

Piper Cherokee 140

1/3 scale

Construction Manual

STAB CONSTRUCTION

1. Remove foam cores from cradle and place on flat surface. Inspect pieces before you epoxy halves together making sure leading and trailing edges are straight. Make sheeting for stab by edge gluing 1/16" balsa sheets together
2. Sand entire stab section with fine grit and remove all dust. To really strengthen stab, you can insert a piece of 1/4 x 1/2 x 36" spruce. (Not supplied)
3. Lay 1/2 of stab cradle section on flat surface before sheeting. Now spread a thin coat of sorghum cement, let dry.
4. Coat all 1/16 sheeting and let dry. Now sheet 1/2 of stab while in cradle so it will not warp. Since stab is so large, weight down.
5. Now that you have sheeted one side of stab, lift out of cradle and sand smooth. Place stab in second 1/2 of cradle and insert plywood for bolt on stab. (If you wish plane to come apart.)
6. Repeat same procedure and glue on 1/4 x 1/2 hard balsa to leading and trailing edges. Make sure you have weight on entire stab before you epoxy in place. This will keep stab from bowing on you.
7. When pieces have cured, scribe a line on leading and trailing edges and install tips at same time. Now sand in entire stab to contour. Make a trial fit to fuse before you are finished.
8. Take (2) 1/2 x 4 x 24" tapered elevator pieces and epoxy together. Scribe center line on elevator and cut 5 slots for hinges. With elevator hinged to stab, finish sand entire assembly.

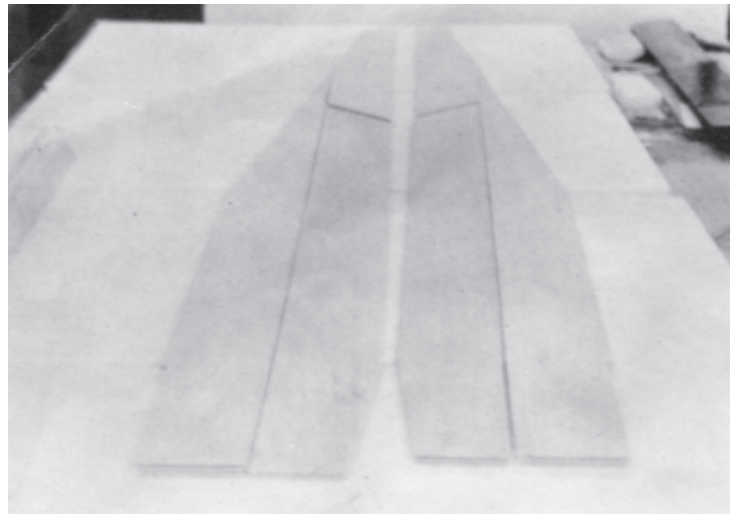
RUDDER CONSTRUCTION

1. Remove foam core and sand both sides down with a fine grit. Remove all dust from foam core.
 - 1a. Make sheeting for rudder by edge gluing 1/16" balsa sheets together. See pattern for best use of balsa.
2. Next, lay foam core down on flat surface using 1/2 of the foam core cradle so that core does not warp. Spread a nice thin coat of sorghum and let dry. Apply sorghum with a squeegee or a piece of stiff cardboard.

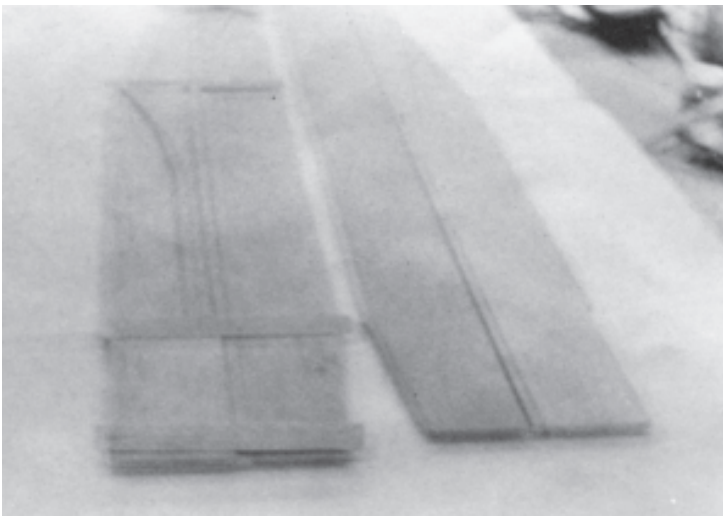
3. Take 1/16 sheeting and spread a thin coat on the sheets. Let dry for 1/2hr. and apply sheeting to one side.
4. After you have sheeted one side of rudder, sand smooth and repeat same procedure for other side.
5. Now take 1/4 x 1/2" hard balsa and cap leading and trailing edge. Make centerline on both pieces and sand to correct contour. Install rudder tip now.
6. Epoxy in 1/4" plywood section to inside cap of rudder if you wish to have rudder bolted on. Make a centerline on piece for bolt patterns. Drill the 3 holes with #7 drill and 1/4 - 20 tap.
7. Now take tapered rudder part and make 4 hinge slots and hinge assembly. Now finish sand entire assembly.

FUSELAGE CONSTRUCTION

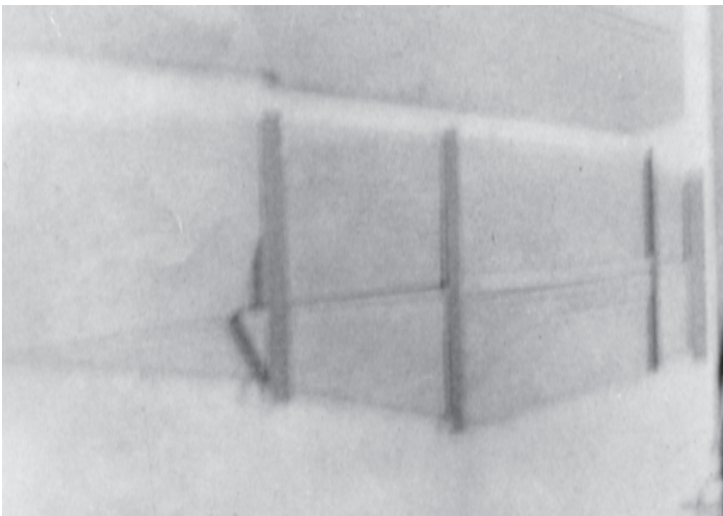
1. Lay out and cut fuselage sides from 1/4 x 4 x 48" sheet stock. Pick matching stock so later bends will be consistent on both sides. Make splice joints as shown on plan. Glue splice joint on flat surface. Next sand both sides smooth on a flat surface. (Note Picture)



2. Lay sides on plan and scribe lines for former locations and wing saddle. Be sure to make a left and right side. Next turn sides over and mark the center line, and stab cut out.



3. With sides on flat surface, glue in triangle stock. Former #1 has 1" triangle in back of #1. #2 former has 1/2" triangle stock to front of former #4, #5, #6 to rear and #7 to front. You will have to sand tighter angles in on triangle stock to match angles of formers F1 and F5 thru F7. Glue triangle stock to bottom of fuse sides. Use 1/2" triangle stock from rear of saddle to tail post. (Note Picture)



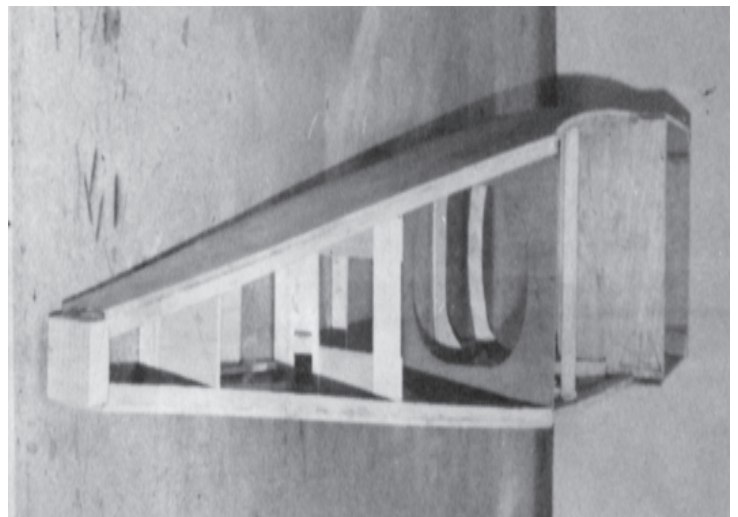
4. Glue in wing saddle doubler to fuse side and 1/4 x 1/2 stiffener to saddle. Do Not cut out wing saddle opening at this point. Mark the centerline on the bottom edge of formers 1, 2, 5, 6, 7.

5. Scribe a line on your building surface from tail post to #1 former. Let line pass these two stations so you can see when fuse sides are in upright positions. Now place fuse sides upright on board and pin to board from F2 to

F5 station. Glue in F2 former to sides and triangle stock, do the same for F5 former. Clamp formers in until dry. Look at formers to make sure of good glue joint and that formers are square.

6. When F2 and F5 are dry, make sure of alignment and glue in 2" x 2" x 1" balsa tail post. Sides should pull in easily. Wet sides if needed.

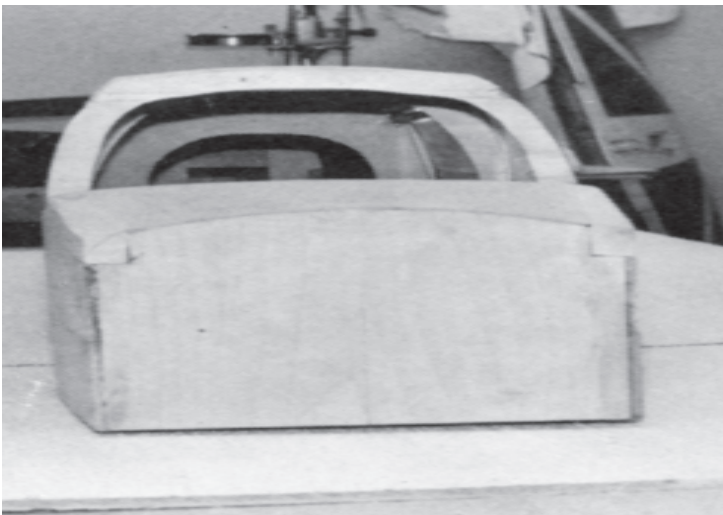
7. Pin tail post in place and dampen side sheeting at F1 and F2 stations. Spray with water so that sides will pull in easily. Now epoxy in former F1 to sides and triangle stock. Be sure you have a good joint. Keep sides wet so they will bend and not split. Be sure that center of F1 is over center line. Clamp in position until glue and balsa sides are dry. Wet sides again and let dry to ensure that sides keep shape and F1 remains centered.



8. Sight down fuse to make sure it is straight. Now glue in formers F6 and F7 in same manner as above. When dry, dampen fuse sides at F4 station and glue in former. To help hold sides out so former doesn't break, insert 1/4 x 1" stock across fuse sides at wing saddle. (This will relieve pressure on side.) When former is in and sides are dry, glue that 1/4 x 1" stock piece in.

9. Glue in F3A in place to give correct angle for windshield and F3. Now you can line up former F3 and glue in place.

10. Sand proper angles in cutouts in formers F1 and F2 to accept 1 x 2" soft balsa blocks. Make sure of correct angle and finish cut out in the blocks before you glue blocks in. (Note Picture and plans). Glue in blocks to formers F1, F2 and F3. Sheet nose section with 1/8" sheeting.

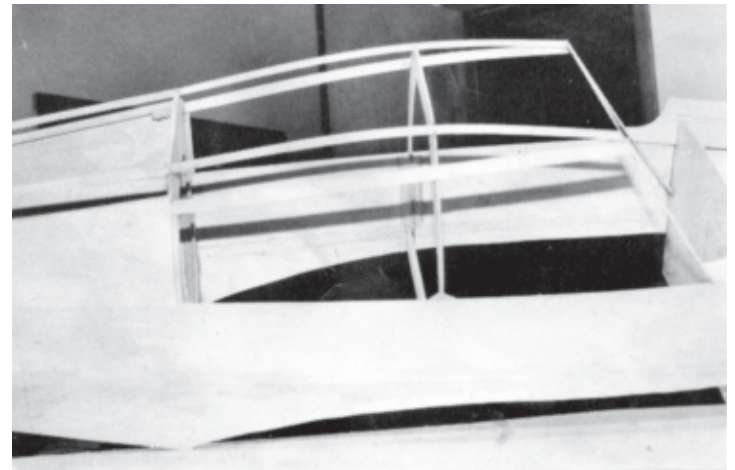
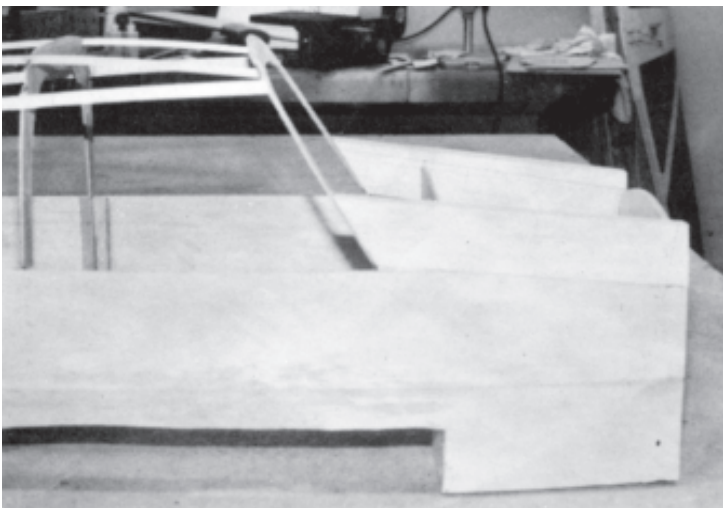


ing is flush with *outside edge* of fuse sides. You may wish to glue 1/8" square stock on top edge of fuse sides between formars flush with *inside edge* to make this easier.

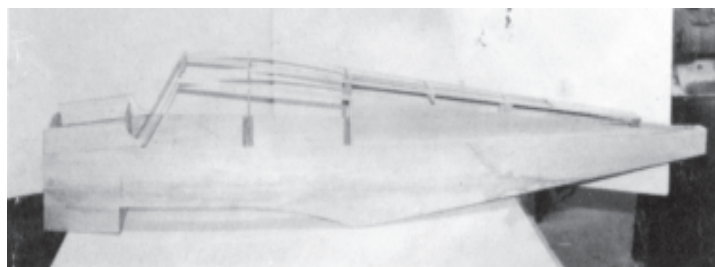
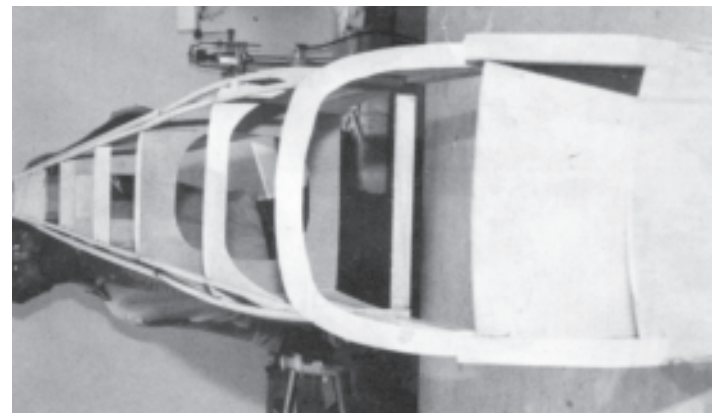
12. Continue sheeting from F5 to F3 covering window area. Do not cut out window area at this time.

13. When sheeting is completed, trim off excess sheeting at top of 1/4" stringer, sand smooth.

14. Now install 2nd 1/4" stringer Between on top of 1" triangle piece Install 1" triangle stock on top of 1/4" stringer. . (Note Picture)



11. Glue in 3/8" square stock between formers F3 and F5. It may be necessary to wet balsa to follow curve.



10. Glue lower 1/4" sq. stringers in place. 1/4" stringer is angled at former F3. (Note Picture).

11. Sand 3/8" square stock and 1/4" stock just installed flush with all formers to accept sheeting. Glue in 1/8" sheeting can from F7 to F5 on both sides. Be sure sheet-

11. Now you are ready to install rudder bolt on platform in place. Epoxy platform in and sand smooth to 1" triangle stock. Now install 1" triangle pieces in cabin area, F-5 to F-3 as shown in picture. Trim excess off and sand smooth.

WING CONSTRUCTION

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.



12. Now with 1/8" sheeting again, sheet top of fuselage from F-7 to F-3. Install at locations on plan and epoxy in 3/8" sq. stock in lower half of fuse. Sheeting is from F-5 to access hatch. Epoxy stab bolt on platform in place. Now sheet in access hatch to tail post. Now cut out wing center cavity to fit wing center section.

11. Glue 1/8" end formers onto wing cores. Cut wire harness tunnel (5/8 wide, 3/4 deep, 18" long) and refer back to section 10 for measurements. Cap strip cover 1/8 x 1 x 18" long recessed into foam core 1/8" deep on right and left panels. (This can be done with an X—acto blade)

12. Take wing center section and lay on flat surface. Next take left and right wing panels and epoxy in wing joiners while bolted together with saran wrap in between. (Using the saran wrap, joiners will not epoxy to each other.) After the epoxy cures, take the wing panels apart and re-epoxy joiner areas carefully, making sure that joiners are solidly bonded into the wing cores.

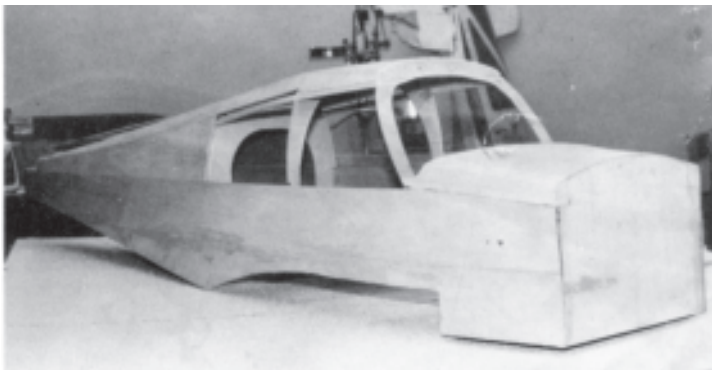
13. Re-assemble wing sections together, resting entire wing on a flat surface. Make a centerline on the center section and measure out 6 11/16" from centerline on each side and make another line. (Total measurement will be 13 1/8") (Note Picture)

13. Take sandpaper block and rough sand entire fuselage now. Epoxy on hardwood blocks and mount cowl. Take a medium sandpaper and sand to contour of cowl. Finish sanding when wing center section is installed.

14. Take stab and rudder, bolt in place at bolt on platforms. Measure to make sure horizontal stab is centered. Same procedure for vertical rudder. Now you are ready for the wing assembly

14. Now you are ready to cut slots in each side (with a hand saw) to get your dihedral. Make a saw cut at the lines about 3/4 of the way through the core from the top. Clean out loose foam from the slot and prop up at each tip with a 1" block. Make a second cut at the same location; clean out slot and block the tips up an additional amount. Make the cut a third time and measure tip to insure that you have at least 6" of dihedral at each tip.

15. Check that there is 6" dihedral at each tip without applying pressure to the center section. Mix enough epoxy for both cuts and apply epoxy in cuts. Bring up tips to correct dihedral. Place weights on center section to



hold it down flat. A 6" block under each tip will hold the correct dihedral. (Foam will absorb most of first coat of epoxy) (Note Picture)

16. After epoxy is cured, unbolt wing panels from center section. Cap with 1/8 x 2" balsa on trailing edge. Apply sorghum to bottom of center section and 1/16" sheeting and let dry. Apply 1/16" sheeting to center section and sand. Use the same procedure for the top of section. Do not cap leading edge at this time.

17. Take foam core section supplied and epoxy this piece to leading edge. Sheet top and bottom with 1/16" sheeting. Take 1/4" end caps and epoxy to sides. Add 1/4" sq. balsa to trailing edge of center section. Take 1/8" ply plate and clamp to former #2, making it flush at bottom. Next measure out equal distance for 2 — 1/4" dowels to be drilled. Now drill out holes to accept 1/4" dowels. Take 1/4" dowels and put a point on them so that they will make impression into foam boot. Now take center section and place it into fuselage flush with 1/8" ply plate. Now dowels with point on them, push through from former #2 into ply plate into foam section. Take 1/4" drill and then drill into foam at marks where pointed dowel made impressions. Now you can recess into front of center section. Do not get epoxy into 1/4" holes at this time. Now sheet front of section with 1/16" balsa. Cut out holes where you drilled and epoxy in good 1/4" dowels pushing them into foam about 2"; now sand.

18. Take (2) 1/8" ply squares, counter sink into wing center section and epoxy in place. Bolt down center section to fuselage and hatch area. Add wing ribs to front of section to form boot. Take 1/4 x 1/2" and add to front for leading edge. Sheet boot with 1/16" balsa to blend with wing core.

19. Take wing panels (left and right) and cut out slot for 18" long aileron cord. Repeat same procedure that was used for center section. At end of slot cut out of foam a 3 x 4" hole, about 1" deep. Fit aileron servo into wing cavity, making sure it is deep enough. Take 1/8" sheeting and cap entire area. Make a 1/8" plywood floor to mount servo to. Light sand entire wing core and use the same procedure for sheeting as was done on center section. Sheet entire wing core using foam saddle so wing does not warp. Top and bottom is sheeted with 1/16" balsa. Cap trailing edge with 1/8 x 2" as before. Add 1/4 x 1/2" to landing edge. Glue on wing tip (made up from 1/4" balsa and 1/4" balsa ribs. Now sheet and blend to wing core.

20. When all sheeting is on and tip is completed, rough sand entire wing to shape. Bolt wing halves to center section, sand to finish entire wing assembly. Now that this is completed, the builder should decide if he wishes to use flaps on the model. (Flap section is optional in kit.) (See picture for parts and assembly.)

21. From foam cores supplied, cut ailerons to length. Now measure on bottom side of aileron 3/4" and make a line. Now set up on a saw and cut angle. With 1/8 x 2" balsa, cap leading edge and ends of aileron. Now sheet top and bottom with 1/16" balsa and add 1/4sq. balsa to trailing edge. Sand out aileron and sections and hinge to wing. Same procedure for flaps if builder decides to use flaps.