Bauanleitung CXRES-2m

The 2m is designed for the Class F3L / RES (Rudder, Elevator, Spoiler).

Wingspan: 199 cm

Length: 112 cm

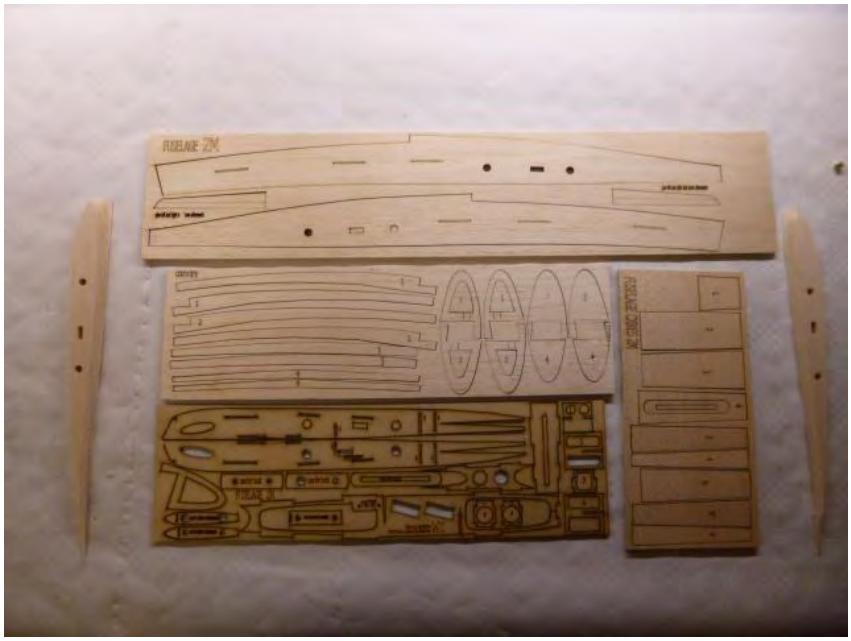
Flying Weight: 440 Gramm

The Kit of the CXRES-2m arrives presorted in 4 labelled bags out of the Shipping Box: Fuselage, Tails, Wings and Accessory. The tapered carbon fuselage tube, the carbon tubes for the wing joiners and the control cable tubes with carbon Push-Pull rods are also inclueded.

The 2m will be glued mainly with super glue, on several parts, we recommend epoxy or PVA glue. This we will describe right on time when you need it. The complete model will be put together like a puzzle, adjusted and then you will glue it together.

The cut outs fort he servos are made fort he CHASERVO DS06. If you want to use other servos, you have to make the cut outs for your choice of servos.

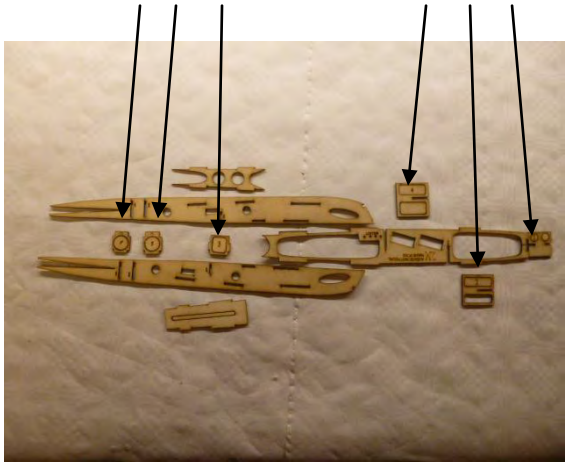
Fuselage:
The fuselage is made up out oft he following balsa sheets.

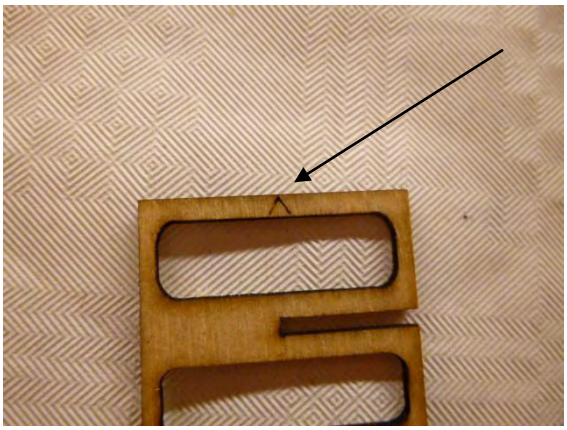


First you build up the main frame, made out of plywood. For that you need all parts of the plywood sheet, except these 3 parts. These are fort he tails and the hook.

The main frame is made out oft he parts as shown below. „UP“ is marked on all frames with an arrow. In the side panels, there are cut outs for the frames. They are numbered. The numbers are on the inside at the build up.

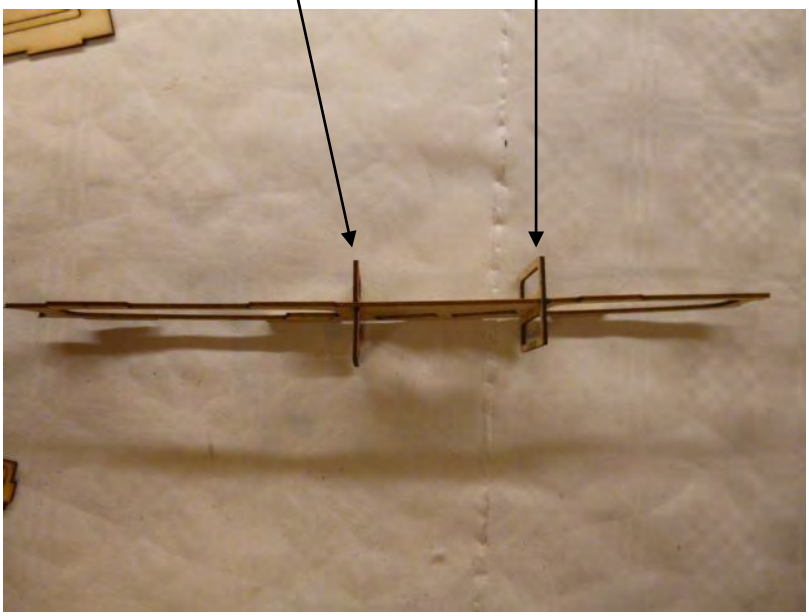
Frames: 6 5 3 4 2 1



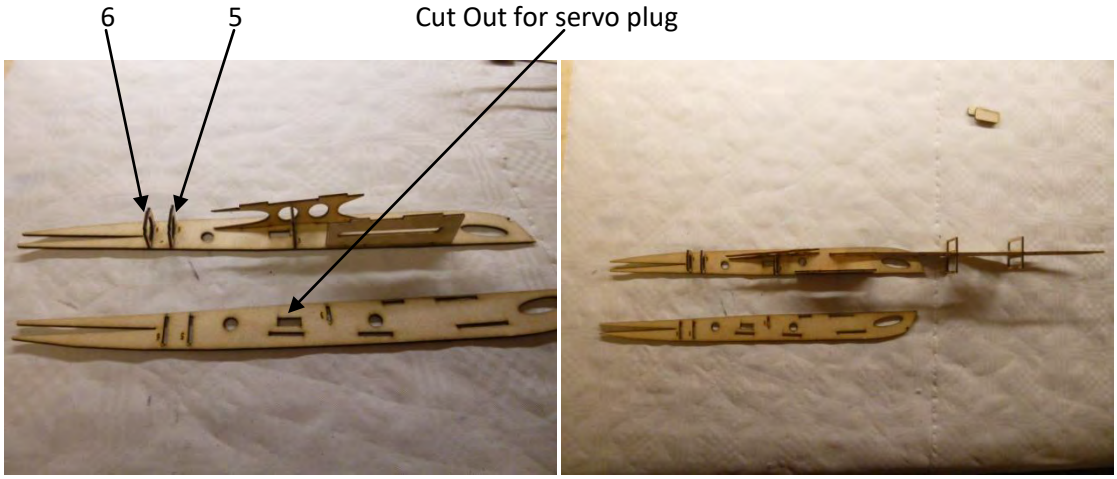


First you begin with the servo tray and the frames 2 and 4. The frames are attached from the L/H and R/H side and need to be flush with the servo tray.

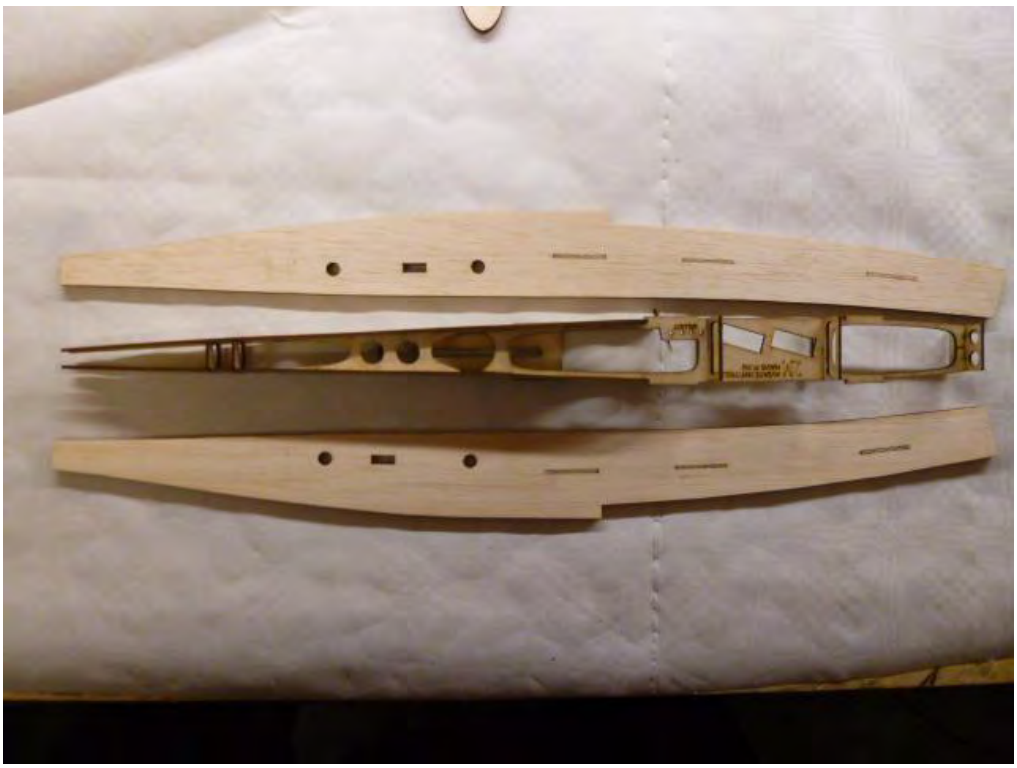
Frame 4 2



You have to put the side panels together as shown in the picture below. Important: The Cut outs for the servo plugs need to be at the correct position, cross check it with the wing to fuselage fairings. Now the servo tray will be attached to the side panels. They have to be completly in contact to the servo tray. The overhang of the servo tray outside of the side panels is disered. This will adjust the balsa plys of the fuselage.

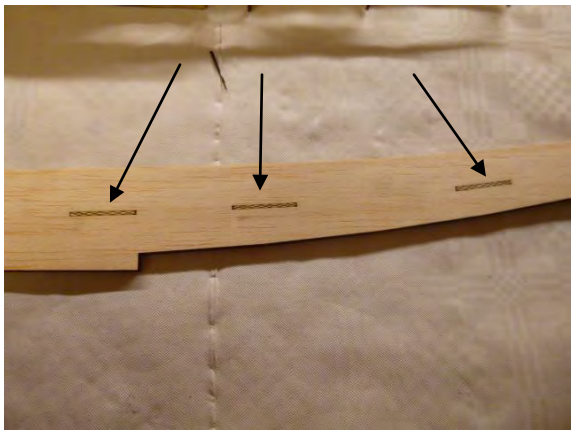


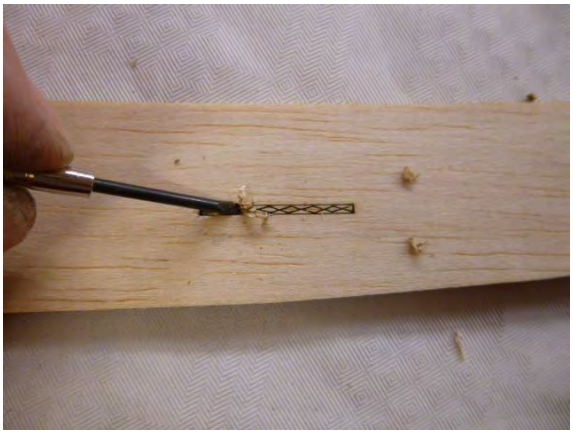
Important!! Except of frame 5 and 6, you can glue all parts together with super glue. Frame 5 and 6 will be glued, when you have installed and adjusted the carbon fuselage tube.



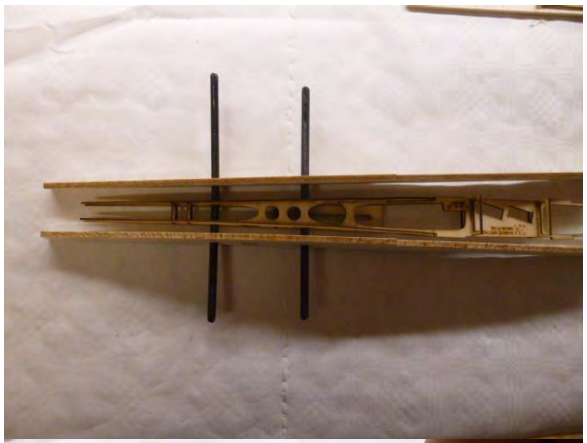
Next step is to install the balsa side panels with PVA glue. With that glue, you have enough time to adjust the side panels correctly.

First, you have to remove the unwanted balsa wood out of the slots. We recommend for that a small screwdriver.

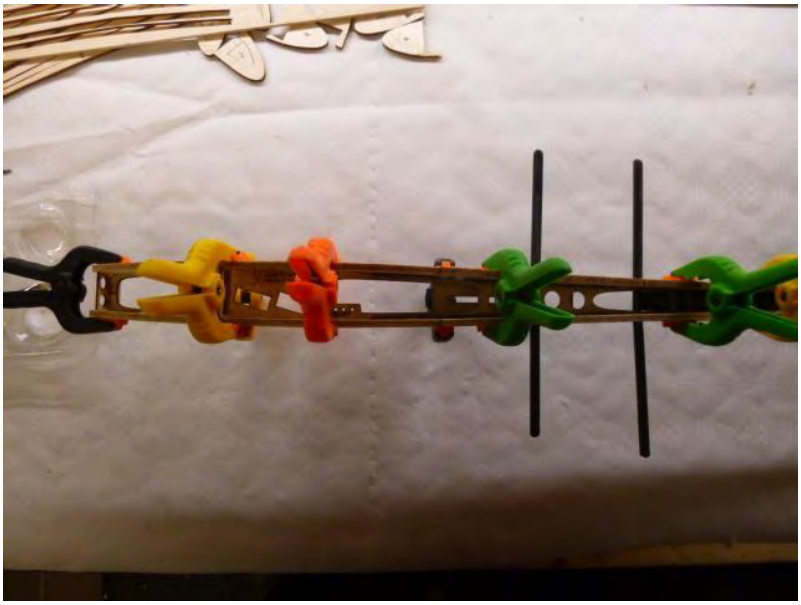




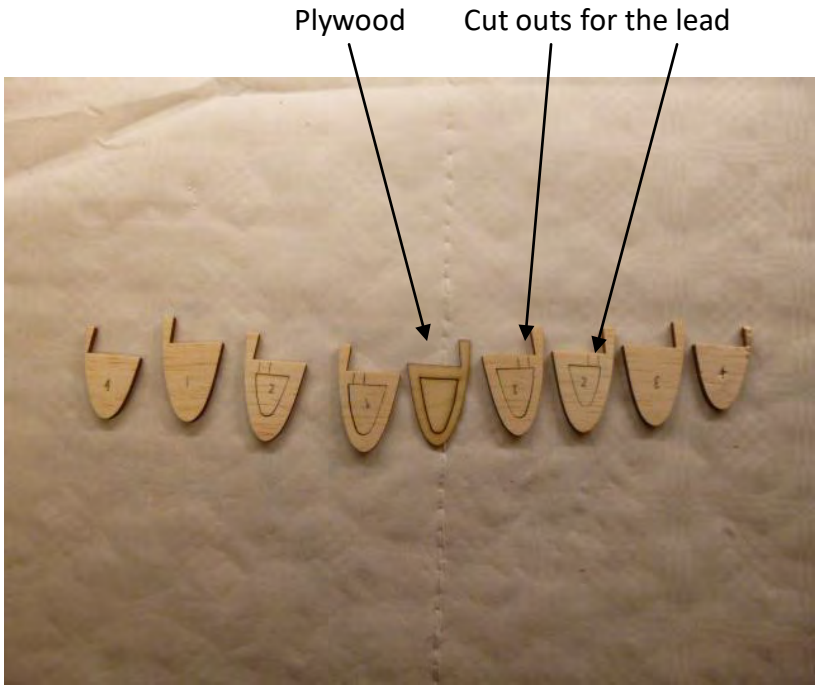
The side panels need to be adjusted and glued at their correct positioin with the wing joiners. The carbon fuselage tube takes place up tot he aft wing joiner. Perform the adjustment for correct position and glue frame 5 and 6 to the main frame. Frame 2 and 4 are flush with the side panels at the upper edge



The best way for that workstep is to fix the fuselage with clamps until the glue is cured. After the glue is cured, you have to remove the carbon fuselage tube again.

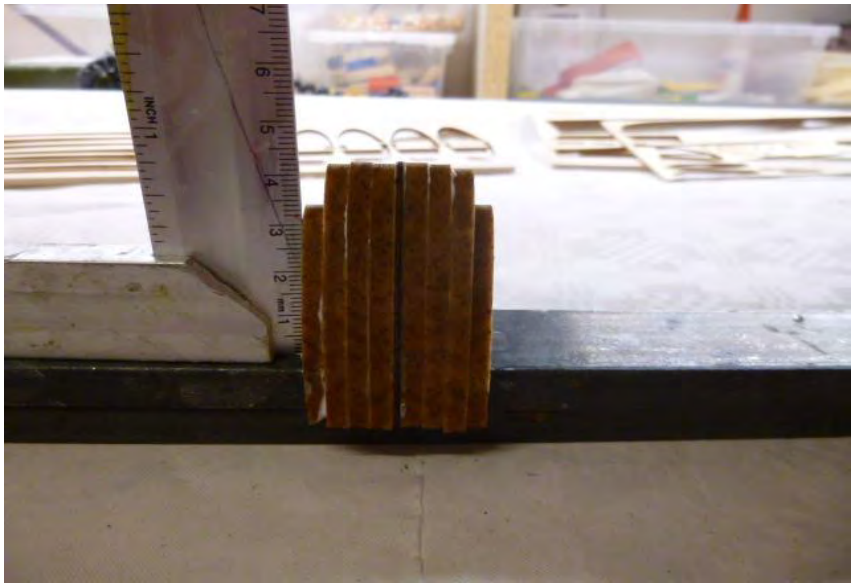


During the glue is curing, you can put the fuselage nose together out of the part 1 to 4 on the L/H side and R/H side of the plywood frame. From inboard to outboard: 1-4. We recommend here PVA glue too, so you have more time to adjust the frames.

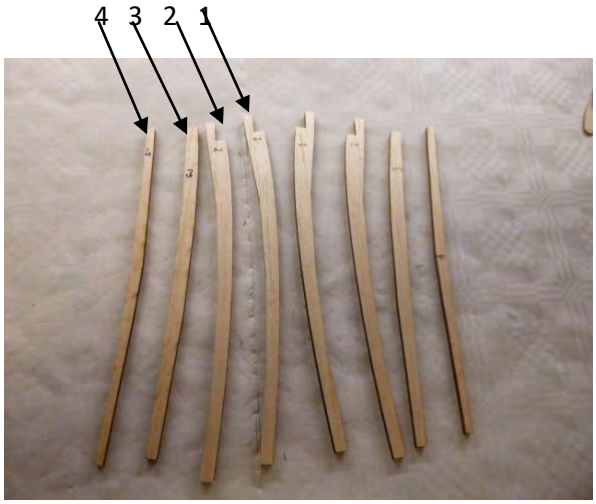


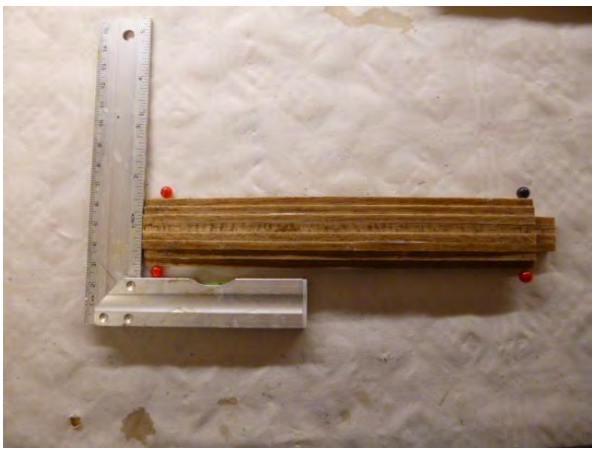
Before you glue all frames together, don´t forget to make cut outs in the frames 1 and 2 for the lead compartment. A cut out in the plywood frame is not necessary.

Glue the parts together, adjust and fix them.



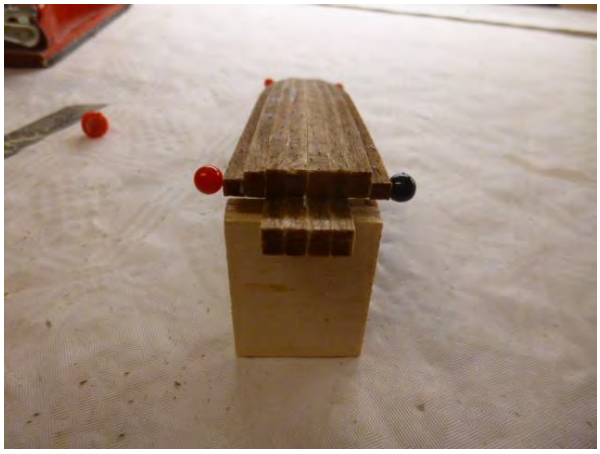
The canopy is made out of part 1 to 4 on the L/H side and R/H. From inboard to outboard: 1-4.



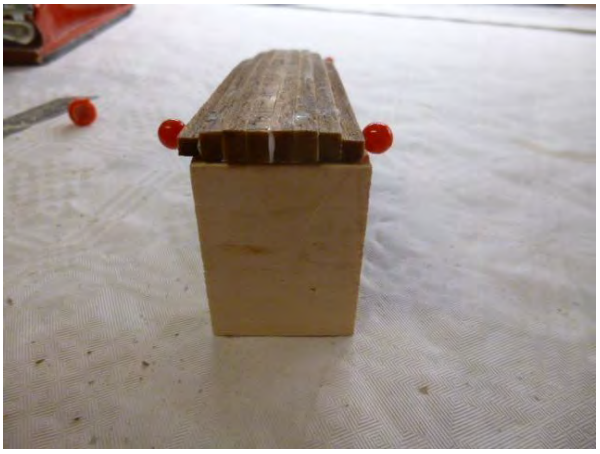


Please make sure, that the lower and aft edge of the canopy frames is flush. As always, glue, adjust and fix them together with PVA glue.

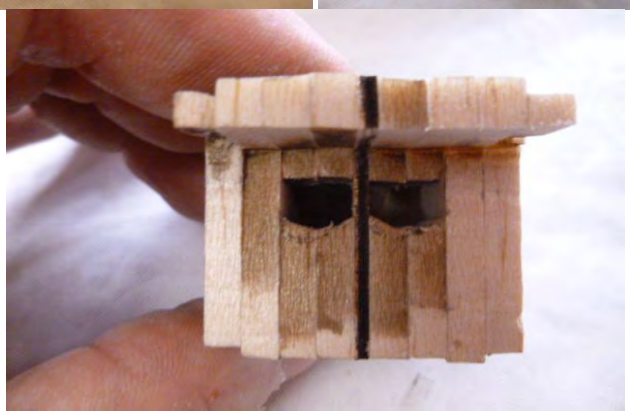
Forward side of canopy



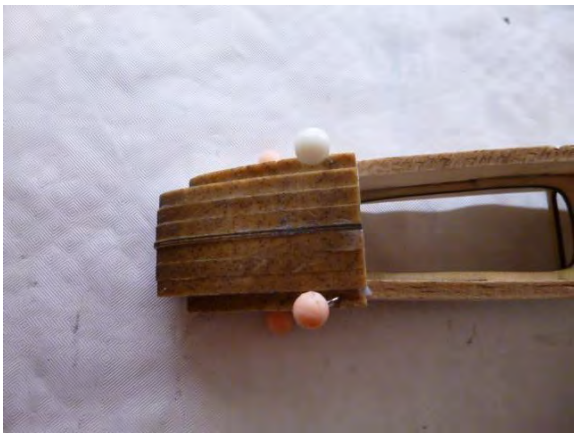
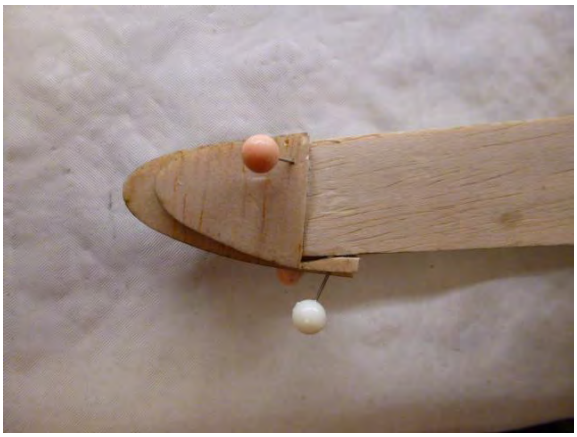
Aft side of the canopy



When the glue is cured, grind the side panels in the front to frame 1. Put the Nose in place, mark the cut outs for the lead compartment and align the holes in the nose with a round file.



Glue the nose to the fuselage as shown in the pictures

Now the lower skin panels (1-6) of the fuselage and the doubler of the hook can be installed.
Important: The upper skin of the fuselage is marked with a „T“ for „Top“.



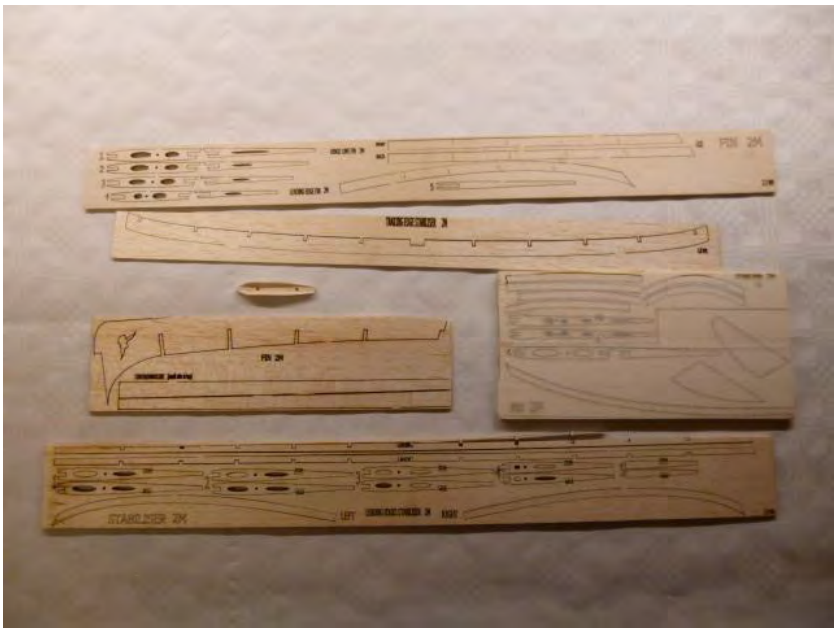
First, you have to installed the lower skin panel 4. The Cut out for the hook has to be aligned with the cut out in the main frame. Here you have to install the the doubler for the hook. After that, you can install the skin panels 5 & 6 aft and 3, 2 & 1 forward.

Now you can make the cut out for the fuselage tube fitting to the tube.

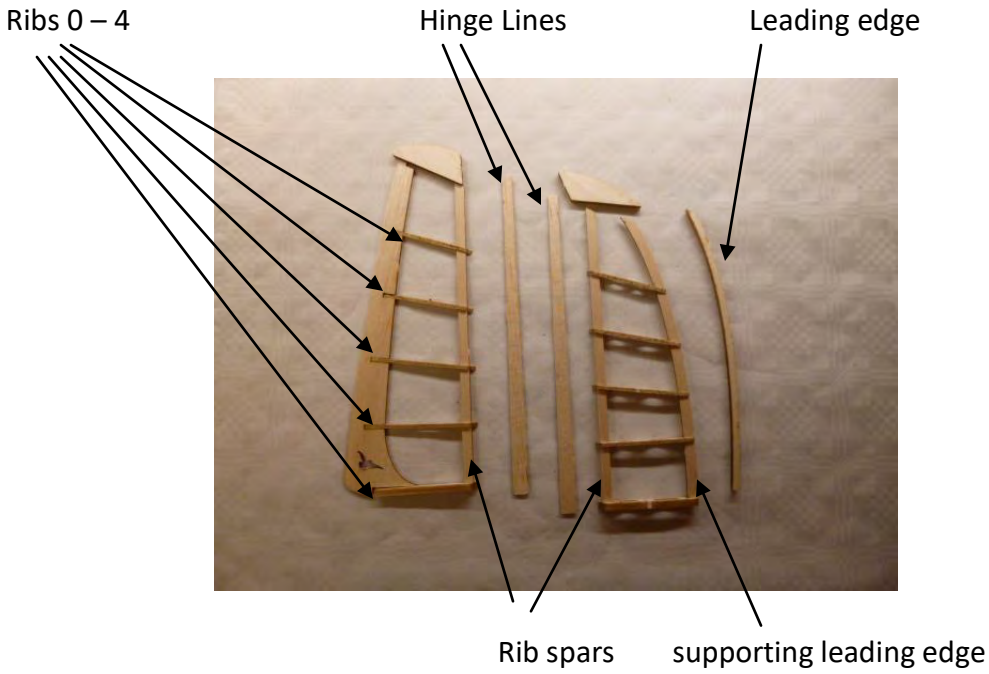
It is better to turn the skin panels with the numbers to the inside, because it is possible, if you use oralight for covering, that the numbers are visible through the covering. The installation of the upper skin panels 4T, 5T and 6T will be done, when the fuselage tube is adjusted to the tails and wing. It will be glued with epoxy.

Tails

The horizontal and vertical stabilizers are made out of the following balsa sheets / parts:

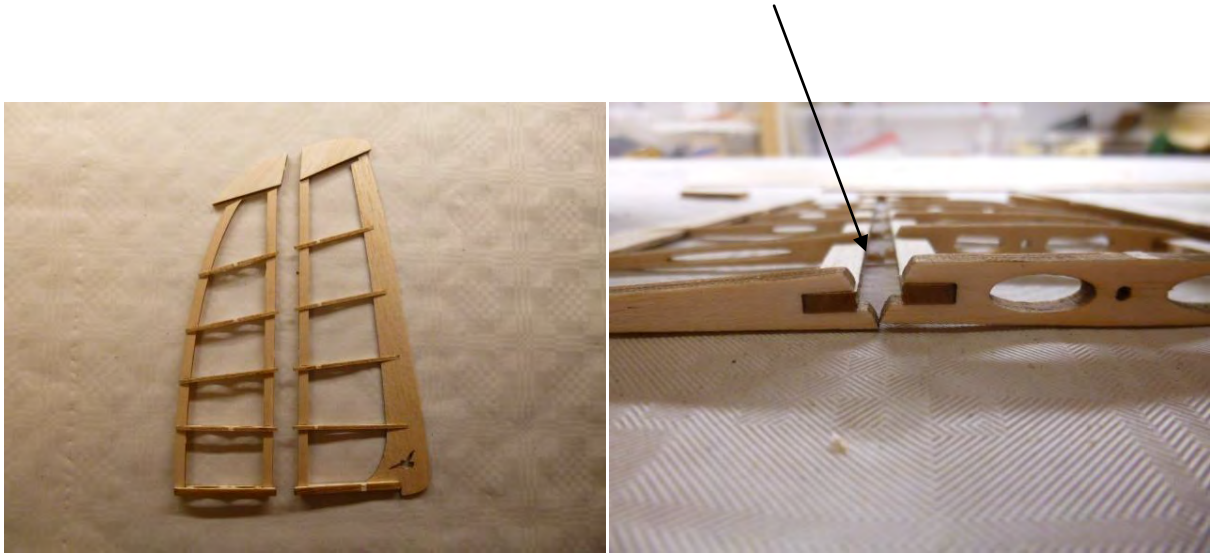


First, we will build up the vertical stabilizer and rudder.

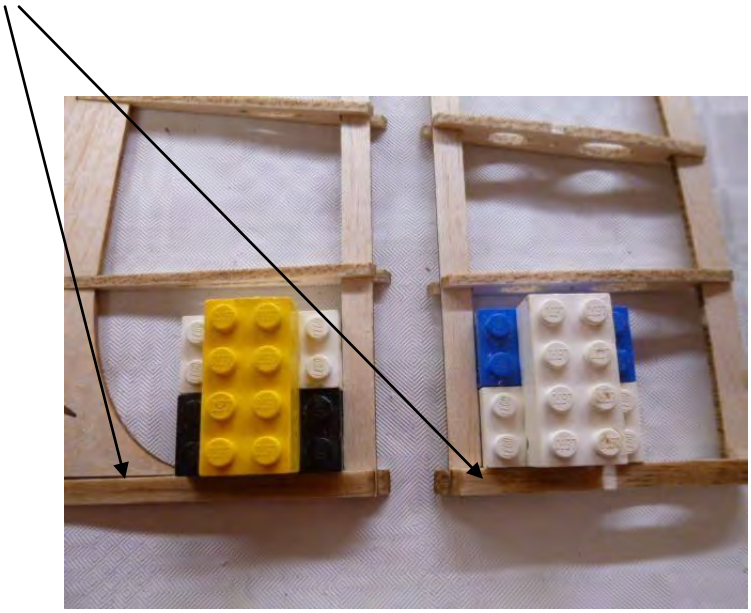


The parts will be put together and adjusted without the leading edge and without the hinge lines.

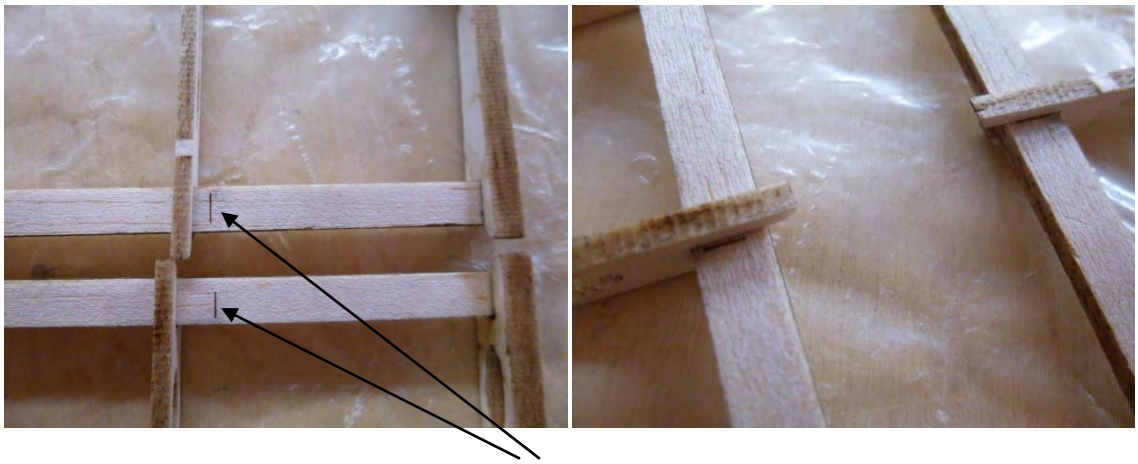
Make sure, that Rib 1-4 in the Rudder and in the vertical stabilizer are correctly installed (V-Cut out – see picture)



First, glue Rib 0 in a 90° angle to the rib spars of the rudder and vertical stabilizer.



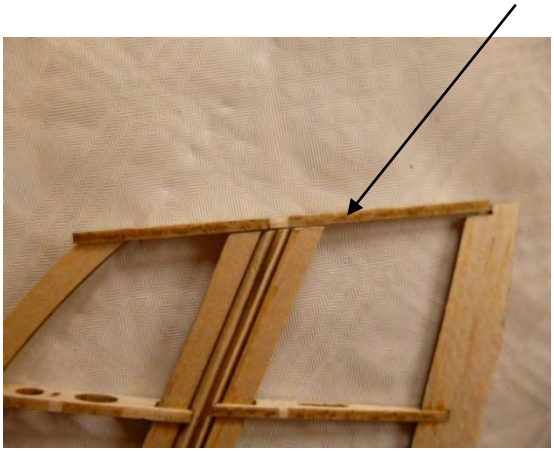
Now install the ribs at the markings on the hinge lines and leading edge of the rudder. The markings are underneth the ribs. The framework can now be glued together except rib 5. Adjust the trailing edge of the rudder centered.



Markings

Now you can glue the hinge lines to the vertical stabilizer and rudder framework. Make sure, that the ribs are in close contact with the spars etc. Maybe you have to grind a little bit for a perfect fitting

Grind the hinge line flush to the ribs. After that, you can glue rib 5 to the rudder framework.



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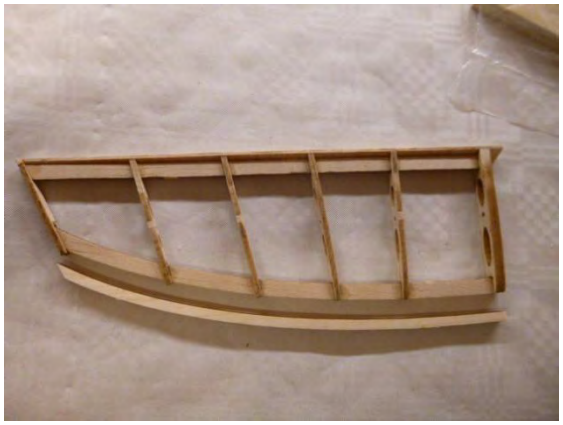
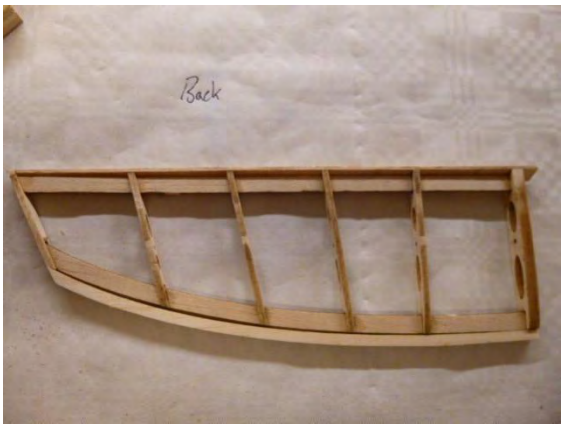
Cut the vertical stabilizer and the rudder at rib 5

Before installing the leading edge, grind the forward edge of the vertical stabilizer smooth

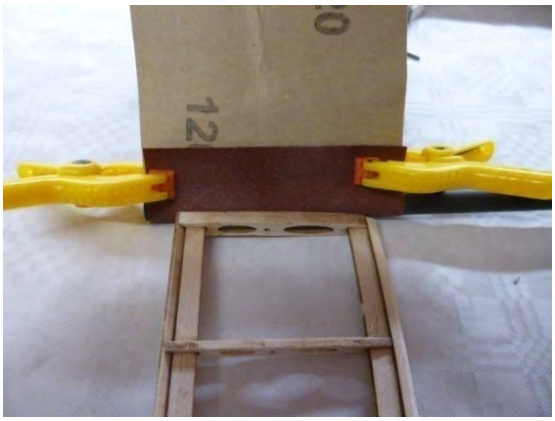




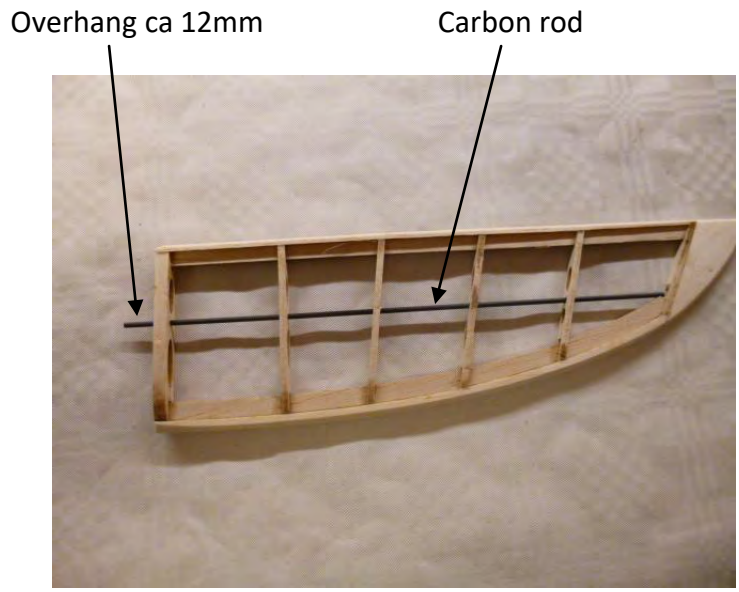
Now you can install and glue the tail tips.

Your vertical stabilizer and rudder is finished now and only needs to be grinded to a smooth shape.

Um eine schlüssige Verbindung des Seitenleitwerks zum Heckrohr zu erhalten, sollte Rippe 0 passend geschliffen werden. Dazu spannt man am besten Schmirgelleinen über das Heckrohr und benutzt dies als „Schmirgelschablone“



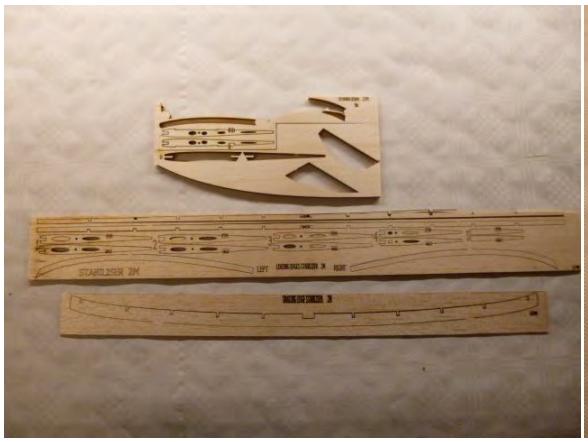
Install the 2mm carbon rod to it´s position.

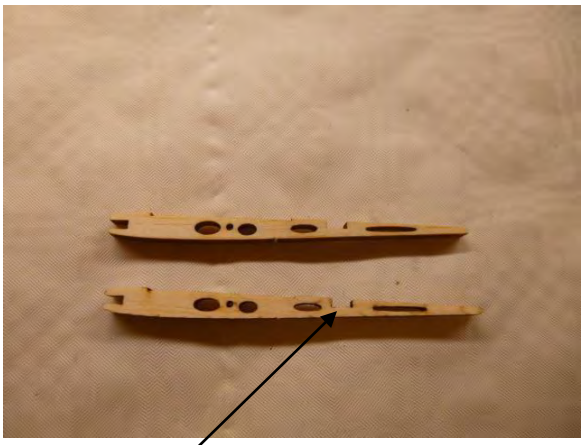


It is enough to glue the fin to your fuselage carbon tube without any reinforcements. If you want, you can keep an overhang of 12mm of the carbon rod. Drill a small hole into your fuselage carbon rod and glue both carbon rods together.

Horizontal Stabilizer

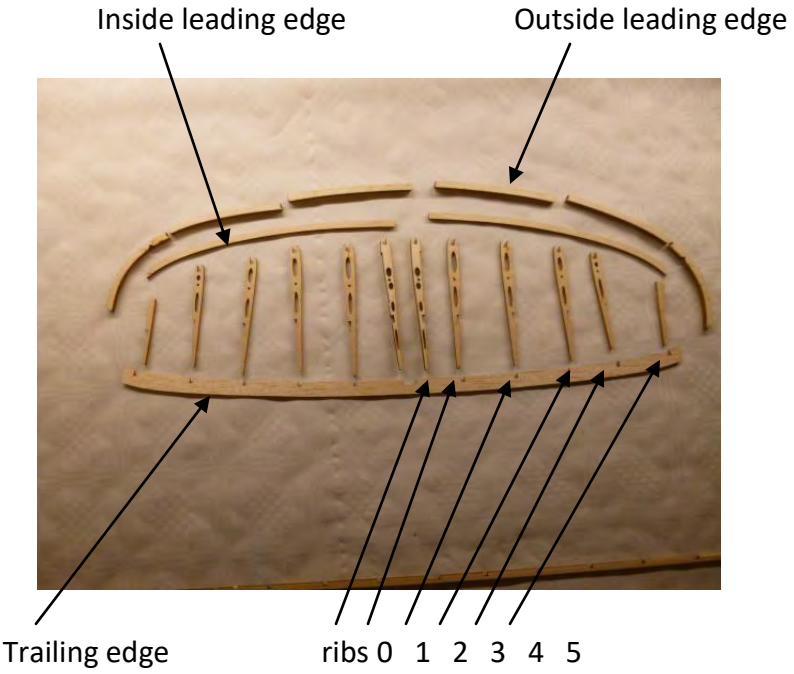
The horizontal stabilizer is made out of the following balsa sheets / parts. Build it the same way as the vertical stabilizer



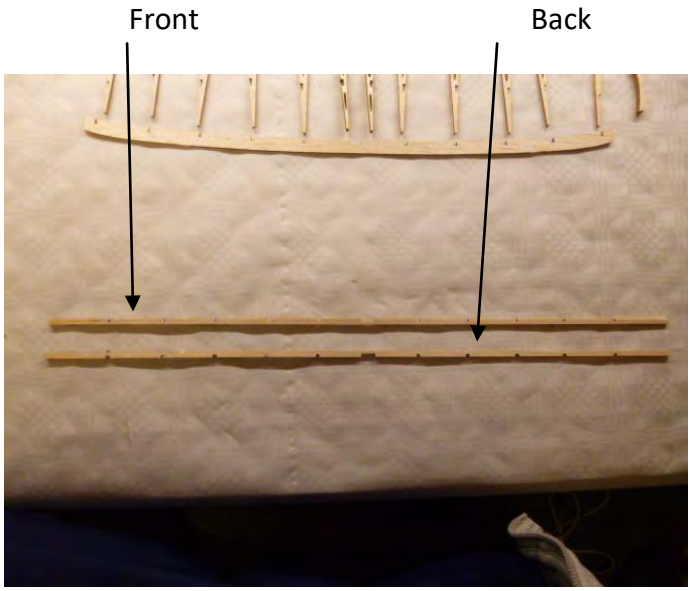


Cut out

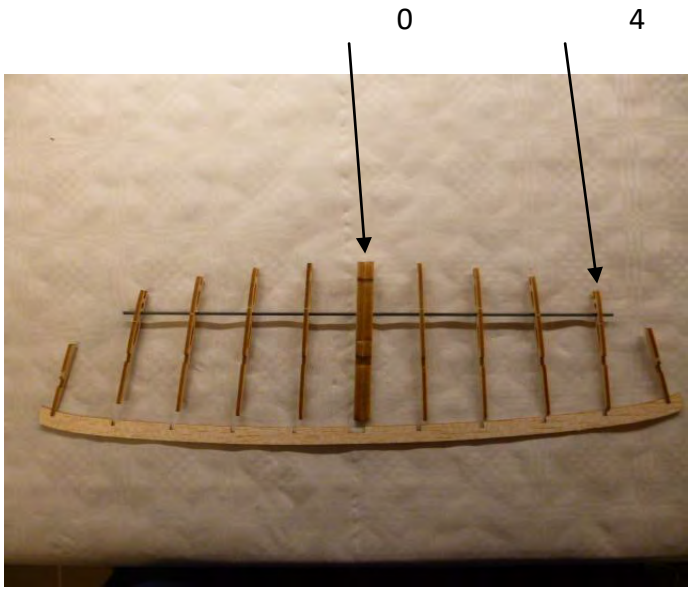
The ribs and the shape parts are numbered in the balsa sheets. Pay attention: The cut out of the ribs in the aft third need to be on the upper side.



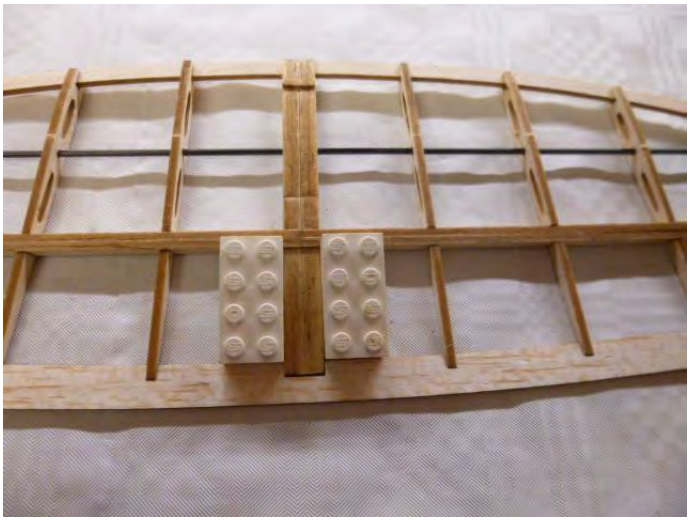
The spars of the horizontal stabilizer „front“ and „back“ are the hinge lines of the horizontal stabilizer and the elevator itself. Do not glue them at this time.



First put the ribs 0 to 4 from the L/H side and from the R/H side on the 2mm carbon rod and adjust them with the trailing edge.

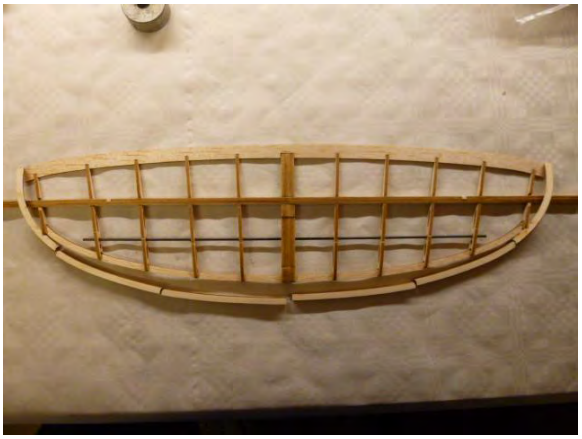


Then put all the remaining parts of the horizontal stabilizer on it´s place. Adjust the main rib 0 in a 90° angle to the trailing edge.



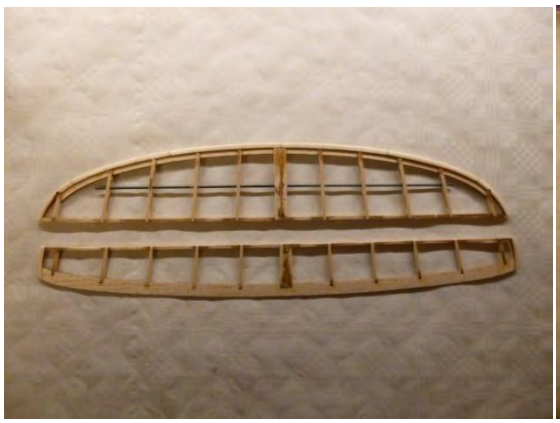
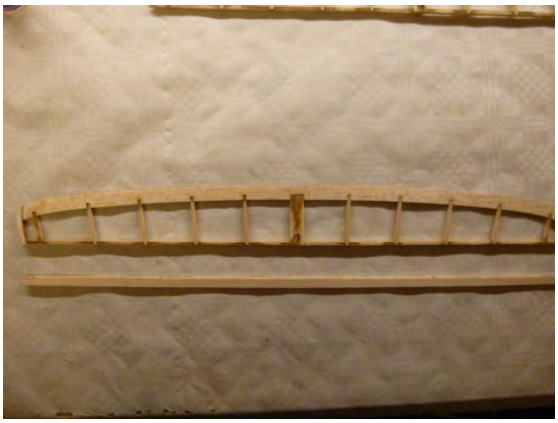
When everything fits, glue it together with super glue. **Pay attention not to glue the hinge line parts to each other!**

Now you can glue the leading edge to the stabilizer and trim the hinge lines to the stabilizer tip



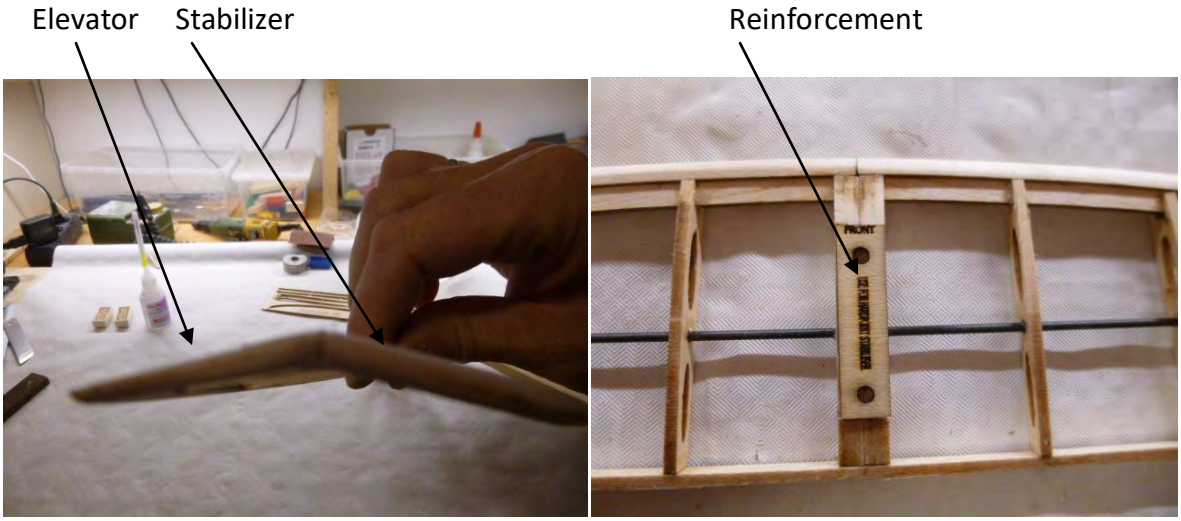

Time for sanding the whole stabilizer to a smooth shape

After that, cut the hinge lines to get the stabilizer and the elevator. We recommend to do it from the lower side.

Install a 2.5mm balsa stripe to the forward edge of the elevator (make it out of a piece of the balsa sheets). With that you will get enough throw at the elevator. At series 2 of the 2m, you do not have to do it, we already did it for you.

Next step is to sand the hinge lines to a tilted angle. After that, glue the reinforcement out of plywood to the Stabilizer. This will also be a template for drilling the screw holes later.



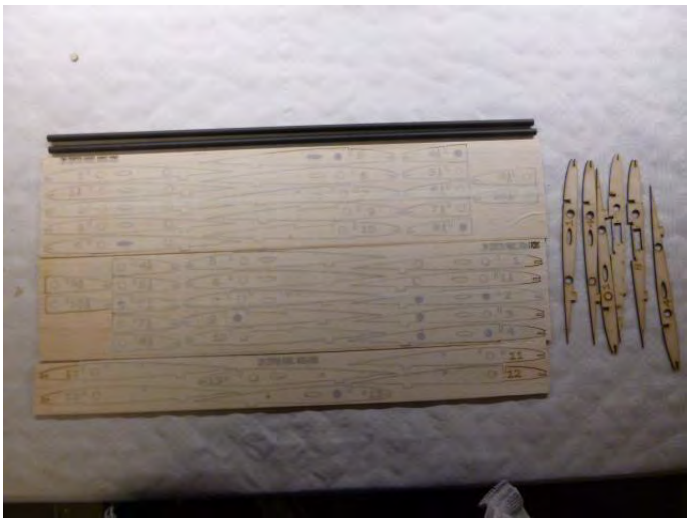
Wings

Caution: All ribs of the wings will be adjusted in a 90° angle to the carbon spar rod.

Inner wing:

Pay attention to build a left and a right wing, you would be not the first, to build two left or two right wings.

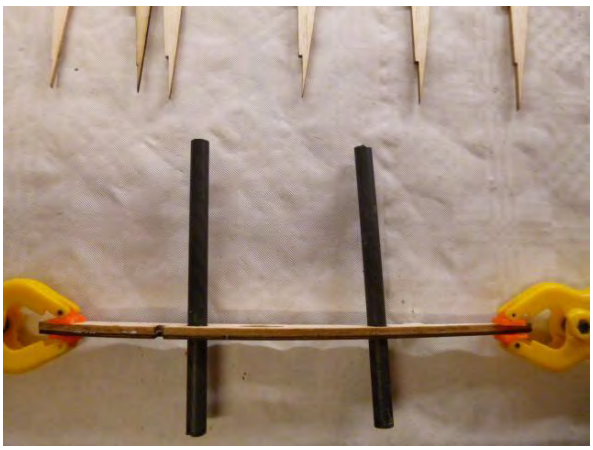
First sort all the parts you need. For the inner wings, you need the long carbon rods (7mm diameter) and the parts as shown below.



Sort the ribs as follows:

Plywood rib 1, Balsarib 1, Balsa 1A, Balsa 2, Balsa 3, Plywood, 4 Balsa 4, Balsa 4A, Balsa 5, Balsa 5A, Balsa 6, Balsa 6A, Balsa 7, Balsa 7A, Plywood 8, Balsa 8A, Balsa 9, Balsa 9A, Balsa 10, Balsa 10A, Balsa 11, Balsa 12, Balsa 13.

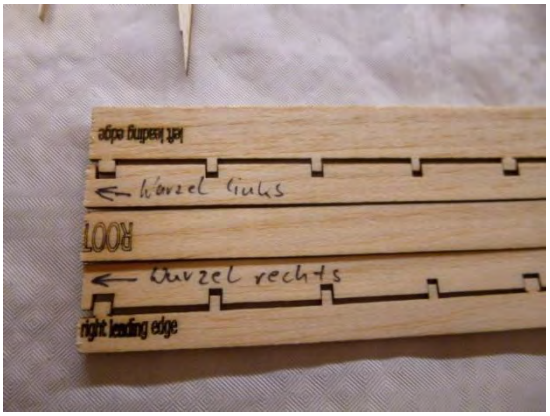
The ribs 1 out of plywood and balsa need to be glued together. The best way is with PVA glue, so you have enough time for the adjustment. Die plywood rib should be on the inboard side (balsa rib outboard side, pay attention to left and right side). For the correct adjustment take the wing joiner tubes. For Rib 4: the plywood rib iss maller than the balsa rib (to take the skin).



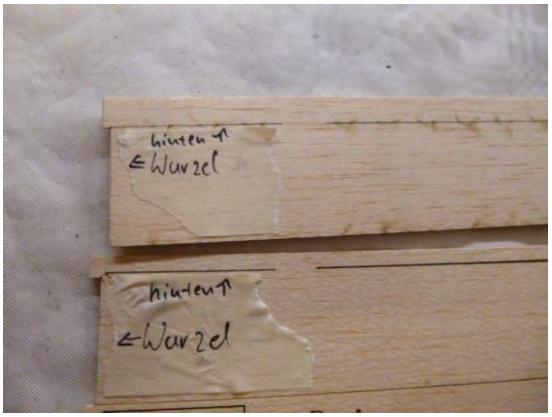
Then you need the inner leading edge (Pay attention to the markings: Root, Left and Right) and the trailing edge. The marking is on the upper edge and „Root“ shows to the wing root.

We recommend to mark every part, so you can not mix them up. Take a crepe tape or something like that, so you can remove your markings later.

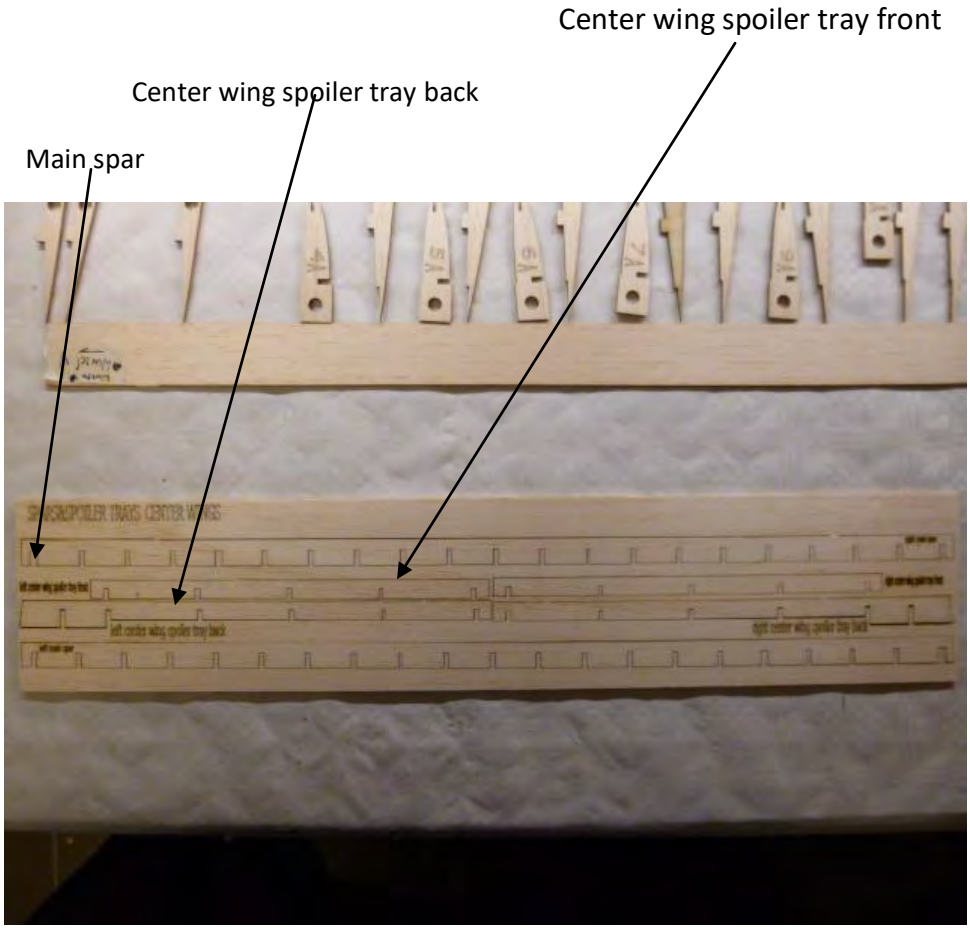
Inner leading edge



trailing edge



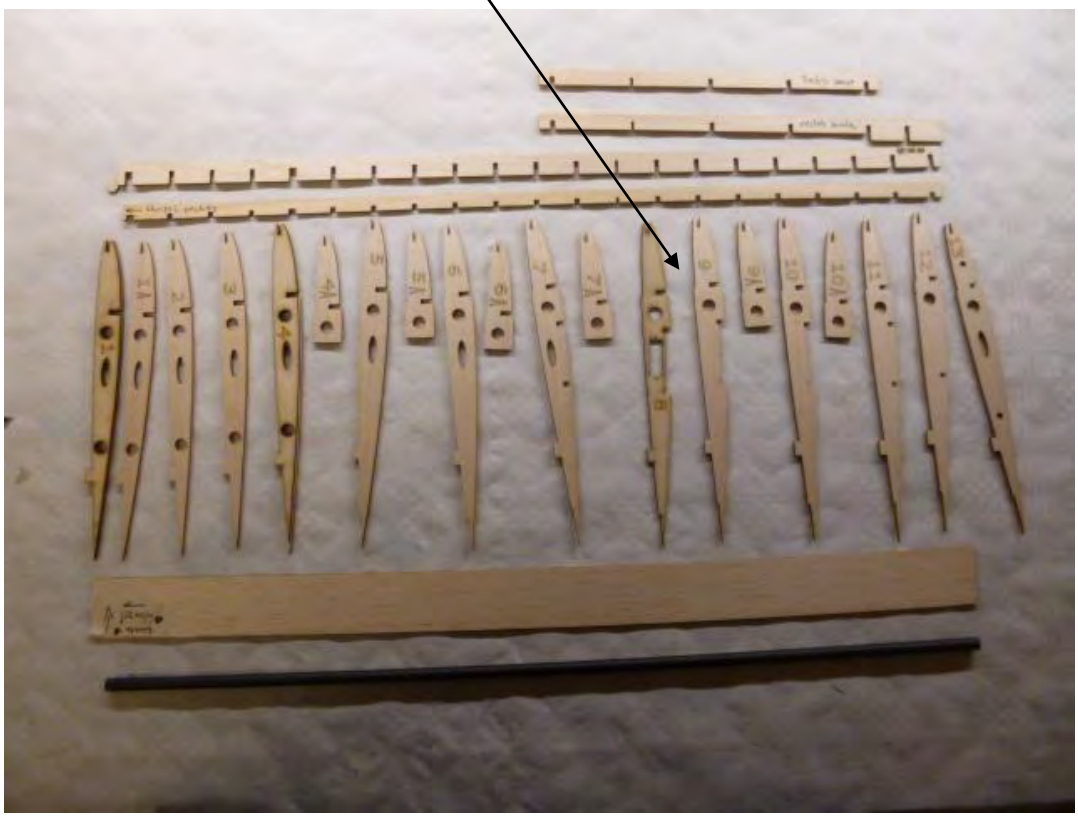
On the balsa sheet „Spars&Spoiler Trays Center Wings), take the wings spars (see markings)



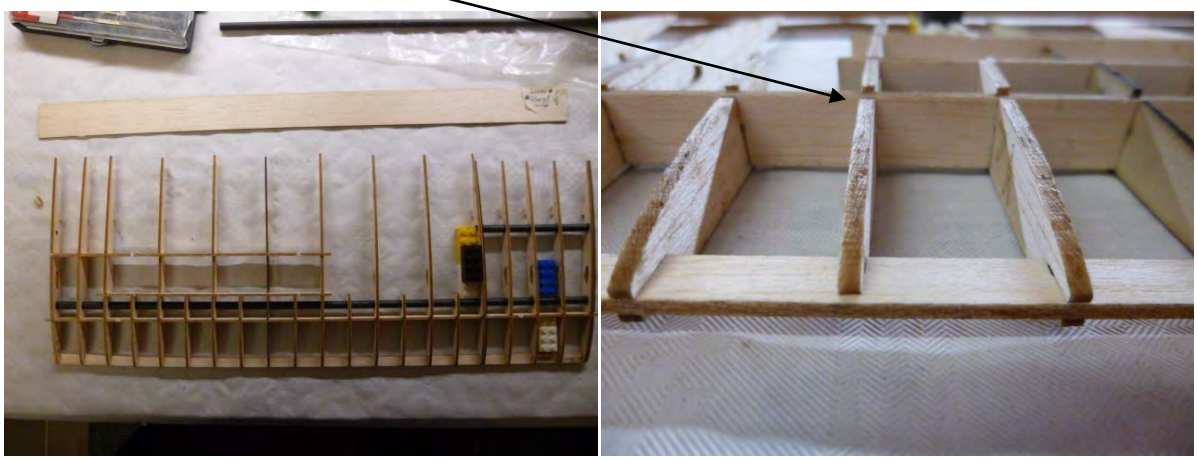
It is useful to make markings on each part. Pay attention for L/H and R/H side.

After sorting all parts, we can start with the build up of the inboard wings. R/H side of the wing is shown in the picture below. L/H side is symmetric. In the picture, rib 8a is not shown. It is between the plywood rib and balsa rib 9.

Position of rib 8a



First install all the ribs in the correct sequence on the carbon main spar. After that, place the balsa spars and the inner leading edge in place of the ribs. The balsa spar needs to be put down as much as possible, it has to be flush with the ribs (see picture)



After the adjustment of the ribs, glue all ribs **except wing root rib 1 and rib** 13 with super glue to the carbon spar. Pay attention, that all ribs are flat on your buidling surface.

Rib 1 will be glued with the wing joiners. It has to fit perfectly to the fuselage. Rib 13 will be glued, when the outboard wing is be installed on the inboard wing.

Flip the wing to install the trailing edge panel. Do not glue rib 1 and rib 13.

The second inboard wing, here the L/H wing needs to be built the same way.

Before you glue rib 1, you have to grind the wing joiners (the two longest V Carbon Rods). They have to fit perfect to the wing joiner tubes.

For the Adjustment of rib 1, it makes sense to markt he middle of the wing joiners. **For the second series of the 2m: Both wing joiners got a straight part in the middle.**

Put the wing joiners into your fuselage and adjust them to the middle of the fuselage. After that, put both inboard wings to your fuselage with a gap to the fuselage. Use as a spacer an old wooden part out of wood box (see pictures)

The alignment of the wings to the fuselage can be done with or without spacers

Now you can glue rib 1 on the L/H and R/H side with the main frame of the wings

Outboard wings

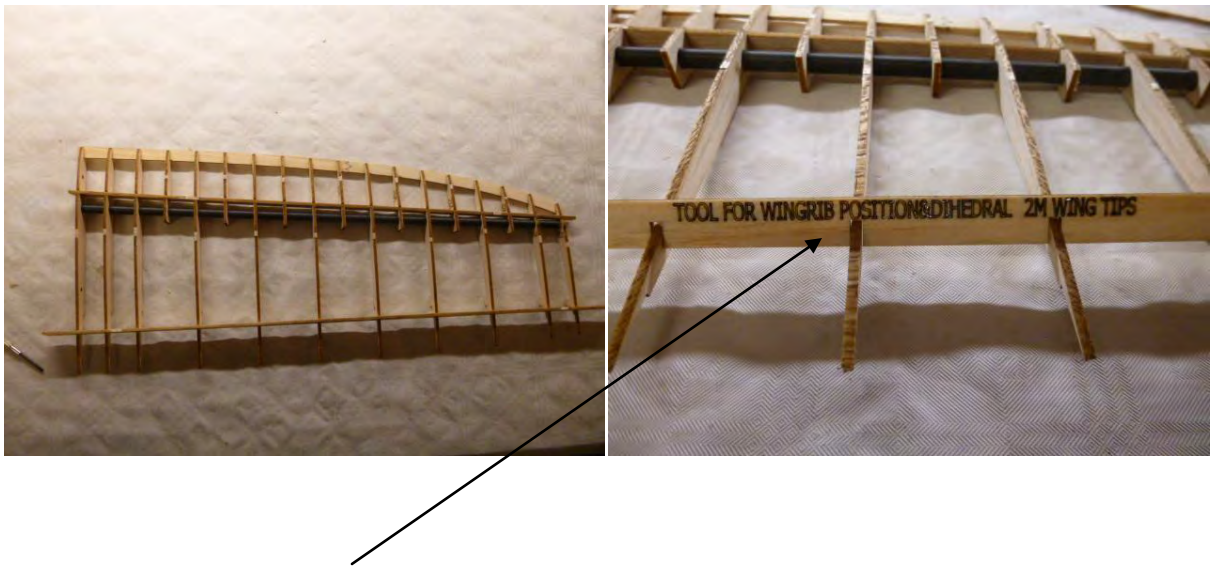
Following parts are necassary. 4 balsa sheets, marked with „Right wing tip“, Left wing tip“, „leading edges 2m wing tips“ and „trailing edges tip 2m)

Same procedure as before: Pay attention to build a left and a right outboard wing.

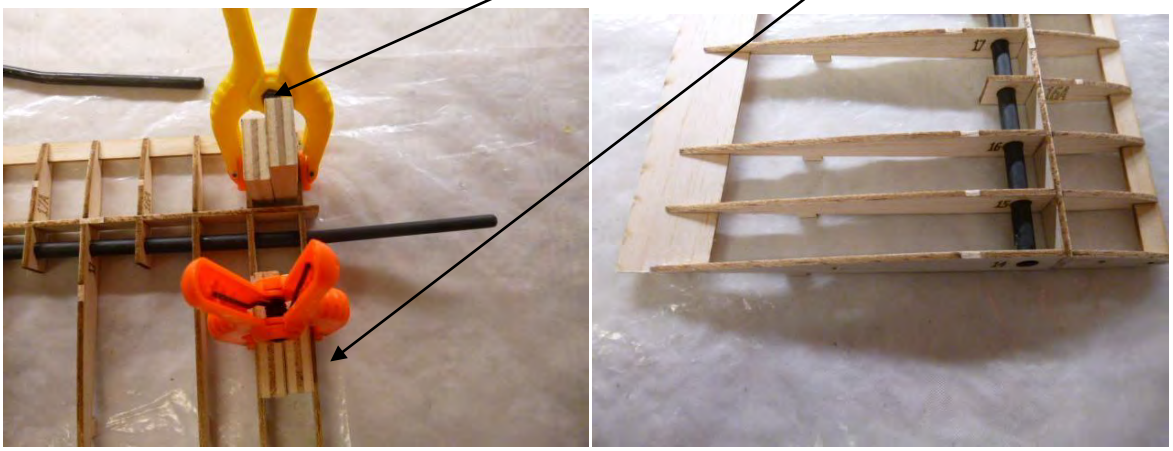
Same precedure for the building as the inboard wing.

First, sort all necessary parts for the outboard wing:

Put the ribs 14, 15, 16, 16A, 17, 17A 18, 18A, 19, 19A 20, 20A, 21, 21A, 22, 22A, 23, 24 on the carbon spar in a 90° angle. After that install the balsa spar and the inner leading edge.



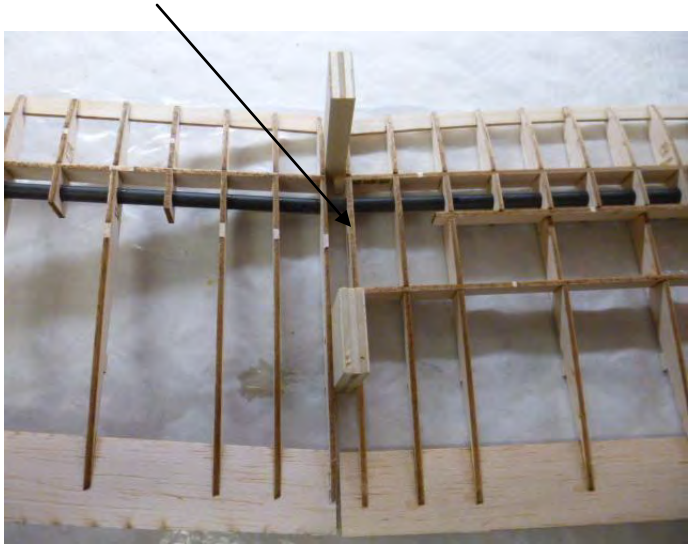
Together with that wingrib tool adjust the ribs to 90° to the spars. Now time to glue all together!.Rib 14 needs to be installed exactly parallel to rib 15 with a gap of 20mm.



Grind the spars, leading edge and trailing edge flush to the wing root rib of the outboard wing.

Build up the other outboard wing the same way.

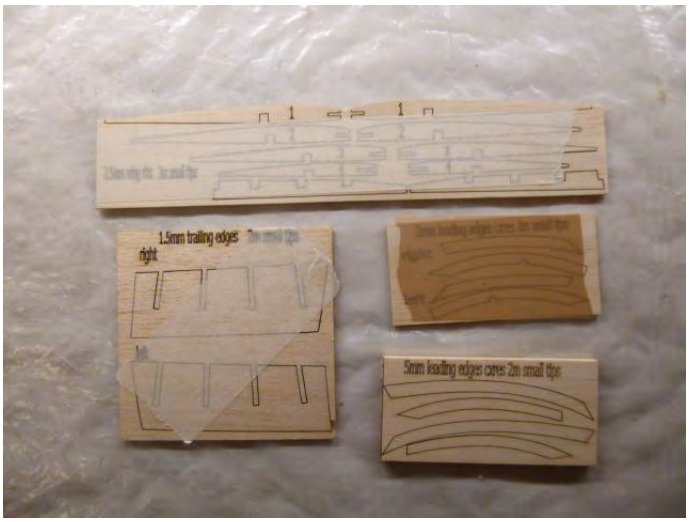
If you built up the L/H and R/H outboard wings, it is time for some sanding, now the wing joiners. They also have to fit perfectly to the wing joiner tubes (in the outboard AND in the inboard wing panels. Now put the wings togeter and adjust rib 13 as shown in the picure below.



Wing-Tips

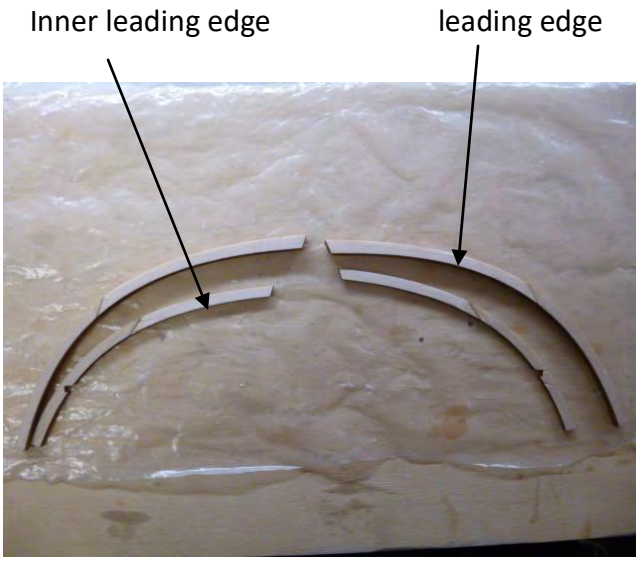
The wing tips are made out of the following parts:

Pay attention to the trailing edges (L/H and R/H side



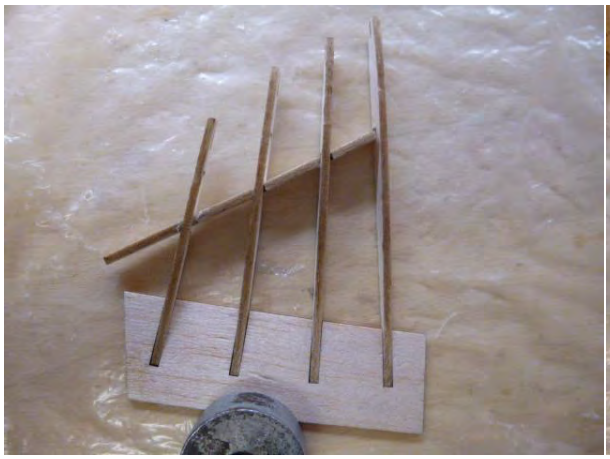
Sort the parts as shown. For the ribs: There is no L/H and R/H side.

The inner leadige edge is 2mm thick. The leading edge is 5mm thick. Put the parts for the leading edge and for the inner leading edge together and glue them with super glue.



Now put and glue rib 1 to 4 into the spar and the trailing edge panel. The trailing edge panel needs to lay flat on your building surface.

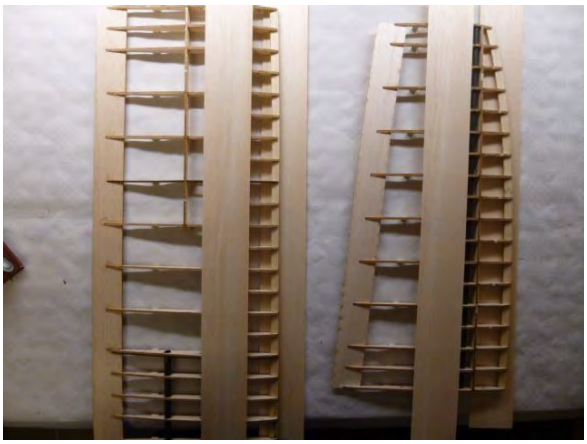
Time to install and glue the inner leading edge to the ribs.



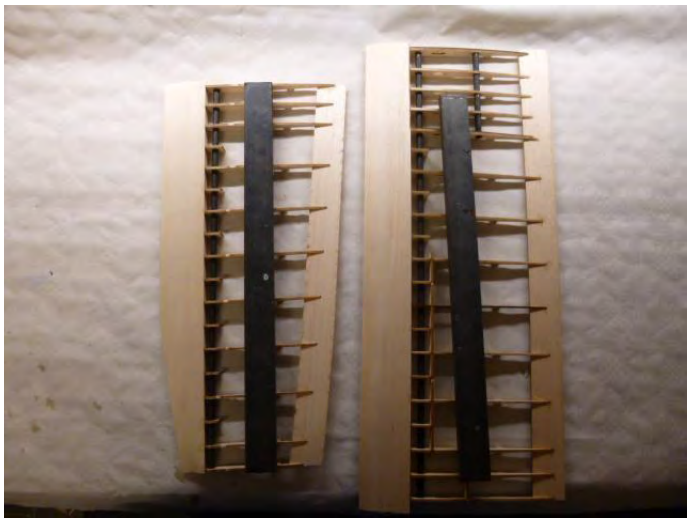
Finally install and glue the leading edge.

The main framework of the wings is done now. Time to install the D-Box skin to the wings, made out of 1mm balsa.

There are 6 balsa sheets in the kit. For the D-Box skin you need four oft hem. Cut them lengthwise, so you have 8 skin parts, for the inboard and outboard wings, upper and lower side.

First you have to install the skin on the upper sides. To prevent deformation of the wings, put some heavy weights on the wings, so all wings are standing flat on your building surface.

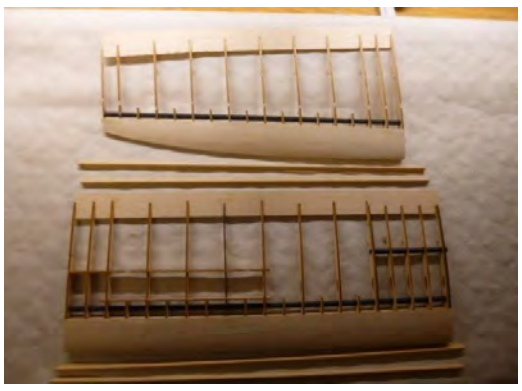


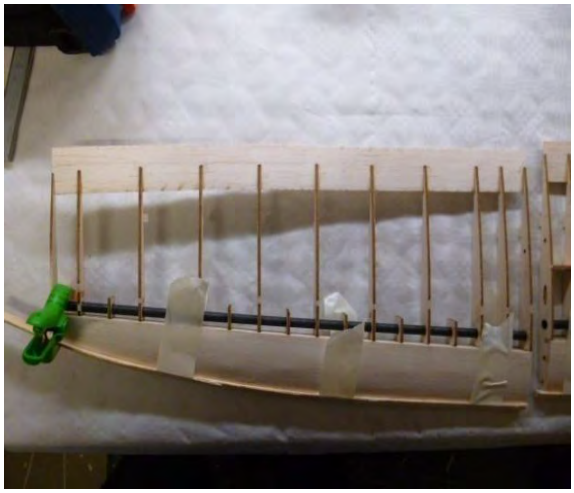
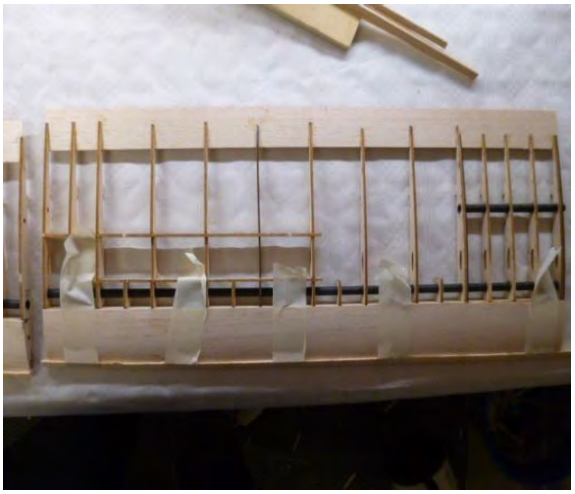
Next step: Install the lower D-Box skin to your wings. To get a good bonding between the ribs and the skin, use PVA glue.


When the glue is cured, sand the skin panels up to the inner leading edge. Pay attention to your wing connections for a smooth crossover.


After grinding the fwd edge of your wings, install the leading edges.
We prefer PVA glue, so you have enough time for the adjustment of the leading edge to the wings.
We put the leading edge of the outboard wings into water, so it is more flexible. Do it as your best shop practice.

The long leading edges are for the inboard wings, the shorter leading edges are for the outboard wings. Pay attention to the profile shape. The leading edges for the outboard wings are conical. They thin out to the outboard side.

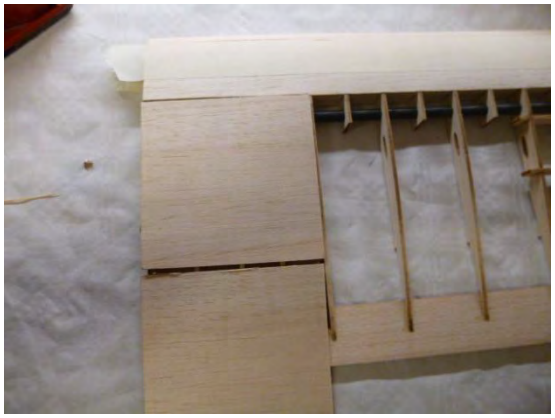
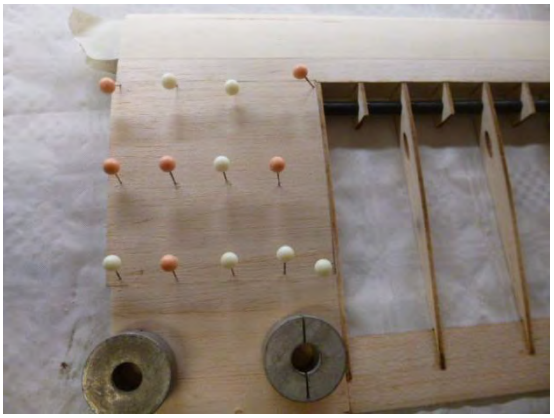


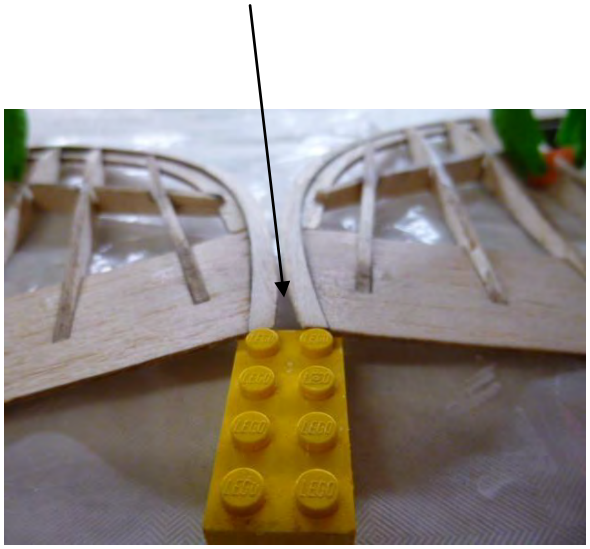
After the curing time of your glue, you can sand the leading edges. Protect you skin panels with tape, it makes the grinding much easier.

Time to remove the stands of the ribs.

After that, you can install the skin inner skin panels of the inboard wings on the upper and lower side. For that, use the other two 1mm balsa sheets.

Time to sand your wing tips. Install them to your outboard wings. Pay attention to the correct angle (The height of the wing tips must be identical on the L/H and R/H side)

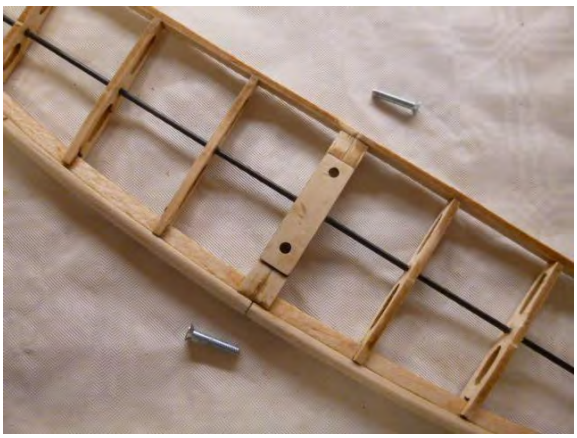


Final assembly of the fuselage

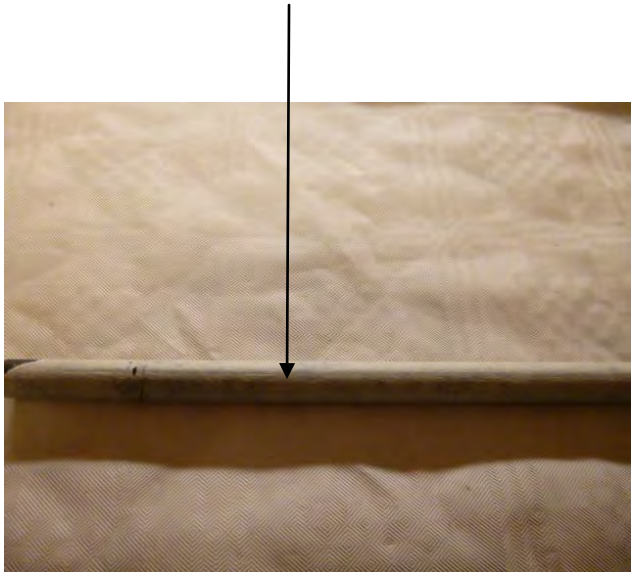
The first step here ist o install the wing to fuselage fairings to your fuselage. Use both wing joiners for a perfect adjustment.

Put all the parts for the Pylon for the horizontal stabilizer together in the correct position and sequence. The surface on the pylon for the horizontal stabilizer needs to be sanded with the shape of the profile. The chord of the horizontal stabilizer needs to be parallel to the fuselage carbon rod.

Drill the holes for the screws of the horizontal stabilizer.

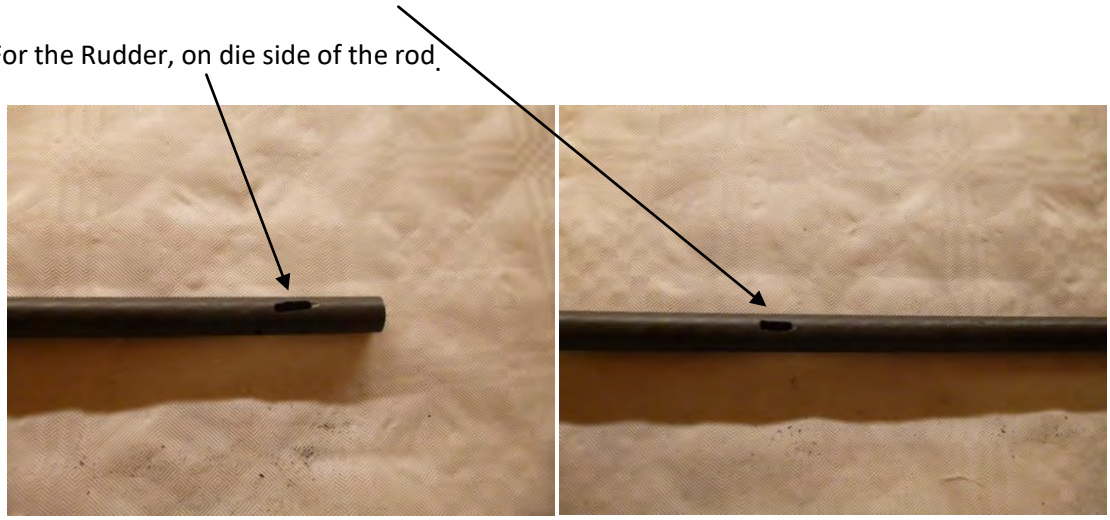


For the adjustment of the stabilizers and for the linkages we put some tape on the fuselage and markt he middle of the rod.



Drill a hole at the correct position (right behind the pylon) for the elevator linkage on the upper side. Die Anlenkung für das Höhenruder kommt mittig hinter der hinteren Schraube aus dem Ausleger,

For the Rudder, on die side of the rod.

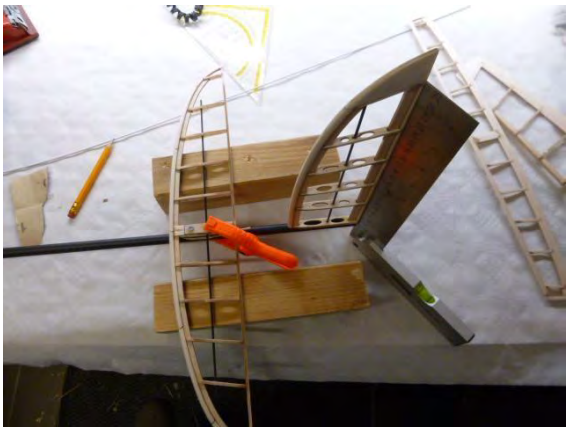


Time to install the bowden cables into your fuselage carbon rod. Pay attention, that the bowden cables are long enough at the servo side.

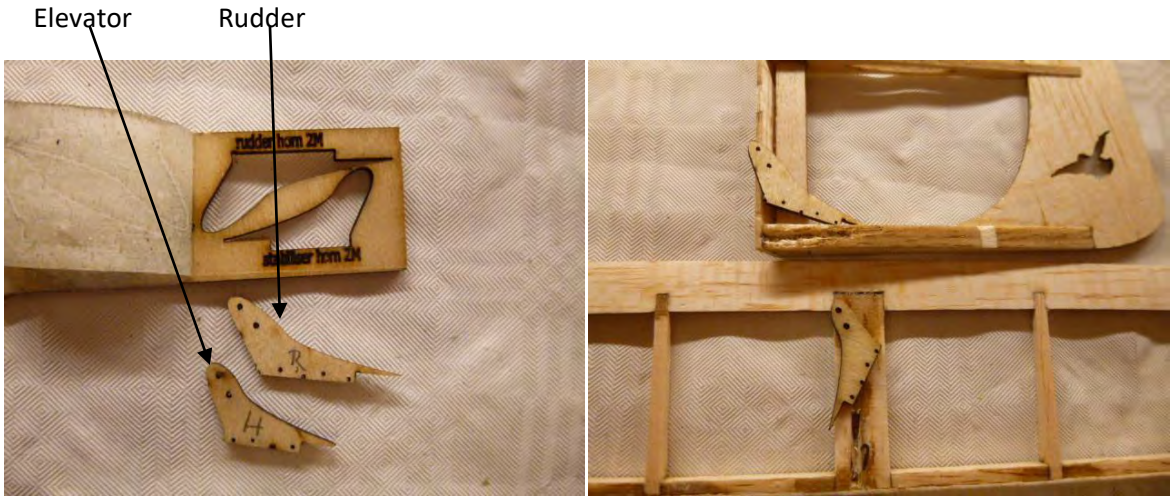
Now install the pylon. Keep a distance of 5mm from the trailing edge of the elevator to the leading edge Of the vertical stabilizer.

If you want to put your carbon spar of the vertical fin into your fuselage carbon rod, you have to adjust the vertical fin and the horizontal stabilizer in an exact 90° angle. After that, glue your pylon to the carbon rod.

We recommend to glue the vertical fin after covering.



Remove the unwanted material out of the notches of the rudder and elevator. Attention: There is a horn for the elevator and a horn for the rudder (Markings on the plywood sheet)

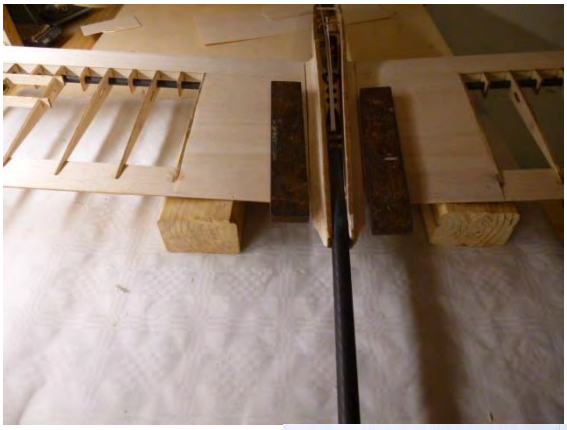


We recommend to install the horns after covering.

Bevor der Rumpf oben geschlossen wird, sollten die Servokabel eingezogen werden. Mit geschlossenem Rumpf wird das sonst ein Gefummel. Die Buchsen stehen ca. 4mm über und müssen nicht geklebt werden. Ich zeichne mir außen am Rumpf immer Signal und Minus an. Kann man, muss man aber nicht.

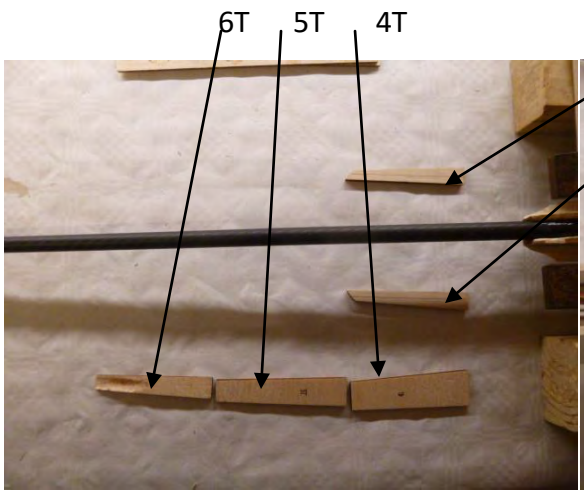
Wer will kann an dieser Stelle die Flächenverbinder mit dem Rumpf verkleben. Die Flächen müssen sich leicht und bündig zu den Formteilen aufschieben lassen.

Adjust and glue the fuselage carbon tube to the wings and fuselage. The Bowden rods are on the upper side of the fuselage middle sheet (see picture)



We recommend to use 5min Epoxy to glue the carbon tube to the fuselage.

Time to install the upper skin panels 4T, 5T and 6T to the fuselage. The aft skin parts need to be trimmed to the fuselage carbon tube.

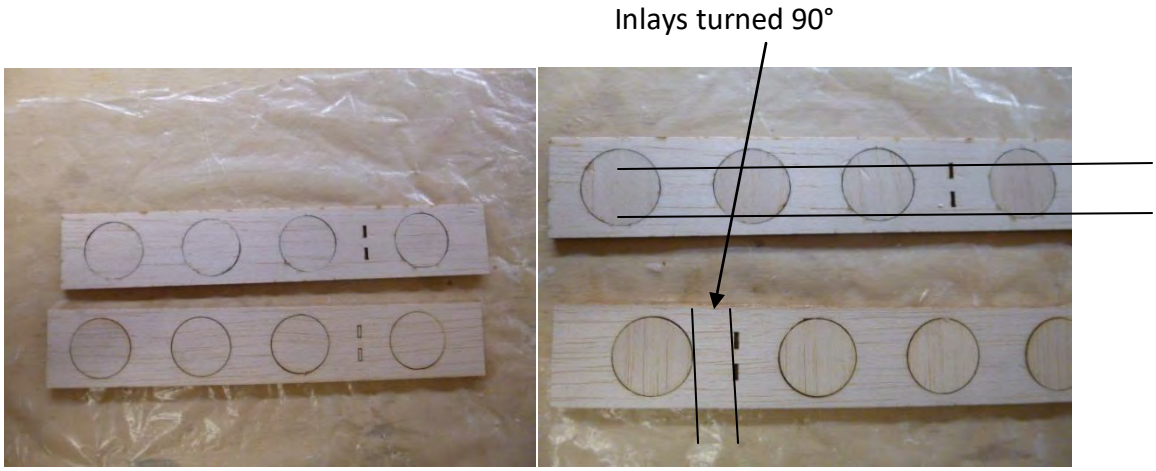


Sand the Fuselage to a smooth shape.

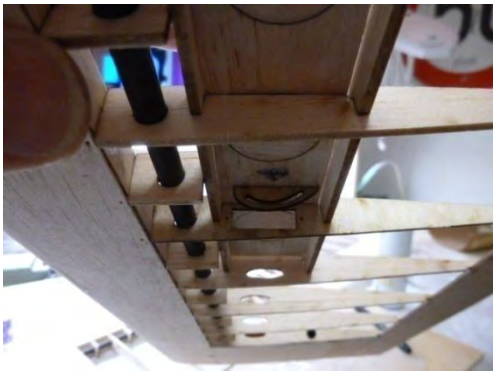
Final assembly of the wings

Time for preperation of the spoilers.

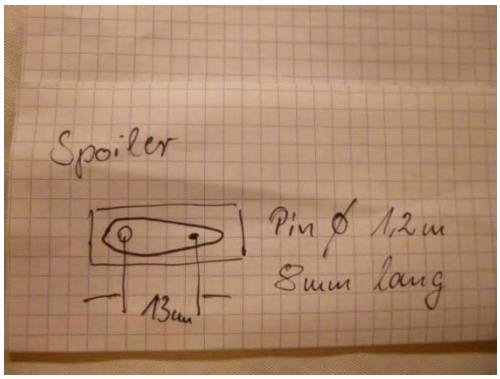
Carfully remove the round cut outs out of the spoilers and reinstall them turned 90°. The grain direction of the spoilers is horizontal, the grain direction of the round inlays is after reinstallation vertical. This will help to make the spoilers nearly torsion-free.



Install the „horn“ of the spoilers for the opening/closing mechanism. Pay attention, the round end needs to be in flight direction at the forward edge.



The 2m got a direct spoiler actuation via Servo (We recommend the CHASERVO DS06). Install a 8mm long pin with a diameter of 1.2mm in a distance of 13mm from the pivot point of the servo in the servo horn. The servo normally got enough torque to hold the spoiler down during launch and flight. If you want, you can install the provided magnets to the wing and a small piece of metal to the spoiler itself.



Now you can finally sand your wings to a smooth shape.

The 2m is now ready for covering. Design your 2m as you like it most. We recommend a light cover material such as Oralight.

Install the servo cables for the spoiler servos before covering. It is much easier.

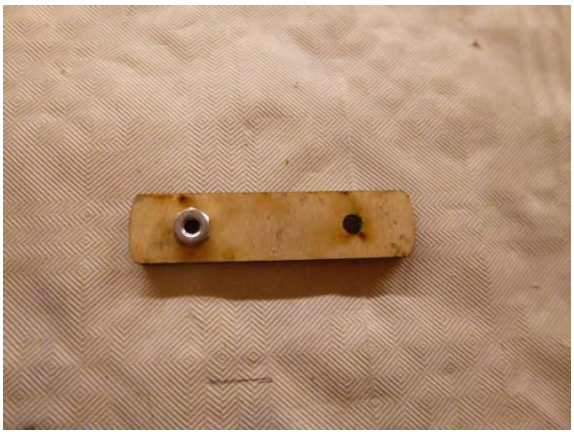
First step is to cover the stabilizers. We recommend not to install the rudder directly to the fin. It is much easier when you install the push/pull rods.

The elevator is removable via screws, so you can install the elevator to the stabilizer now. Do it as you want, with covering material or with tape.

Adjustable launch hook

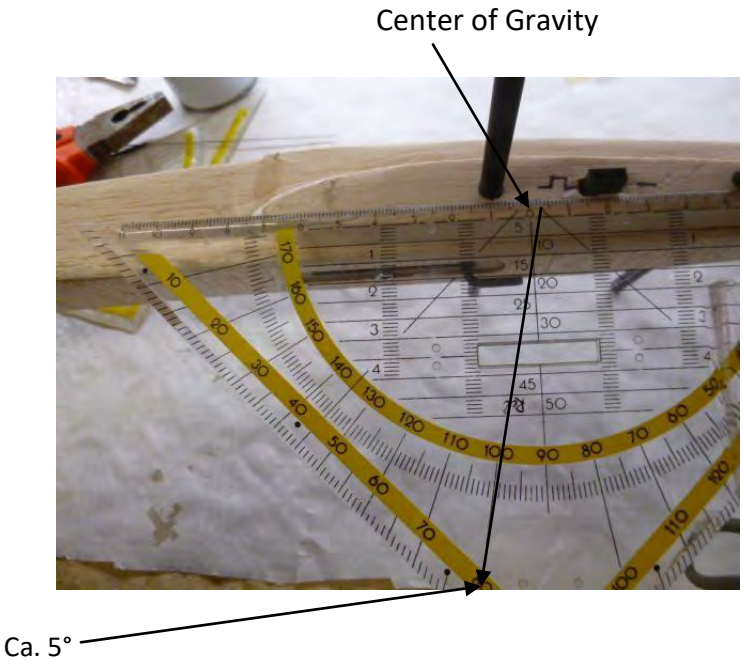
The hook is made out of the following parts:

Glue the plywood sheets together. Put the M3 nut into the cutout. On the other side, place the second M3 nut above the hole and glue it in place.



Put the hook in place into your fuselage as shown in the pictures below. Install a washer under the head of the adjustment screw to safe your fuselage.

For the first launches, we recommend a position of 5° from the CoG. Place the hook after a few flights in your favourite position.



Now, your 2m is nearly ready for takeoff.

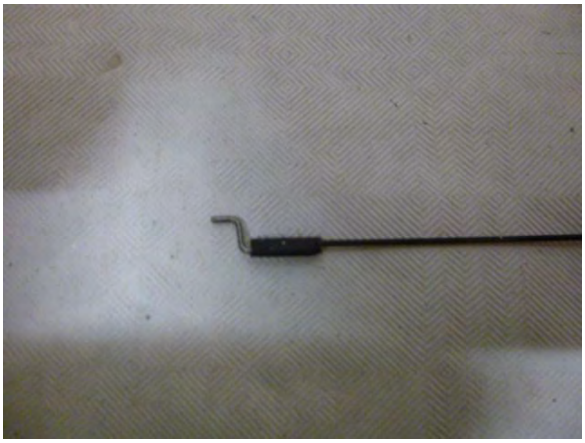
We recommend a Center of Gravity at 69mm, measured from the leading edge. For windy days you can go up to 62mm and for calm days, you can go up to 76mm.

RC-Installation

Install your RC equipment as per best shop practice. Here we shortly show you how to install the carbon rods for the linkage.

Before you install the carbon rods to the tubes, cut the tubes to the correct length in the fuselage.

Install a Z-wire to the 0.8mm carbon rods on your work bench with super glue and heat shrink.



Install the Z-wire to your rudder and push the carbon rods into the tubes. Now is the best time to install your rudder to the fin with covering material or tape.

The connection of the linkage and the servo horns works the same way

Non-Warranty: We are not responsible for resulting damages while working with this manual or during handling with the 2m.