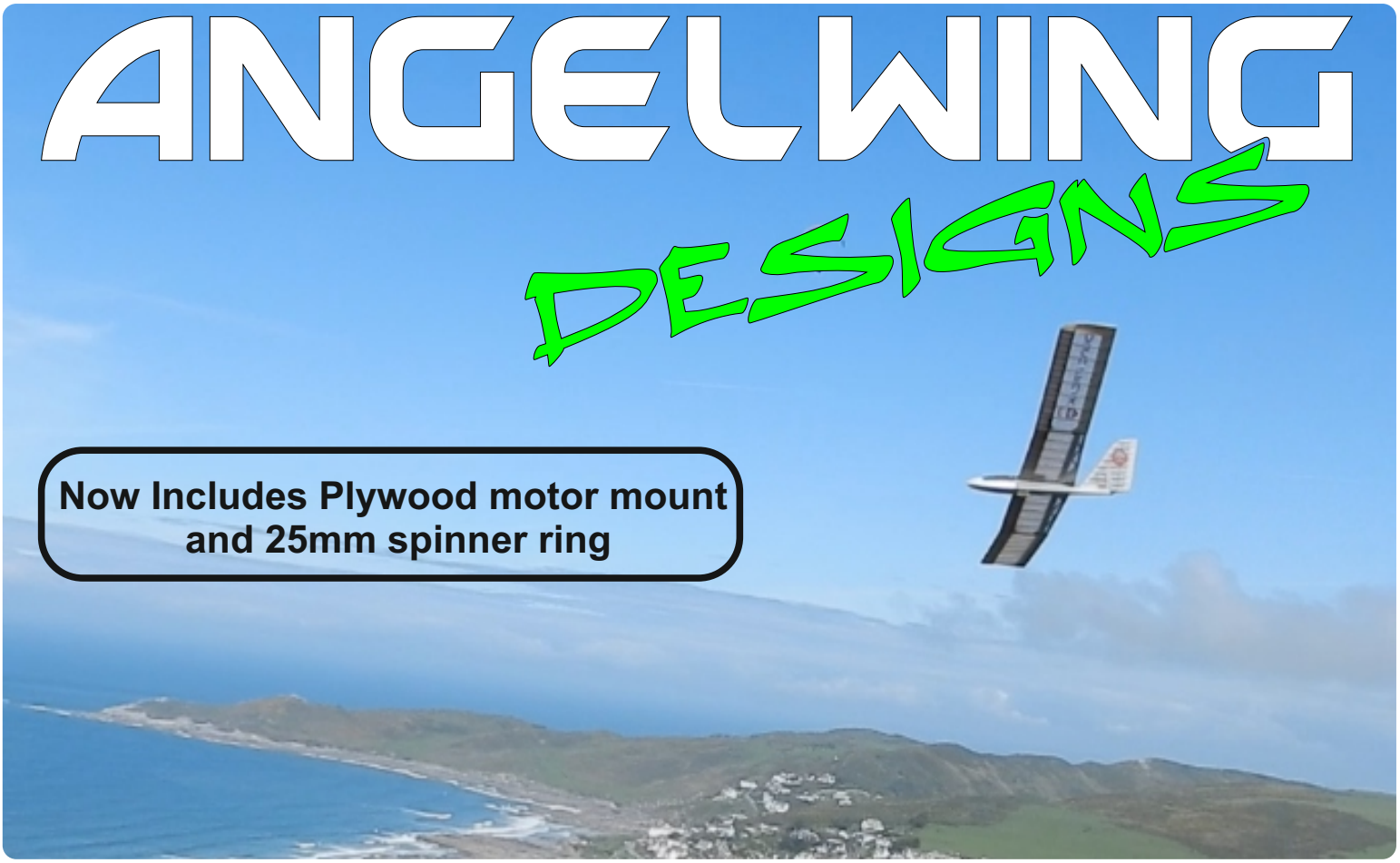
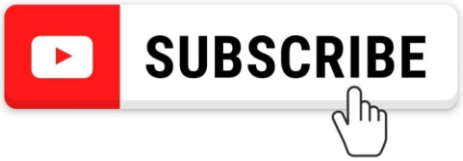
ANGELWING DESIGNS



Although the Dune Freak is very easy to fly we do not consider it a first time builders kit. As such the instructions are not a join part 1 to part 2 guide.
We will cover the key areas of the build paying particular attention to the less obvious details. The wing is very easy to build for anyone who has built wings before. With the addition of full sized plans for the wings and fin / rudder (vertical stab) most of the build is self explanitory.
Please note however that the fin has some very small parts that are delicate. They build into a very strong structure but care must be taken handling the ribs in particular. Do not glue any of the ribs to the leading edge or trailing edges until the carbon spars have been fitted. Please take time to view Nick Chittys fantastic build videos on Youtube. Don't forget to Like, Subscribe and smash the notifications bell to keep up with Nicks exploits. ***Nick Chitty Flying***

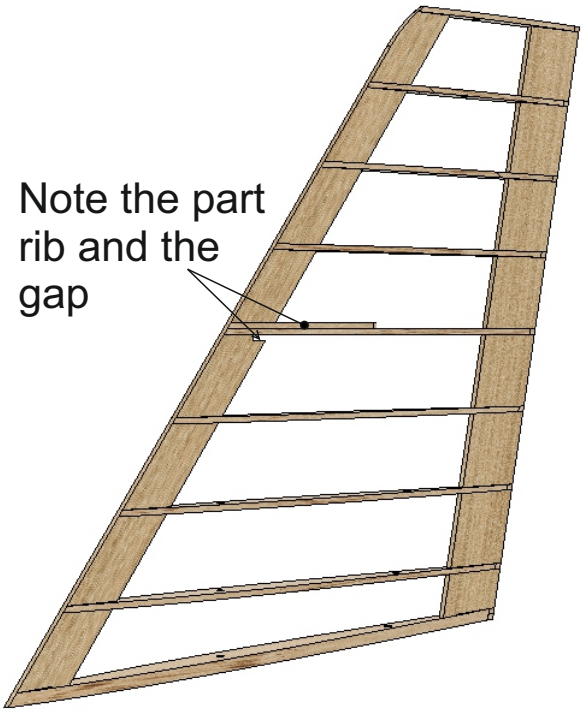


Original design by Nick Chitty 2022.
Redrawn and produced by AngelWingDesigns 2023

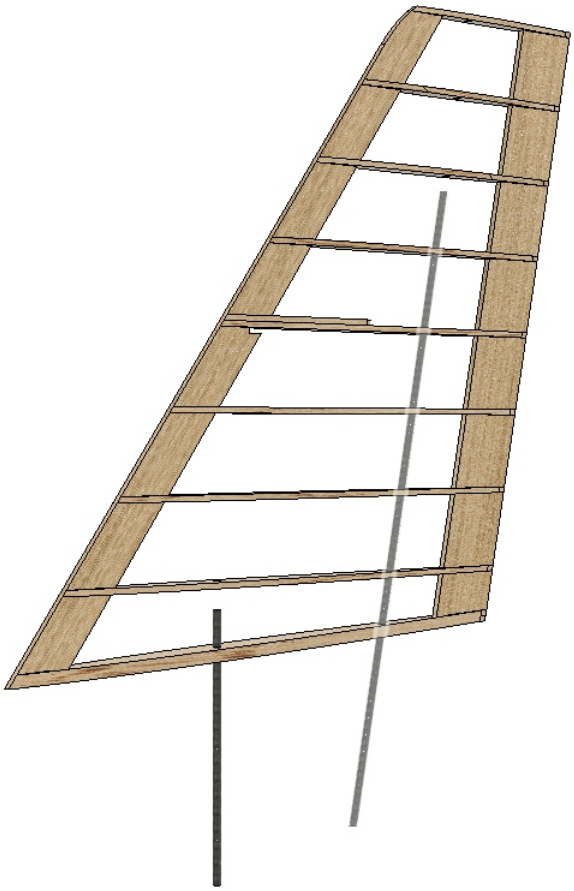
DUNE FREAK

Inspired by the Windfreak from 1978

Carefully slide all the ribs onto the leading and trailing edge sheet. Take your time the ribs are cut to nothing and are very delicate at this stage. **Do not glue!**

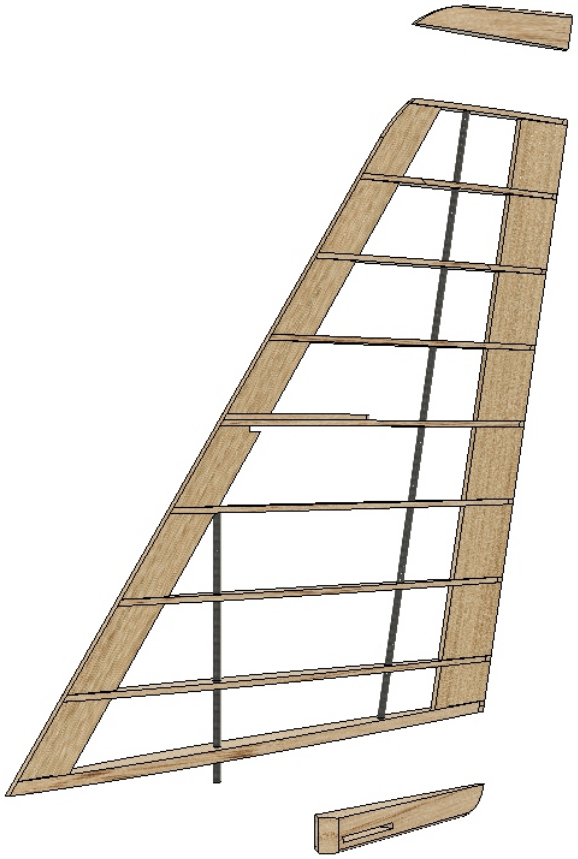


Do not glue!

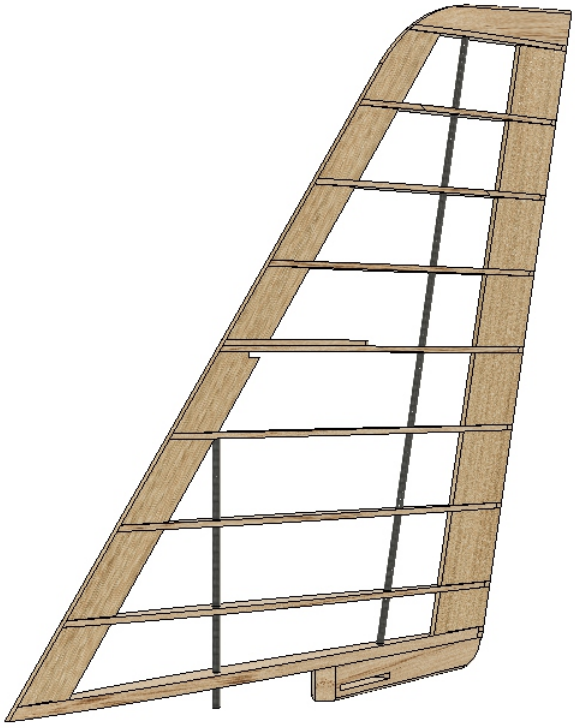


Slide in the 2mm carbon tube spars, slowly twisting helps, as done sanding a slight point to the top of the spars

Once the spars are in position with the fin assembly held accurately over the plan you can now glue the assembly together. Use CA for carbon to balsa. We suggest either superphatic or laser cut wood glue for the wood to wood joints

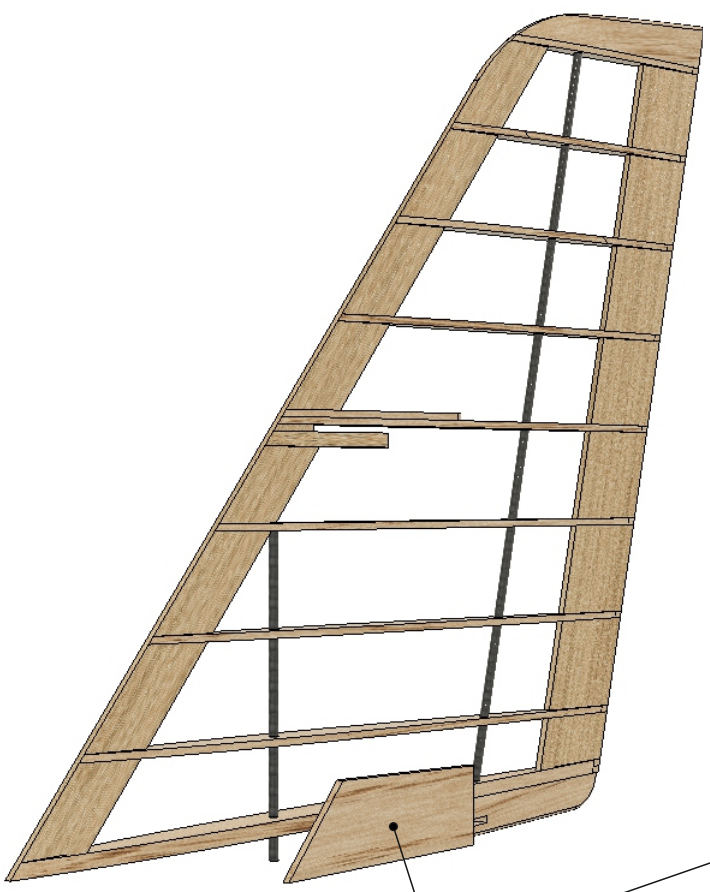


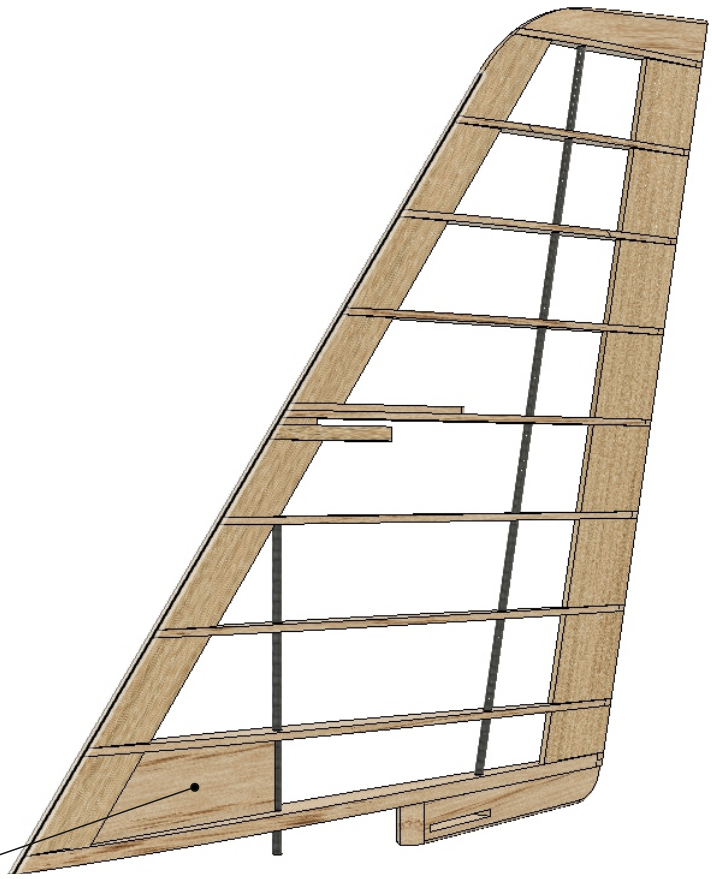
The tip and base of the rudder are made from laminations of 3mm balsa



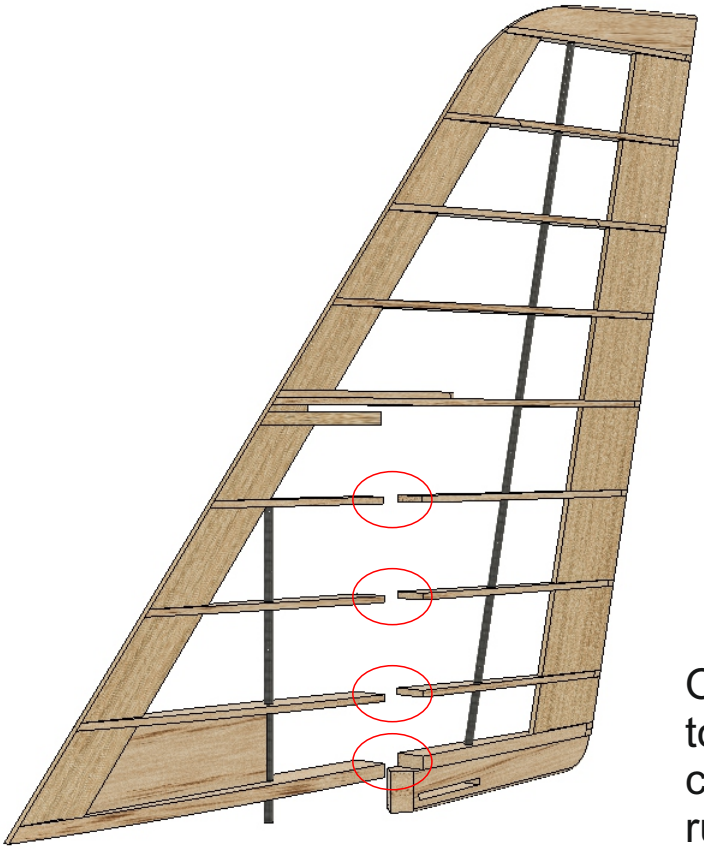
At this stage the assembly can be sanded if prefered. Just a slight radius on the leading edge is required and the tip and base blocks sanded to match the rib profiles and rounded

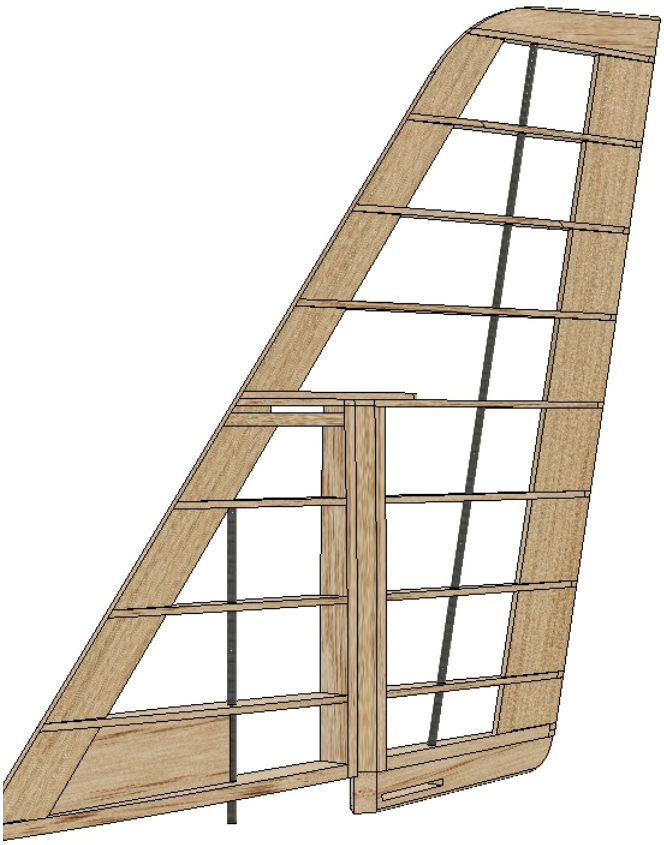
Pin into place the 3mm rib that forms the top of the fin. This can be adjusted later when the Leading and trailing edges are added





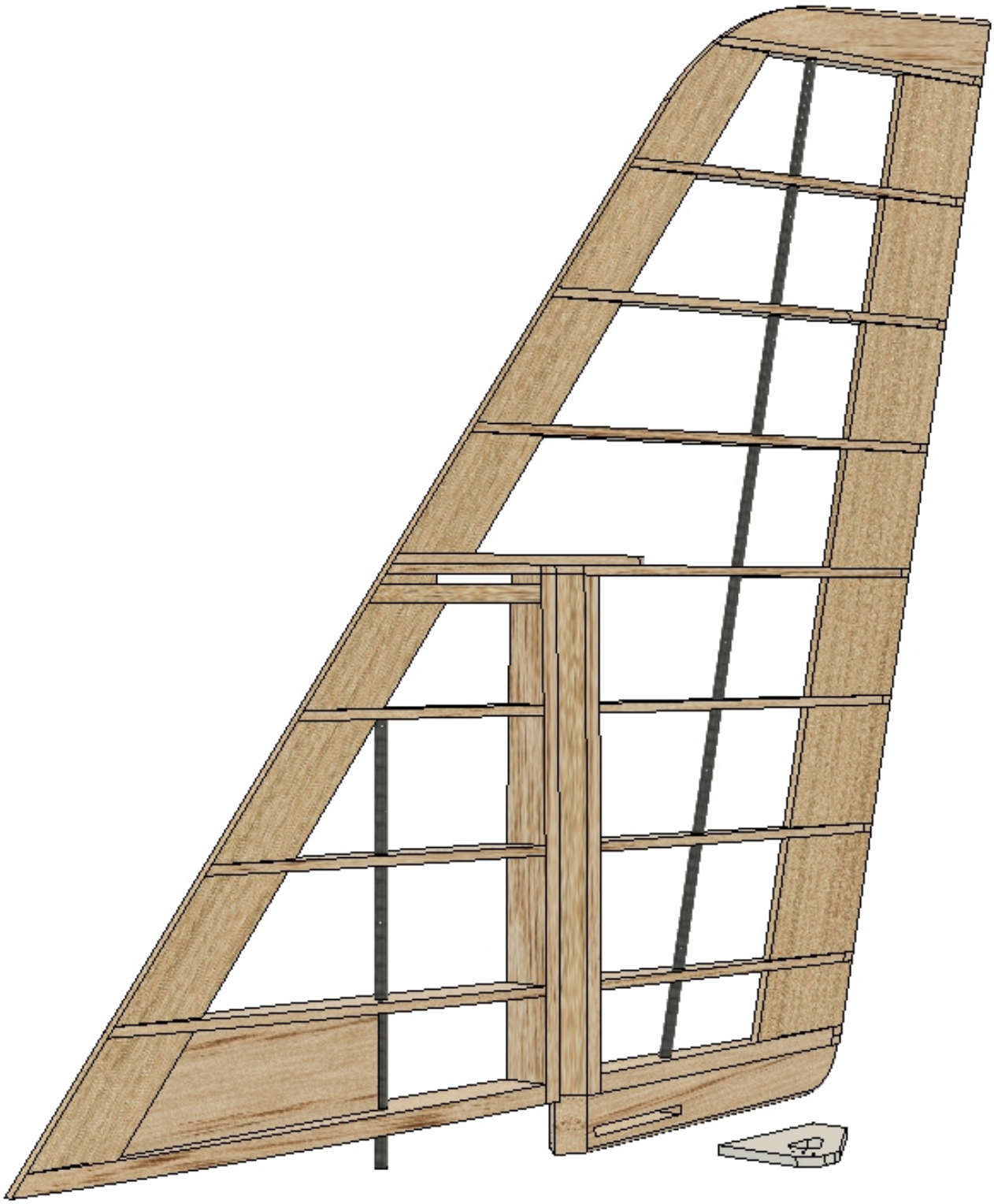
1.5mm Balsa Infil





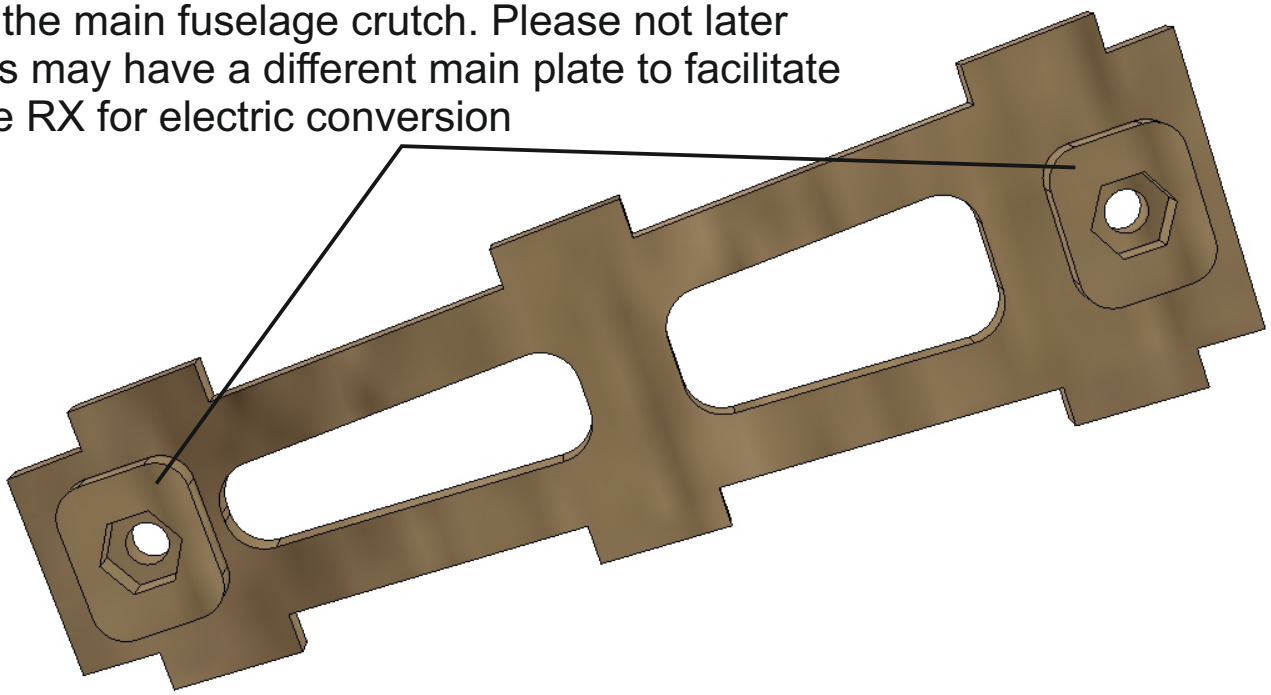
Remove rib material to accept the 4 laminations of 3mm balsa that form the hinge post. Use the plan and parts for position and sizing

Once the Rudder post is glue and shaped to the correct profile the fin and rudder can be split. Both fin Trailing edge and rudder leading edge should be shaped as below to allow large rudder deflections.

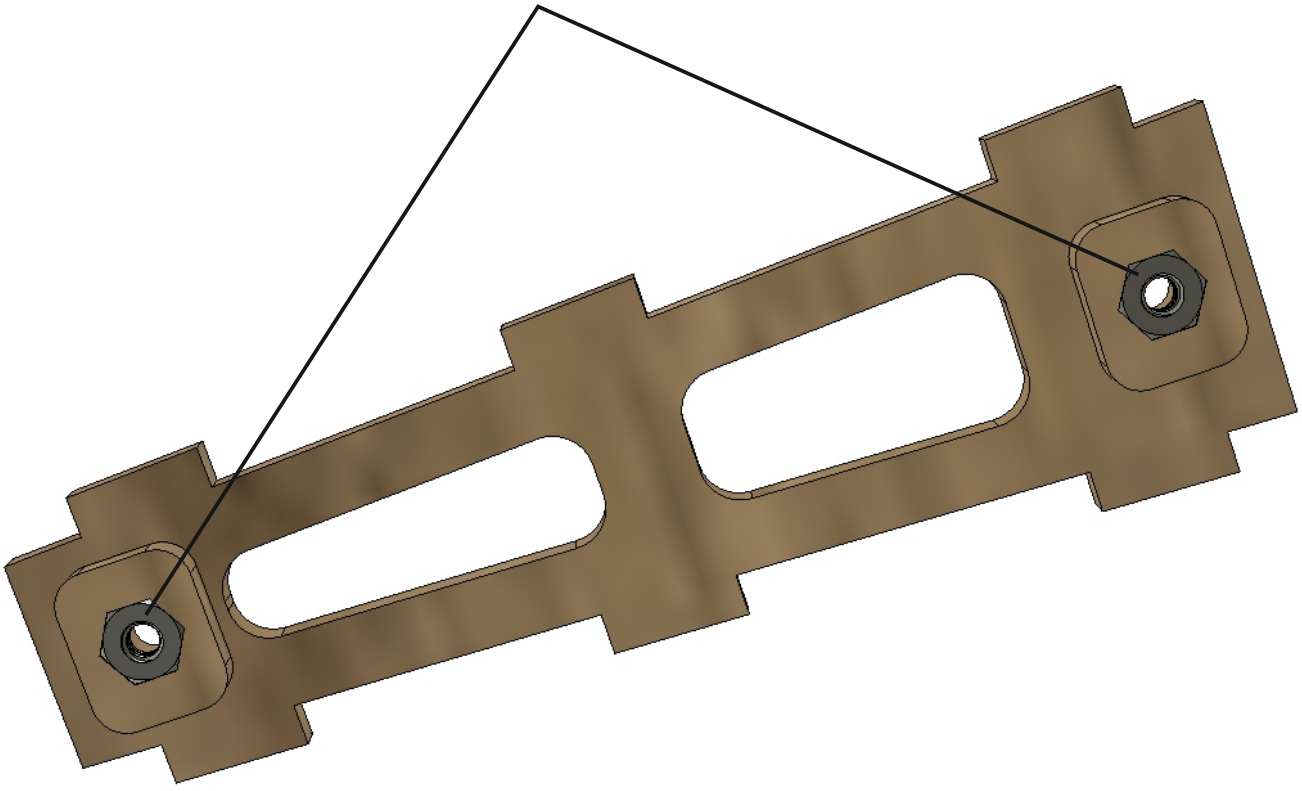


Check the fit of the Rudder horn. Use a needle file to ease the slot if required. **Do not glue the horn into place until covering is complete!**

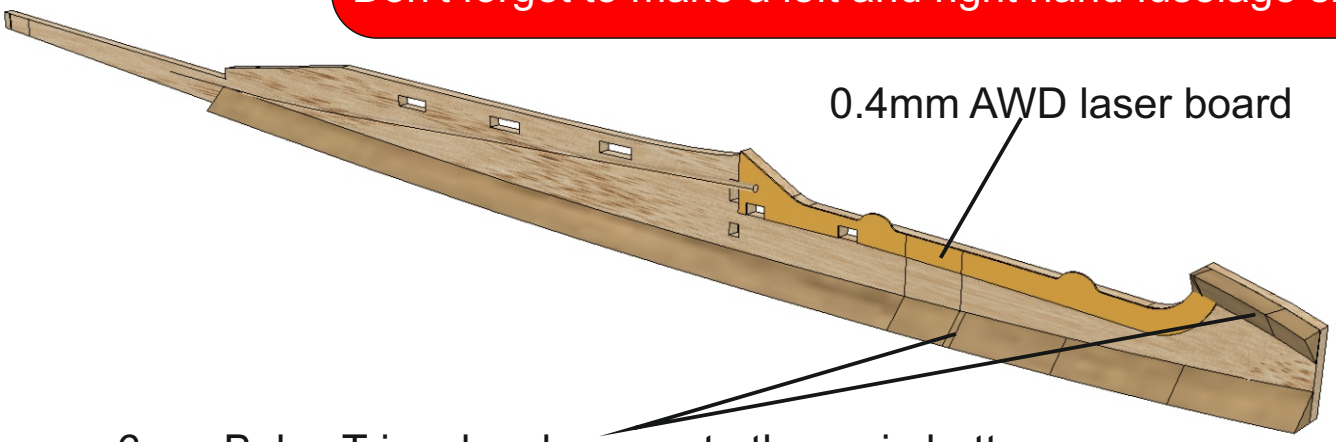
Glue the wing retaining nut holders to the underside of the main fuselage crutch. Please not later kits may have a different main plate to facilitate the RX for electric conversion



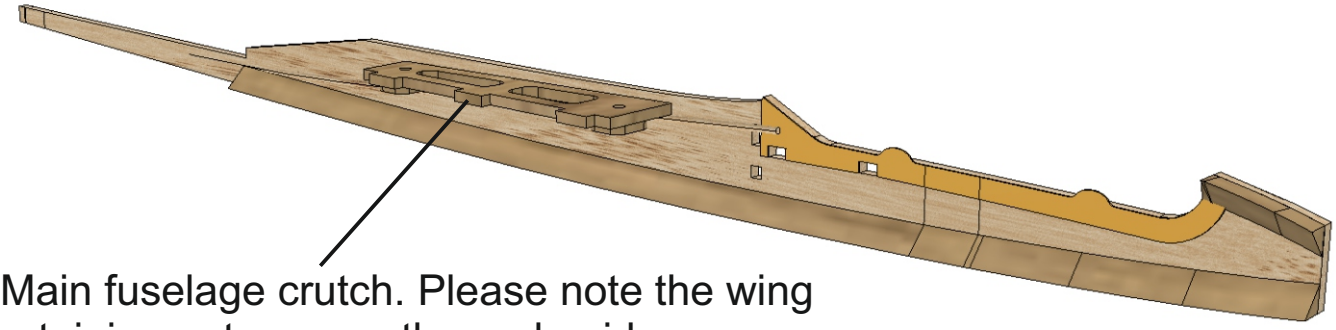
Using epoxy or THICK CA glue the 2 M3 steel nuts into the nut holders. It is essential to keep the threads clear of any adhesive, modeling clay, soft wax etc can all be used to protect the threads from the glue



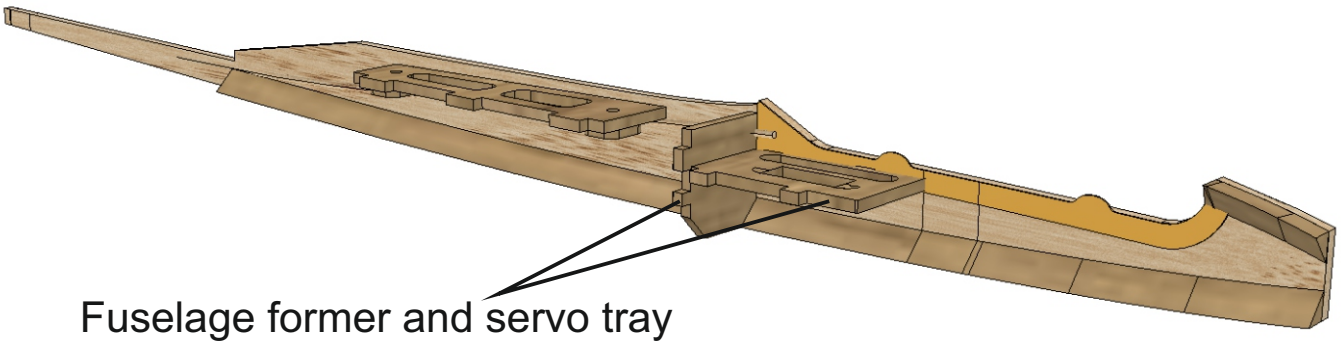
Don't forget to make a left and right hand fuselage side



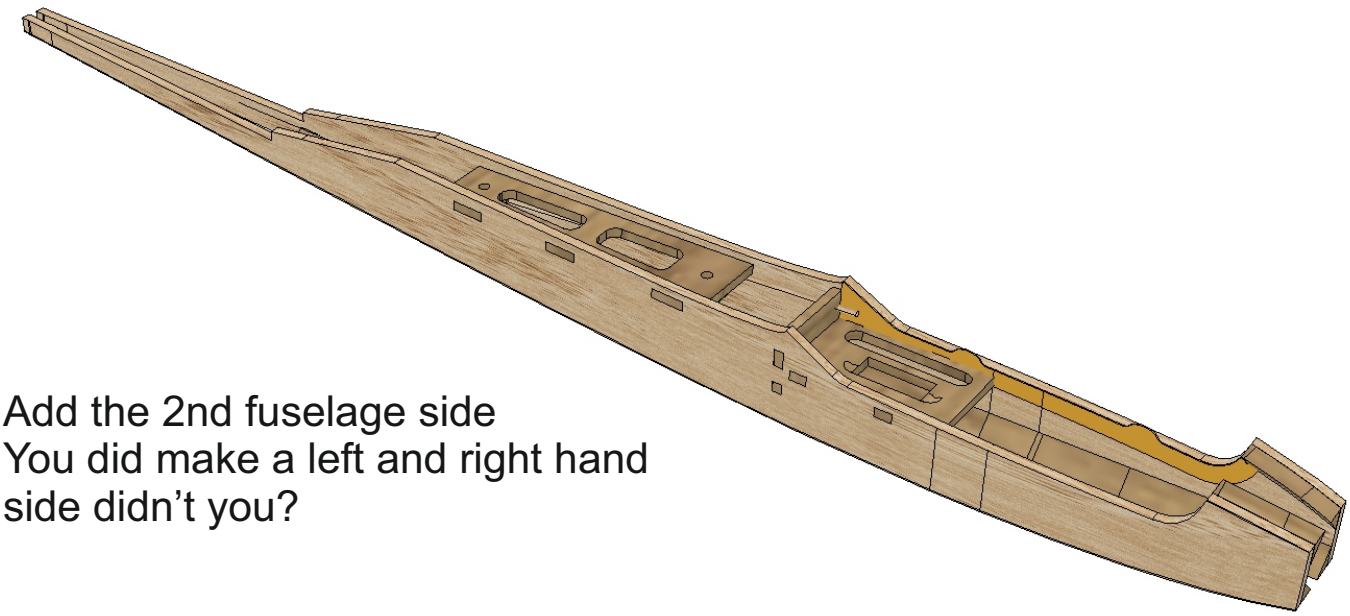
6mm Balsa Triangle, please note the main bottom triangle needs to be cut to 300mm long



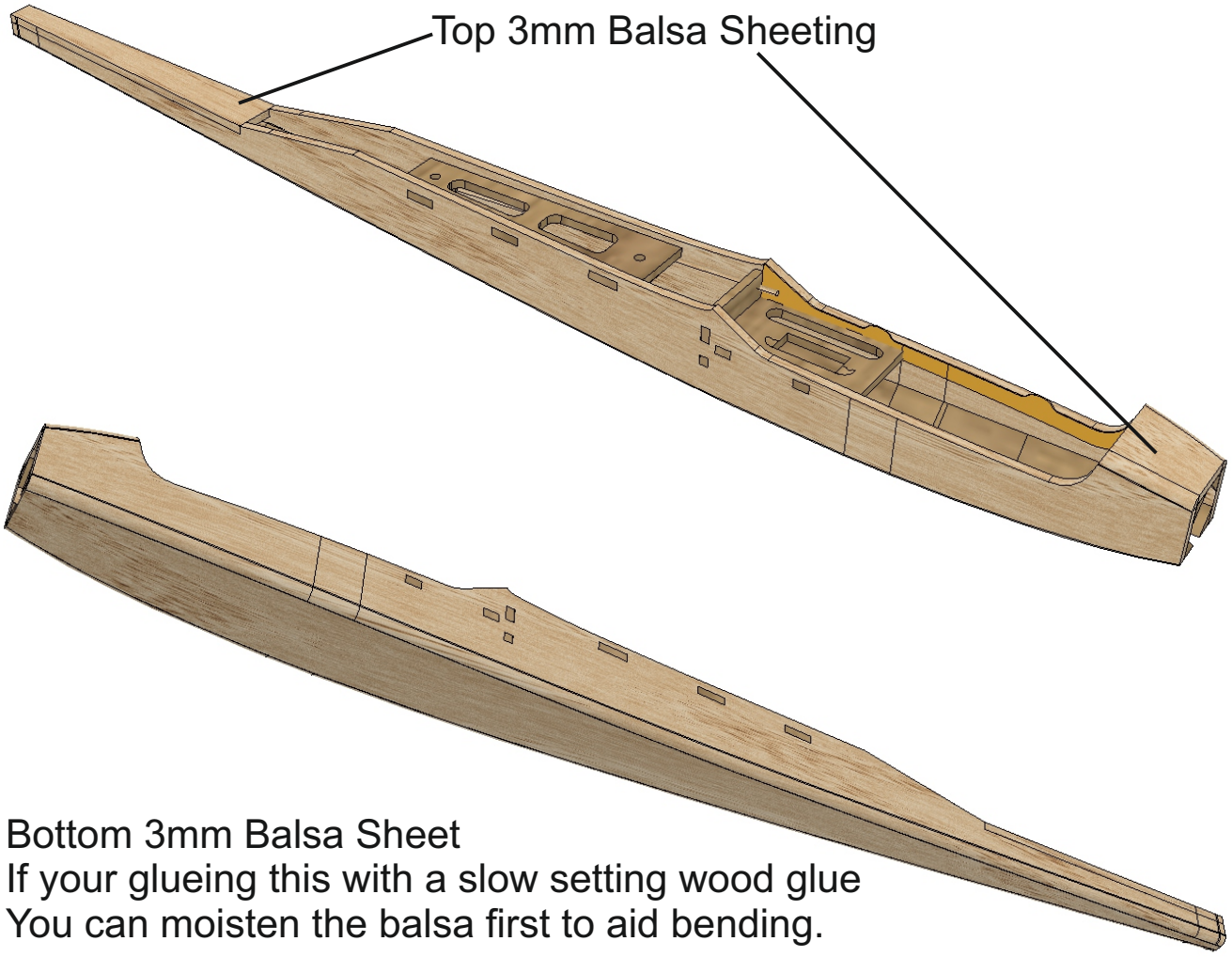
Main fuselage crutch. Please note the wing retaining nuts are on the underside



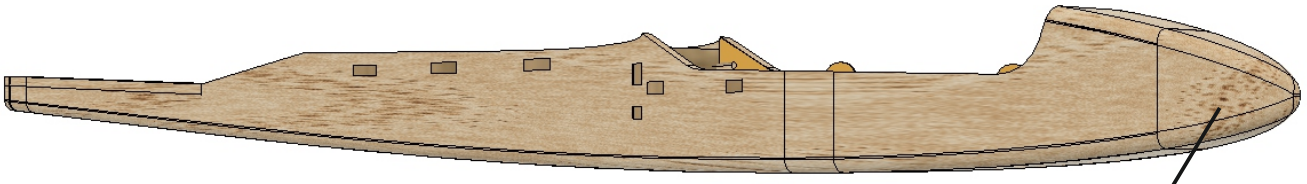
Fuselage former and servo tray



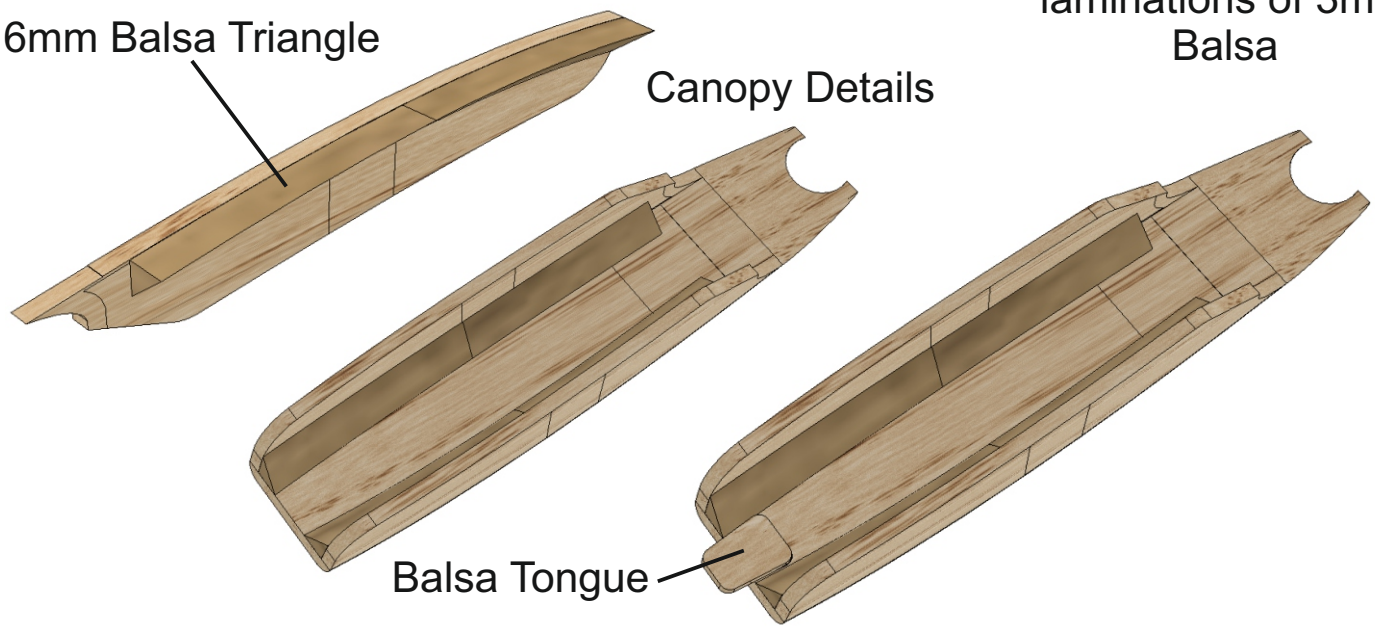
Add the 2nd fuselage side
You did make a left and right hand side didn't you?

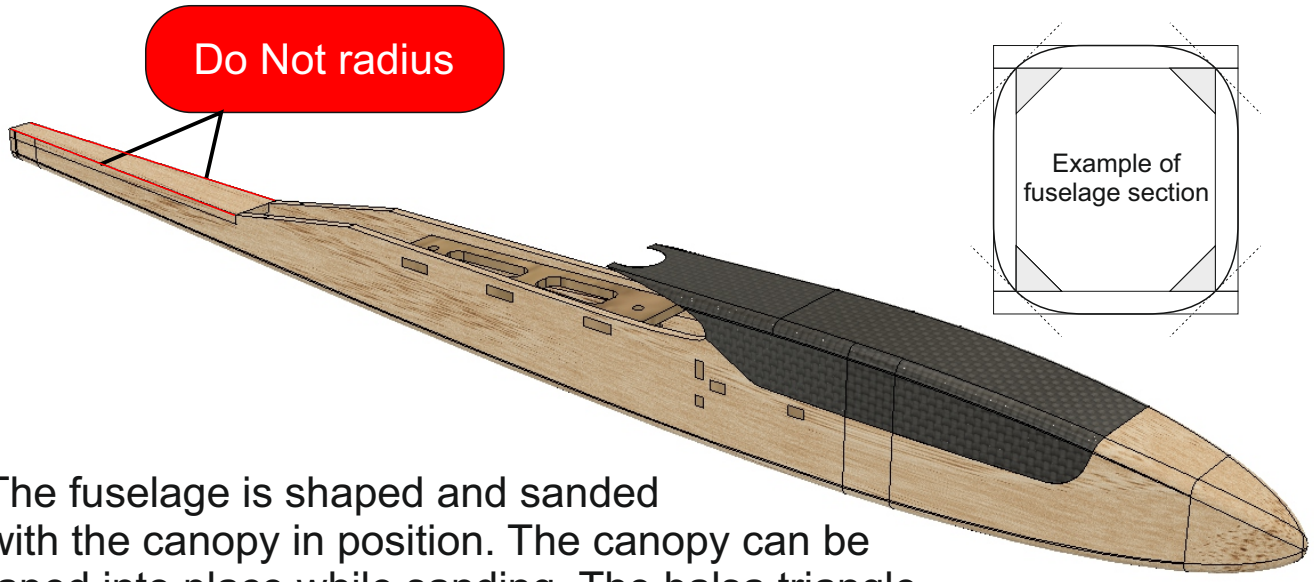


Bottom 3mm Balsa Sheet
If your glueing this with a slow setting wood glue
You can moisten the balsa first to aid bending.



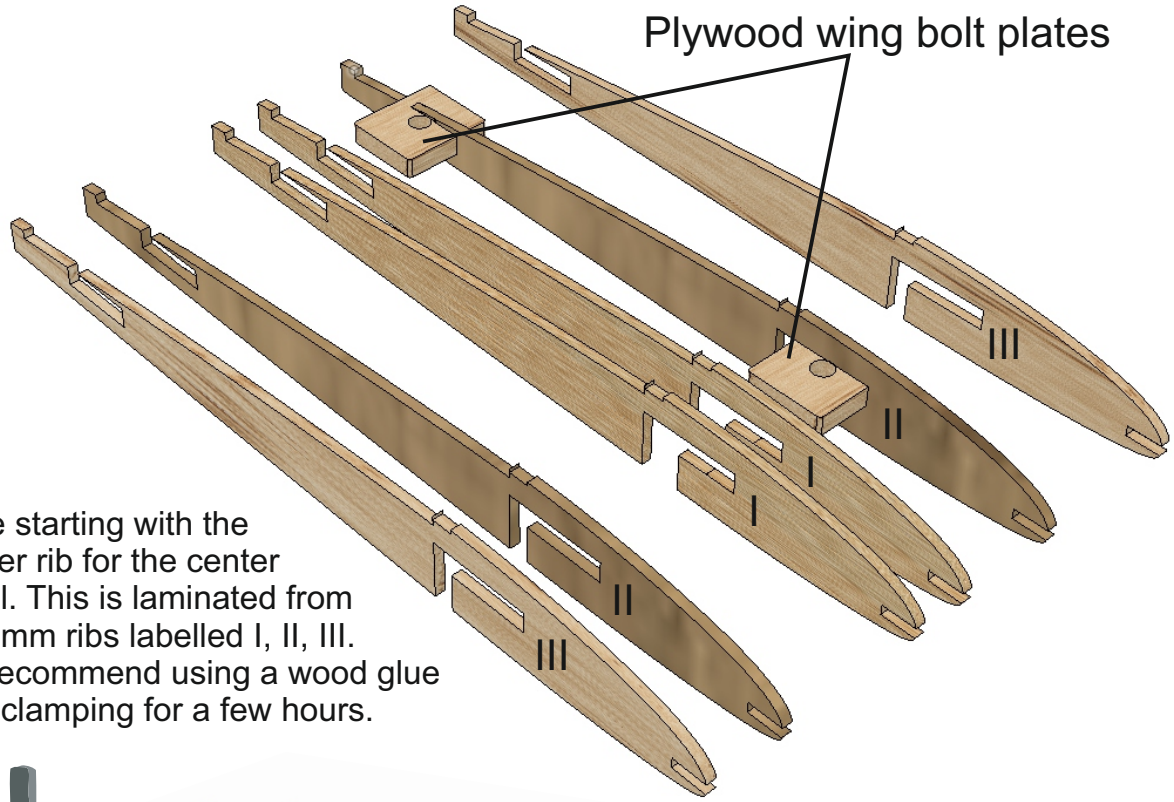
Nose block is made from multiple laminations of 3mm Balsa



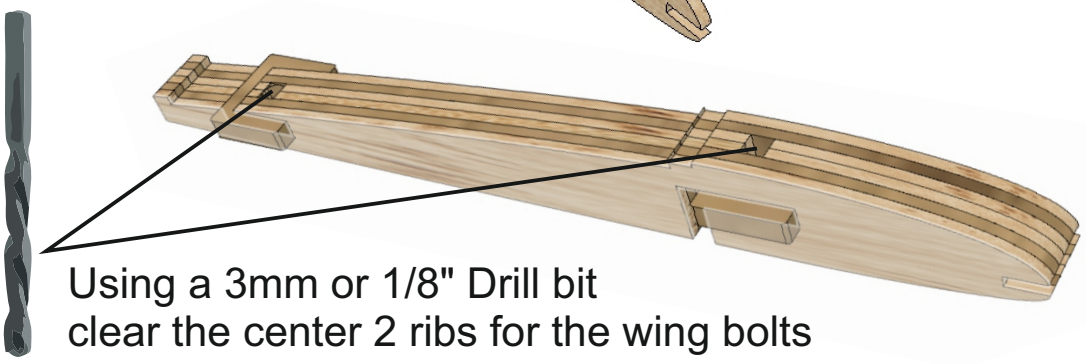


The fuselage is shaped and sanded with the canopy in position. The canopy can be taped into place while sanding. The balsa triangle wasn't fitted to add strength to the fuselage, its there to allow you to shape the fuselage. We sanded a 45 degree profile on the sides until we reached the edge of the triangle before adding the radius.

The Wings

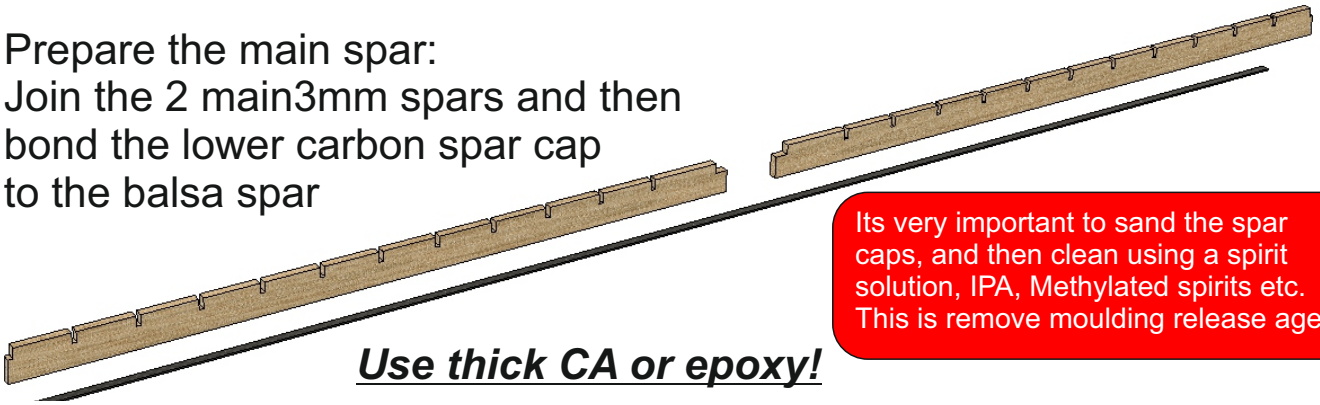


Were starting with the Center rib for the center panel. This is laminated from 6 1.5mm ribs labelled I, II, III. We recommend using a wood glue then clamping for a few hours.



Using a 3mm or 1/8" Drill bit clear the center 2 ribs for the wing bolts

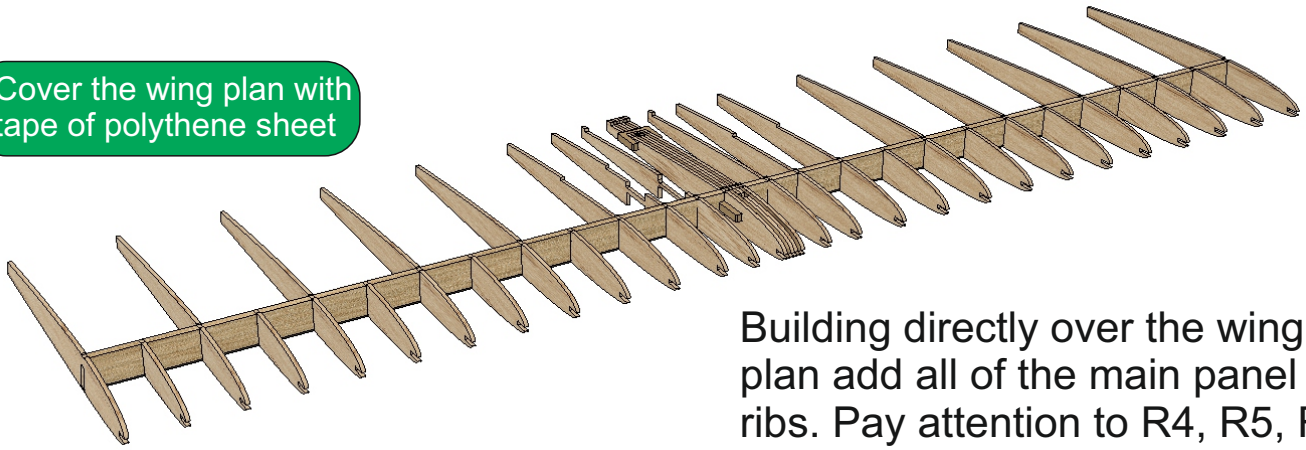
Prepare the main spar:
Join the 2 main3mm spars and then bond the lower carbon spar cap to the balsa spar



Its very important to sand the spar caps, and then clean using a spirit solution, IPA, Methylated spirits etc. This is remove moulding release agents

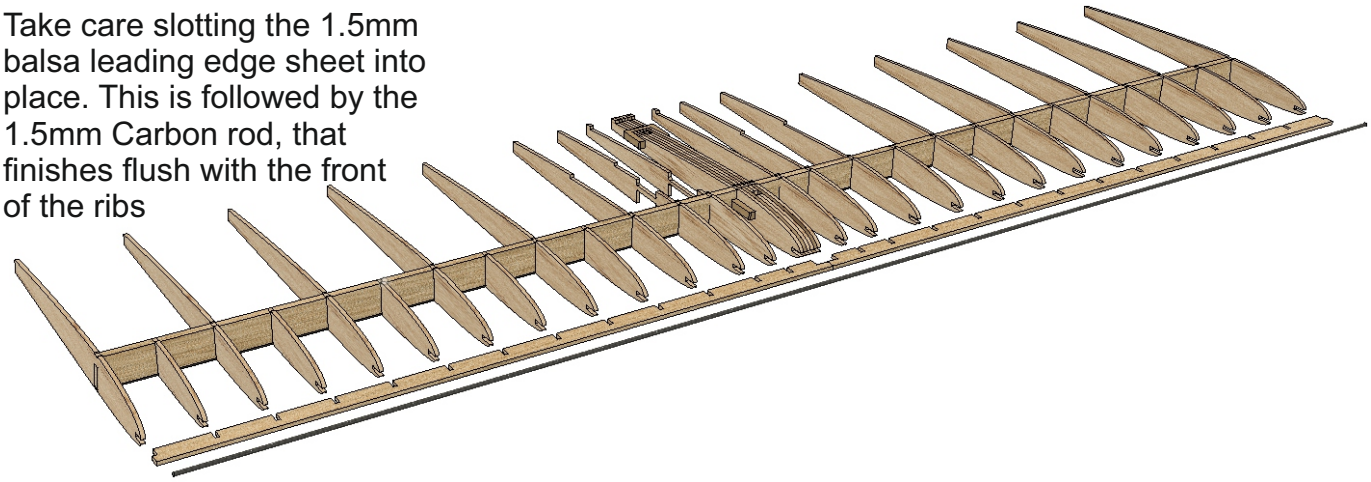
Use thick CA or epoxy!

Cover the wing plan with tape of polythene sheet

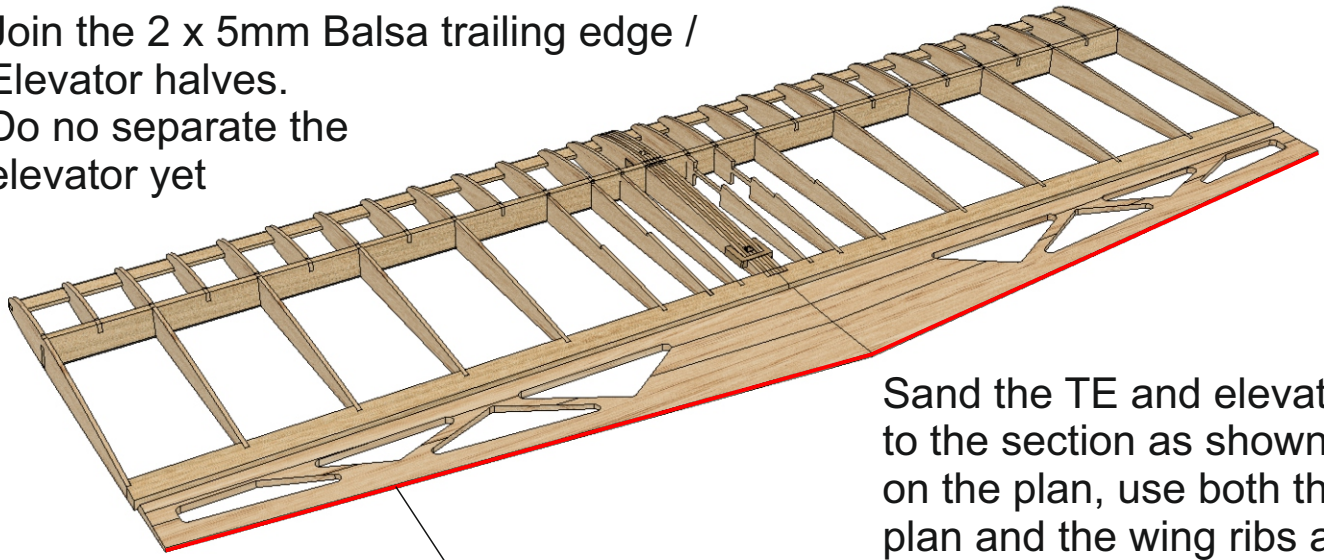


Building directly over the wing plan add all of the main panel ribs. Pay attention to R4, R5, R6 These are all different!

Take care slotting the 1.5mm balsa leading edge sheet into place. This is followed by the 1.5mm Carbon rod, that finishes flush with the front of the ribs



Join the 2 x 5mm Balsa trailing edge / Elevator halves.
Do no separate the elevator yet

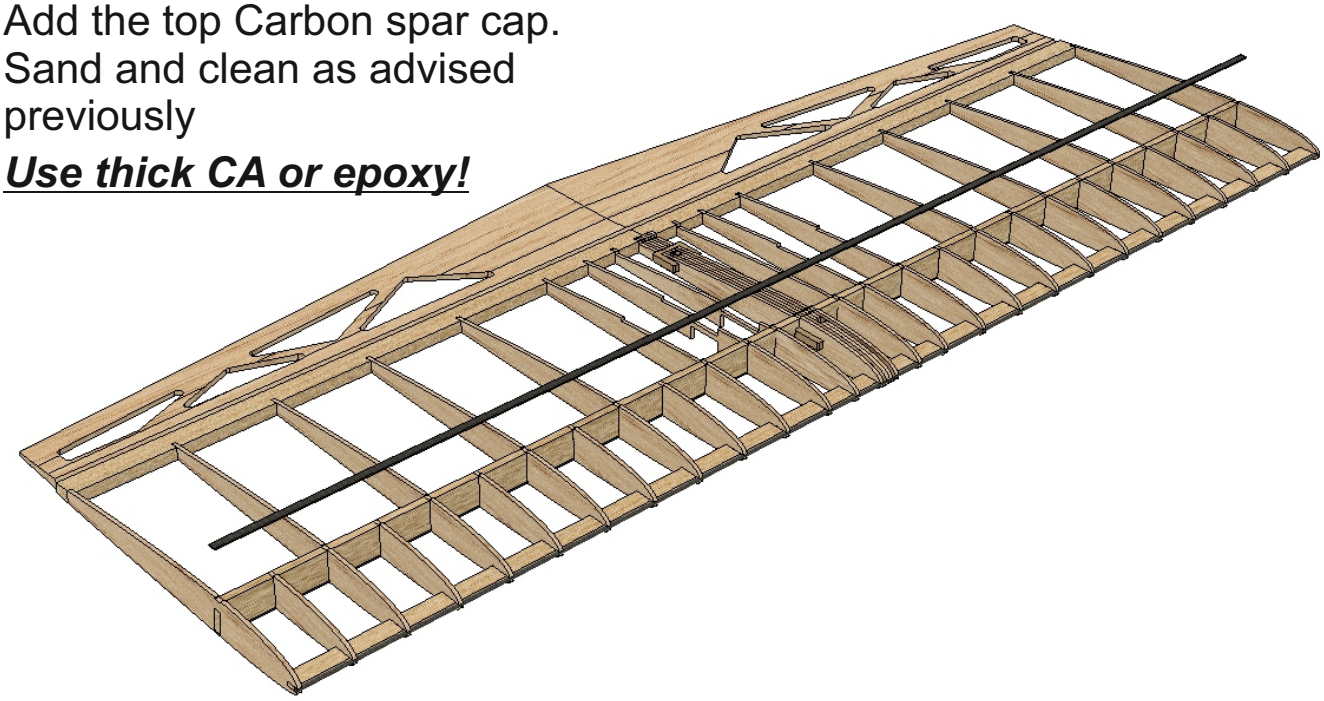


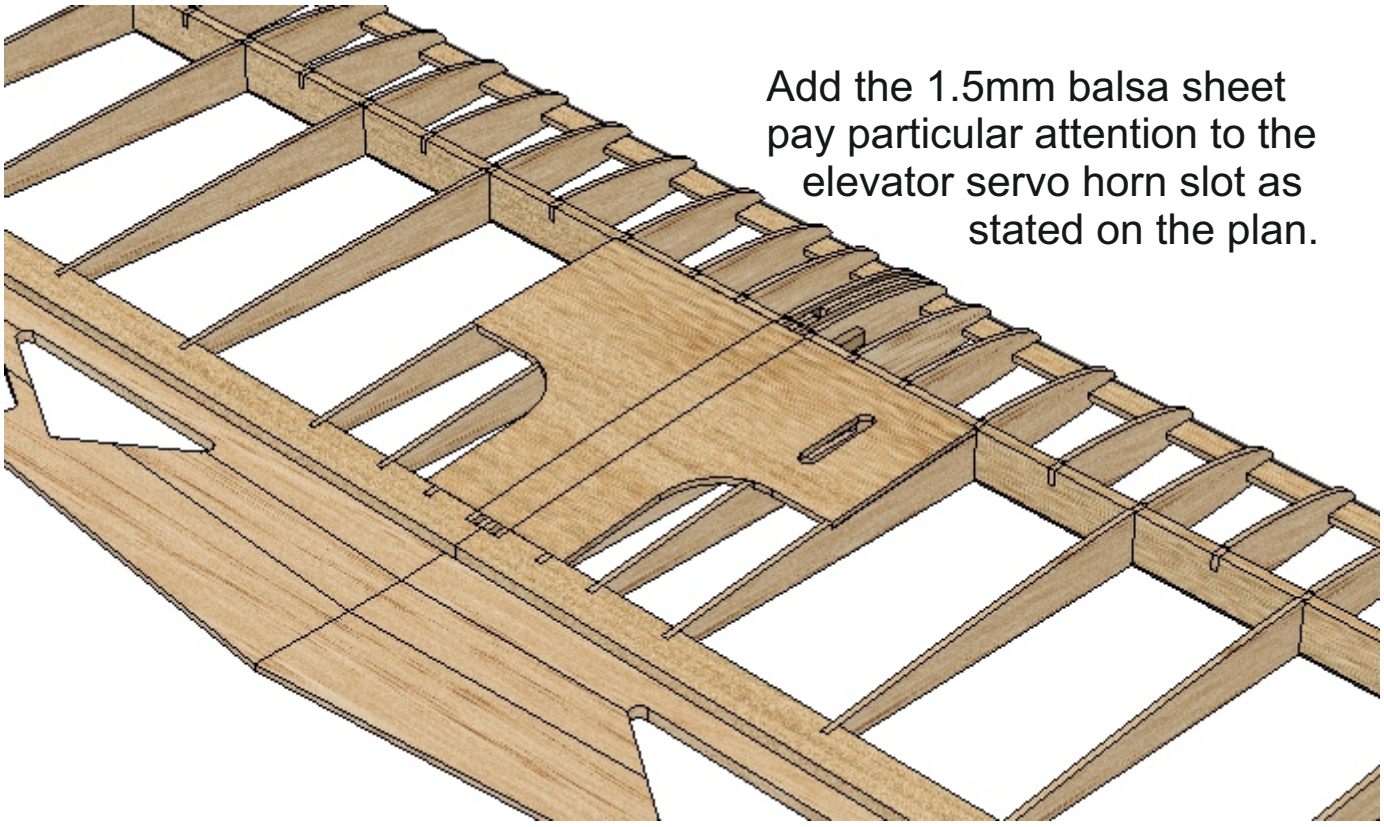
This area should be sanded to 1.5mm thick

Sand the TE and elevator to the section as shown on the plan, use both the plan and the wing ribs as your reference

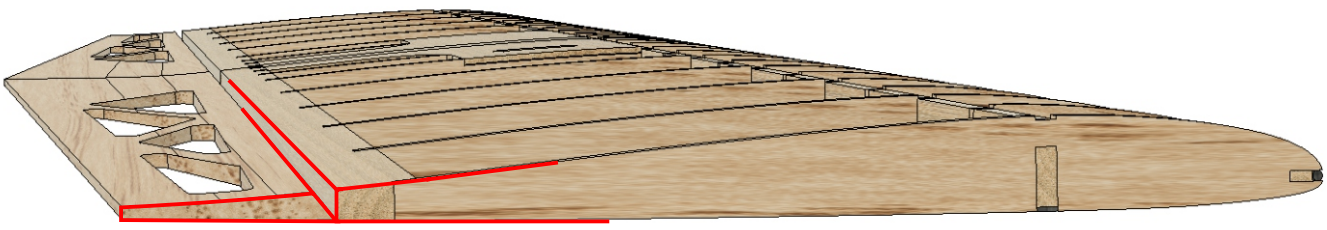
Add the top Carbon spar cap.
Sand and clean as advised previously

Use thick CA or epoxy!





Add the 1.5mm balsa sheet pay particular attention to the elevator servo horn slot as stated on the plan.

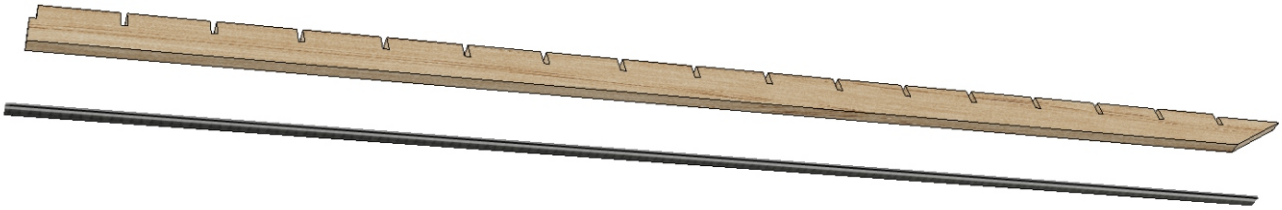


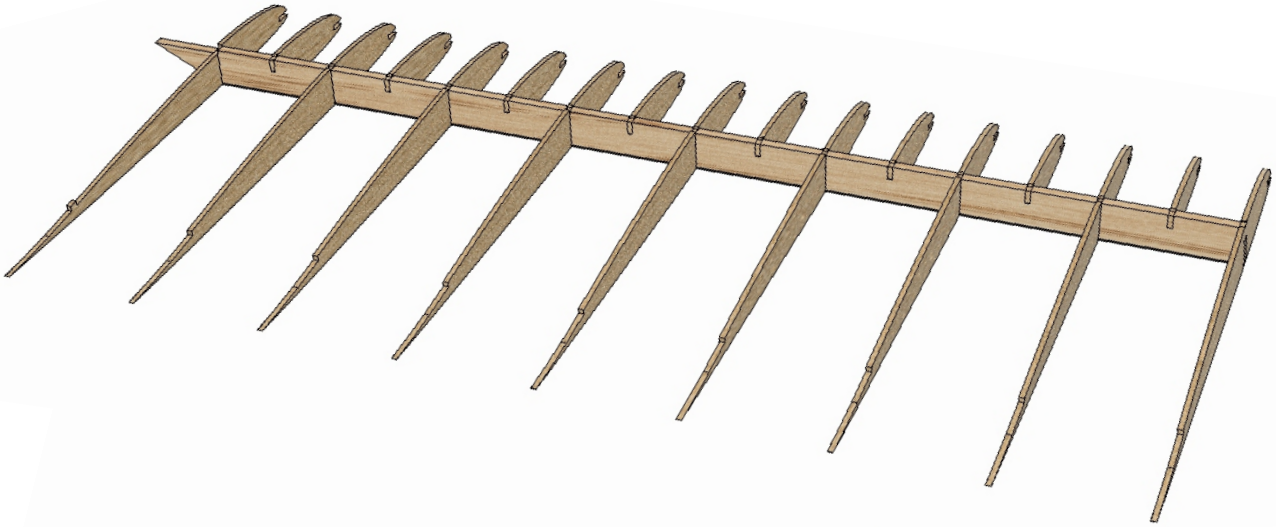
Remove the elevator, with a sharp knife and straight edge
Add a chamfer to facilitate **bottom hinging!**

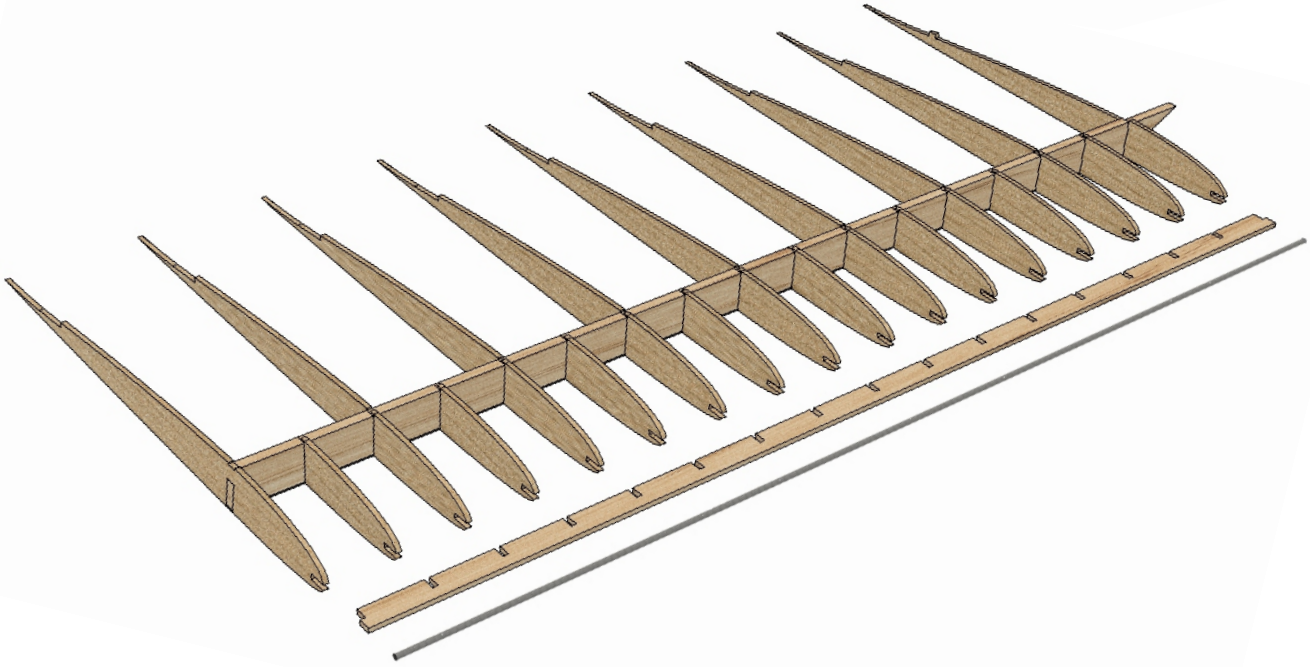
Outer Wing Panels

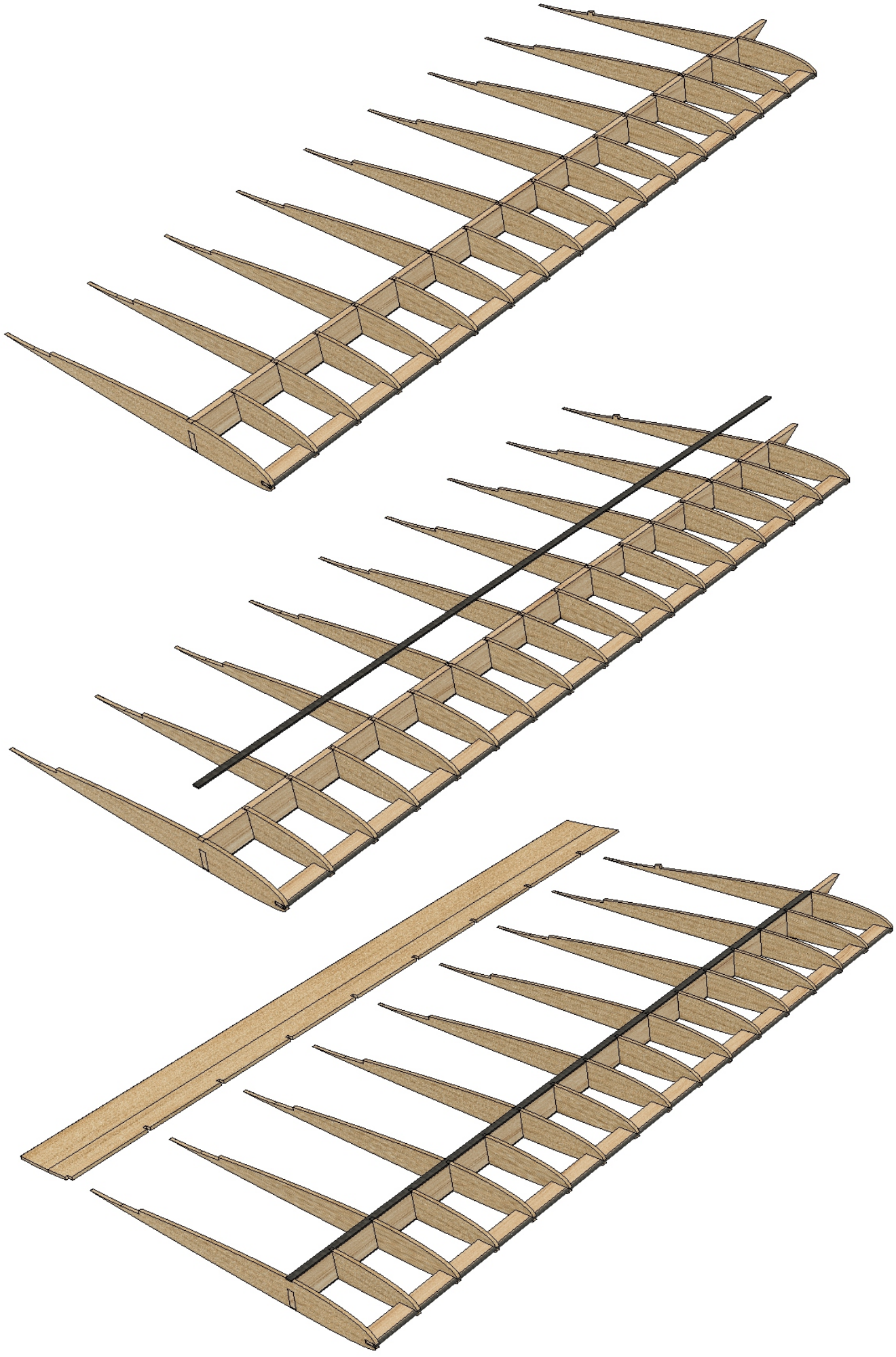
We'll remind you right now to make a left and right hand outer panel!

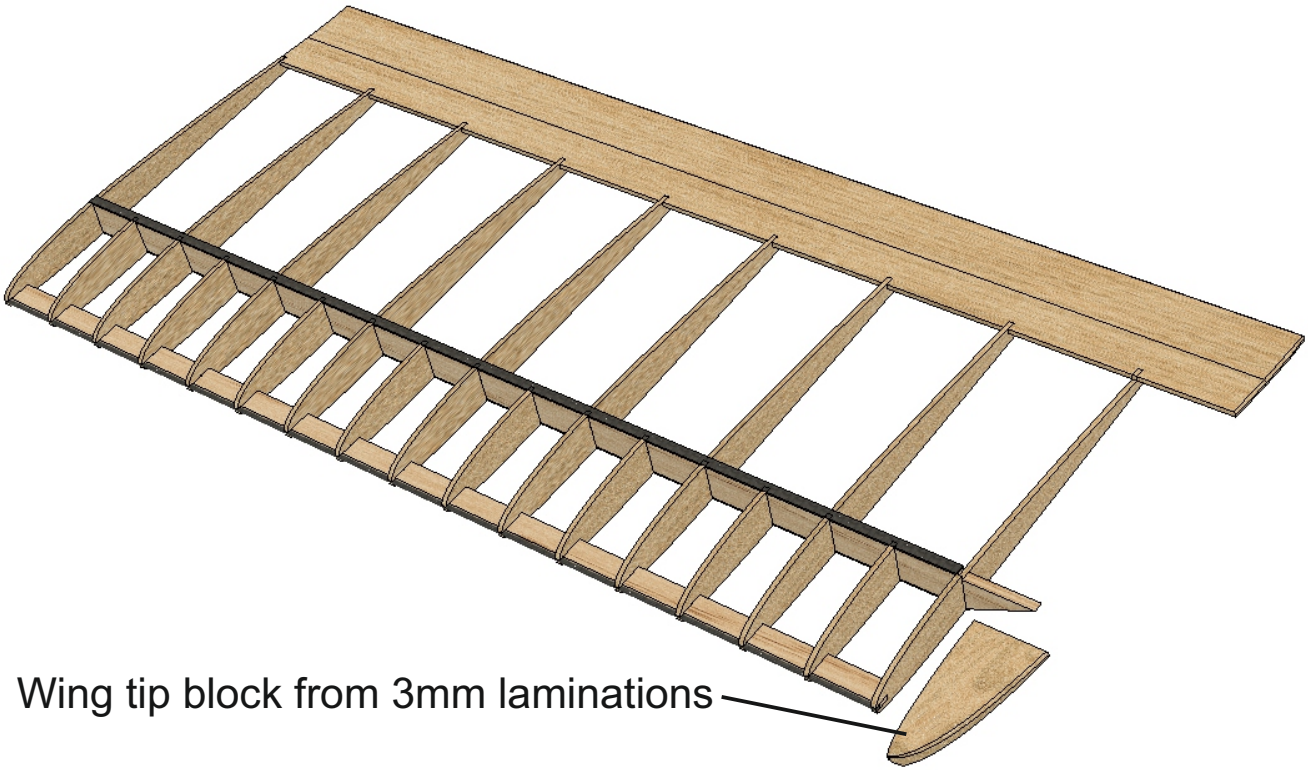
The construction of the outer wing panels are no different to the main center panel. As such each step is not annotated unless needed

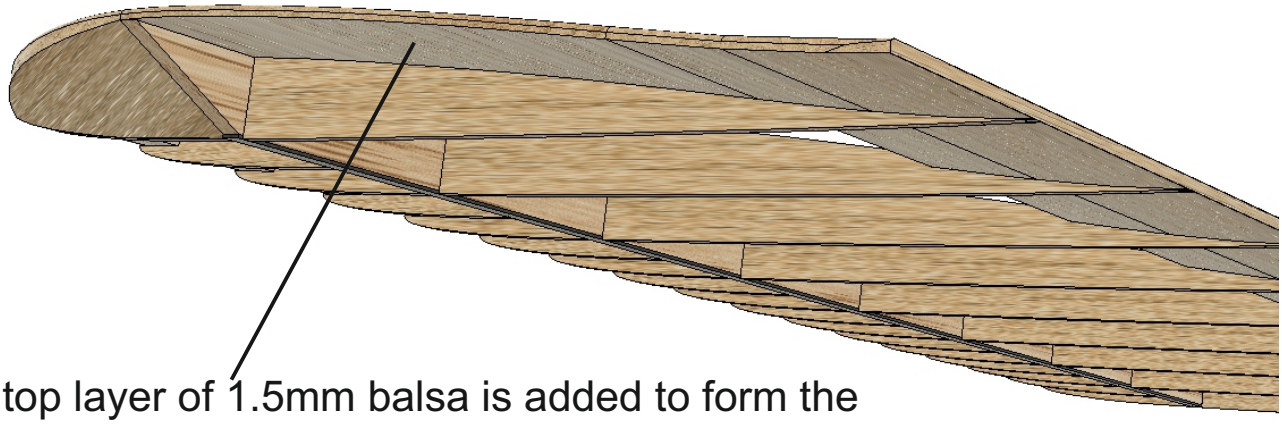




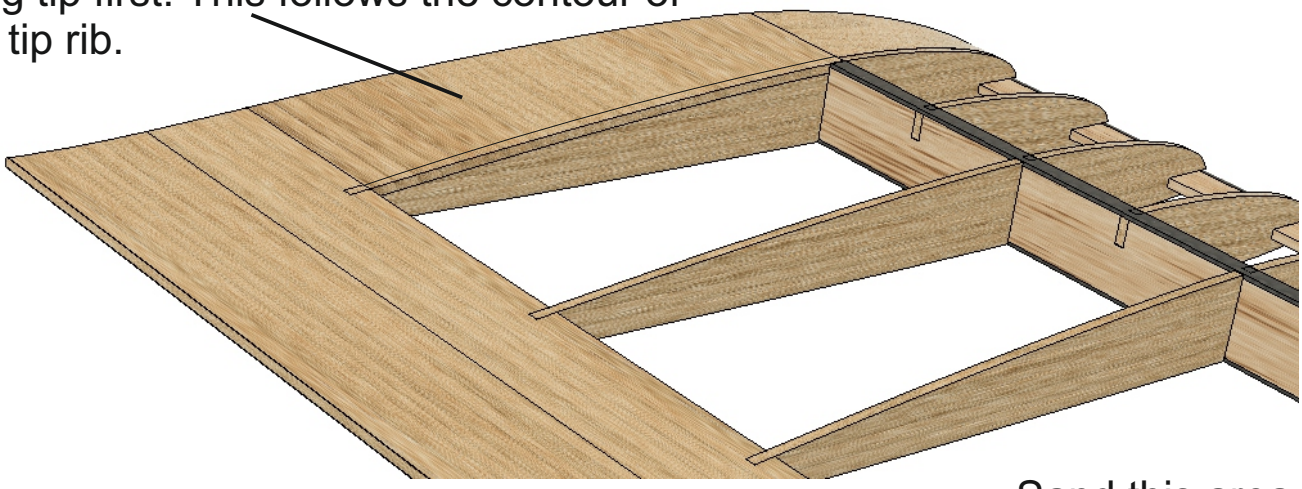


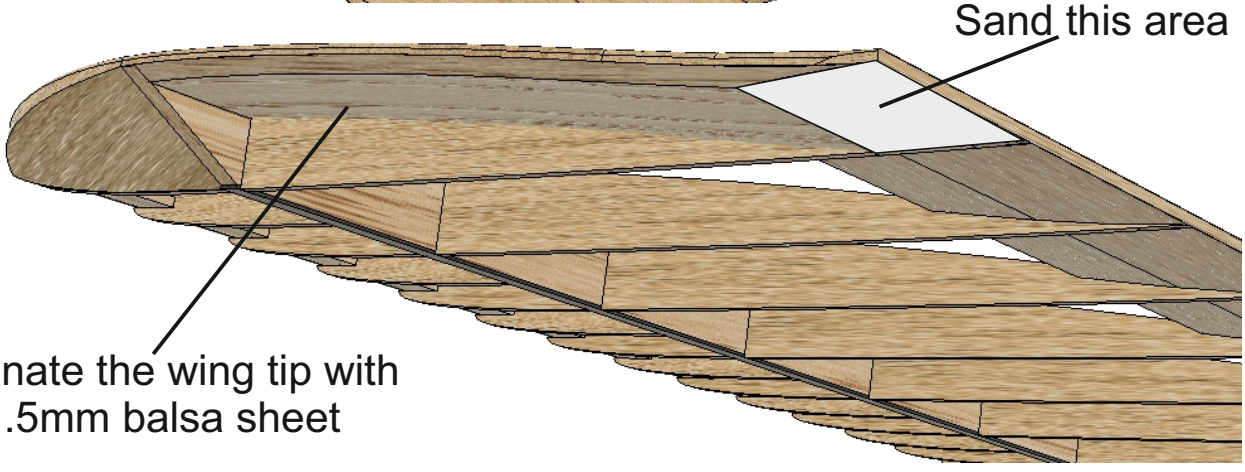


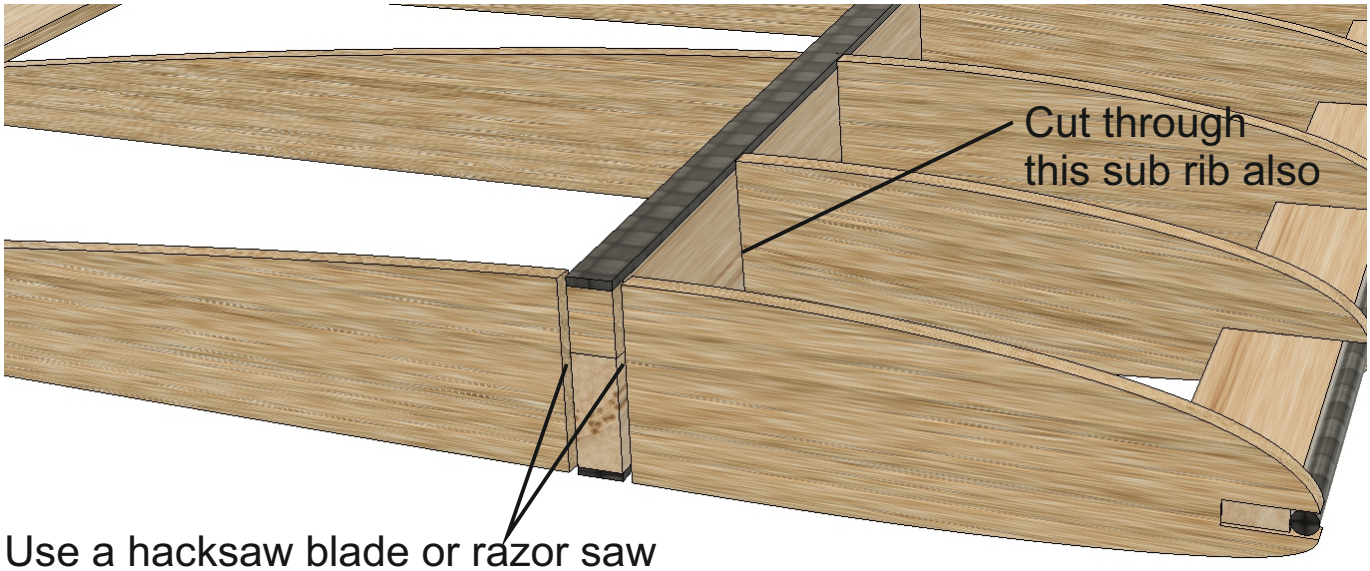




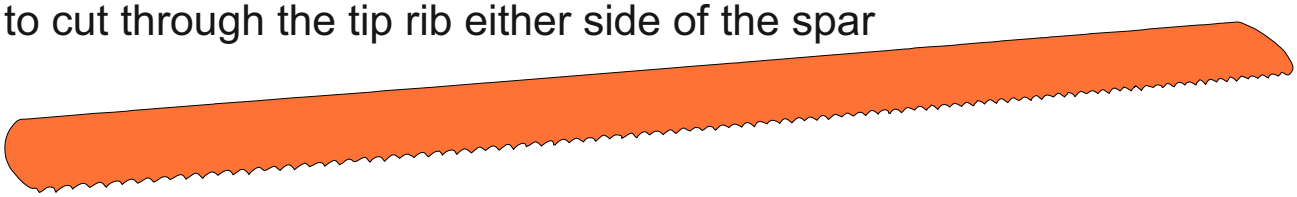
The top layer of 1.5mm balsa is added to form the wing tip first. This follows the contour of the tip rib.

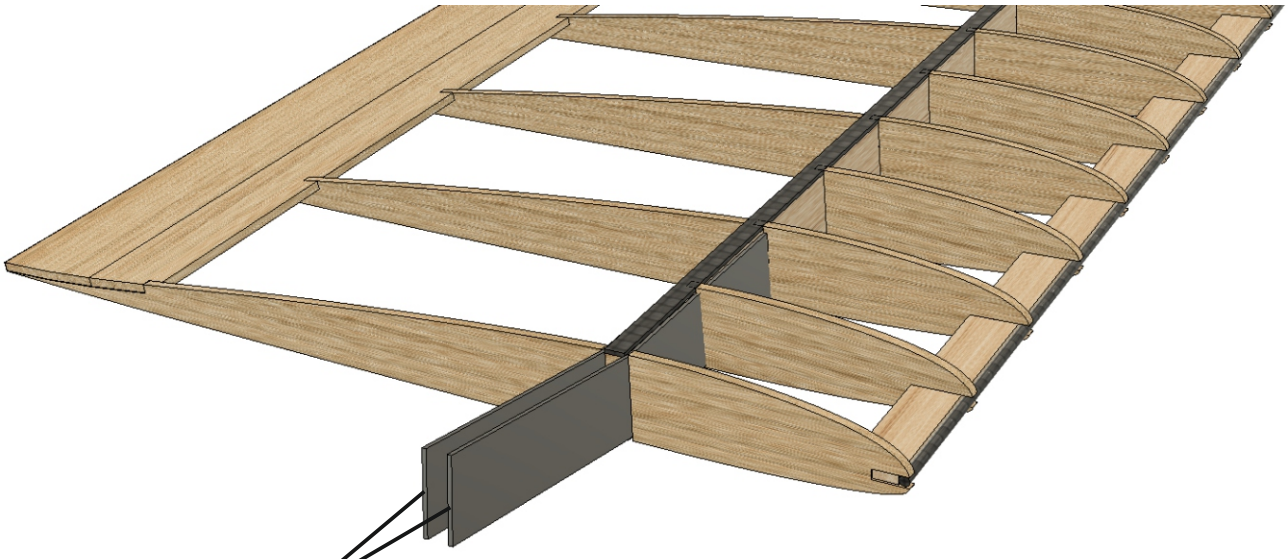






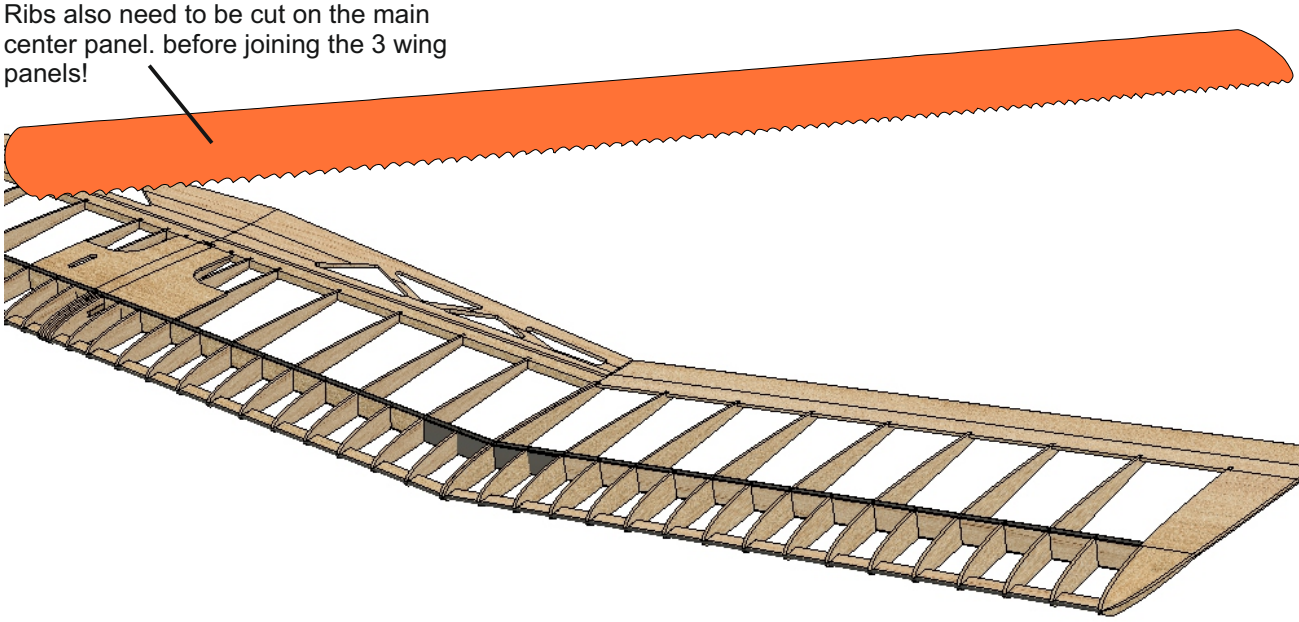
Use a hacksaw blade or razor saw
to cut through the tip rib either side of the spar

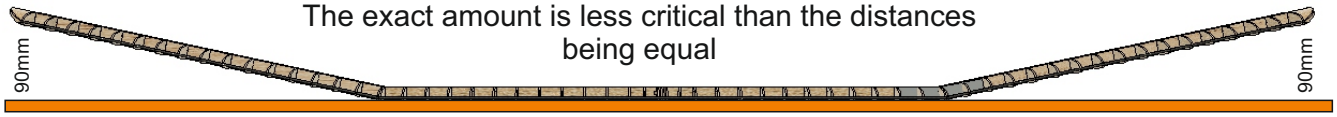




Laser board dihederal braces either side of the main spar

Ribs also need to be cut on the main
center panel. before joining the 3 wing
panels!





Canopy Retention

The caopy is retained using a pair of 6mm magnets. One is buried into the canopy itself, the other has been buried into the main center rib. We suggest this is done before covering the model

Finishing and Covering

Apart from the fuselage there is actually very little sanding to do. But that doesn't mean its not worth spending the time to get it right. Laser scorch can be removed using 400-600 grit paper removing the scorch from the edges of the ribs. Of course this isn't required if you are going to use solid colours for covering. The most important thing to take into account is to only use lightweight covering on the wing panels and the fin / rudder. The fuselage can be covered in anything, including glass cloth if preferred. Our model is covered with feather cover on the wing and fin, and then uses a standard film on the fuselage and leading edge " D-box" up to the main spar. It would be easy to distort the wing and badly twist it by using heavy covering materials we suggest either feather cover or Oracover Oralight only.

CG and Control Throws

C of G is 30 - 32mm from Leading edge
Elevator should be set 2mm up from Neutral

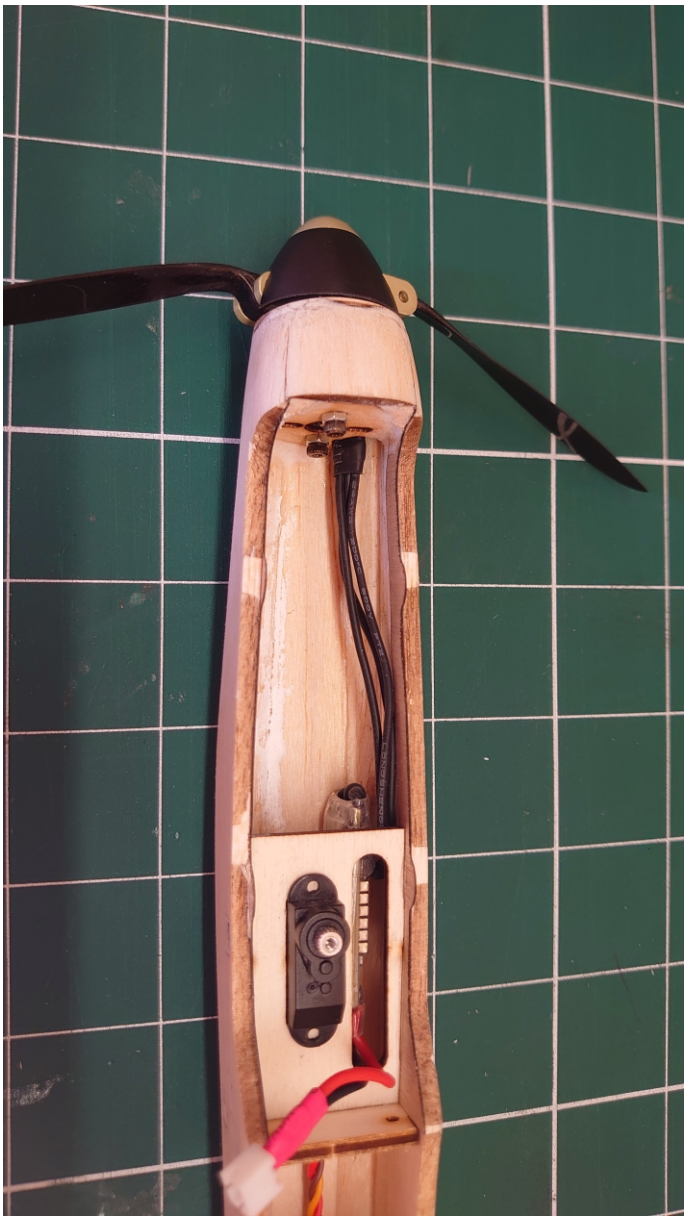
High Rates
Rudder 35mm either way 30% Expo
Elevator 15mm up, 8 mm down 30% expo

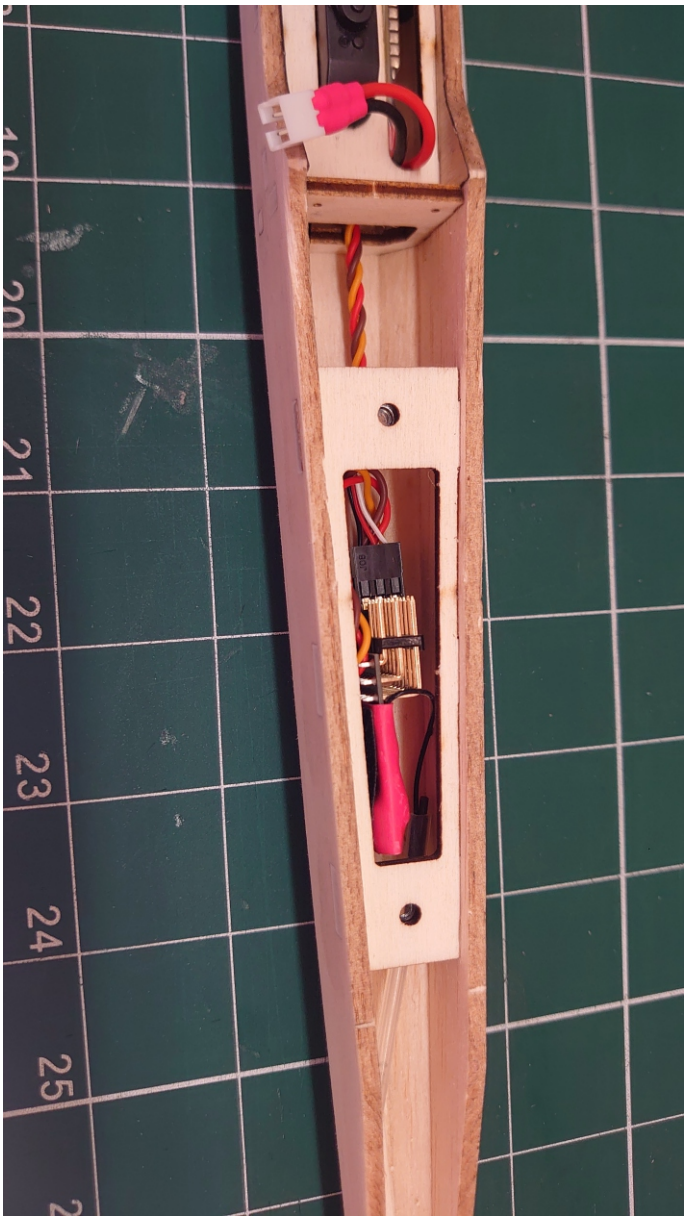
Low rates, Especially useful on bungee launch
Rudder 15mm either way 30% expo
Eleavtor 12mm up 7mm down 30% expo

E-Conversion

The kit is supplied with a 1.5mm plywood bulkhead and 1.5mm plywood spinner ring. The Dune Freak was designed specifically as a Dune Soarer but can be converted to electric flight. The “E” parts supplied are for experimenters. Images shown are of our own electric conversion, and here is a list of what we used. all parts were supplied by Hyperflight. This is a superb setup that is super efficient well balanced and almost silent!

T-Motor F1507 2700 RPM/V 15g Outrunner
CN Models 25mm Spinner for M5 shafts
CN 6x4 Folding prop blades (2mm hinge pin)
HyperFlight 28A BLHELI-32 ESC with SBEC
Bonka LiPo 2S 400mAh 7.4V 50C JST

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