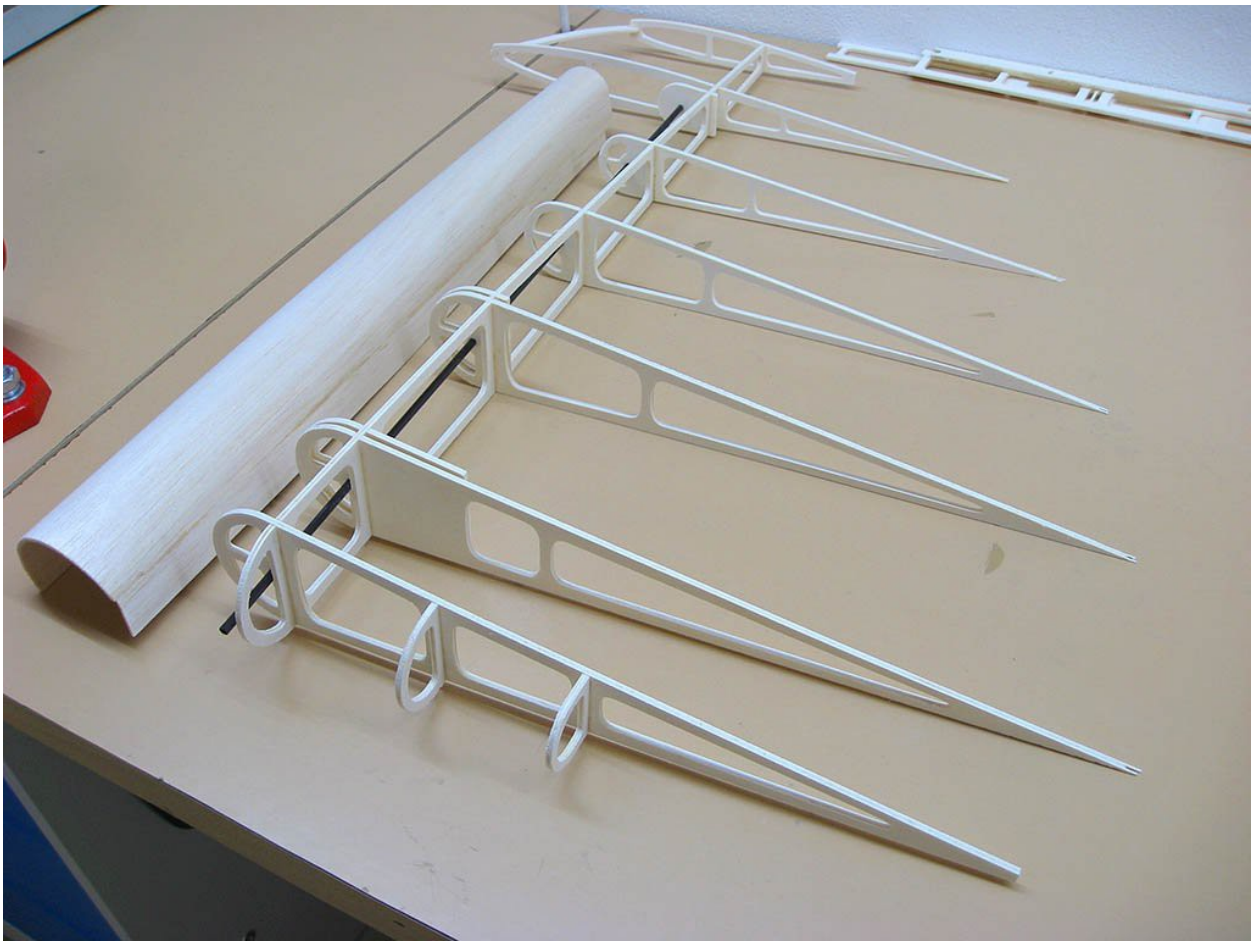
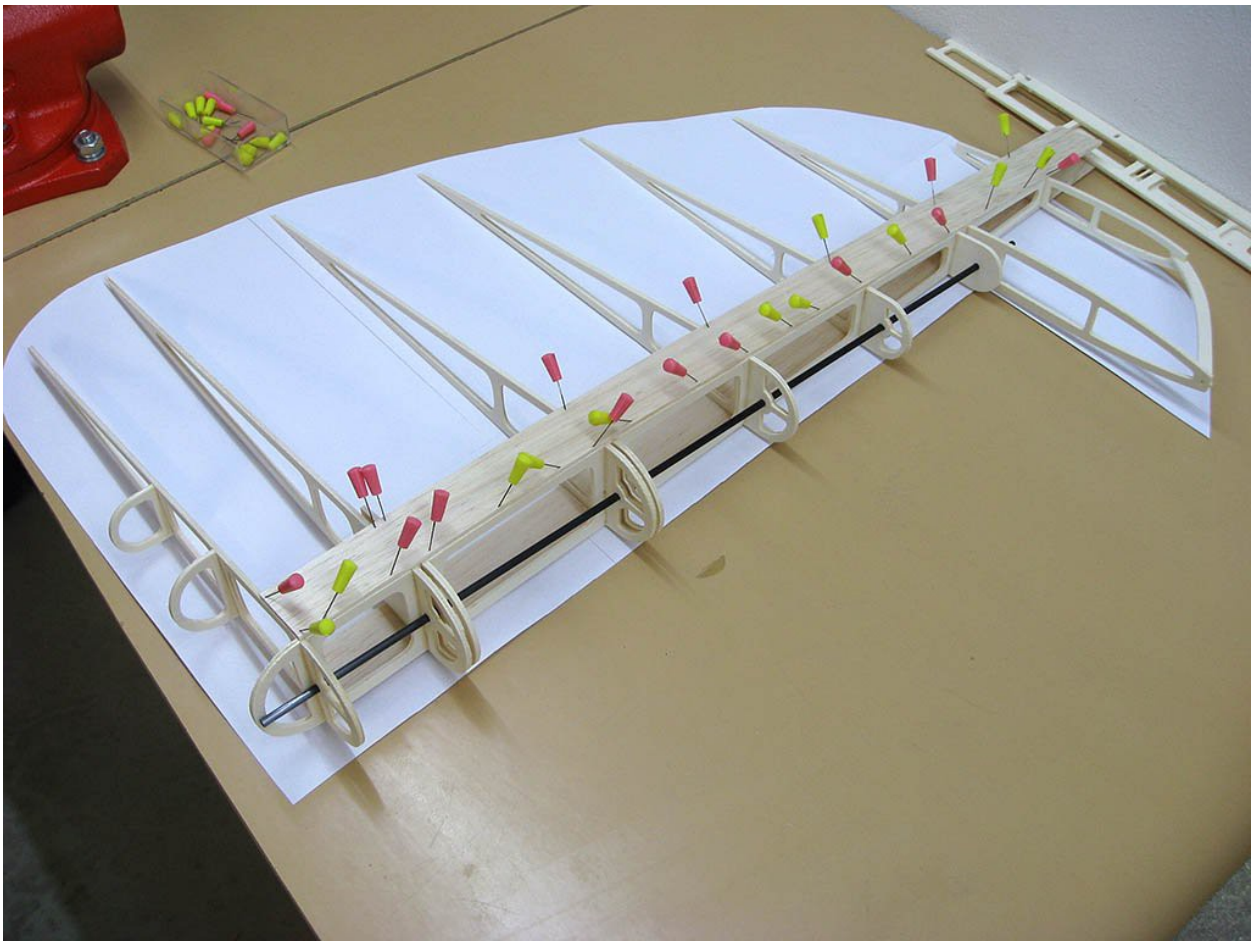
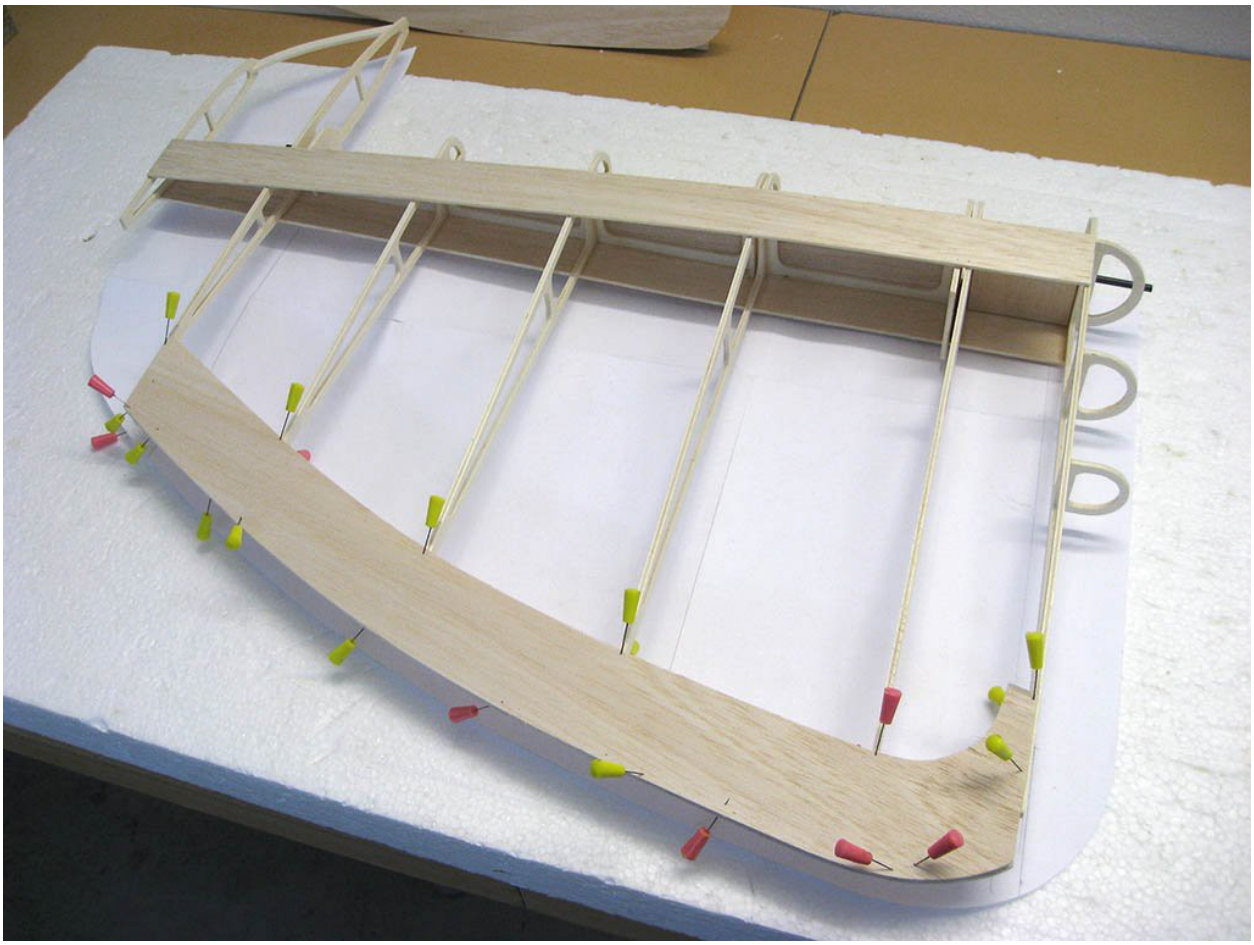
TAIL



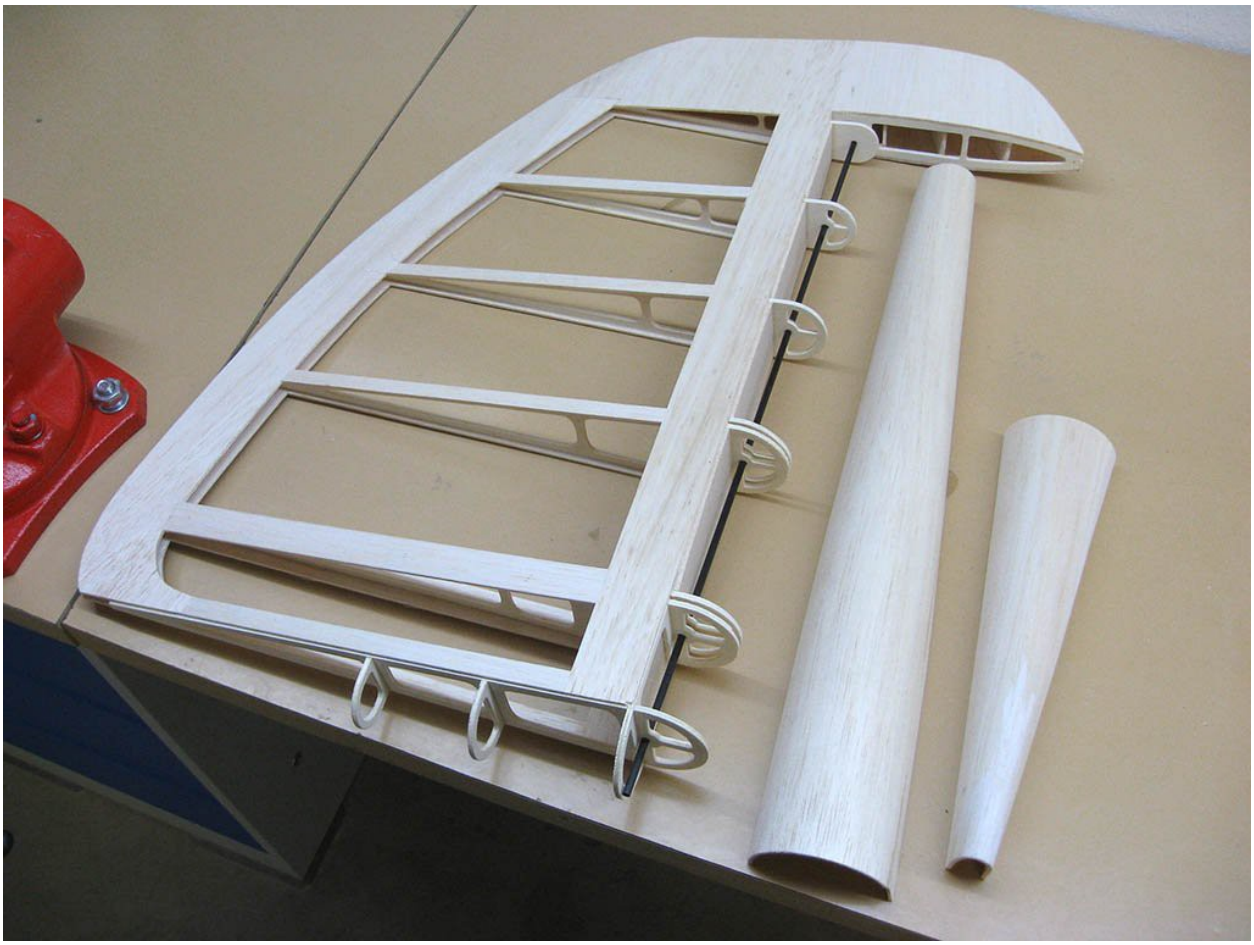
Here is a different procedure than the original version, when there were problems with the rudder twist. The rudder ribs stick perpendicular to the web. It also glues the half-ribs at the hinges, the front web on the counterweight and the arches at the bottom of the rudder. Before further gluing is going to the front cover of the rudder, which has not only a round but also a little warped shape. The balsa board must be glued in two pieces with a width of more than 100 mm. The board is then dampened longitudinally through the center of the board and wrapped around the ribs around the ribs with the adhesive tape, the tape ensuring the pressing and copying of the shape. After drying the balsa retains its shape. It is not a good idea to bypass this phase and glue the wet sheet, the whole thing will twist and then it must not be straightened through dampening and twisting. In version 2 I only use carbon tubes 4/3 mm, which further saves weight.



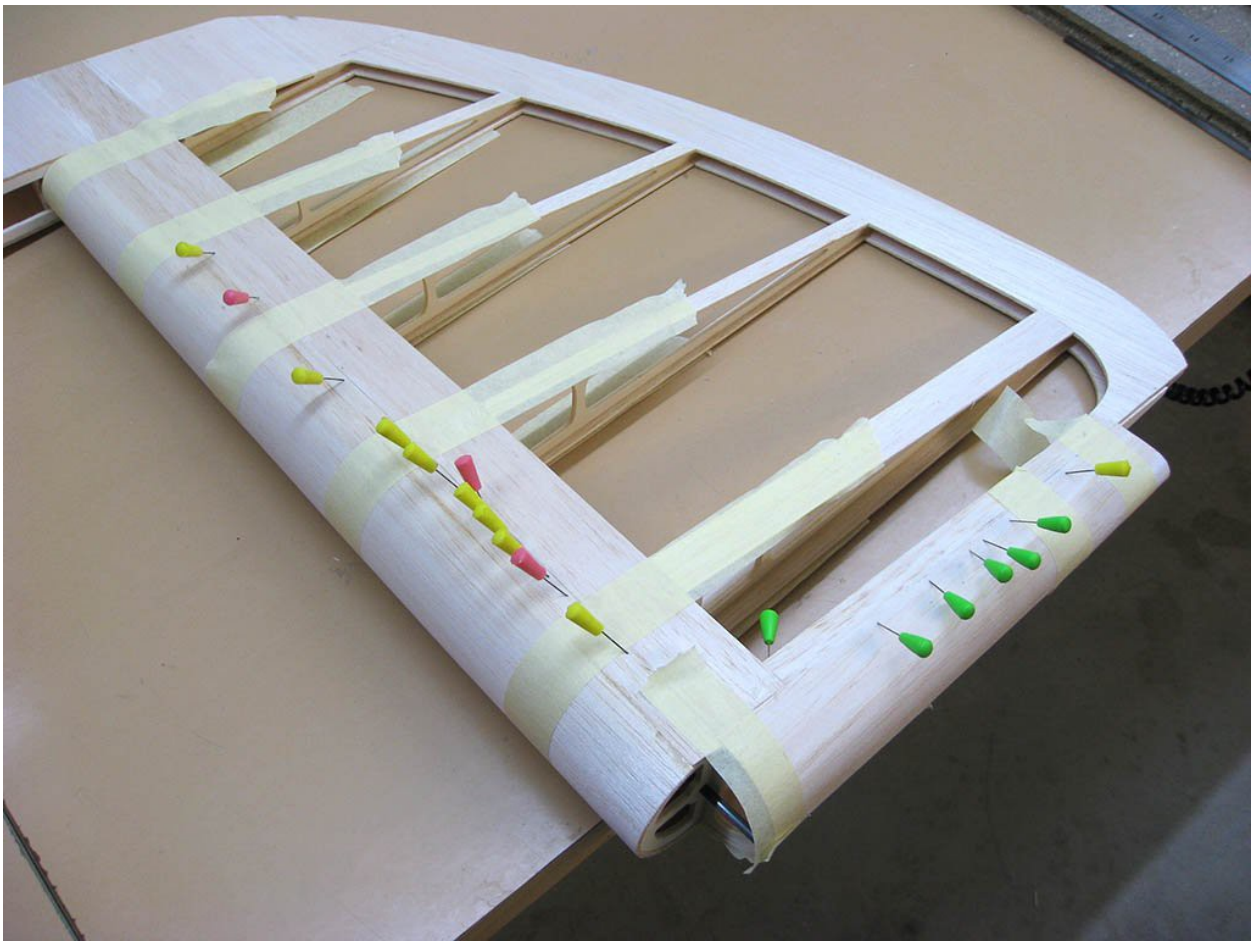
This phase is a bit unpleasant in that it finalizes the position of the ribs relative to each other. So it must stick so that the rudder is straight, the ribs in alignment. It is best to make a fixture in advance to solve the narrowing of the rudder in its lower part so that it can be glued on a flat board. But it is also possible to stick "in hand" with some patience, which I also did. The board on one side will significantly increase stiffness, the other will make it the final, with the ribs then basically cannot move. Subsequently, the pieces of balsa boards are closed by the web in their lightening, which is not in the picture. To prepare the rudder, you need a template for preparing a bladder.



Two identical boards should be carved according to the template. This time they are only from the lower rib to the second from the top. The boards should be made of medium rather than light balsa, otherwise the trailing edge will twist when glued. Gluing itself requires patience, the first settlement usually does not lead to a completely straight runoff. The dispersion starts to hold the parts relatively quickly, and at the same time it is possible to move them, so gluing with another glue is not recommended.

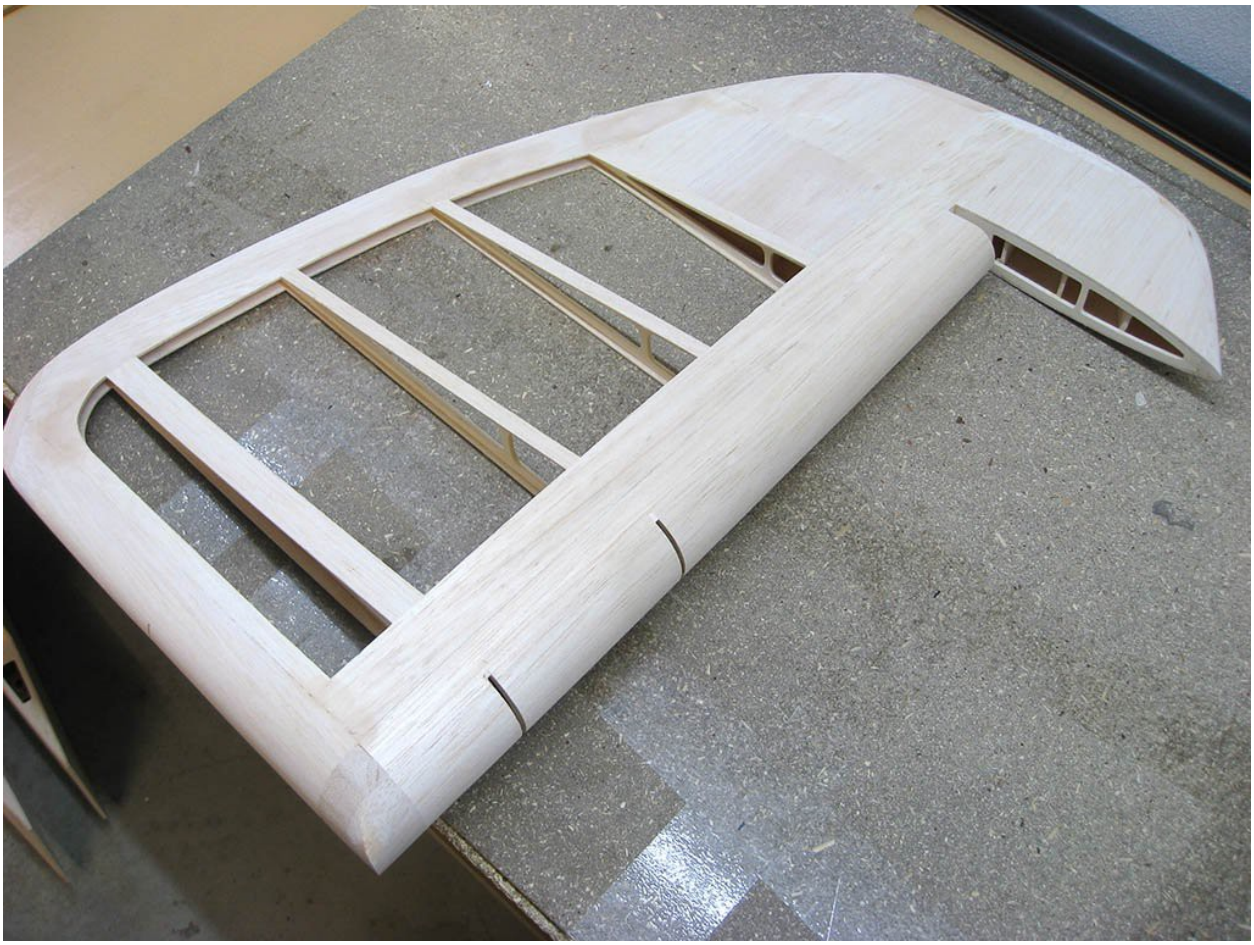


There's not much to comment on. It is advisable to at least roughly shape the cover before and after the web of the rudder top to form a side elevation of the rudder. It is strapped with 2 mm thick and 10 mm wide balsal tapes, except for a 20 mm wide strip on the rib, where the rudder lever will later be. Also the lower rib is banded. The tape is glued so that approximately half of the rib remains exposed. The photo shows the pre-bent covers of the front and bottom of the rudder.

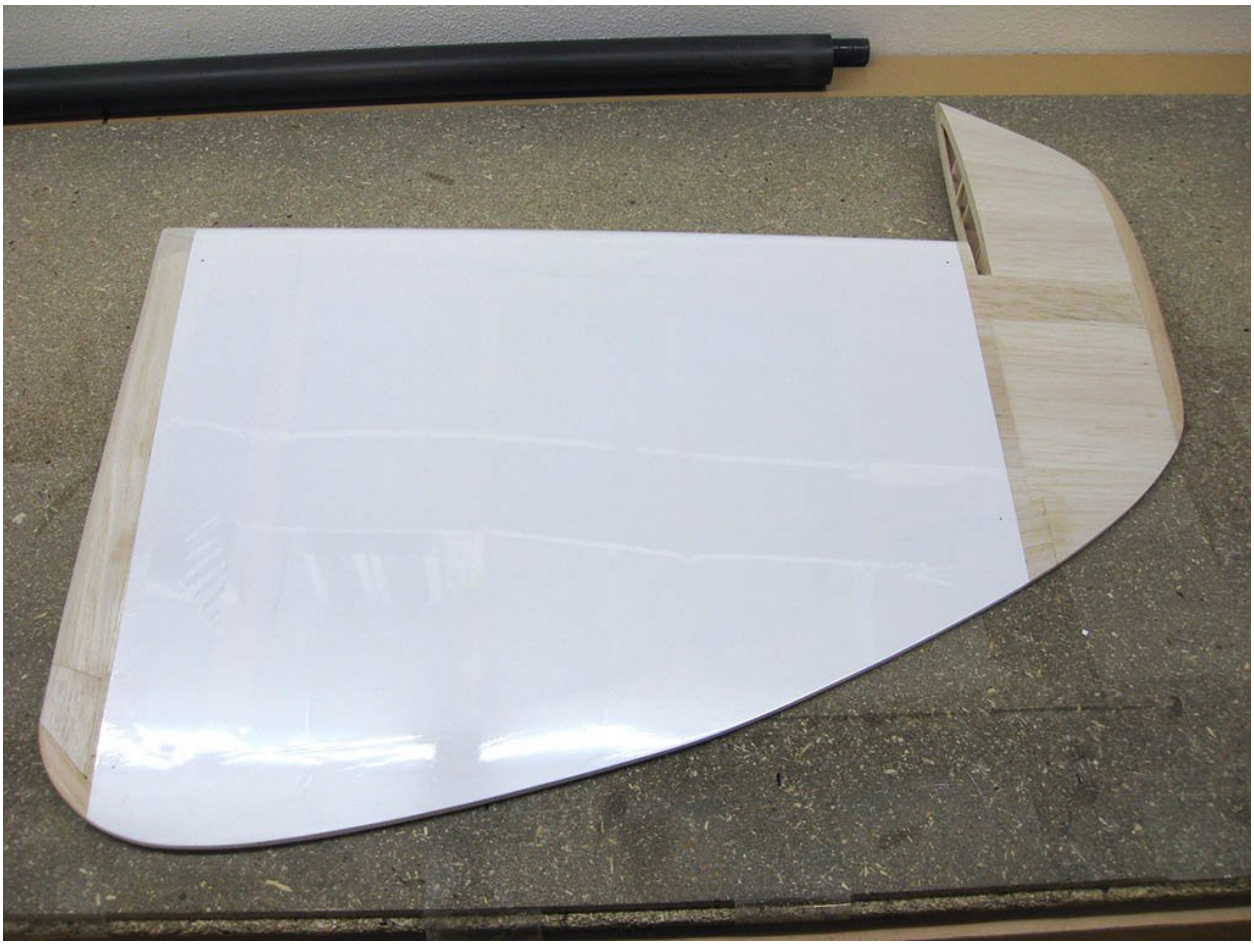


It is necessary to save the covers before gluing, then gluing will be comfortable. First the cover of the front of the rudder is glued and then the cover of the lower of the rudder. It is not tightened to the end, here the rudder will be finished from a block of balsa, visolists know that this part is often stressed ...

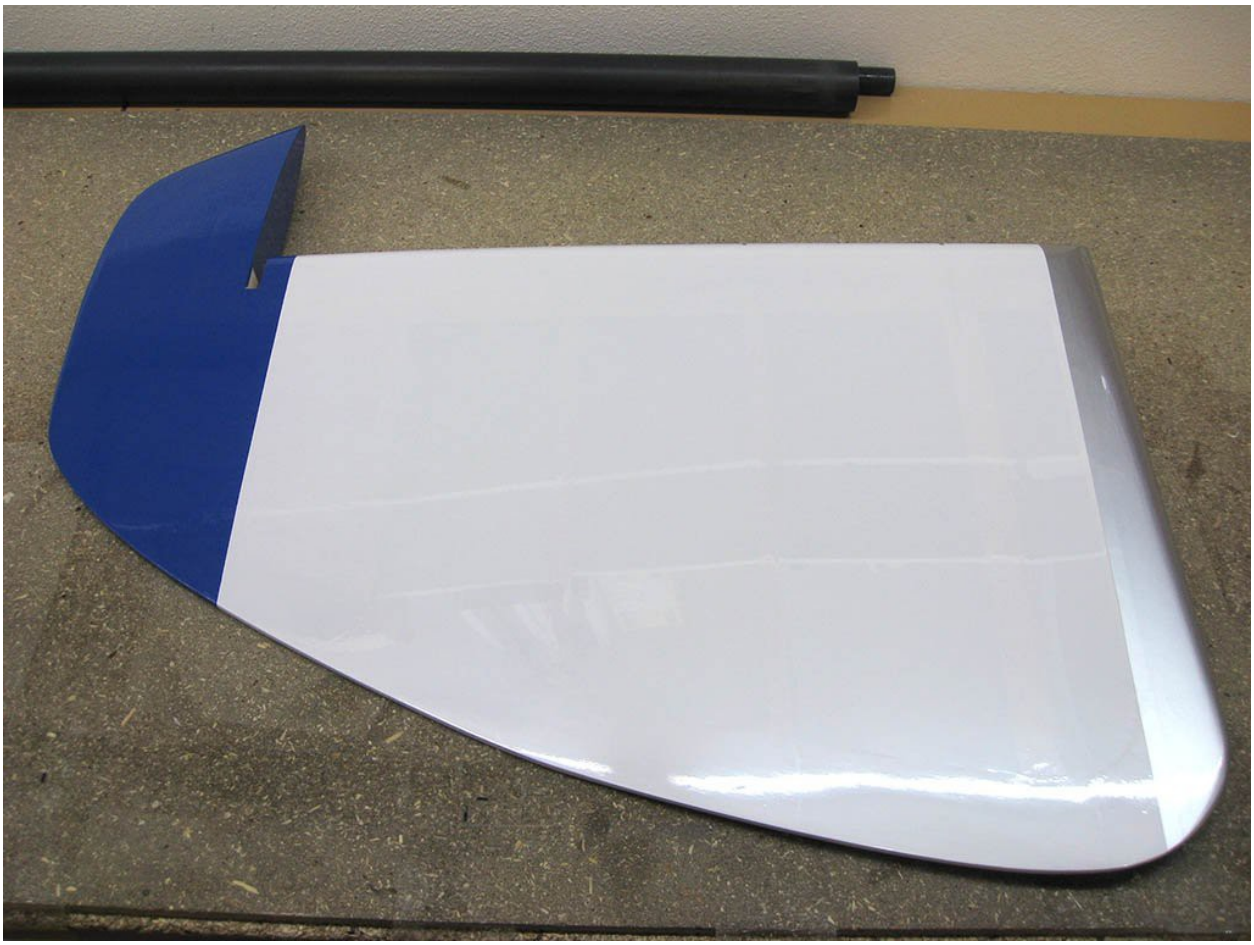
For rough completion signs must dolepit missing parts of lightweight balsa logs. At the leading edge down missing voluminous piece. It is good to pre-shape the log and then to fit it with the structure so that it fits during gluing. Before gluing it must be drilled to pass through the carbon rod. It is possible even after sticking, but it is usually not possible to hit the angle so that the rod can go all the way in and out. The lower end of the rudder is best dolepí logs up to the level of the lower ribs and then recommend the entire end be cut at an angle of about 45 degrees and dolepit harder balsa blocks. Peak rudder dolepí blocks are shaped by drawing, at the front left margin to the leading edge, to be finishing up together with the fin to the fuselage.



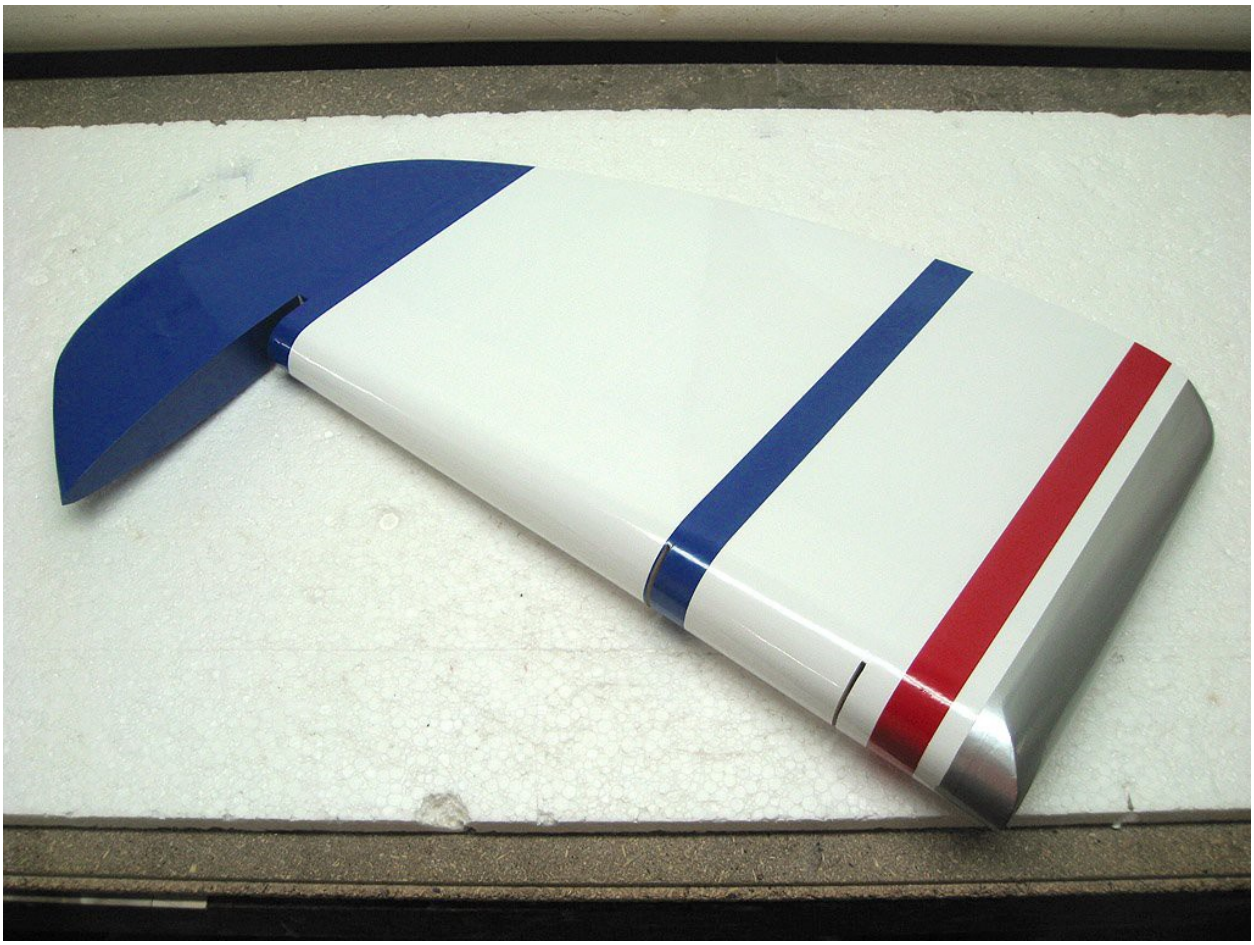
In addition, I used a solid cover for the top window under the counterweight, which will then not twist as much as it would without a hard cover. After cutting and grinding it is necessary to turn the rudder on the fuselage. The rudder must walk freely throughout the entire rotation range. Free movement is achieved by gradual grinding holes hinge in the rudder. If the holes are longer than necessary for maximum deflection, the hole is backed up with a piece of balsa. Finally, the entire rudder is finally finely ground.



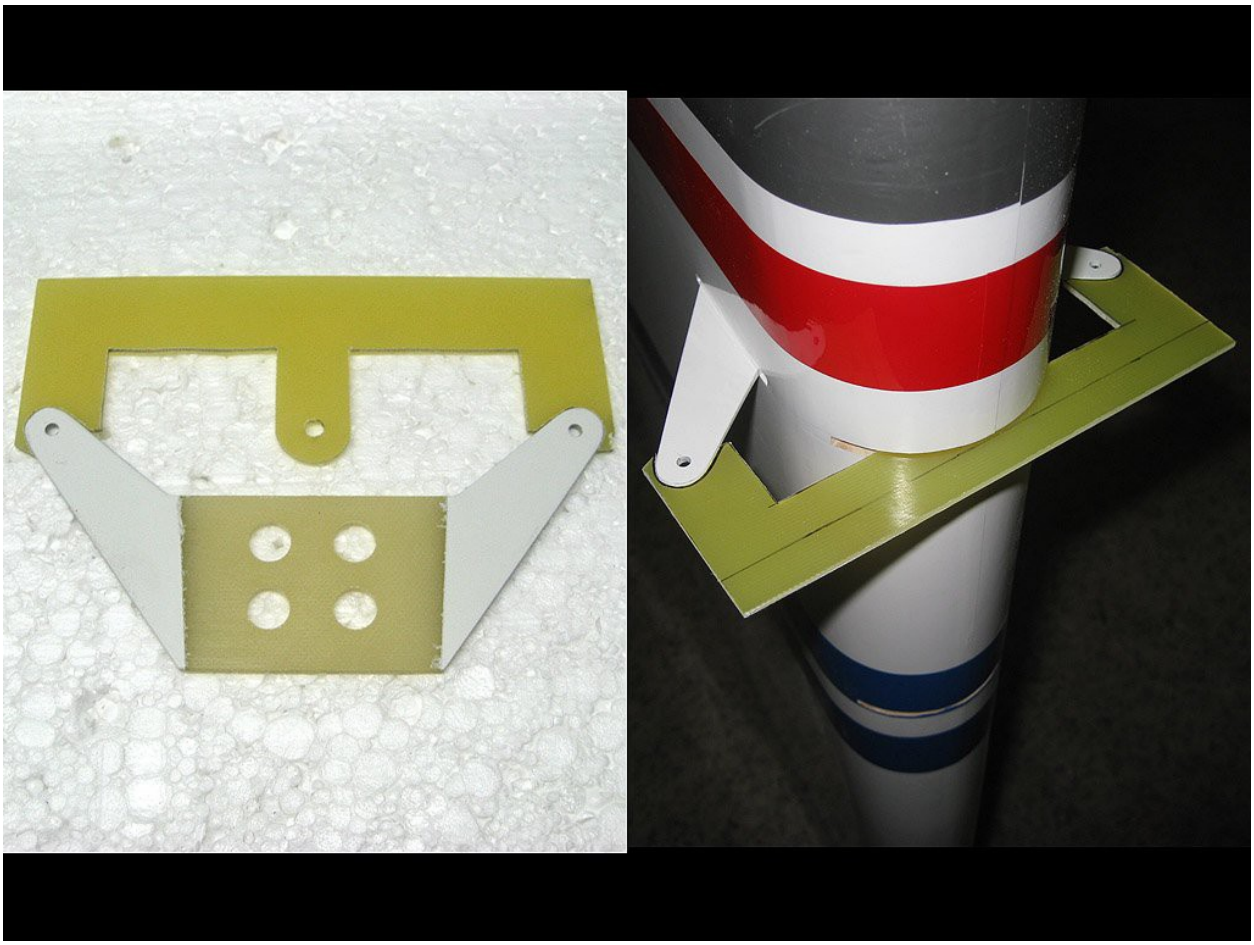
At the rudder, I did not iron the cover in advance, the color divisions are on a continuous surface, and I also wanted to accurately deploy the color dividers on the fuselage and the rudder. At first, I marked the dividers with a 8 mm margin on the rudder, and in this range I pulled white. Then I marked with the marker the position of the divisions on white, so without that 8 mm reserve.



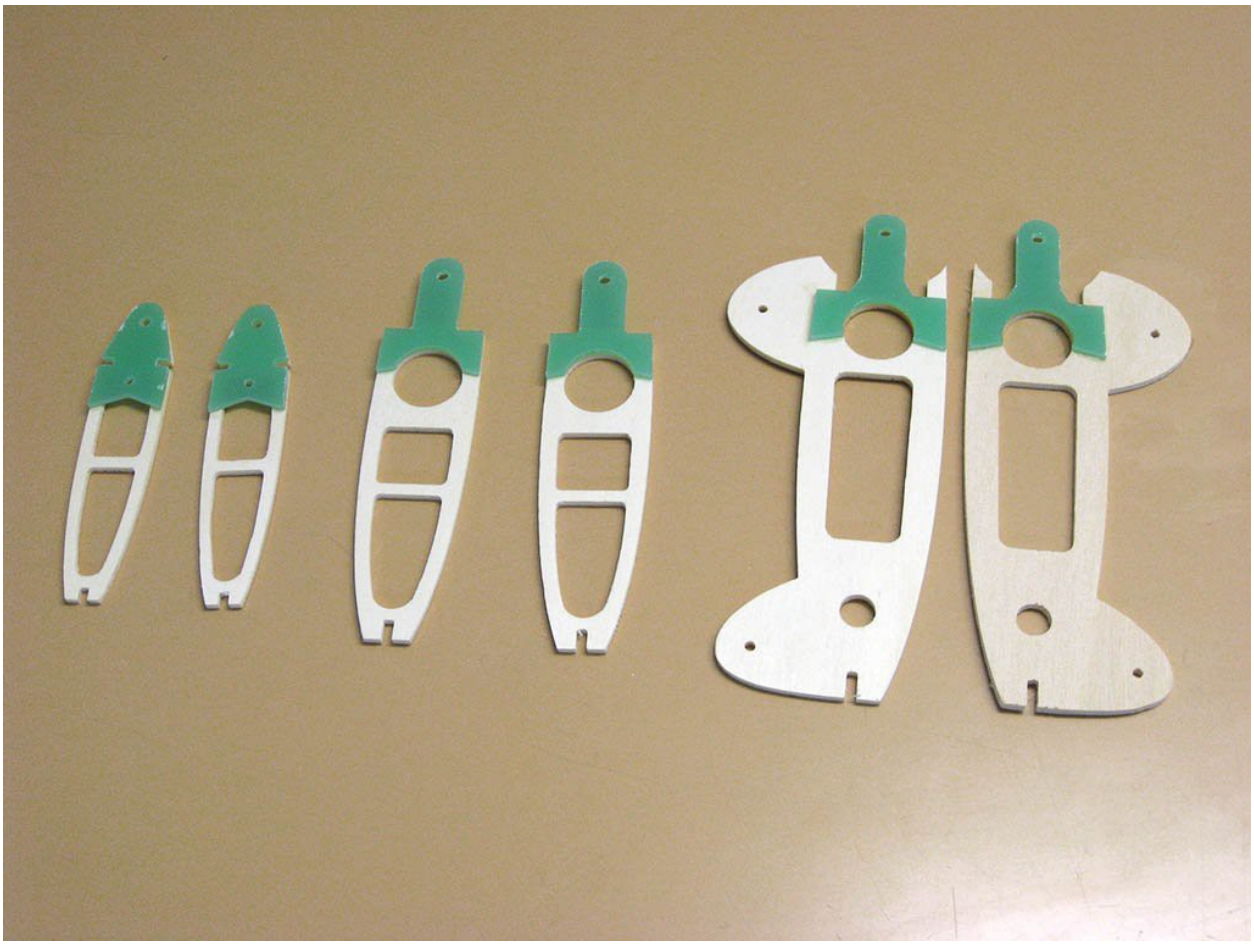
From the marks I then covered with other colors. The marker is easily washed off with acetone.



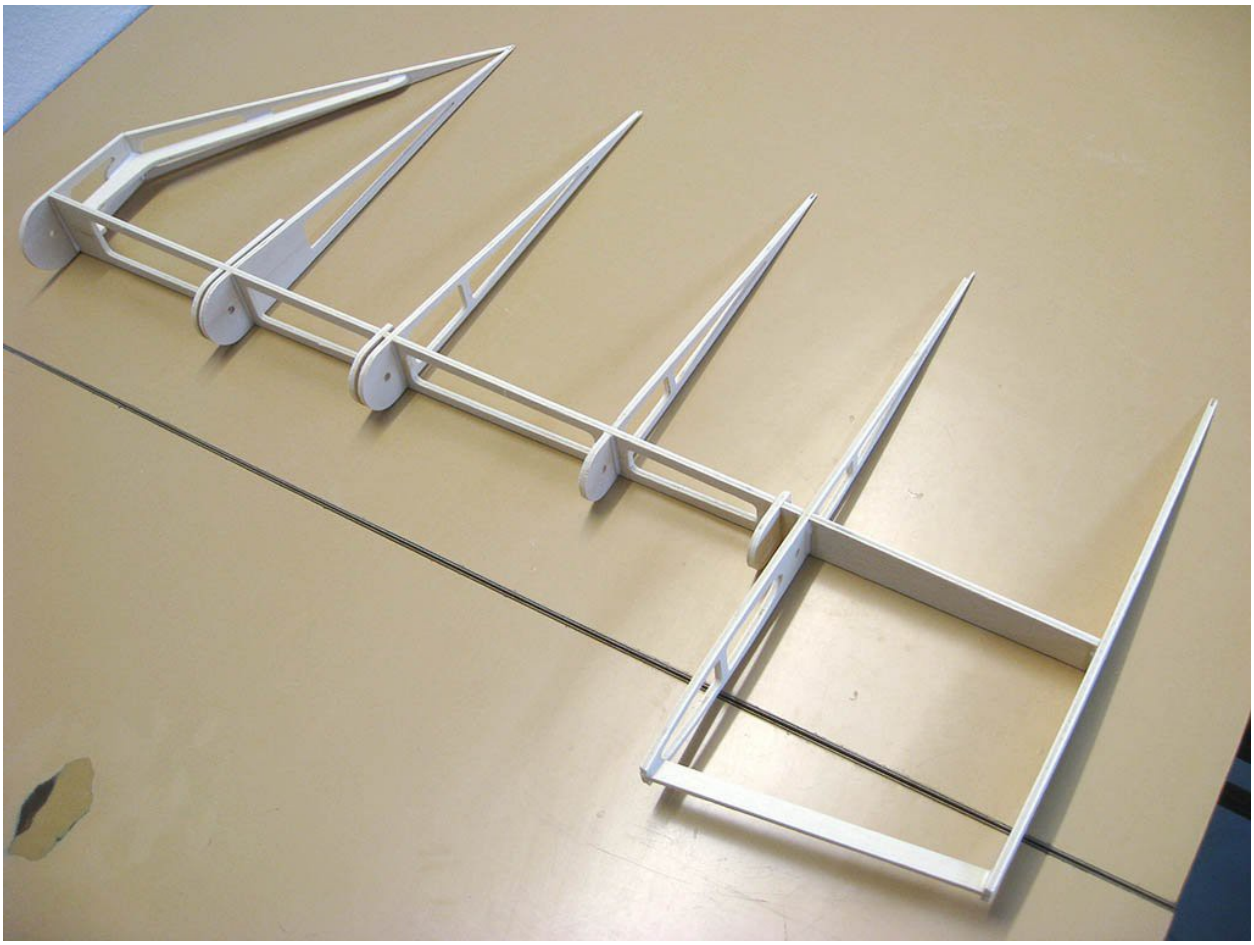
Stripes are ironed at low temperature, max. 150 degrees Celsius. It is ironed gradually and the air is forced out.



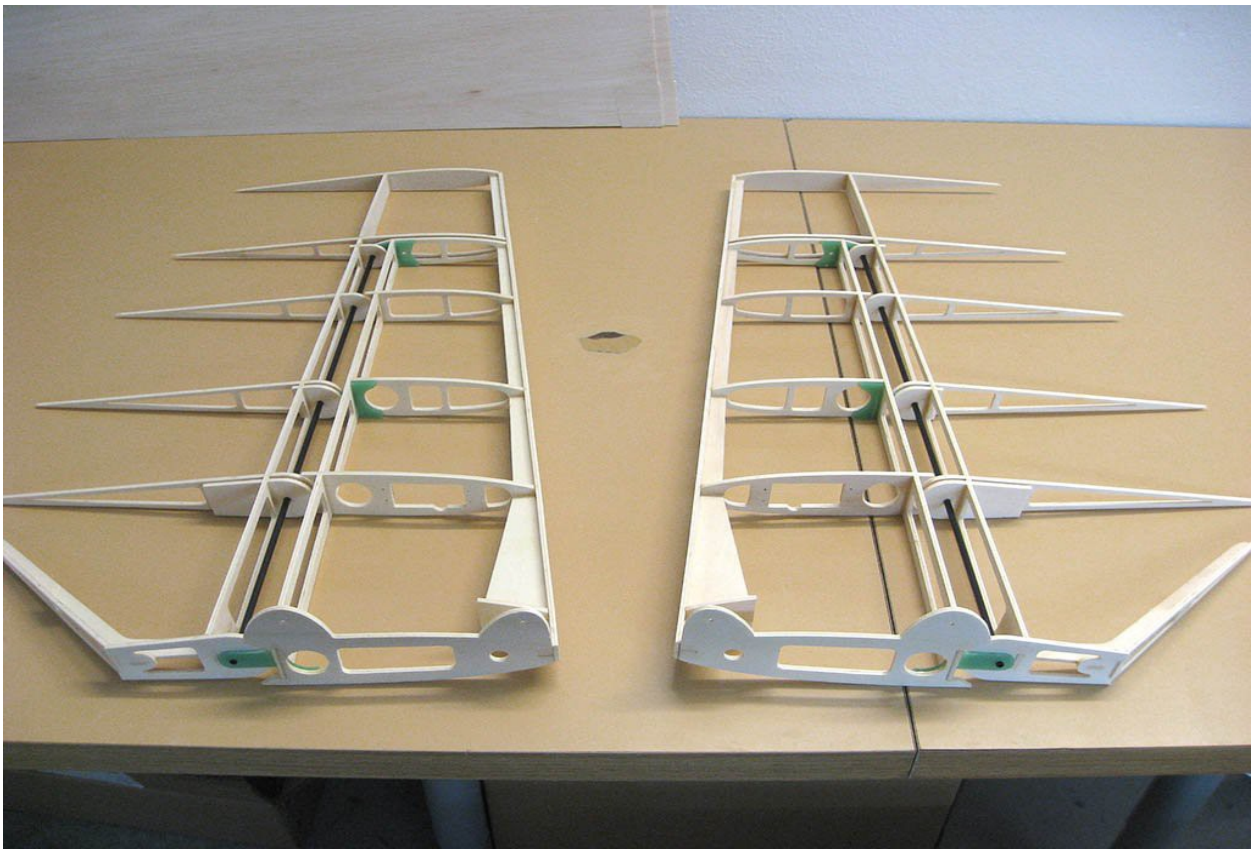
Most consider sticking the rudder lever a trouble-free business. The opposite is true. Gluing the lever to the right geometry is a problem. If a template is used for this purpose and there is a hinge hole at the lever gluing point, this problem is easily solved. The template is carved from glass fiber so that it firmly surrounds the lever. The hole in the brass tube template, which is the center of the rudder turn, must be correctly aligned with the ball joint holes. Since all the openings on the rocker arm of the servos are flush, it must be so. At the same time, the holes must be equidistant from each other. This is the only way to achieve a smooth and accurate turn signal. During gluing, a template is put on the inserted lever, which is centered with a brass tube and finally the lever is set at right angles to the rudder. Pohoda ...



After the parts have been cleaned, it is advisable to attach the elevator hinges to the ribs before bonding the stabilizer. The parts fit to the edge, it must be glued exactly. It is glued with epoxy.



After the parts have been cleaned and dried, the parts are simply glued by dispersion. All ribs and ancillary parts must be glued perpendicular to the elevator web except for the root rib where the required angle is provided by the reinforcement. The parts to be bonded to the reinforcement must be sanded to the bevel before bonding so that they fit together perfectly. This basic elevator construction is largely wrinkled, but for the next step it is necessary that all parts are straight and untwisted and the ribs are perpendicular to the web. If this is not the case after the adhesive has dried, the structure must be moistened and leveled where necessary. During drying, the material returns more to its original condition, so any corrections must be slightly greater than needed when the parts are still wet.

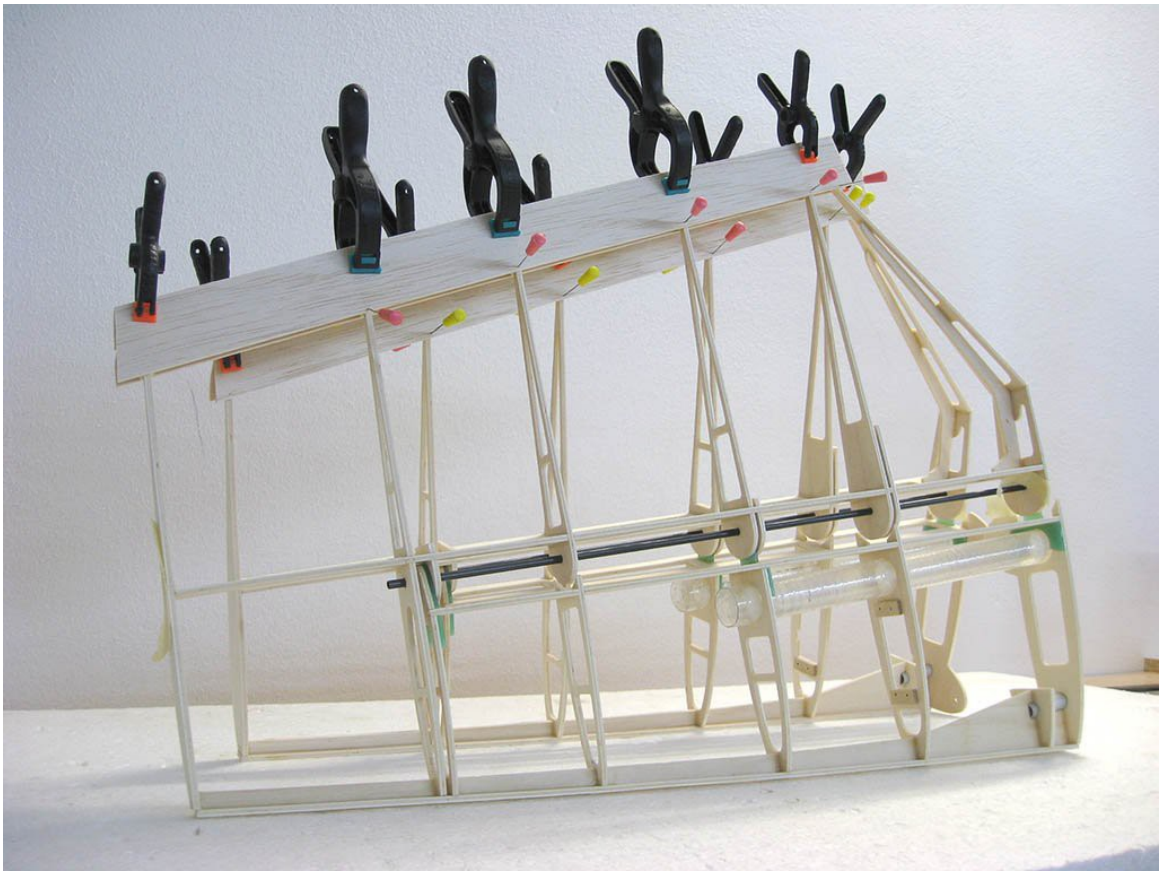


This is quite a demanding action, largely stuck in your hands without templates, unless someone makes them in advance. While the elevator ribs are perpendicular to the web, the stabilizer ribs are not perpendicular to its web, the angle is a slightly smaller leading side of the rib going towards the torso. Before gluing the stabilizer, it is necessary to fix all the holes in the elevator and the stabilizer so that the carbon tube passes through with minimal clearance. Subsequently, the stabilizer parts, with the exception of the root rib and the auxiliary perpendicular edge behind the future inlet, are bonded together with a dispersion. It is advisable to connect the glued part of the stabilizer to the elevator and check the angle between the ribs and the web before the glue completely fits. If the elevator parts are untwisted and the elevator ribs are perpendicular to the web, the same gap shall be slightly greater than 2 mm between the adjacent elevator rib and stabilizer along the entire length. After the glue has dried, the root rib is glued. Be aware of the orientation, the rib mounts must be on the opposite side of the notch in the servo hole of the servocable. It is advisable to check the angle of the rib on the fuselage with the pipe and sleeve inserted before the glue completely fades, or a slight correction should be made. Subsequently, the elevator and the stabilizer are connected by an auxiliary perpendicular edge behind the leading piece to secure the neutral position. The structure thus connected is completely straight, non-twisted, the ribs are connected to each other and are parallel to each other while maintaining the correct procedure. The leading edge must be straight and at the same time the rib ends at the trailing edge must be flush. Another check is to cover the carbon tube with the ends of the ribs and the center of the leading edge. If something is twisted, correction of the structure after

wetting is required. The picture shows both halves of the combined stabilizer and elevator ready for finishing with balsal stiffeners and covers.

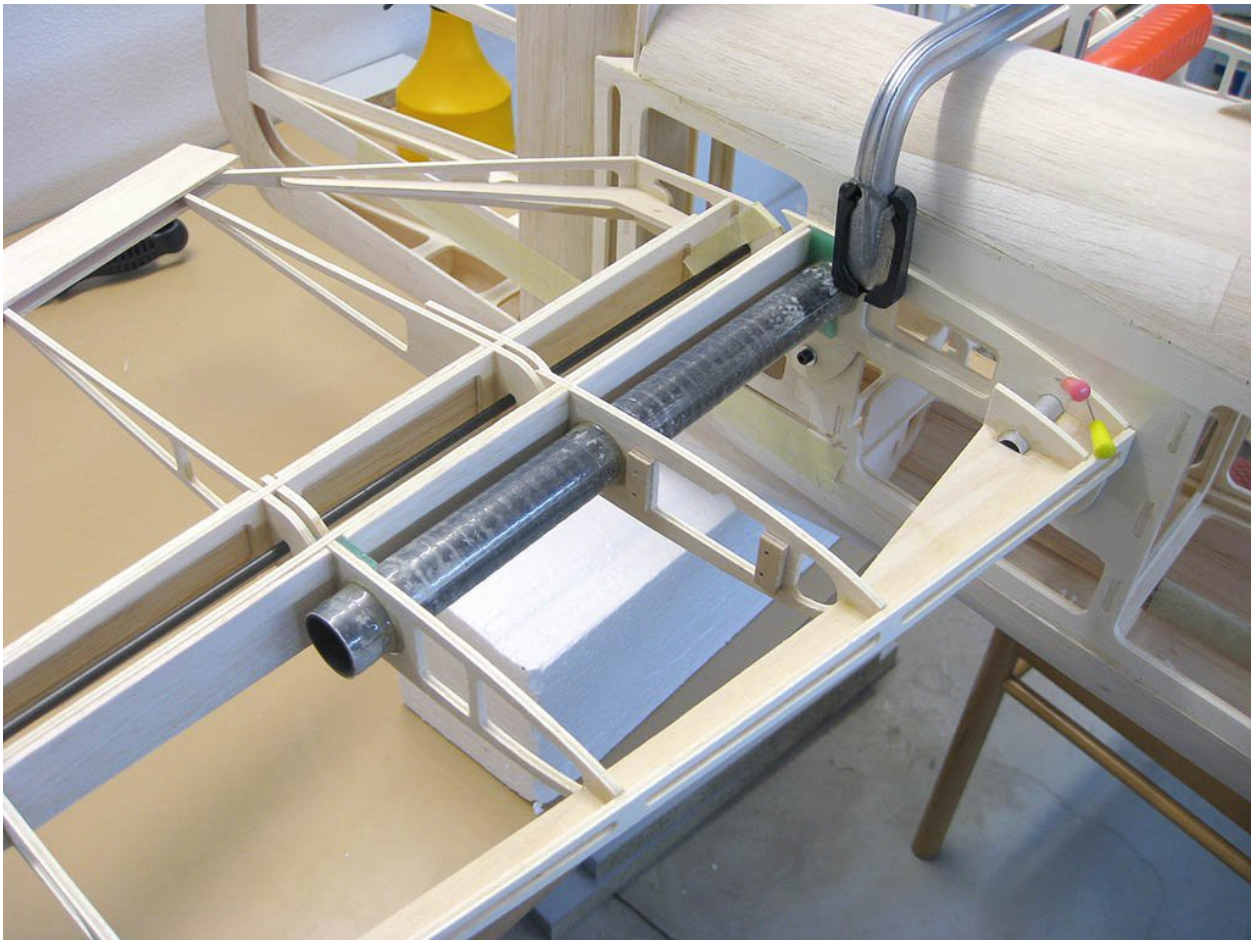
Before further gluing it is advisable to grab the hull stabilizers. The first thing is the production and alignment of Al guide tubes. First, the round nail file only very carefully and slowly fixes both holes in the fuselage, which are in line with each other, so it can do at once. One longer Al tube with a diameter of 10 mm must fit tightly and without play into both holes at the same time. Subsequently, one and then the other stabilizer is gradually saved. The fuselage is inserted into the fuselage with a carbon tube. One stabilizer is slid onto the housing. The screws must be easy to screw in, after tightening the root rib must fit perfectly on the hull. Subsequently, the Al tube is inserted from the other side of the fuselage and it should be inserted into the stabilizer, eventually the holes in the stabilizer are slightly sanded. The same is done with the second stabilizer. Nothing sticks yet. The position of the stabilizers shall be checked with respect to one another and perpendicular to the vertical plane passing through the center of the hull when viewed from the front. The sleeve should not

have a bag in the stabilizer, it should be sliding with minimal resistance, if not, the holes in the ribs should be slightly modified.



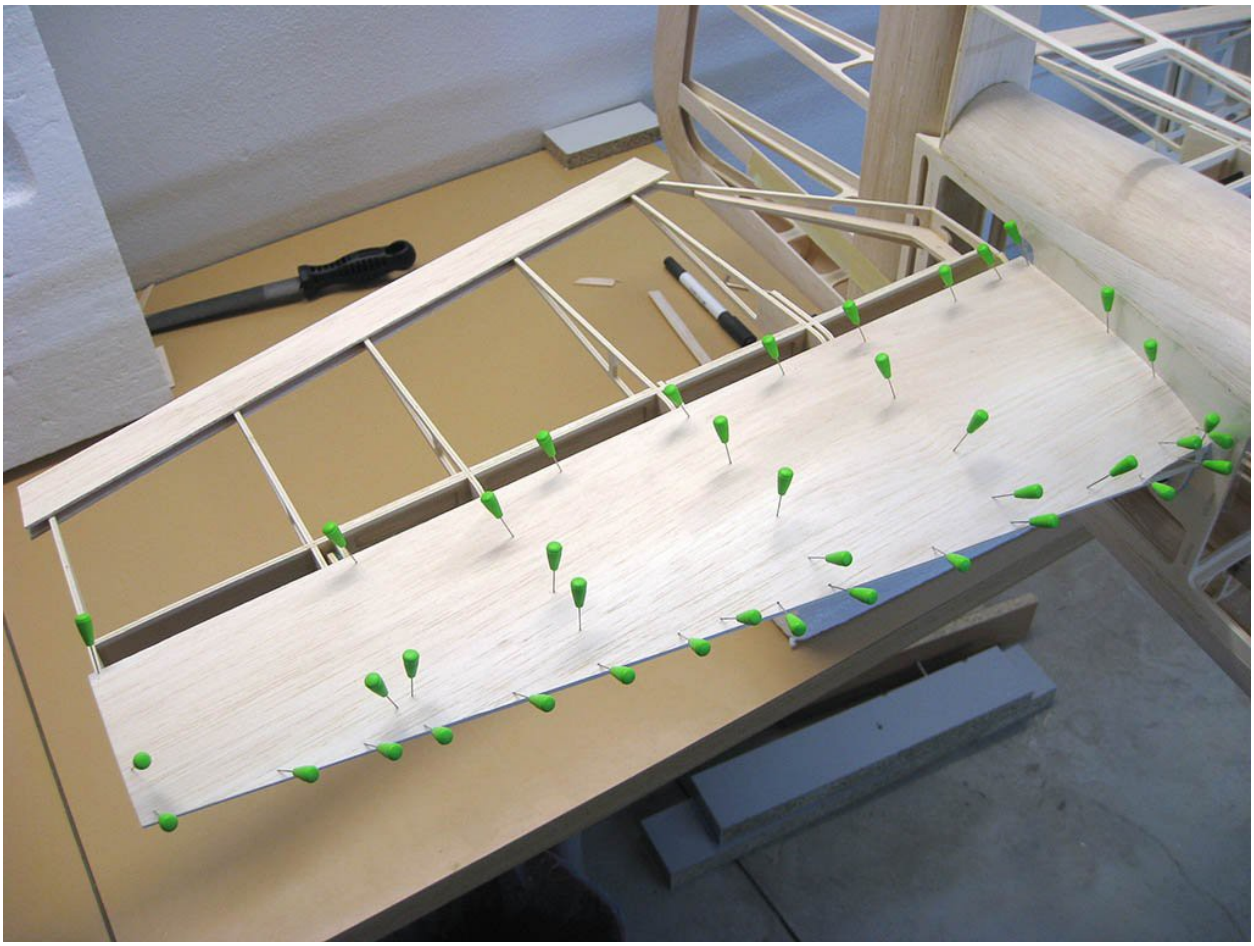
Again, this is a more challenging action on accuracy, but it goes well. Before starting this bonding, everything should be really straight and not twisted. Subsequently, the position of the elevator relative to the stabilizer is fixed in neutral with adhesive tape. It is glued in place of the fiberglass hinge of the elevator rib. The medium balsa thickness of 2 mm is then made boards 33 mm wide and cut to the necessary length. Place the cutting board in place, the rib end should be 5 mm from the board edge. The opposite edge of the board is marked on the ribs and enough glue is applied to the marks. The board is attached according to the marks and on the front edge of the drain plate the board is attached by pins, usually it does not lie elsewhere, but it is not a problem. Immediately the glue is applied to the ribs from the other side for the opposite board, plus a lot of glue is applied along the edge of the drain. The opposite chopping board is attached and it now grips the pegs in place of the ribs. Once the pegs are in place, the edge of the glued boards is checked and must be completely straight and at the same time aligned with the carbon tube and the axis of the

leading web. It sounds jerky, the final setup is about 5 minutes, which is enough to spare. The glued boards are malleable during this time, the planks are leveled by hand and aligned.



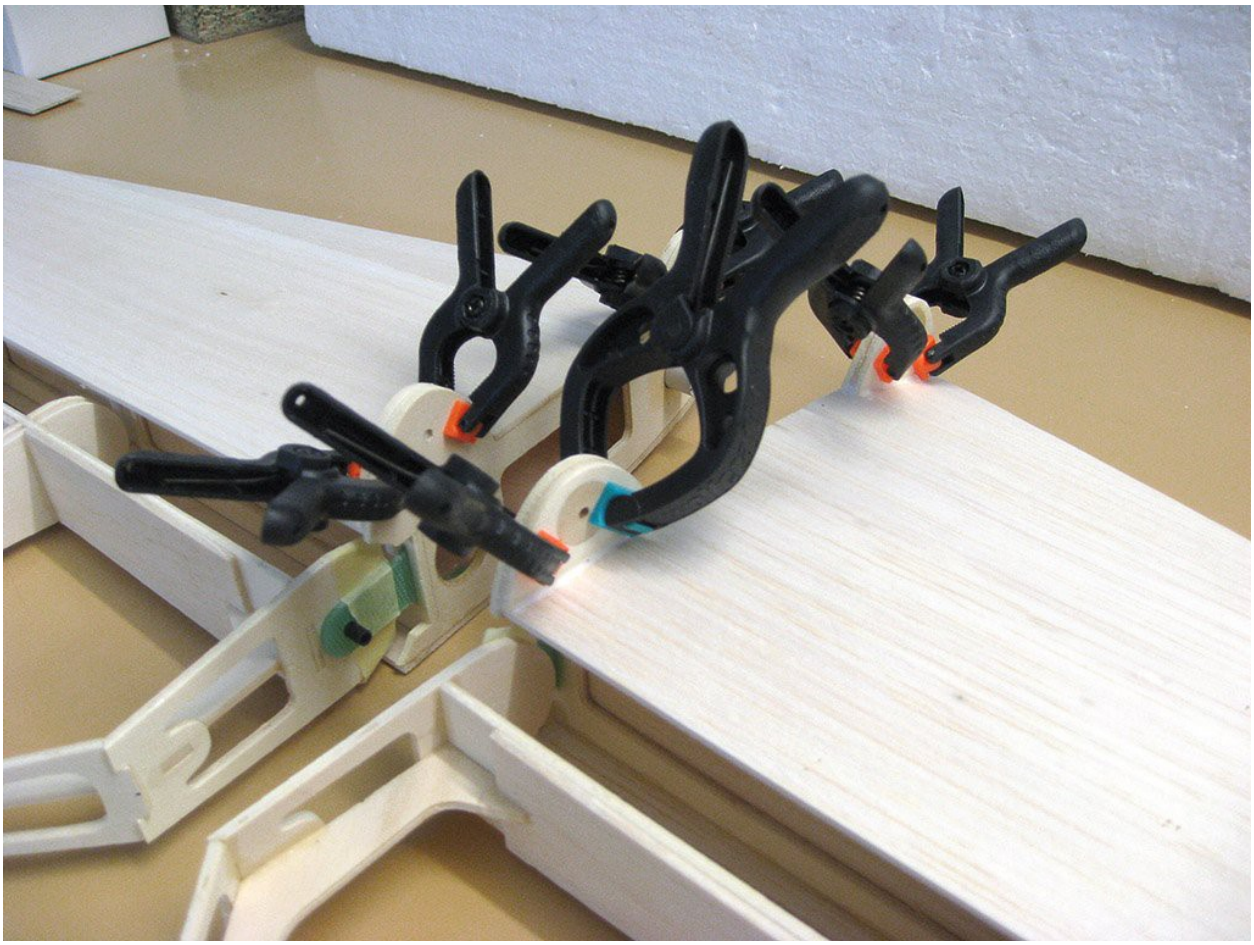
Light stabilizer uprights and elevator from hollyhock are covered with balsa thick. 2 mm, the final web thickness is 5 mm. At this stage, the whole should be completely straight, fit with the hull and already relatively strong. The fuselage is inserted into the fuselage and the fuselage is glued to the fuselage, which serves as a separator to prevent the elevator from sticking to the fuselage. A hole for the carbon rod and Al guide tube is cut in the tape. The same is done on the other side of the fuselage and the second stabilizer with the elevator is screwed on and screwed on, the whole at the moment serves as a fixation of the carbon tube. The Al guide tube is inserted into the glued stabilizer and sealed with epoxy, the excess adhesive on the outside of the root rib is wiped off and cleaned with alcohol. The same is done with the sleeve, which is pushed deeper first and enough epoxy is applied to the ribs, rotated to distribute the adhesive evenly in the rib hole, and by sliding to the root rib level, the sleeve is finally set. Any excess epoxy on the outside of the rib is wiped off with alcohol again. Finally, the unit is bolted to the hull. If the rib does not fit completely, it will be attached to the torso with pins and possibly a puller, and the epoxy is allowed to dry. The same is done with the other half, not

recommended to do both halves at once, rather only after checking the finished half.

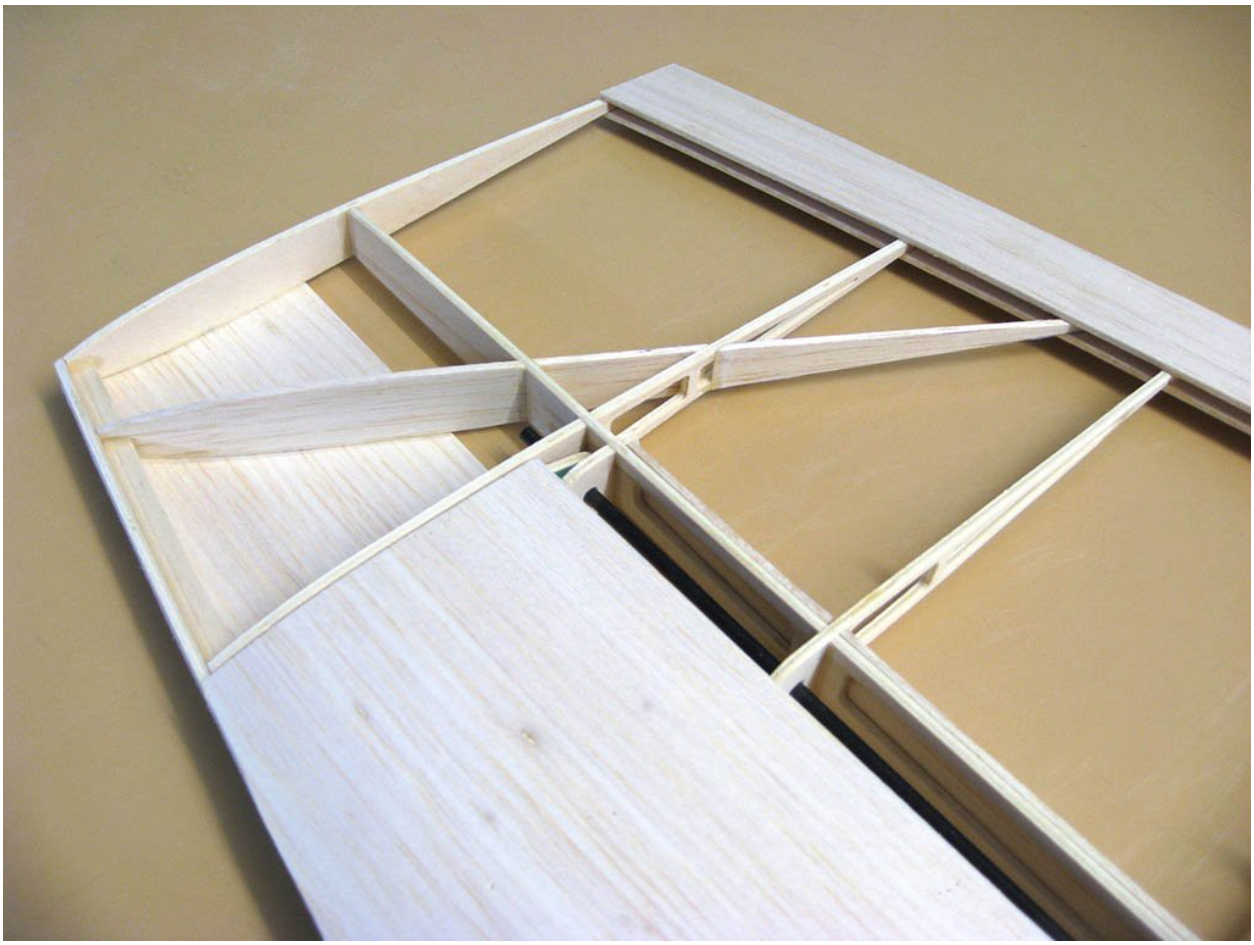


After the adhesive has dried after the previous gluing, everything is checked again to make sure it is straight and the coating can stick. As usual, it is glued together from balsa boards. 2 mm and fitted directly to the fuselage, which is already separated from the previous gluing tape. On the parts of the elevator, the end is marked with a pencil according to the saved coating and then enough glue is applied to the structure. The cover is applied and begins to attach to the main web of the stabilizer from its center towards the edges. After holding the cover well on the web, the cover begins to attach to the ribs from the center of the web again. It always attaches gradually to the ribs, not one rib at a time. Finally, the cover attaches to the perpendicular edge behind the future leading.

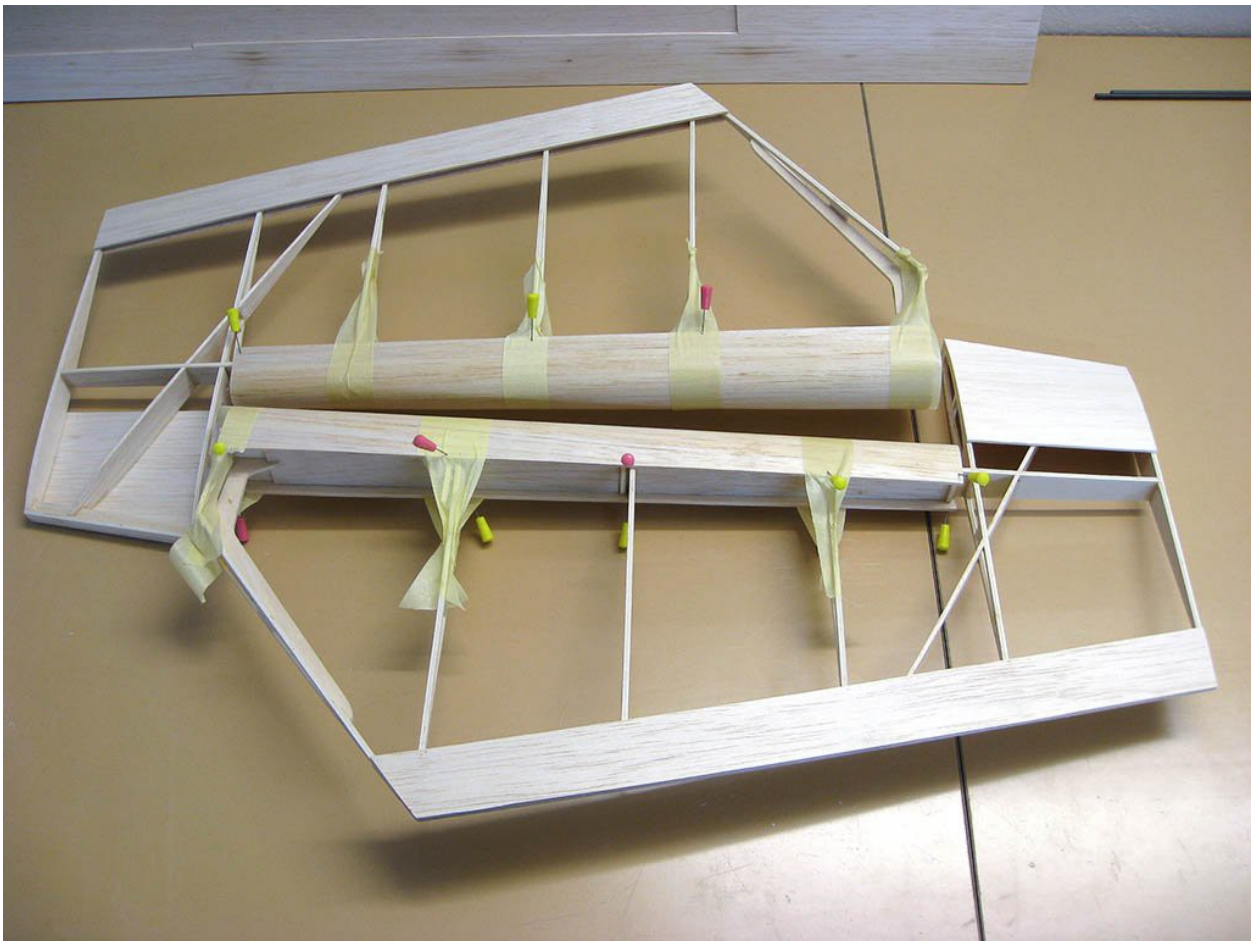
Since a single 1 m long board is coming from one board, the bottom is only up to the end of the stabilizer. The coating is pre-fitted with the fasteners on the stabilizer. Before gluing, however, it is still necessary to precisely fit the length of the tube and sleeve, and to cut and glue the stops so that the tube does not slide past the sleeve. Salvation is done on the hull. The coating is glued so that the assembly is removed from the fuselage and enough adhesive is applied to all contact surfaces. While still on the table, apply a cover and attach it from the main web to about half the depth of the ribs. Then the whole is put on the hull and the rest of the cover is attached to the lead. It is best to have the fuselage completely horizontal and look sideways to check the horizontalness of the whole. By twisting during snapping it is possible to make corrections. Once it has dried, the stabilizer has a final shape.



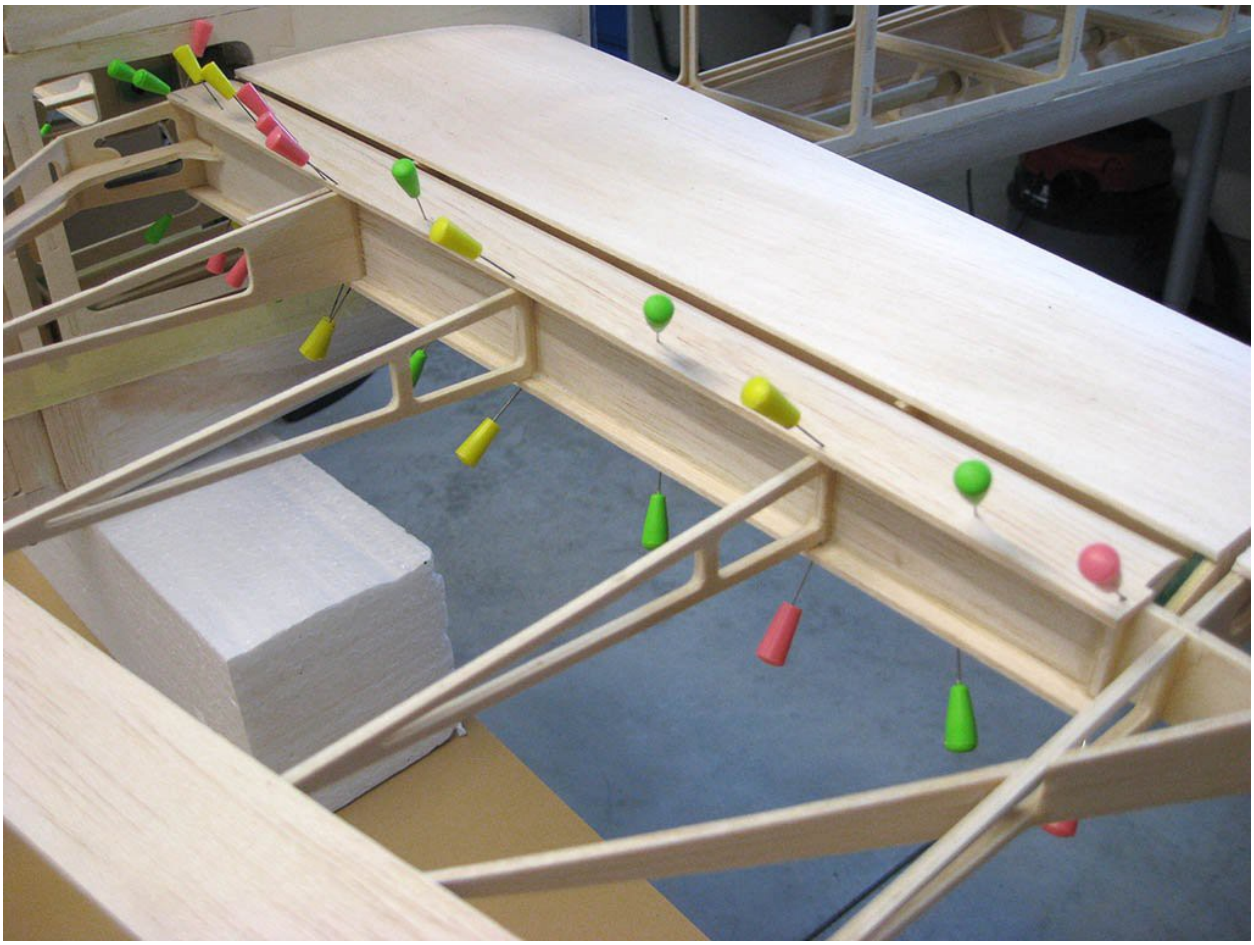
The handles on the original version were crushed a lot due to frequent tightening. The outer grips now have a hole for gluing plywood made of aviation plywood, which is hardly creased. I recommend first gluing the plywood and then gluing the glued part to the inner handle and glue sufficiently.



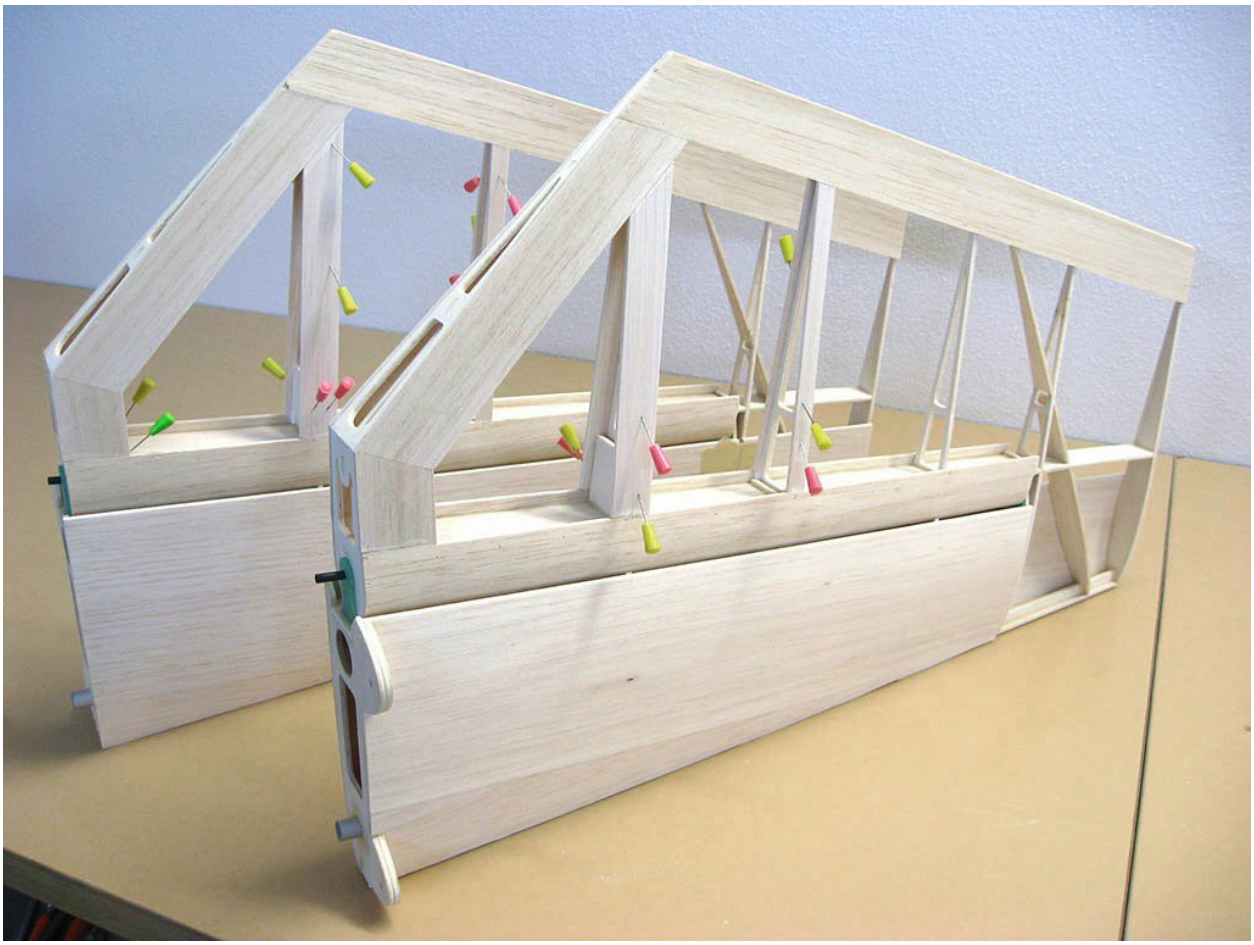
Due to the original version, where the counterweight is narrower and longer, the version 2 counterweight is wider and shorter. For sure I still glued before closing the elevator by covering the transverse rib of balsa th. 2mm. On the one hand, it will support the coating at the counterweight and at the same time further increase the torsional stiffness of the elevator at the counterweight. After gluing the transverse rib, the structure is considerably strengthened.



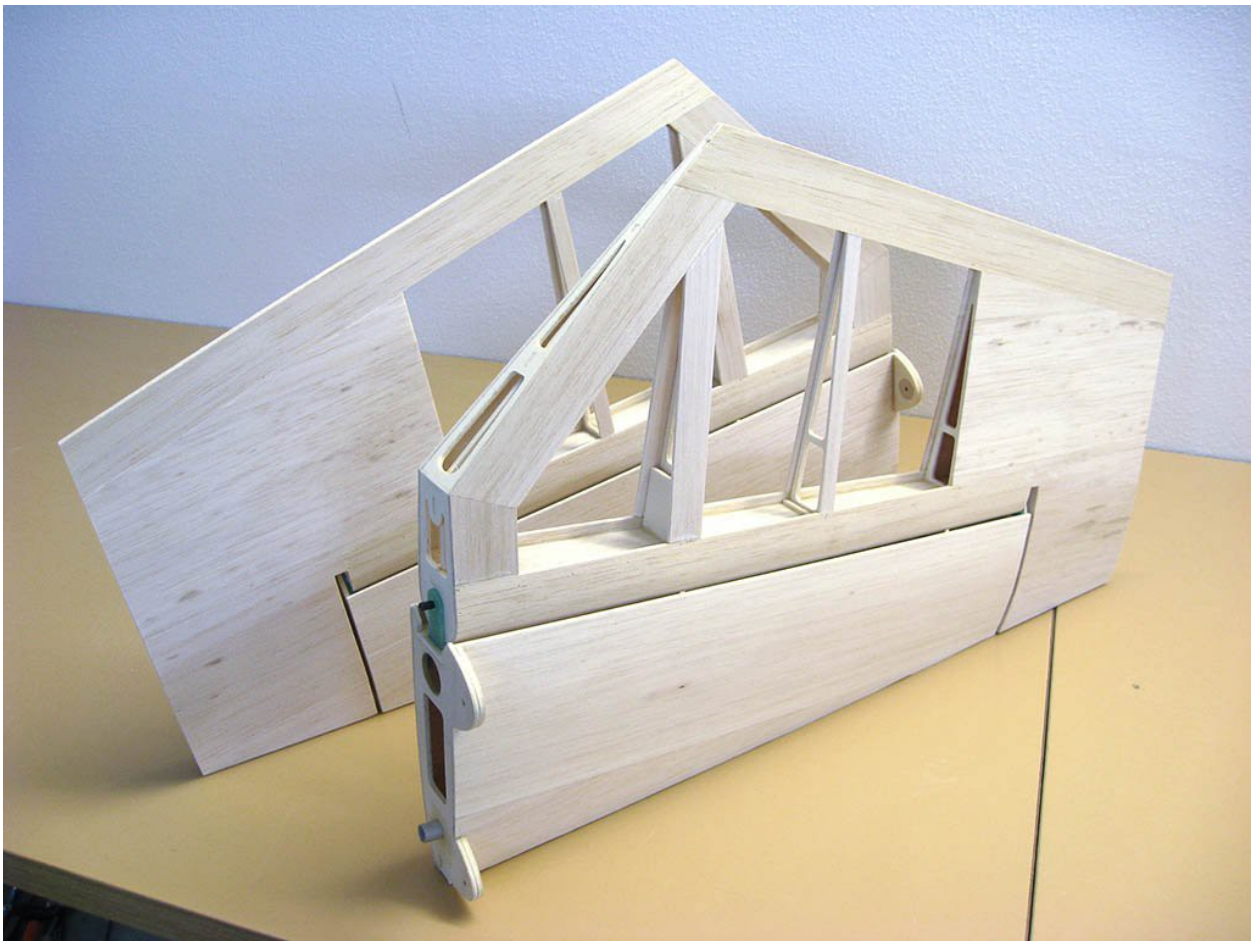
The whole is now divided, cut at the leading edge and cut the cover. At this point, it is good to incorporate the previously applied covers. The elevator joint covers are then prepared. After cutting into a trapezoidal shape (on one side a board width 100 and from the other 78 mm) the board is moistened longitudinally in the middle, the edges are left to dry. After 5 minutes of wetting, the board slowly bends to the required shape. Then the cover is fastened with tape and pins in place and allowed to dry. The dry coating is glued.



The cover fits precisely to the structure in its edges before bonding begins. It goes well, the cover is held with one hand and the other is trimmed and grated. Enough glue is applied and the cover grabs the pins at its ends. At the middle hinge, a hole in the cover is cut and the elevator is put on the stabilizer. Usually this is no longer necessary, but before drying again check that everything is straight on the hull.



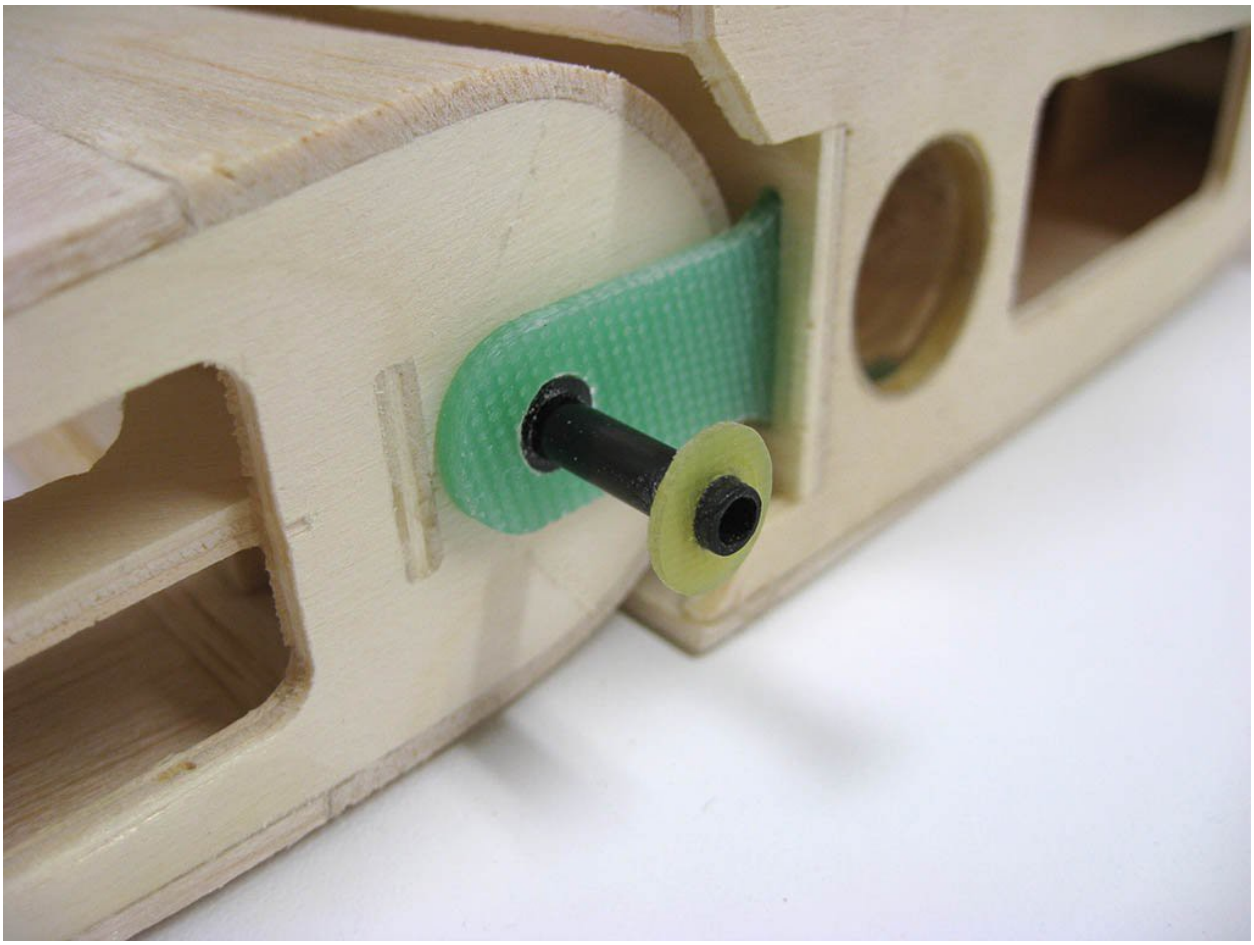
From the same stronger balsa thick. 2 mm, which was used on the boards at the trailing edge, cut out the 33 mm boards and pull the edge of the elevator at its root. It is better to glue the boards together with the necessary bevel and then stick them on the construction. Instead of the future elevator lever it is striped with 20 mm wide strips and the adjacent rib only 10 mm. The rest will have a solid coating. If a heavier engine is used, an integral coating of the entire elevator can be used.



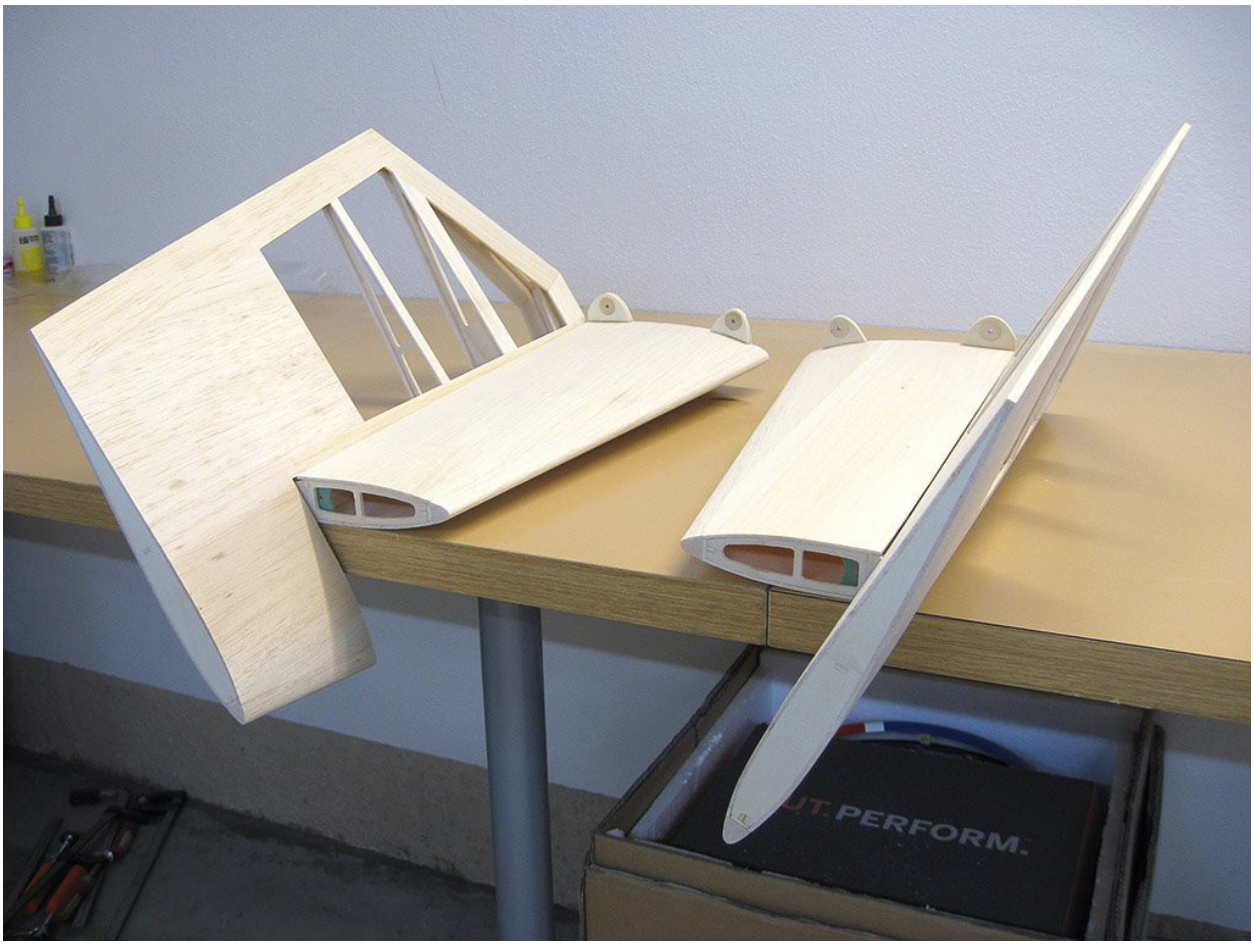
here is not much to write here, simply prepare in advance covers that fit exactly into place. Since the counterweight is larger and the original version of the elevator was slightly undersized, the cover is tightened to the third rib from the end of the elevator. After gluing the cover, the units are ground abrasively, but to the final and the same ground plan shape. In the front part, the overlap of the cover is ground to the level of the auxiliary perpendicular edge on which the balsa log of the leading edge will be glued.

The balsa log blocks are used as feeders. 13 mm. Before sticking, the elevator must be set to neutral, secured on both sides with stabilizer tape. The logs are glued to the completely flat surface of the auxiliary perpendicular edge and secured with tape.

After sticking all the leading on the tail, I first trim everything and then resurfaced to the final shape of the profile. I do not use a planer to cut the leading edge into the shape of a profile, but a new and sharp blade of the breakaway knife, with which I will first make a rough and then fine cut into the shape of the profile. The blade fits beautifully up to the profile of the cover without disturbing it like a plane. I always want to sharpen as little as dust is my enemy. Everything seems to be as straight as it should be. There is a final fine bonding and fine grinding before the foil coating.

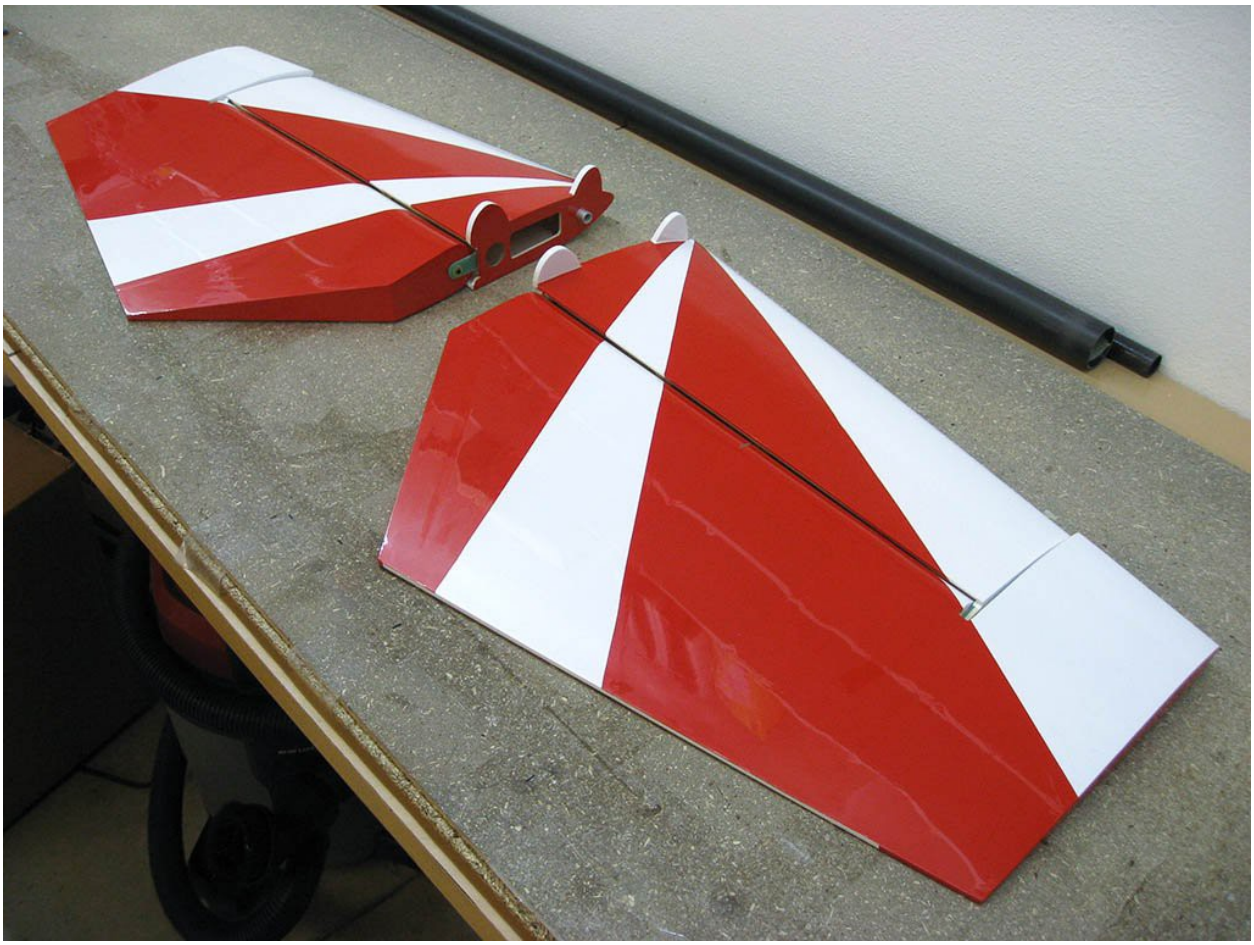


Like the rudder on the fin, the elevator on the stabilizer is suspended through a carbon tube that rotates in hinges with a nylon insert, here made of black PA12. The insert is visible in the photo in the hinge. The carbon tube also pulls out quite badly. If it is caught with pliers, the tube will crush at this point. From glass fiber thickness. 0.6 mm I cut the annulus, which I glued thin CA on the end of the pipe. The outer ring can be retracted without any problems and the tube can be pulled out easily. At the same time, the annulus serves as a safeguard to prevent the tube from entering the interior due to vibrations.



After final trimming of the end of the coating of both stabilizers is possible deviation of the elevator +/- 60 degrees. That should be enough. It was finely cemented and final grinding and this part of the tail is finished construction, left to cover, cut the hole for the servo lever, glue the elevator lever and install the servo.

According to the standard procedure, the individual parts of the design with the necessary overlap are first cut according to the templates, then the parts are ironed together to create a complete covering for a specific part of the model. Ironed with an overlap of 8 mm. The cover also has overlaps where there are edges of parts, if necessary I use an overlap of 10 to 25 mm.



The V2 has a different design from below than the original version. The elevator and stabilizer are coated, servos and stickers remain.

Sticker and star is cut on CNC plotter from car foil.

So the tail is ready. All servos, rods and cables are mounted. Everything is already programmed on the transmitter.