BABY BI

This little 36" span, .40 powered stagger bipe is easy to construct and will do any maneuver you can dream up. It's a must for your hangar of models.

By Fritz Schuetzeberg

The "Baby Bi" came about after nineteen years of looking for a small, high powered, easy to build, roomy airplane. If you study the lines, you may see that it's a cross between a Nesmith "Cougar" and a "Staggerwing" Beech with a little "Knight Twister" thrown in. The "Baby Bi" is 41½" long, 36" wide with a 12 oz. tank, but you can get both hands and a screwdriver, along with a radio unit, in the radio box. To make it big, it has two 8" x 36" wings giving the .35 to .40 engine 576 square inches to pull around at only 5½ lbs.

What does all this information give you? Well, with a good .40 engine and big wheels, she will jump off the ground, do any manuever you can dream up. Then she will slow down fast with the two wings and large fuselage and, with the constant chord wings, she will land at a walking pace. Another good bit of information is that I fly on a three acre field with wires all around and haul the "Baby Bi" in my Volkswagen convertible.

To fly the "Baby Bi", point her into the wind, open the throttle, add right rudder to point the nose and let her lift on her own. As she comes up, roll just a bit left and climb out. Try 5 or 6 stalls and note the slow break. Bring her around on final with the nose down. Flare and watch that slow stall. After you get use to the fast slow down, you can do some of the smoothest nose up, drag in, full stall landings you have ever seen.

Well now, look at the pictures, look at the plans, and notice the easy build and clean lines. If you like what you see and have about 40 hours of free time --- proceed.

CONSTRUCTION

The "Baby Bi" is designed to make the best use of materials at the best price. Follow the cutting list to the letter and you won't have much scrap. See the bill of material when purchasing parts. Cut all parts by the list at this time.

(1) Match edges on a 3" x 1/8" x 36" sheet of balsa with a 4" x 1/8" x 36" sheet of balsa. Sand edges, if required, to have a good fit. Glue the edges together. Lay out the fuselage side as shown on the plans and cut as shown.

(2) Match edges on a second 3" x 1/8" x 36" sheet with a second 4" x 1/8" x 48" sheet as in Step 1. Glue edges together. Lay the fuselage side cut in Step 1 over the new assembly. Mark and cut.

(3) Lay out the stabilizer, fin, four wing saddles, four tip ribs and front part of fin on a 1/4" x 4" x 48" sheet of balsa, and cut out.

(4) Lay out and cut the elevator and rudder on a piece of 1/4" x 2" x 36" streamlined shaped balsa stock.

(5) Lay out and cut fourteen each 4¼" long planking for the fuselage top and bottom from two each 1/8" x 4" x 36" sheets.

(6) Lay out and cut the front and rear gear mounts, the windscreen and the front cowl ring from one 6" x 12" piece of 3/32" plywood.

(7) Cut four each pieces of dowel 5¼" long and one piece 5½" long from one 36" x 1/4" dowel.

(8) Cut the firewall from a piece of 3/16" plywood as shown.

(9) Cut the following parts from two pieces of 1/4" x 36" triangle stock: two at 3", two at 8⅛", two at 8½", and two at 4".

(10) Cut the following parts from two pieces of 1/4" x 1/2" x 36" balsa: two at 4¾", two at 4¼", two at 7½", two at 10¼", two at 5¼", two at 3½", and four at 4".

(11) From two each 3/32" sheets 3" x 36", cut twenty-two ribs. Use a ballpoint pen and mark the top. **See plans.**

(12) From four each, 1/16" x 3" x 36" sheets, cut four each 1" strips and four each 2" strips for wing sheeting.

(13) From one each 4" x 1/16" x 36" sheet, cut four each 4¼" long pieces.

(14) From six each 1/16" x 1/4" x 36" strips, cut fifty-two each at 4" long.

(15) From 2-36" x 1" x 1/4" aileron stock, cut four each at 15⅜" and two each at 5".

(16) Cut and bend a 36" piece of 5/32" steel wire, as shown on plans, for the landing gear.

(17) Cut and bend a 36" piece of 1/16" wire, as shown on the plans, for the tail gear.

BABY BI

Designed By:
Fritz Schuetzeberg
TYPE AIRCRAFT
Sport/Pattern Bipe
WINGSPAN
36" (both)
WING CHORD
8" (both)
TOTAL WING AREA
576 Sq. In.
WING LOCATION
Stagger Wing Bipe
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
None
O.A. FUSELAGE LENGTH
41 Inches
RADIO COMPARTMENT AREA
(L) 8" x (W)4" x (H)6½"
STABILIZER SPAN
18 Inches
STABILIZER CHORD (incl. Elev.)
5¼" (Avg.)
STABILIZER AREA
84 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
9 Inches
VERTICAL FIN WIDTH (incl. rudder)
6¼" (Avg.)
Rec. ENGINE SIZE
.35-.45 Cu. In.
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa
Empennage	Balsa
Wt. Ready To Fly	**75-85 Oz.**
Wing Loading	**19-20 Oz./Sq. Ft.**

(18) Locate four each 1/4" x 1/4" x 36" spars, four each 1/4" x 1/2" x 36" spars.

(19) Cut the remaining 1/8" sheet into strips to use as wing shims.

Now that you have all the parts cut and in nice little stacks, let's start by building the wing.

Wing

(1) Mark the four 1/2" x 1/4" x 36" strips and the four 1/4"x 1/4" strips on each side of the ribs shown on the plans. Be sure one end is flush and square and mark the parts in one stack using a straight-edge and ballpoint pen.

(2) Set a 1/4" x 1/4" spar on the work surface and "tack" glue the ribs to it. Note the top of the wing is on the work surface. **See plans.**

(3) Line the ribs tails up, and tack glue as you go, to the 1/4" x 1/2" rear spar. Note: They are flush at the top of the spar. **See plans.**

(4) Tack glue the 1/8" x 1/4" shims to the rear spar. Note: They will later be removed.

(5) Tack glue the bottom spar 1/4" x 1/4" x 36" to the ribs.

(6) Tack glue the front 1/4" x 1/2" x 36" spar to the ribs at the leading edges.

(7) Check the alignment of the wing and the flatness in relation to the work surface.

(8) Weld all joints together.

(9) Remove shaded area, as shown in plans, from the lower side of the wing. This is the very slight bevel.

(10) Plank the lower side of the wing at the aft spar.

(11) Plank the front top and bottom sheeting on the wing. Make the front joints good and tight.

(12) Plank the top of the wing at the back.

(13) Plank the center section of the wing.

(14) Install the 1/4" x 1" x 5" aileron stock to the center of the wing as shown. **Note:** The aileron torque rod must be installed at this time and the 1/4" x 1" aileron stock must be grooved to accept the torque tube. **See plans.**

(15) Install the capstrips on the top and bottom of the wing.

(16) Repeat Steps 2-16 for the bottom wing. Disregard the note on Step 14 because it is for the top wing only.

(17) Radius the leading edge as shown on the plans.

(18) Remove the material, shown on the plans, from the rear spar flush to sheeting.

Fuselage

(1) Glue the fin to the horizontal stabilizer. The fin and stabilizer must be at 90 degrees to each other.

(2) Glue the 1/4" triangle stock and 1/4" x 1/2" vertical braces to the inside of the fuselage, as indicated on the plans. Do not glue the front and back vertical brace for the landing gear and tank mount bulkheads in at this time.

(3) Square the fuselage and "tack" glue the firewall in place. "Tack" glue the top and bottom 1/4" x 1/2" x 4" horizontal braces at the aft of the radio compartment. Note plans for location. Check to see that this assembly is square before proceeding.

(4) Glue the 3/32" plywood windshield in place. Center left to right and flush top of fuselage sides.

(5) Pull the aft end of the fuselage sides together and check for flush. Clamp and tack the joint **below** the horizontal stabilizer slot.

(6) Slide the horizontal and vertical stabilizer into the slot. Use a tape measure and make the distance from the front of the fuselage to the aft outside edges of the horizontal stabilizer the same---usually 36½" Glue the stabilizers to the fuselage sides.

(7) Use a piece of scrap, about 1/8" x 1/8" x 2½", and pull the sides to vertical using the aft vertical 1/4" x 1/2" brace as a sight guide. "Tack" glue the scrap across the top of the fuselage side just under the fin to hold the side vertical. This will make up for the fin thickness.

(8) Glue the front cowl ring to one side of the fuselage, "flush with the edge". Pull the sides together, till you flush the other edge, and glue.

(9) Locate the front and aft tank and landing gear bulkhead. Mark the smaller one front and the larger one back. Lay the back bulkhead over the plans and the landing gear on top of it; glue the gear to the bulkhead. Locate the front bulkhead and, using the guide marks on the plans, glue it in place. Fill the sides and top of the space between the bulkheads with 5-minute epoxy using masking tape as a dam to hold it in. When it sets, do the same on the inside (hole where tank goes).

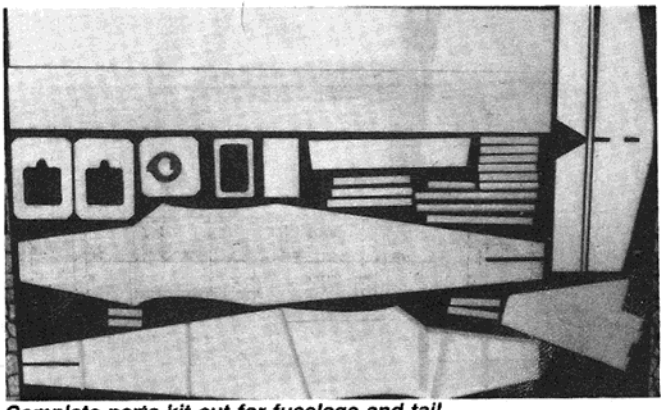
(10) Glue the landing gear assembly into the fuselage. Glue the front and aft vertical braces to the landing gear assembly and fuselage sides.

(11) Glue the balsa wing saddles in place.

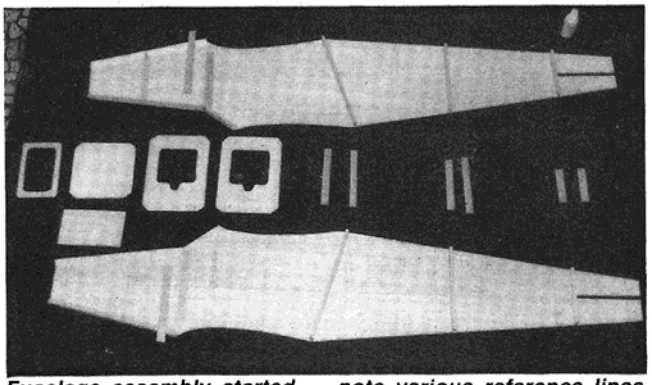
(12) Glue the fuselage bottom sheeting to the fuselage. 1/8" x 4" in the front and 1/8"

Material List

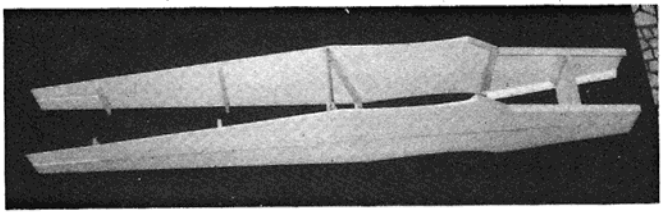
Item	Description & Location	Amount
Cyanoacrylate	Adheisve	2 oz.
Epoxy	5-Minute	3 oz.
Balsa	1/8" x 3" x 36" fuselage side	2 sheets
Balsa	1/8" x 4" x 36" fuselage sides	2 sheets
Balsa	1/8" x 4" x 36" fuse. top & bottom	2 sheets
Balsa	1/4" x 4" x 48" vert. & horizontal stab., wire saddles, tip ribs	1 sheet
Balsa	aileron stock 2" x 36" x 1/4" elev. & rudder	1 sheet
Birch	1/4" x 36" dowel elev. connector and wing hold downs	1 each
Balsa	1/4" x 1/2" x 36" (hard) fuselage Braces	2 each
Balsa	1/4" triangle x 36" fuse. corners	2 each
Plywood	3/16" x 4" x 4" firewall	1 each
Plywood	3/32" x 6" x 12" gear mounts & cowl ring	1 each
Music wire	5/32" x 36" gear	1 each
Wheels	3" diameter	2 each
Wheel	1" diameter	1 each
Radial Motor Mount	40 size	1 each
12 oz. tank	rectangular	1 each
Hinges	small	15 each
Wheel Collar	5/32" diameter	4 each
Wheel Collar	1/16" diameter	2 each
Balsa	Trailing edge stock 1" x 1/4" x 36"	2 each
Balsa	1/16" x 3" x 36" wing sheeting	5 each
Balsa	1/4" x 1/2" x 36" rear spars (straight front spars)	4 each
Balsa	1/4" x 1/4" x 36" main spars	4 each
Balsa	1/4" x 1/16" x 36" cap strips	6 each
Balsa	3/32" x 3" x 36" ribs	2 each
Silk	1 sq. yard	1 each
Dope	clear	16 oz.
Dope	color	8 oz.
Retarder	dope	8 oz.
Thinner	dope	16 oz.
Brush	1"	2 each
Talc Powder		4 oz.
Engine	.35 to .45	1 each
Aileron Kit	strip type	1 each
Control Horns	nylon type	6 each
Pushrods		
Links	steel type	6 each
Solder Links	steel type	2 each
Music Wire	1/16" x 36" tail wheel wire	1 each
Sandpaper	assorted	1 each
Gold'N-Rod or dowel	for pushrods	2each
#64	Rubber bands	1 box



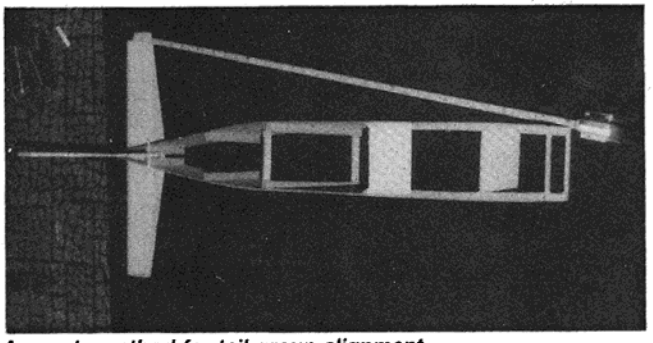
Complete parts kit cut for fuselage and tail.



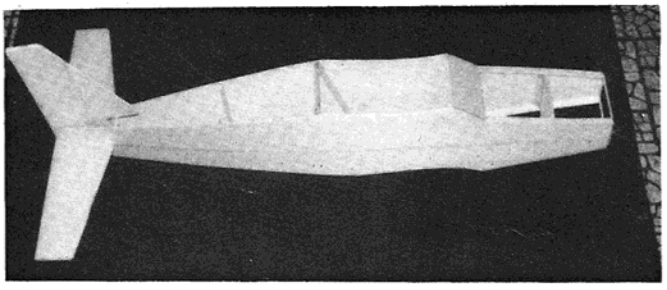
Fuselage assembly started — note various reference lines plotted on sides.



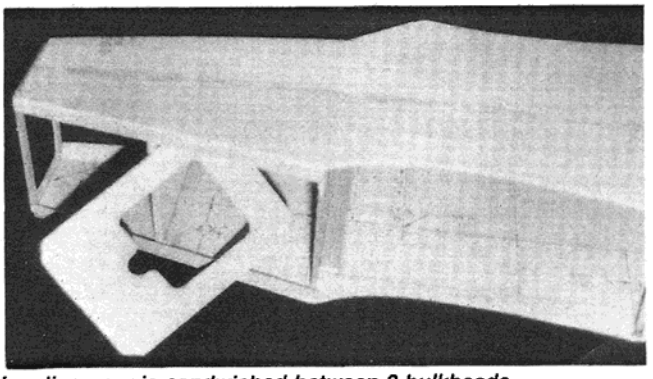
Two sides are joined making sure they are parallel.



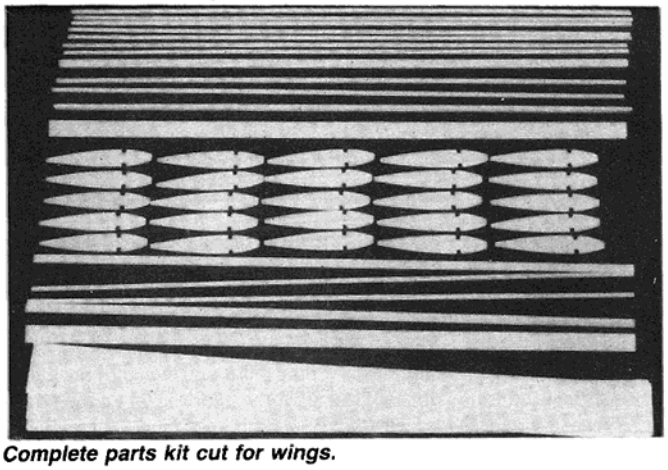
Accurate method for tail group alignment.



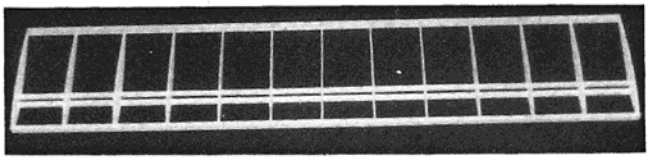
View shows simplicity of construction.



Landing gear is sandwiched between 2 bulkheads.



Complete parts kit cut for wings.



Basic wing structure before sheeting.

x 4'' to the back. Note: This is to be crossgrain.

(13) Install the motor mount and pushrods at this time.

(14) Glue the fuselage top sheeting in place to the fuselage, 1/8'' x 4'' in front and 1/8'' x 4'' in back. Note: This is to be crossgrain.

(15) Cut the engine hatch out of the fuselage side as shown.

(16) Radius all fuselage exposed edges with a 1/8'' radius. Radius the leading edges of the horizontal and vertical stabilizers to a 1/8'' full R.

(17) Install the dowels that hold down the wing, as shown on the plans.

Finishing:

(1) Glue the elevator joint dowel to the elevators.

(2) Glue the tail wheel assembly to the rudder.

(3) Cover the wings with your favorite material. I still use silk and dope.

(4) If you use iron-on material, cover all parts now.

(5) Paint, iron-on, or dip your favorite paint job on the bird.

(6) Install the ailerons to the top and bottom wings.

(7) Install the connecting horns between the top and bottom ailerons. Use nylon horns and steel snap links.

(8) Install the elevator.
(9) Install the rudder.
(10) Install the engine.
(11) Install the radio.
(12) Install the fuel tank.
(13) Install the control horns on the rudder and elevator.
(14) Adjust the elevator travel to 1/4'' up and 1/4'' down.
(15) Adjust the rudder to all you can get left and more if you can right.
(16) Adjust the ailerons for 1/8'' up and 1/8'' down for the first several flights, and then you can go to 1/4'' and 1/4''.

Conclusion

Notice how much time it took to build.
Notice how easy it is to repair the flat sides and simple wing if you have an accident.
Notice how small an amount of scrap you have.
Notice how small an amount of money you spent.
Notice how easy it is to service an airplane when you can get to it through two big holes.
Notice how well it flys.
Notice how well it lands.
Notice all the attention you got when you went to the field.
Notice how well it fits in your new compact money-saving car.
Notice how 12 oz. of fuel lets you do what you want for a long time.
What else could you ask for in a Sunday airplane?
Tell a friend. □

Editing By Hlsat.
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