fuselage temporary. Check if the torsion tube is parallel to the tunnel and fuselage bottom. Drill holes for attachment of bearings pos. 23 and 39 if everything fits and install bolts temporary (do not use locknuts). The axial movement of torsion tube is limited with insert pos. 40. Make sure that the torsion tube is in correct position. Set the position of lever pos. 4 on the torsion tube (A. OF S.) and mark positon of collar pos. 28 on the tube with felt marker. Remove assembly from fuselage.
Insert the insert pos. 26 into torsion tube and drill hole thru collar pos. 28 and the rest of assembly. Install securing bolt into assembly. With the lever pos. 4 in place, mark hole for the spring pos. 31 and drill it through collar pos. 27 and the rest of assembly. Secure the collar against turning and drill and tap the thread for bolt M5x15 holding the spring in its position. Grind the flat surface on the spring and install it temporary on the assembly with bolt pos. 38 in the lever pos. 4. Mount the trim lever pos. 7, all bearings and insert pos. 40 on the torsion tube and install whole assembly in the place temporary. Attach the trim desk pos. 21 on fuselage using hot glue. Verify its position against the trim lever and drill front leading hole for riveting nut. Remove desk, drill appropriate hole and install the riveting nut M5. Verify the desk position against lever again, fix it using hot glue and repeat the step on rear nut. Perform final installation of desk on fuselage. Set perpendicular position of lever pos. 4 against the cockpit floor and fix it. Find the neutral position of trim lever pos. 7 on the trim desk and mark it on the torsion tube. Remove whole assembly from

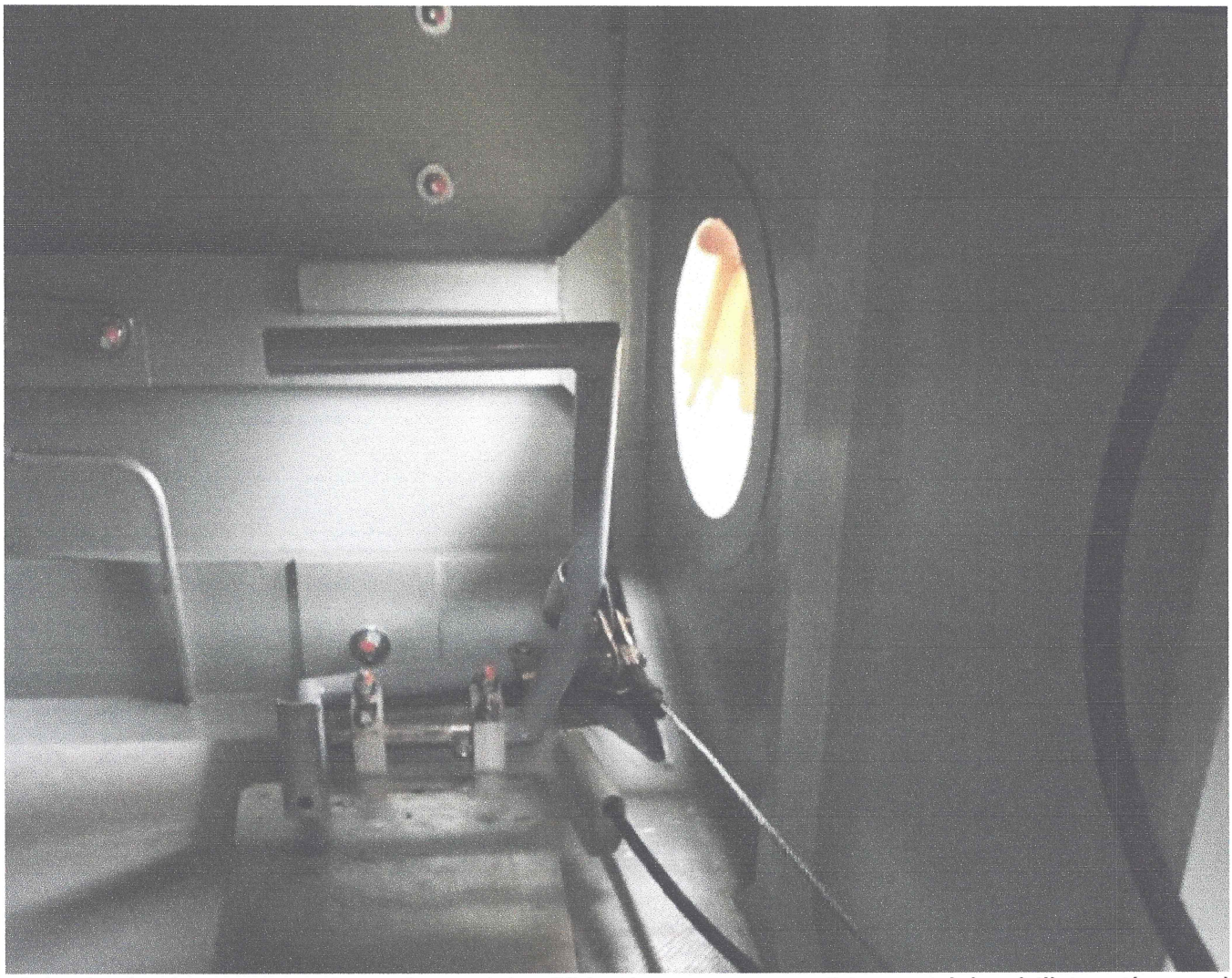
fuselage. Drill hole Ø5 through the lever flange, torsion tube, insert pos. 40 in accordance to drawing. Install securing bolt. Make sure that bearing pos. 39 is placed tight enough between the collar and lever flange. Perform final installation of torsion tube assembly on the fuselage.



Connect the lever pos. 4 with rod pos. 11 temporary and check the end positions of pitch controls. Drill installation holes to the lead weight pos. 41 and the lever but do not install it. Install whole assembly of rear lever on fuselage temporary. Complete the rod pos. 14 and install it on the lever pos. 9 temporary. Install painted elevator including trim tab and connect front hinge to the rod. 14. Set the fuselage to the horizontal position using level. Set the length of rod (with rod end bearings) so that elevator is in horizontal position and position of rear lever in accordance to drawing. The length of free threads should be same on both ends. The length of thread in the rod nut **MUST** be at least 10 mm.
Attach the weigh pos. 41 on the lever temporary and check balancing of elevator. The elevator should be balanced in connection with rear lever. If not, grind down some material from the weight pos. 41 or add washers under nuts.
Install the rest of rods adjusting their length to neutral position of controls. Check deflections of elevator. Install permanently if everything is OK.

5.18 Yaw Controls, SD1-60-000

Mount the hinges pos. 5 and 15 on the rudder. Place rudder on the fin and check collision of rudder with the fin skin. There should be app. 2 mm gap in the whole range of rudder deflection. Trim the skin if necessary. Check the axis position of rudder hinges. The bottom of rudder should smoothly follow the fuselage bottom. Mark positions of hinges on the fin spar and remove them from rudder. Drill installation holes using the hinges as templates and install all bolts progressively.
The pedals installation should be performed before firewall closing.

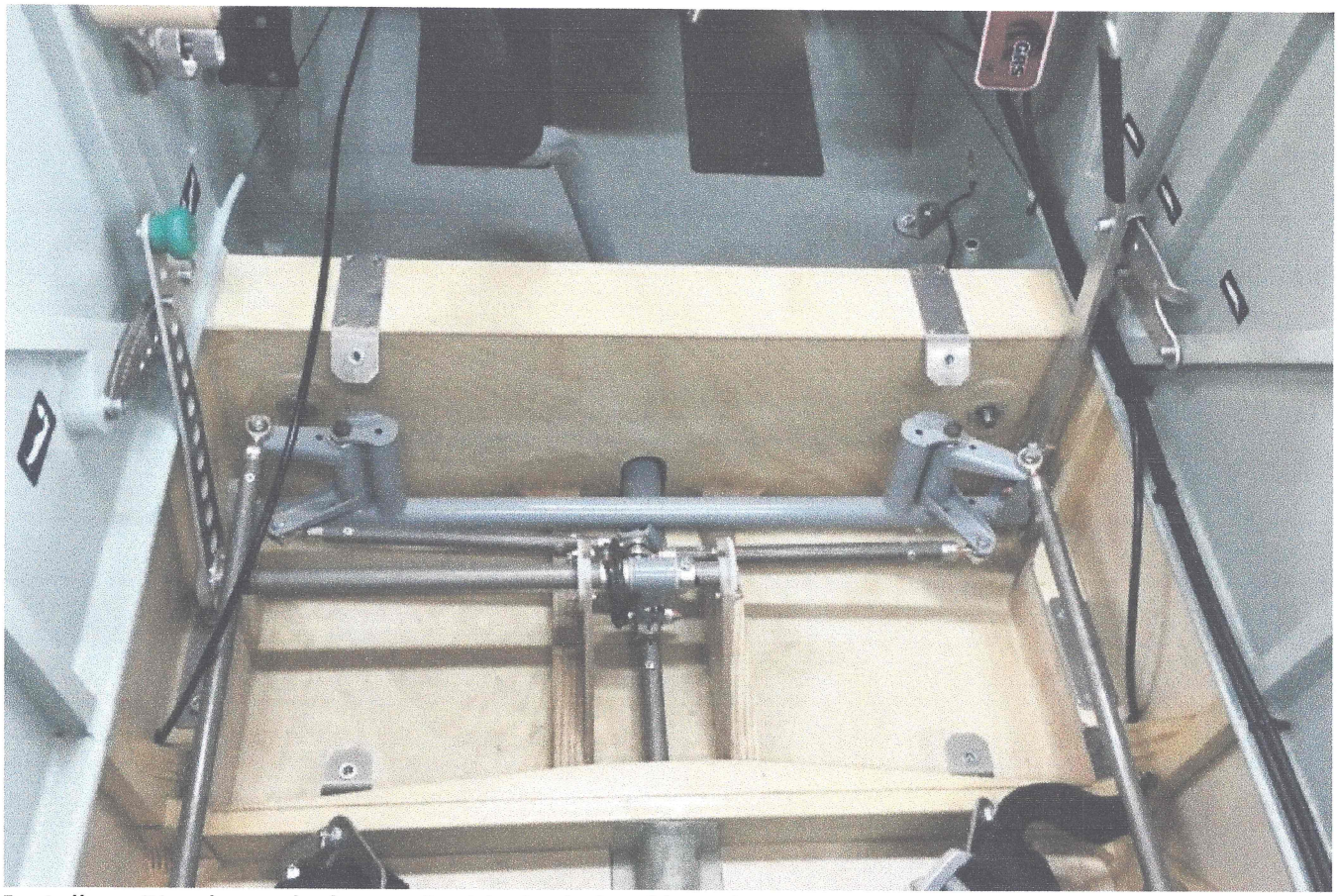


Slide the bushings pos. 18 on the pedals. Slide the spacer pos. 34 on pedals, drill together and secure in accordance to drawing. Measure and mark the bushings positions on the cockpit floor. Drill holes into floor using bushing as template. Bolt the bushings into the floor progressively during drilling. Cut app. 3,2 m long steel cable Ø2 mm. Put the thimble on one cable end, run the cable through Nicopress sleeve and press it using swag tool. Drive the cable through the leading hoses with finished end on the pedals side. Set pedals to neutral position according to your stature and fix pedals using spacers resting against the firewall frame. Connect cable ends with pedals hinges in accordance to drawing. Set the rudder into a neutral position and fix it in neutral position. Hang the cables to rudder lever using temporary terminals (use the cable clamps). Check deflection of rudder and modify cable length on clamps if necessary. Perform final terminal of cables on the rudder side if everything is OK.

5.19 Roll and flap controls, SD1-65-000

IMPORTANT NOTICE: Roll and flap controls must be performed before installation of wing-fuselage fillets.

Put the bearings pos. 9 on the mixer console pos.1. Set the position of console in the fuselage and fix it using spacers. Turn bearings pos. 9 to correct position and fix them using hot glue. Drill mounting holes thru them. Assemble control mixer console pos. 1 including levers pos. 2 and handle pos. 6. Be very careful when installing levers pos. 2. There cannot be any axial play on installed lever. Glue beds pos. 12 into levers using epoxy. Install finished mixer assembly into the fuselage.



Install position lever desk pos. 8 with the help of hot glue.
Assemble the flaperon drive levers pos. 3 on bracket pos. 7 temporary.
Insert the levers in their place from the inner fuselage side and put the wings on the fuselage. Slide the levers on the flaperon leading collar and put a drive stone into a flaperon groove with app. 1 mm space before the full insertion. Check if the tube angle is same as the wing dihedral. Mark position of bracket pos. 7 if it lays on plywood gusset. Glue a plywood piece of required thickness if there is a gap between bracket and gusset. Mark positions oh lever supports pos.16 on outer side of fuselage which will be mounted after removal of wings with app 1 mm gap between support and lever tube.
Put off the wings from fuselage. Mark position of rod end on the bracket pos. 7, remove it. Fix bracket to fuselage marked position using hot glue and drill mounting holes to the fuselage. Perform final assembly of flaperon levers and their supports pos. 16. Put the wings on fuselage. Assemble rods pos. 4 and 5. Install rods pos. 4 temporary and set their length so that both lever pos. 2 are in the same position when controls are in neutral. Fix the flaperons in the neutral position using blockades and set the length of rods pos. 5. Mount the rods temporary, check the flaperons deflection according to the drawing. Perform final installation if everything is OK and secure nuts of rod ends using paint. The rod end bearings M5 should be screwed in the rods at least in 8 mm length.

5.20 Main gear leg, SD1-70-501

Main gear legs are made of round fiberglass pultrusion ∅27 mm. This material has strength of best steel but is for about 65% percent lighter. You can buy this material from company Fibrolux (Germany) or from the other source. Vacuum clean the dust during the turning. Perform lay-up of glass braid with specific weight at least 160 g/lm in accordance to drawing. Put a peel ply of 20 mm width on lay up in a spiral shape. Sand the surface under the wheel pin and the lower hinge after peel ply removal. Glue a bronze collar in accordance to drawing.

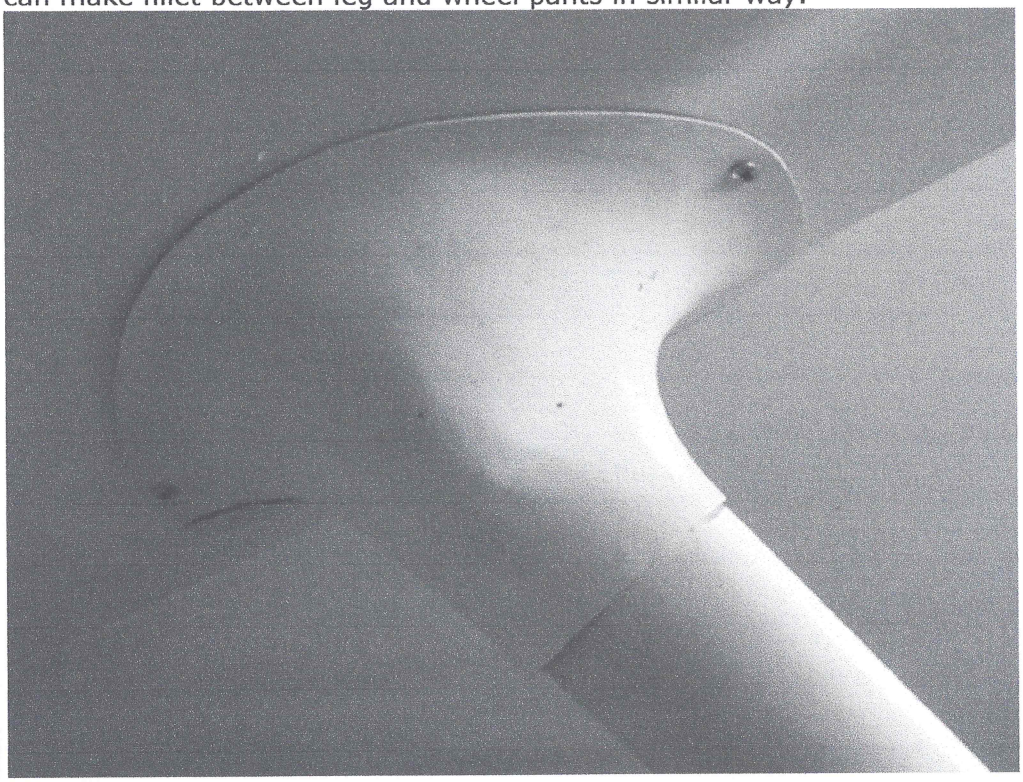
5.21 Main gear installation, SD1-70-000

IMPORTANT NOTICE: Parts delivered in the kit as wheel spats, gear leg pants and all fillets are gel coated from the production thus do not have to be painted-keep weight down where possible

Install the hinges pos. 3 on tunnel so that not threaded part of bolt M5x35 DIN 7991 stick out of hinge flange. Use more washers under nut if necessary.

Turn the fuselage bottom up and support it. Put the legs into the upper hinges. Slide lower hinges pos. 4 on the legs and slide the brackets pos. 7 and 8 on hinges. Slide whole assembly till the brackets lay on the fuselage. Check diagonal and lateral distances between the leg ends and firewall lower edge in accordance to drawing. The distances should be the same on the left and right leg. Drill holes to fuselage thru the brackets after final setting. Apply mix on legs in place of lower hinges pos. 4 but **DO NOT** tight clamp bolts on them and mount brackets on the fuselage temporary. Tight the clamp bolts on lower hinges after cure. Turn fuselage to normal position. Mount complete wheels on the pins pos. 2. Set the pressure in tires on the same level. Stick the pins on gear legs and support fuselage in horizontal position using level so that wheels rest on the ground in straight position. Lay down two, at least 3 m long straight bars (steel square hollow

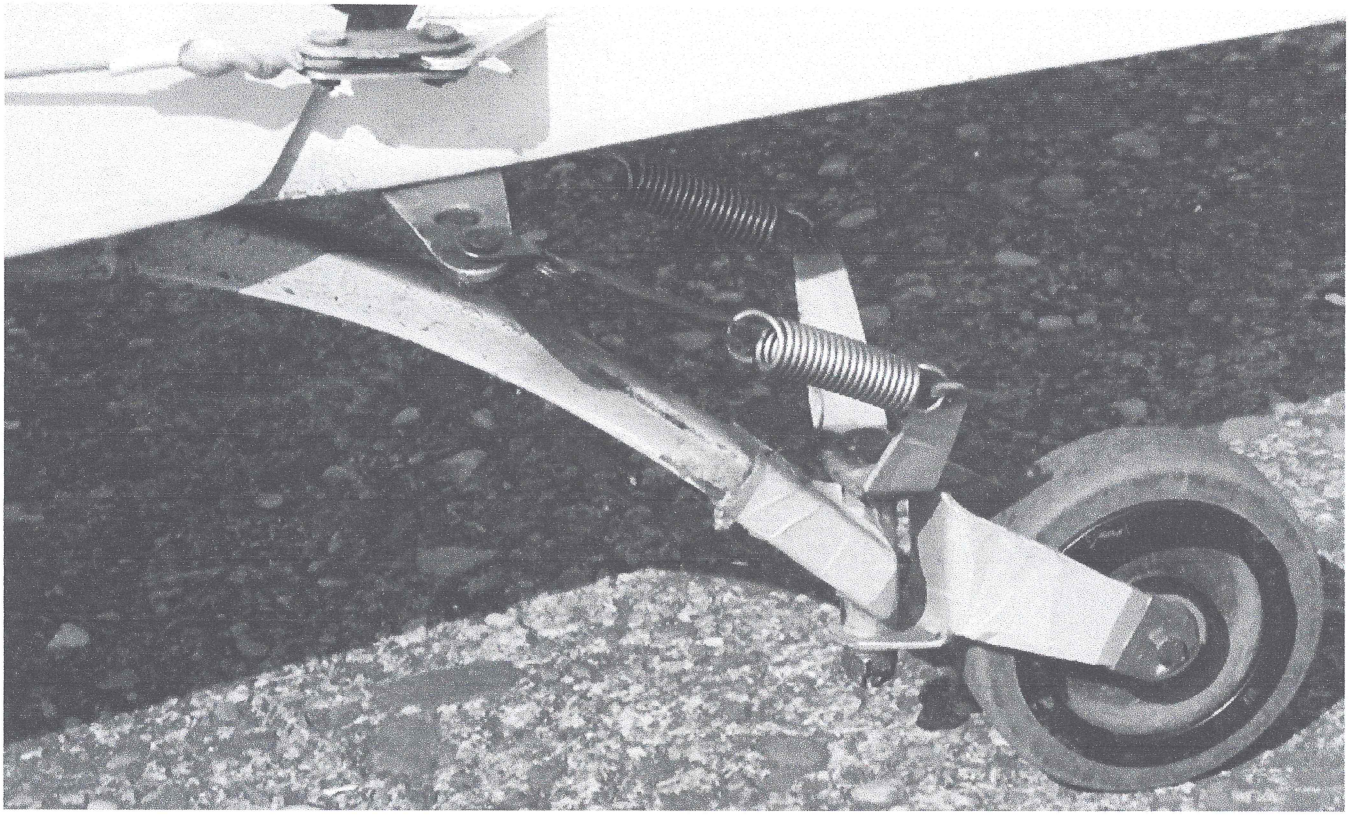
section is the best) alongside the fuselage resting tight on the side of wheels. Set wheels track so that both bars are parallel to each other and fuselage axis. Slide down pins from legs. Slide before prepared or pre-molded "pants" on the legs and put mix on the legs in the place of pins. Put pins on legs and check geometry of wheels again. Turn the fuselage bottom up after cure. Remove wheels from pins and legs from fuselage. Drill holes for bolt M6x45 thru pin pos. 2 and leg. Install the bolt. Install gear legs back on fuselage.
Set the leg pants to their future position and fix them using hot glue. Mask brackets, legs and fuselage around leg using tape. Mask also the rim of pants where will rest future cover on it. Apply adequate amount of PU foam which is used for installation of house windows around the bracket. Do not forget that foam will increase its volume significantly. Let cure one day and then cut rough shape of cover using sharp long knife. Now you have to become an artist for a while and using sand paper on variety of cylindrical sanding blocks sand the shape of covers you like. When you are satisfied with the shape vacuum all dust and fill bigger cavities with plasticine. Be precise because it will serve as positive mould for fiberglass cover. Mask foam surface with plastic tape. Separate surface with PVA. Perform layup of 3xG160 on mould with sufficient overlaps on fuselage and pants. Apply dry micro over whole surface and sand it to smooth shape after cure. Carefully cut cover on its trailing edge using oscillating saw. Remove from mould and trim. Remove the rest of tape and foam from fuselage. Drill holes for mounting of covers in accordance to drawing. You can make fillet between leg and wheel pants in similar way.



5.22 Tail gear, SD1-75-000

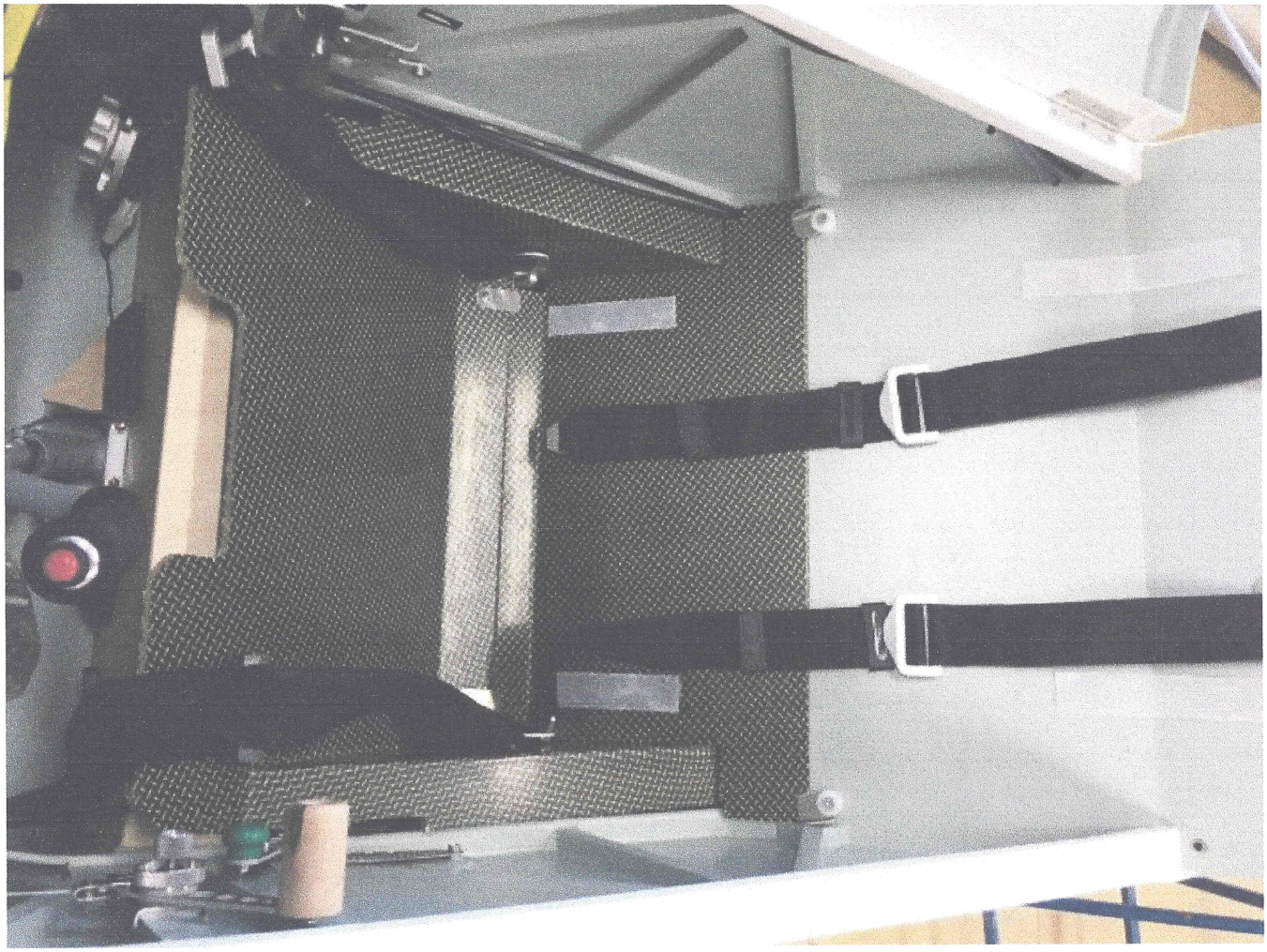
Tail skid is made of a fiberglass spring, to which is attached wheel hinged in a tow fork. The wheel is controllable and is connected to the rudder.
If you do not buy pre-molded fiberglass spring, it is necessary to fabricate it. Prepare simple mould from a steel sheet copying upper shape of the tail spring. Sand its surface to smoothness if necessary and separate using wax. Perform lay-up using unidirectional glass cloth. The higher specific weight of cloth will be used the faster lay-up will be. Measure the thickness of the cloth by a slide rule before and count how many layers you will need. Apply a pressure on lay-up using masked plywood splice 3 mm thick with a bigger amount of clamps. Trim the spring sides and sand its edges on radius circa 3 mm after cure. Prepare three 90 mm wide diagonally cut stripes of G 160 and lay them on plastic foil and penetrate with epoxy. Wrap the spring into prepared cloths, remove foil and cover lay-up with app. 20 mm wide peel ply in spiral way. You can use appropriate braid instead of cloth. Remove peel ply and trim after cure. Drill front mounting hole for bolt M6

and mark place of rear carbon hinge. Lay-down the spring on masked desk as mounted on the fuselage and fix it thru front hole. Support it in the place of fork hinge. Perform lay-up using 40mm wide diagonally cut 6 pcs of strips C200 in the place of rear hinge. Remove the spring from desk after cure and attach to fuselage on front bolt. Drill holes thru rear bracket and fuselage. Remove spring from fuselage and trim rear bracket. Install hinge of wheel fork on mix. Drill hole for securing bolt M4x25 after cure. Install the fork including the wheel mount assembly on fuselage and connect to the control.



5.23 Instrument panel, electrics, seat, seat belts

Cut the instrument panel (IP) from plywood T.3. The lay-up of panel face with 1xC200 is recommended. Sand the surface of carbon to smoothness with sand paper grit 300. Cut the holes for instruments. Fix the holders including plywood parts to instrument panel. Check the fit of panel in place. Put a mix on holders gluing surfaces and put panel in place. Separate the panel from rim of tank with piece of plywood T.1. Remove the panel from holders after cure and perform lay-ups over holders. Paint the panel with transparent lacquer. Install instruments, switches, fuses or circuit breakers. If you are not experienced with the electric installation any average electrician should be able to help you. Use the Teflon protected wires if possible. Lead the wires in right upper corner of fuselage. Let wires app. 100 mm longer so that final connection to IP could be performed with panel lying on underlay placed between longerons. Fix all free wires with the nylon cable ties.
If you will not use pre-molded seat you have to build it from sandwiched panel in accordance to drawing. The panels could be fabricated in similar way as described at tank construction. The seat has two parts. The front one is fixed to the tunnel thru holders pos. 3 and to bulkhead thru holders pos.4. Install the holders before drilling holes for riveting nuts M5. Measure position of holes and mark their position on the surrounding structure so that you can transfer it on the seat. Put the seat in place and drill holes in transferred positions. Drill smaller diameter first and increase holes before riveting. Trim the aft seat pan so that it is tight in the place but could be easily removable for an access to luggage area.
The system of seat belts connection to airframe must be abided even if you will not use offered seat belts. Use the steel cable Ø3 with appropriate thimble for prolongation of shoulder belts if necessary.



5.24 Parachute rescue system installation, SD1-80-000

There is special manual for the installation of Dyneema ropes. Drawing shows the fuselage design for the installation of GALAXY GRS 4/240 and Junkers Profly Magnum 300 rescue systems. These systems are used when installation weight of engine is 30-40 kg. For engine up to 30 kg of installation weight is possible to install rescue system in stainless steel box on firewall. The installation of different systems can vary in details. All the systems should have main hanging ropes attached to the upper hinges of the engine mount and one auxiliary rope to the support hinge on the gusset placed on the right side of the fuselage close behind the canopy. We recommend use of steel rope of diameter 4 mm for the main and 3,5 mm for auxiliary rope for systems placed rear. The ropes are driven to the system through a tunnel in the frame behind head. The ropes are attached to fuselage using hot glue. The tunnel is covered by a paper tape and then lay-up 1xG80. You can prepare thin fiberglass sheet in advance and glue it on the fuselage. The process of attaching the ropes to the sidewalls is the same, but the fiberglass can be substituted by the PVC tape. Lengths of ropes are specified on drawing. It is good to use cable thimbles on the snap-hook side of the rescue system. The main ropes are winded around the upper engine mount screws and connected by a nicopress sleeve. Put a plastic sleeve on the engine mount to prevent wear.

5.25 Weighing before the engine installation

It is recommended to weight the aircraft before engine installation if it is the new one. In an ideal case the airplane is painted and is completely equipped with instruments, emergency rescue system if installed and battery is temporary attached in supposed place of installation. Weigh the aircraft in horizontal position. You will need only a personal scale. Put it under one wheel and support the others in the same height. Then put the scale under another wheel and repeat the process. Weigh the engine, muffler and propeller also. Maximum weight of engine including accessory **should not exceed 45 kgs**. The airplane will be nose heavy otherwise. A typical weight of glassfiber engine cowling is 3-4 kg. Make simple Excel sheet for easy modification of data. The CG position of the empty aircraft must lays in the range 13-18% of MAC what means 829-882 mm from the trailing edge. According to the distance you got accurate the lengths of engine mount rods. Longer airplane nose destabilize it directionally.

5.26 Engine Installation, SD1-9X-000

Drawing shows installation of chosen engine. There is special manual for the engine kit installation. If you decided to install the engine which installation is still not designed for the SD-1, follow the general rules described further.
Fix or fasten the control bowdens and electric wiring to prevent them from vibrations, which would cause shorter durability and lower reliability consequently. Use grommets or silicon sealant in the ducts thorough the firewall. Attach the engine cowling to the firewall hem, or to the engine mount. Never attach the engine cowling directly to the engine itself. Perform the engine test lasting at least 2 hours before the test flight, to be certain, that all operation values vary in allowed ranges. The cooling inlet area in the engine cowling should be performed following these instructions: the outlet area should be at least 1,5 times larger than the inlet area. Make sure, that the fuel pump is well cooled. We recommend mounting of backup electric fuel pump.

6 Test Flight

The taxi tests could start after engine testing. Never taxi without mounted wings. Make the first test flight after weighing of aircraft and checking its CG. The most difficult flight phase is the take-off, when it is necessary to correct the aircraft tendency to yaw by a rudder (it is possible to correct that by engine axle offset). The aircraft behaves very kindly and is controllable in the whole speed range. We recommend test the slips with full extended flaps at first in a higher altitude to adapt to a little specific flying.

7 Finishing

Make the final finish of your airplane after the test flying when you installed new powerplant solution. Use very dry micro as filler for coarse filling requirements. Sand varnished wooden surface slightly using sand paper of grit 100 before filler paint for perfect adhesion. Apply the filler with the UV protection then. The light weight polyester filler works well for small disparities. It may be brushed or sprayed on and dries fast. Sand filler to smoothness using sand paper from 300 to 600 (1000 is better) grit gradually. Do not sand wood structure under water!
Try to keep the filler layer as thin as possible. The best choice for the final dope is multi component acryl paint. It has very good covering features. The brushing and polishing could be applied, what you would appreciate mainly during repairs. **Do not use darker colors than white pastel shades on final dope** because of the use of epoxies in the construction.

LIST OF SD-1 Minisport BASIC AIRFRAME CONSTRUCTION MATERIAL

Valid for scratch built airplane (excluding Basic kit)

Not specified dimensions in mm

Wood: Spruce, pine wood	
Section:	Length [m]:
15x15	41
15x10	9
15x5	4
10x10	15
8x8	15
5x5	21
Birch plywood	
Thickness:	Area [m^2]:
0,8	5
1	15
1,5	3
3	2,25
5	1
XPS Foam	
Thickness:	Area [m^2]:
20	7
50	1
100	1,5
PU (PVC) Foam	
Thickness:	Area [m^2]:
5	0,5
8	1
20	1
Glass cloth	
Type:	Lenght of roll (width 1 m)[m]:
BID Twill 80 g/m^2 (Interglas 90070)	14
BID Twill 160 g/m^2(Interglas 90110)	10
UD 600 g/m2	1
Carbon cloth	
Type:	Lenght of roll (width 1 m)[m]:
BID Twill 200 g/m2	2 m
Carbon/Kevlar cloth	
Type:	Lenght of roll (width 1 m)[m]:
BID Twill 200 g/m2	2 m
Gluing epoxy for wood (resin+hardner)	1,5 kg
Laminating epoxy (resin+hardner)	5 kg
Varnish	2 kg
Cabossil (Aerosil)	0,5 kg
Microbaloons	0,5 kg

Incl. wing lay up

Cotton flox	0,5 kg
Pultruded glassfiber round rod dia.27	1,3 m
Pultruded carbon strip 10x1 mm	2,2 m
2024 T6 SHEETS	
Thickness:	Area [m^2]:
1	0,1
1,5	0,1
2	0,1
3	0,1
4	0,1
AISI 4130 SHEET	
Thickness:	Area [m^2]:
1	0,25
1,6	0,1
2024 or 6061 Tubes	Length [m]:
12x1	1,3
14x1	2,6
16x1	0,4
AISI 4130 Tubes	Length [m]:
32x2	0,1
28x2	0,1
28x1	0,5
22x1	0,3
20x2	0,3
20x1	1,5
14x1	1,3
10x1	0,3
CARBON WOUNDED TUBE 10x1	1 m
2024 or 6061 or 2007 round bars	
Diameter:	Length [m]:
12	0,5
14	0,3
40	0,15
4130 round bar dia. 8	0,1 m
2024 T6 L profile 40x40x4	0,35 m
POM sheet T.12	0,05 m^2
POM round bar dia. 50	0,5 m
UNIBALL SM ROD ENDS	Nr. of pcs:
5	8
6	7
8	2

LIST OF HARDWARE FOR SD-1 MINISPORT CONSTRUCTION

BOLTS

DIN-931, strenght 8.8, zinc plated

Dimension	Nr. of pcs
M4x25	3
M4x30	15
M5x25	20
M5x30	2
M5x35	12
M5x50	2
M6x30	9
M6x35	14
M6x40	7
M6x45	2
M6x50	2
M6x55	2
M8x65	1

DIN 7984, strenght 8.8, zinc plated

M3x10	4
M3x14	2
M4x10	1
M4x16	2
M4x25	4
M5x20	6
M6x35	2

DIN 7991, strenght 8.8, zinc plated

M3x6	1
M3x12	6
M3x25	6
M4x25	1
M4x35	2
M5x35	16
M5x50	8

DIN 912, strenght 8.8, zinc plated

M3x20	4
M3x30	2
M4x30	1
M5x16	2
M6x14	1
M8x40	2

DIN 7985, zinc plated

M3x8	12
M4x10	4

AN standard

NAS1352C06-8	6
AN526C-632R8	2

NUTS

DIN 982, zinc plated

M6	25

M5	36
M8	3
DIN 985	
M4	23
M3	22

DIN 439, zinc plated	
M4	1
M5	8
M6	8
M8	4

Riveting	
M5	8

Aluminium -wheel pants	
M3	12

WASHERS

DIN 125, zinc plated	
3	10
4	10
5	40
6	30
8	10

DIN 9021, zinc plated	
3	20
4	20
5	10
6	2

PIN, DIN EN 22341(B)

4x14	2
5x12	8
5x20	1
6x25	2

COTTER PIN, DIN EN ISO 1234

1x10	2
1,2x14	10
3x30	2

RIVETING NUTS, Avation Standard

One lug	
MS21071L06	2
M5	4
M6	4

Two lug	
MS21069L06	6
M4	4
M6	1

CABLE THIMBLE

For cable DIA.2	4

NICOPRESS

For cable DIA.2	4

RIVETS AVEX

1031-3208	32
1034-2410	32
1663-0521	5

SCREW

DIA 2,5x10	18