

Sides & doublers Start with a piece of A-grain 1/16th balsa, lay out the two sides per the view shown on the drawing, then cut them out. Two things to note. The sides are left long on the bottom side to allow wrapping around the bulkheads and the lower edge of this extension is parallel to the edge (grain) of the balsa to help keep the sides from splitting when they are wrapped around the bulkhead. They are also left long so the bottom surface can be sanded flat for the fuselage bottom sheet. Add the CF reinforcement with slow set epoxy, being careful to make a left and a right. This surface will be the INSIDE of the fuselage sides. Add the 1/32 plywood doublers and set aside for later.

Crutch - The basswood crutch is formed from three thickness' of 1/4" basswood. Cutout the pieces to the length shown, then bond together with slow-set epoxy. After the glue is dried rout out the interior shape. I do this on my mini-mill so I can accurately locate the insert holes, but it can be done by hand. If done carefully, the engine will drop right through. Cut the outline to shape, I use a bandsaw.

Speaking of the inserts. I use brass threaded inserts from DU_BRO or Microfasteners, 4-40 for the engine, and 2-56 for the tank. I install the inserts using an allen screw and nut. Note that the slot in the insert is for cutting the threads in the wood, not a screw slot for installation. Coat the insert with slow set epoxy prior to final installation. I have not had an insert back out in any of my current models when installed with this method. As an alternate, blind mounting nuts may be used, but I have found they tend to crush the basswood material when tightening mounting screws. I think BMNs use should be restricted to hardwood installations where inserts DO tend to back out.

Bulkheads – Cut the bulkheads out of 1/16" balsa and 1/8" plywood as shown on the plans.

Tailskid mount – The tailskid is retained in a 1/16" plywood sandwich.

Assembly of the crutch and sides. This step will start the alignment process of the fuselage and wing, so take your time. Clamp the crutch to a flat surface with the engine mount surface against the flat. I use a large flat piece of 3/4" melamine faced board. Make sure there is a centerline drawn on the surface for reference. Clamp and glue the two fuselage sides to the crutch, making sure the slots for the wing and stab are parallel to the surface.



The wing must be installed now. Once the sides are glued together at the rear the wing will not fit through it's slot due to the bellcrank connector.

Alignment of the wing/fuselage/horizontal stabilizer will make or break the performance of the airplane. The wing and stabilizer chord lines must be lined up parallel with the horizontal thrust line or some sort of control input will be required to keep the airplane flying level. That means preventable drag and slower times. The wing must also be installed perpendicular to the fuselage centerline. With the wing centerline aligned with the crutch CL measure from the nose CL to a point equidistant from the CL on the trailing edge. This will ensure planform alignment. Don't use the wingtips as a reference, the inboard and outboard spans are different. Make sure the wing is at zero spanwise tilt. Use slow set epoxy and take a lot of time lining up the wing and it will pay off in performance.

The bulkheads can be trial fit and/or glued in place at this time. The tailskid block is glued between the sides under the stabilizer, on NEMESIS. The tailskid is a part of the lower vertical tail on SPRNTR. Do not glue the fuselage sides together above the stab slot, closest to the surface. Installation of the stab and elevator requires this to be open for the control horn. After the bulkheads are in place the reinforcing diagonals can be added in the bays between the wing and stab. These contribute greatly to the torsional stiffness of the fuselage and make the top and bottom blocks less critical for strength of the aft fuselage. Side to side whipping of the fuselage occurs during a pit stop catch. If there is not enough aft fuselage strength the tail may break off right at the trailing edge of the wing. This was a common occurrence in the past.

The stab/elevator are installed next. With wing/crutch assembly clamped to a stiff board, align and glue the stab in place. Again shim the stab so that the chord is parallel to the thrust line, the hinge line perpendicular to the CL, and the stab at zero spanwise tilt.

