

CORKSCREW 80

By Jerry Shape



Color Photos by Wes Kelfer



With the success of the smaller Corkscrew by Stu Richmond, Jerry Shape produced this larger version for a 1.2 4-stroke. It's as great as the small one.

The Corkscrew first appeared in RCM in January 1983. It was designed by Stu Richmond and endorsed by Don Lowe. Its looks really do nothing to tip you off that this is one hell of an airplane. Its performance with a hot engine (mine is powered by O.S. .28FSR) is truly spectacular. The things you can do with this plane, that would tear another plane apart in the air, are truly amazing. Added to this, with the trainer-like take-offs and landings, the very low cost to build and to operate, you would be doing yourself and your budget a favor by building one. I'm on my fourth Corkscrew. No, I didn't crash the others but several of my fellow club members have one now. They are good for sport flying, fun-flies and even pylon races. I particularly like the reaction of someone who hasn't seen a Corkscrew.



Balsa

- 3 — 3/32 x 4 x 48 (Split two pieces to 2 x 48 for trailing edge of wing)
- 4 — 1/8 x 4 x 48
- 3 — 3/16 x 4 x 48
- 1 — 1/4 x 4 x 48
- 2 — 1/4 x 1/4 x 48 sticks
- 2 — 3/8 x 4 x 48
- 3 — 1/2 x 2 x 30 T.E. Stock
- 2 — 7/16 x 3/8 x 48 Balsa Sticks (may have to be cut on table saw)

Wood List

Plywood

- 1 — 1/32 x 12 x 48 (Balsa USA)
- 1 — 3/16 x 6 x 12

Dowels

- 1 — 3/8 x 30
- 2 — 1/2 x 48 or 3 — 1/2 x 36

Hardwood

- 2 — 1/2 x 3/4 x 12 Maple
- 1 — 1/4 x 2 1/2 x 48 Sitka Spruce (Balsa USA)

ABOUT THE AUTHOR

Jerry Shape, 38, has been interested in aviation for as long as he can remember. As a boy he used to hang out at a small airport occasionally catching a ride. On one of his trips to the airport he saw his first R/C airplane and never forgot that day.

Years later he started building planes of his own and has been modeling for about twelve years. He builds and flies mostly sport and scale type airplanes but has been into several different phases of the hobby.

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Enough about the small Corkscrew. For some time I had considered enlarging the Corkscrew because of the popularity of larger planes. I didn't really want to get into gas engines and, since I already had an O.S. 120 4-stroke, I thought a lightweight 80" Corkscrew would be an excellent match.

The engineering of this model was a lot of fun, but there were a few problems to be worked out, and material choices to be made. I didn't want to overbuild and end up with an overweight plane because I believe it is better to build to fly rather than build to survive a crash, yet I didn't want a flimsy plane either. The inverted engine and enclosed tank are purely cosmetic. There is a lot to be said for an upright engine and exposed tank for ease of maintenance and operation, but I prefer the inverted engine set-up and have had no trouble with it. Both upright and inverted installations are shown on the plans. The choice is yours.

3/16" balsa was chosen for the fuselage sides with 1/32" ply doublers. Cross-grain 3/32" balsa was used on the top and bottom of the rear of the fuselage. This resulted in a strong lightweight body. 3/8" sheet balsa was used for the tail feathers which simplified construction. All balsa used on the plane needs to be about medium weight.

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received the go ahead and this is my first attempt at writing a magazine article and having it published in RCM which has been a dream of mine for some time.

I will talk more about flying this plane, 4-stroke engines and radio installation after the construction section of this article. I would like to give you just a couple of other facts about this plane that I hope will get you interested enough to build it. Your wood bill for this plane is in the \$30.00 range. It will climb at a 75° angle till out of sight. And, unlike some large airplanes, it doesn't float like a cement block when the engine quits. In fact, you can almost thermal with it. It makes a very good first Giant airplane, and I believe that with the throws set on the mild side it would make a very good trainer. Many people have said that it really shows up in the air and is very easy to see. One last thing, with the O.S. 120 4-stroke, the fuel economy is excellent. We timed one flight and got almost 20 minutes on a 12 oz. tank and still had an ounce left. About 80% of that flight was at full throttle! A .60 2-stroke engine would surely fly this plane, but the vertical performance would suffer. Why not do yourself and your budget a favor and build a Corkscrew 80? Why not order a set of plans and give a call to Balsa USA (which I highly recommend for quality of product, price and service) and get to hacking?

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CORKSCREW 80

Designed By:

Jerry Shape

TYPE AIRCRAFT

Low Wing Sport

WINGSPAN

80 Inches

WING CHORD

13 Inches

TOTAL WING AREA

1040 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

2 1/4 Inches

O.A. FUSELAGE LENGTH

65 Inches

RADIO COMPARTMENT SIZE

(L) 13" x (W) 3 3/8" x (H) 4"

STABILIZER SPAN

25 3/4 Inches

STABILIZER CHORD (incl. elev.)

7 Inches

STABILIZER AREA

175 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

10 Inches

VERTICAL FIN WIDTH (incl. rud.)

8 1/4 Inches

REC. ENGINE SIZE

1.20 4-stroke

FUEL TANK SIZE

8-12 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready To Fly	136-144 Oz.
Wing Loading	19-20 Oz./Sq. Ft.



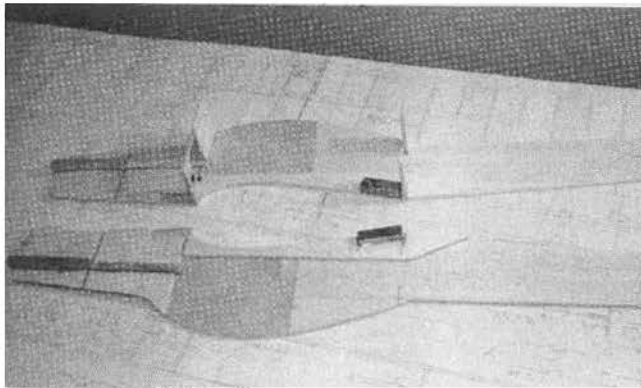


angle. Use blue nylon for a sleeve bearing. Use a 5/32" wheel collar on the other end and substitute a 4-40 bolt or threaded rod for the set screw. Silver solder the bolt and wheel collar in place. Groove the T.E. and set the linkage. Cover with 1/32" ply, finish flush with the top. Ailerons are made from 1/2" x 2" T.E. stock. Cut or sand

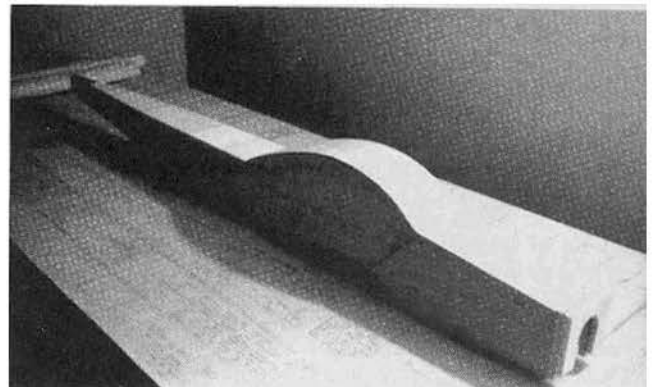
the aileron leading edge to the angle shown on the plans. After both wing halves are finished, prop up one side 4 1/2" and join the halves with epoxy. Epoxy in the dihedral brace. Glue the 1/32" ply bolt pad to the bottom of the wing.

The fuselage halves are next on the list. Prepare the right and left sides

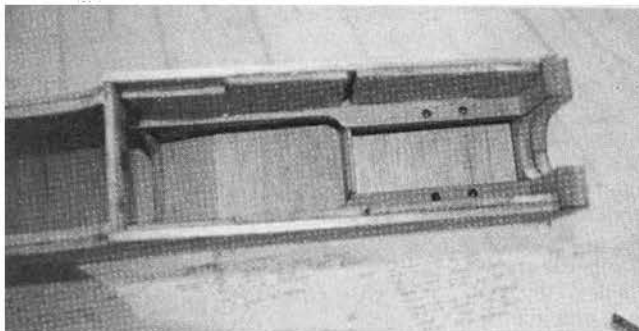
with all doublers, wing saddles, and motor mounts. Don't forget to put blind nuts on motor mounts to suit your engine. Also note that if you use a different engine than the O.S. 120 4-stroke, the width of the fuselage formers may need to be changed. Glue formers F4A and B and F5A and B to one side of the fuselage. When dry,



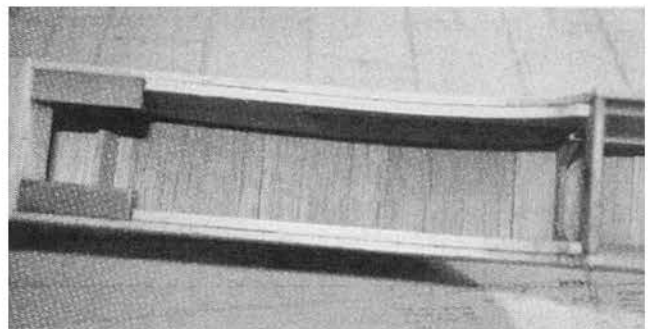
Fuselage sides with doublers, engine mounting rails. Wing tie-down blocks in place. Formers in place on right side.



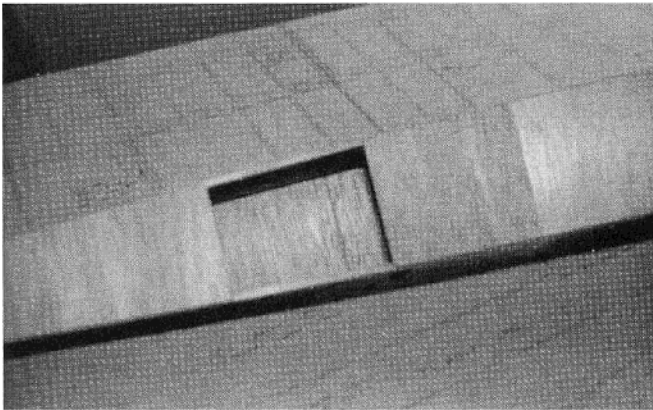
Left side, nose blocks, and top sheeting glued in place.



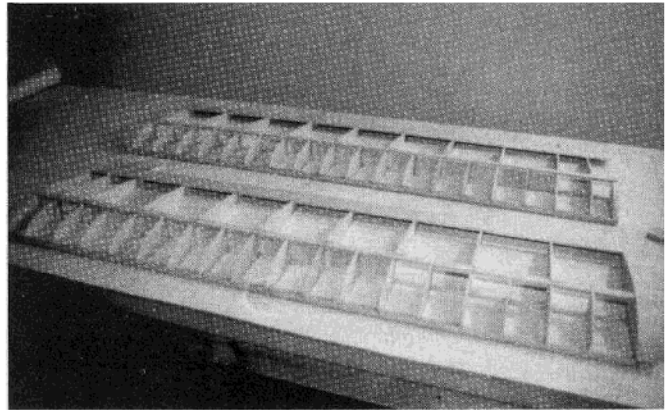
Looking up into tank and engine bay areas.



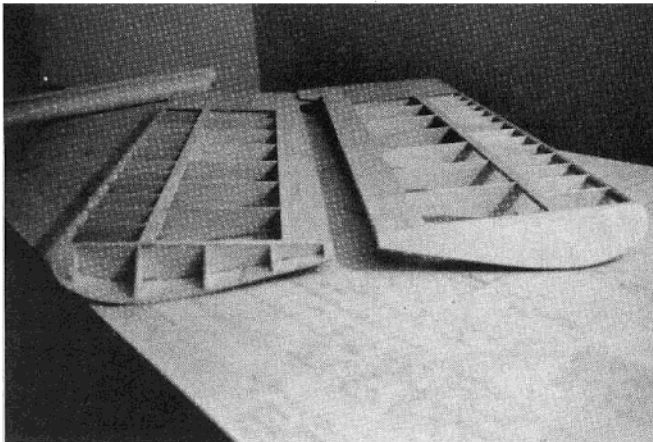
Radio bay (over wing).



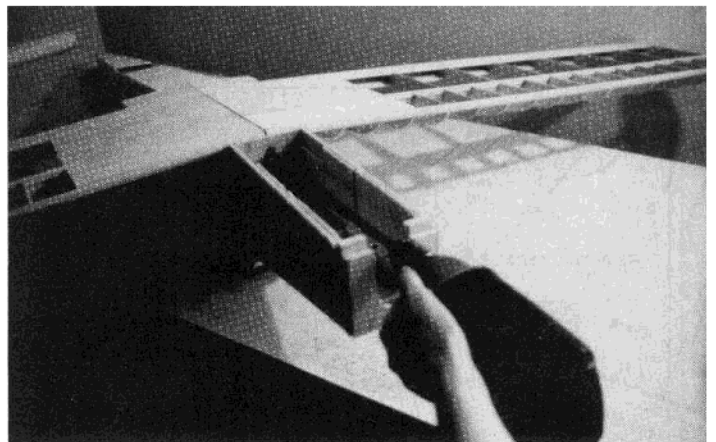
Hatch left open in aft lower fuselage for installation of pushrod supports.



Wing halves ready to join. Note half ribs in leading edge.



Detail of built-up wing tips, showing the before and after of the lower surface sheeting.



Drilling the wing dowel hole with an extension drill.

glue the other side to the formers. Check for squareness. Pull both sides together at the tail and glue. Glue cross pieces inside on to the nose of plane. Sheet the top of the body from the nose to the tail. Next, sheet the bottom from the wing trailing edge to

the tail. Next, add wing bolt mounts and make ready to bolt the wing to the body. Using 3/8" brass tubing, drill through former F4A into the wing for wing dowel. Drill and tap for wing bolts. After this has been completed, check to be sure that the bottom of the

fuselage nose will be the right height after 1/32" ply is added so that the landing gear will be tight up against the bottom of the wing when bolted on. Sand the wing leading edge dowel if needed. Add landing gear, blocks and formers F1, F2, and F3A and glue on a 1/32" ply nose bottom sheeting.

Cut out the tail pieces and glue the elevator halves together with 3/8" dowel.

All pieces can now be sanded. Edges are rounded just enough to eliminate the boxy look. The rudder and elevator are not tapered, the edges are just rounded.

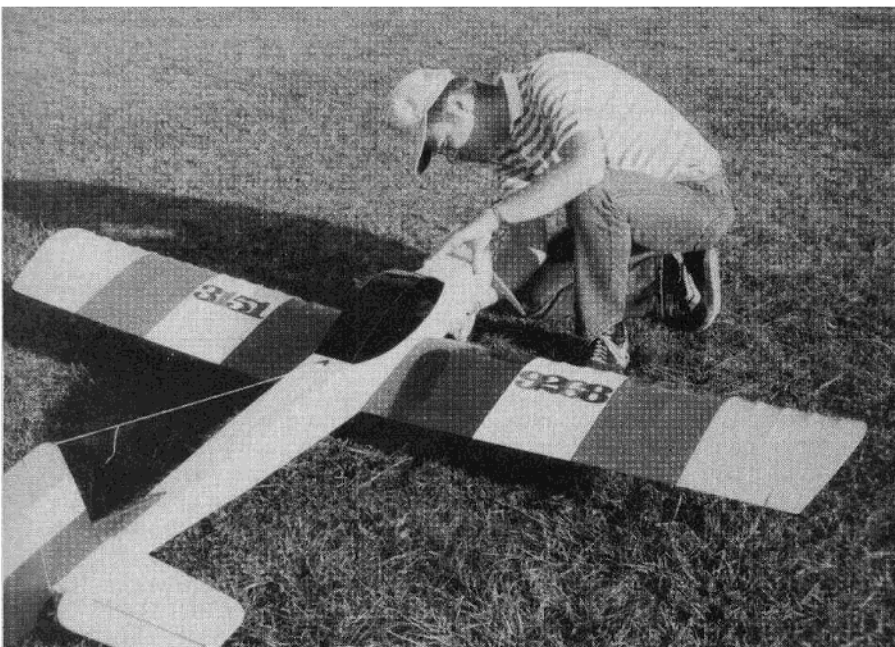
The tail can be glued to the fuselage now or after the fuselage and tail pieces are painted or covered.

Finishing:

For a quick, lightweight and good looking finish, you can't beat MonoKote. Don't use the lightweight films on the wings because you need the strength! I MonoKoted the wing and tail surfaces and painted the fuselage.

Radio Installation:

This may be the most important part of any large airplane. I have seen people get by with poor radio installation on smaller airplanes, but on a larger plane this will get you in trouble in a hurry. There is a lot of



Author cranking it up for its maiden flight.

force on large control surfaces. I use one Ace Atlas servo for each aileron. Also, I use 4-40 pushrods from the servos to the control horns. Don't fool yourself by using a cheap servo with a lightweight gear train even if the manufacturer claims it has a lot of torque. A \$15.00 or \$20.00 servo is no saving if it costs you an airplane. I recommend the Ace Atlas or a comparable servo.

I have been using only one servo on rudder and elevator but two servos on the elevator could be cheap insurance. The pushrods on rudder and elevator are most important. Use fiberglass or aluminum arrowshafts or 3/8" dowels. Keep the wire ends as short as possible. Use 4-40 wire ends with no bends. Also the plans show putting an access hatch in the middle of the fuselage so the pushrods can be caged. Use 1/4" x 1/4" hard balsa. This will insure solid control surfaces. I don't recommend the NyRod type controls but they could be used if properly braced. Finally, use a larger capacity battery. Extra servos and large control surfaces can eat up a 500 mAh battery. A 950 to 1200 mAh size is recommended.

4-Stroke Engine:

A little about 4-stroke engines. I have only one 4-stroke engine — an O.S. 120 4-stroke — and a fine engine it is. It requires little maintenance and runs fine. Mine was broken-in with a 16 x 6 prop. The first flight was on the rich side. After leaning it, I then flew the engine for about 1½ gallons of fuel and never touched the setting. I then installed a 15 x 10 Zinger prop and lately have been using a 14 x 8 MK prop with good results. I run with 15% Cool Power standard fuel and rarely touch the needle valve. I have run both with and without muffler pressure. I think I get a more consistent engine run with pressure and the noise level is very low in the air. Be sure to watch the prop on these engines. They are very big and can really bite you. Always have someone hold the plane (or tether it) while you start it.

I have occasionally had the prop nut come loose; but this should not be a problem as long as you don't lean the engine too much. Do not pin the prop. I have seen the prop come apart when the engine was set too lean and the motor stopped abruptly. I recommend using an electric starter on this engine, especially if you are running it inverted. Use a metal spinner — I have had a plastic one distort and come apart. I rarely have to set the valves. With these few cautions the 4-stroke engine is a fine choice and the fuel economy is a real bonus. I am sure that one of the other makes of 120 4-stroke engines would also be a fine

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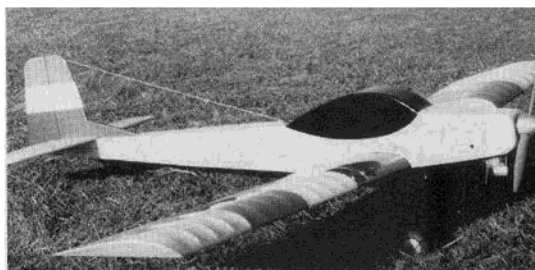
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□

*"Corkscrew"
ready to go.*



**From
RCModeler
Aug. 1 1987**

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- 1 — 1/4 x 4 x 48
- 2 — 1/4 x 1/4 x 48 sticks
- 2 — 3/8 x 4 x 48
- 3 — 1/2 x 2 x 30 T.E. Stock
- 2 — 7/16 x 3/8 x 48 Balsa Sticks (may have to be cut on table saw)

Plywood

- 1 — 1/32 x 12 x 48 (Balsa USA)
- 1 — 3/16 x 6 x 12

Dowels

- 1 — 3/8 x 30
- 2 — 1/2 x 48 or 3 — 1/2 x 36

Hardwood

- 2 — 1/2 x 3/4 x 12 Maple
- 1 — 1/4 x 2 1/2 x 48 Sitka Spruce (Balsa USA)

CORKSCREW 80

Designed By:

Jerry Shape

TYPE AIRCRAFT

Low Wing Sport

WINGSPAN

80 Inches

WING CHORD

13 Inches

TOTAL WING AREA

1040 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

2 1/4 Inches

O.A. FUSELAGE LENGTH

65 Inches

RADIO COMPARTMENT SIZE

(L) 13" x (W) 3 3/8" x (H) 4"

STABILIZER SPAN

25 3/4 Inches

STABILIZER CHORD (incl. elev.)

7 Inches

STABILIZER AREA

175 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

10 Inches

VERTICAL FIN WIDTH (incl. rud.)

8 1/4 Inches

REC. ENGINE SIZE

1.20 4-stroke

FUEL TANK SIZE

8-12 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Throt., All.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply
Wing Balsa & Ply
Empennage Balsa
Wt. Ready To Fly 136-144 Oz.
Wing Loading 19-20 Oz./Sq. Ft.