BIG FOILER

A giant size Sport Pattern model that's big on performance and fun!

By John Tanzer

Big Foiler is an enlarged version of my original design Foiler which was published in Model Aviation, May 1991. The design concept of the Foiler is for a plane that is inexpensive, lightweight, simple to build, will do the pattern, and still be docile enough for the novice flier. The wing, tail, and engine are on the centerline, all at 0°. The fully symmetrical, airfoil shaped fuselage (which gives the plane its name) adds quite a few square inches of lift.

In knife-edge flight, it doesn't take much rudder deflection to fly the airfoil shaped fuselage. Too much rudder will cause it to stall and sink slowly. The wing, using sub spars, is lightweight and very strong. Don't let all the sub spars deter you from building the wing. It is lighter, easier, and faster to build than a sheeted D-Tube and capstrip wing. Once covered, it is just as rigid and warp-free. The rudder fin, and subfin make for an arrow straight flying plane. Directional stability is phenomenal, and yet when you want to do something wild, it responds immediately. "Lomcovaks," snap rolls, knife-edge, inverted flight, rolling circle, point rolls, slow rolls --- it will do it all. Yet, stall speed is very slow. "Big Foiler" was designed for the "Big Is Better Bunch." With an 81" wingspan, it meets IMAA guidelines, and at a weight of 13½ lbs., it is very lightly loaded. I used a Tartan Super Glow Single in my Big Foiler. The Tartan is very short from mount to prop, so I moved the fire wall forward from what is shown on the plan. The fire wall on the plan is set for a Q-42 or G-38. Using a bigger engine than these would be overkill. The parts count is low and the structure is quite simple. By referring to the plans, photos, and construction notes, you shouldn't have any trouble building "Big Foiler."

CONSTRUCTION

Wing:

Make a rib pattern from See-Temp. Then, cut one W-1 rib from 1/8" balsa sheet. Sand it to the right shape. Check all notches for fit. When you are satisfied that it will make a good master rib, soak all edges with CA to harden the edges, and mark the top with the letter "T". Cut the rest of the W-1 ribs and mark the top, which will ensure that the notches will line up. Stack all the ribs with the master rib, and sand to shape carefully. Cut four W-2 center wing ribs 1/8" smaller top and bottom to accept 1/8" balsa sheet at center of wing, between the spars. I used 1/8" plywood patterns, as I intend to cut more than one set of ribs. Now, make twenty 1/8" balsa sheet vertical grain

BIG FOILER
Designed By:
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TYPE AIRCRAFT
Giant Sport Pattern
WINGSPAN
81 Inches
WING CHORD
16½ Inches
TOTAL WING AREA
1336 Sq. In.
WING LOCATION
Center of Fuselage
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
None
OVERALL FUSELAGE LENGTH
68½ Inches
RADIO COMPARTMENT SIZE
Ample
STABILIZER SPAN
28 Inches
STABILIZER CHORD (incl. elev.)
9 Inches
STABILIZER AREA
252 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Center of Fuselage
VERTICAL FIN HEIGHT
15½ Inches (incl. sub fin)
VERTICAL FIN WIDTH (inc. rud.)
10 Inches (Avg.)
ENGINE SIZE
23-50cc
FUEL TANK SIZE
17½ Ozs.
Hobby Lobby #GR237
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, & Spruce
Empennage ..... Balsa
Wt. Ready To Fly 218 Ozs. (13 Lbs. 10 Ozs.)
Wing Loading ..... 23½ Oz./Sq. Ft.

shear webs. Stack all the shear webs and true them up with a sanding block. The 81" wing has no dihedral, and it's built in two panels and then joined.

Cover your plan with plastic film or wax paper to protect it from glue. Only the left wing panel is drawn full size on the plan. It will be used to build both panels. Pin down 1/4" x 3/8" spruce main spar. Pin down the 1/4" sq. balsa shim at the location on plan. Start with a W-1 rib at wingtip with mark at top, pin rear of rib to shim. Now, holding rib and web, CA to spar at the same time. This will ensure that the rib is perpendicular with the spar. Do the same with all the W-1 ribs and webs in the center of the wing. Pin a 1/8" shim on top of the 1/4" sq. shim to compensate for the smaller W-2 ribs. Do not be concerned if your ribs don't line up with the ribs on the plan. Your webs may be a little longer or shorter. The only thing that will be affected is the width of the center bay. Now glue in 1/4" x 3/8" spruce main spar, and all 1/4" balsa top sub spars. Glue a straight piece of 1/4" x 1½" balsa to rear of ribs. Do not use any bowed wood, it will cause the wing to warp. Glue in the 1/2" sq. balsa leading edge. Remove wing panel from plan, remove 1/8" shim, turn over and weight down on shim as before. Glue in the rest of the 1/4" sq. sub spars.

Remove wing panel from plan and put aside for now. Build another panel using same side of plan, only this time install all ribs with the mark facing down. This will be the right wing panel. With both wing panels completed, pin down another 1/4" sq. balsa shim so that the wing can be weighted down over shims with the center butted together. Cut two 1/16" ply main spar splice plates and glue in place using epoxy. Glue in the 1/4" x 1¼" balsa rear spar splice plate. Using scrap 1/4" sq. balsa, splice sub spars and L.E. Glue in dowel blocks at L.E. Cut 1/8" balsa sheet to length to sheet center of wing. Hold a piece of sheeting up against a spar, and using #11 X-Acto blade, cut a

List Of Materials
4 — sheets 1/8" x 12" x 48" lite ply
1 — sheet 1/4" x 12" x 24" aircraft ply
1 — sheet 1/8" x 6" x 12" aircraft ply
1 — sheet 1/16" x 6" x 12" aircraft ply
1 — 1/2" x 36" triangle stock
3 — 3/8" x 36" triangle stock
3 — sheets 3/8" x 3" x 36" balsa
2 — sheets 1/8" x 4" x 48" balsa for shear webs
14 — sheets 1/8" x 3" x 36" balsa ribs & sheeting
18 — 1/4" x 1/4" x 48" hard balsa strips sub spars
2 — 1/2" x 1/2" x 48" balsa L.E.
2 — 1/4" x 1½" x 48" balsa T.E.
2 — 3/32" x 3" x 36" balsa aileron base
4 — 1/2" x 5/8" x 36" balsa aileron L.E.
4 — 3/8" x 1/2" x 36" medium balsa
2 — 3/8" x 1/2" x 36" hard balsa for stab
4 — 3/8" x 3/8" x 36" balsa
1 — balsa block 1½" x 4" x 8"
1 — balsa block 1" x 5" x 5"
4 — 1/4" x 3/8" x 48" spruce main wing spars
1 — 4½" Zinger spinner
2 — 4½" wheels
2 — 10" to 12" wheel pants from Fiberglass Specialties, 38624 Mt. Kisco Dr., Sterling Heights, Michigan 48310
1 — 15" bubble canopy from Sig
1 — 1½" thin tail wheel
2 — 1/4" x 36" music wire for L.G.
1 — package Sig Easy Hinges