

Fat Porter

From the time you take it out of the station wagon and get ready to fly you'll draw the crowds. And they'll keep laughing until you fly this cartoon caricature of an airplane. And then nobody will be laughing.

By Alan Wiseman

If you have been promising yourself a larger model, here is one that is different from anything you have ever seen before. In fact, we see so many look-alike sport models today, I think the Fat Porter will prove to be a refreshing change of pace.

It is as easy to fly as anything you have ever flown. The big plus for this model is that it's a lot more exciting because of its scale-like flying capabilities. This is especially true of the maneuvers which actually appear to be in slow motion. And, if you stop to think about it, this is actually how a full size plane flies through an Immelman or loop, etc. If you have always wanted your models to fly in this fashion, the Fat Porter will come pretty close to fulfilling that wish.

The idea for the design came from pictures I saw some time ago in one of our British magazines, of a model with extra large side area and a quite narrow fuselage.

It is a very discrete way of making a model look enormous since you would expect it to be very wide with all that side area. But, surprisingly it isn't. It is big, I suppose, as models go since it has 900 square inches of wing area and weighs between 9 and 11 pounds ready to fly. But, think of the weight if the width was in proportion to all of that side area—12" wide instead of 3" which is what you might expect it to be.

A favorite light aircraft of mine for some time has been the Swiss Pilatus Porter which is operated mainly from short unprepared runways, off grass, snow, ice, etc., in restricted mountainous areas, thus having to have STOL capabilities. I feel that the aircraft also has a lot of character and, in some degree, almost appears to be comical, much like the Turbo Porter with its unusually long nose, the high aspect ratio wing, angular wing and tailplane with outwardly counterbalanced rudder and

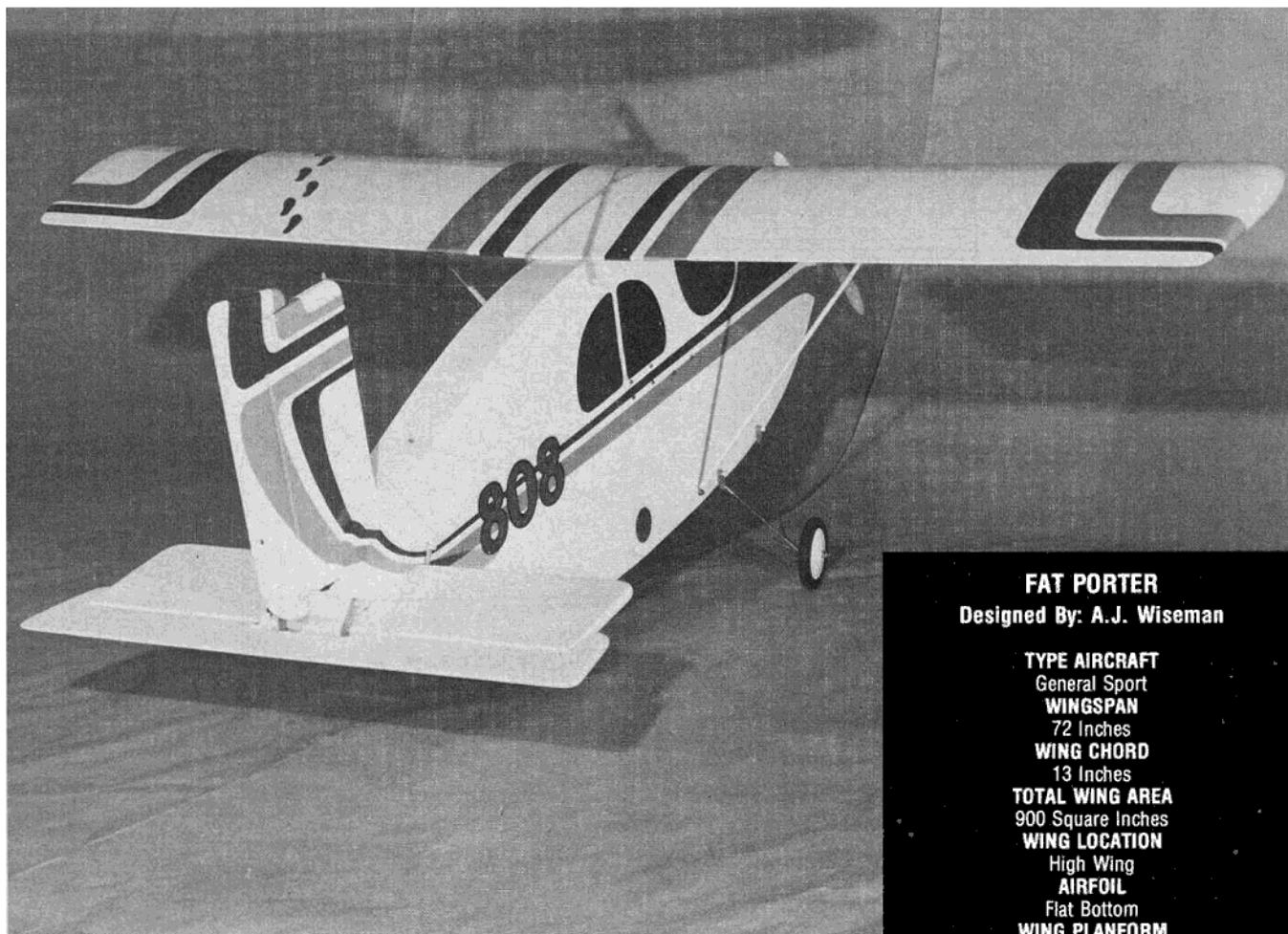
elevator and those unusual side windows.

Thus, I have taken the idea of massive side area on a model aircraft a stage further by incorporating in this design some of the features I've just mentioned of the Pilatus Porter. It is, if you like, a send-up called the Fat Porter, a not-so-scale, fly for fun plane, guaranteed to get plenty of laughs on your club field before take-off. But, I guarantee that when she has taken off, is flying around and going through some aerobatics, lands, and you taxi her back to your feet, no one will be laughing. They will simply be stunned at the pure grace and beauty that this cartoon-like character of an airplane demonstrates once airborne. In addition to that she is as easy to build as she is to fly. So, if you are convinced, let's begin building the Fat Porter.

FUSELAGE:

Be sure to cover your plans with Saran Wrap or wax paper before beginning





construction. Unless otherwise specified in the article, use Wilhold Aliphatic Resin throughout.

Begin building one fuselage side, by first soaking two pieces of quarter inch square spruce in diluted ammonia for one hour, at which time it will easily form around those curves. Be sure to use plenty of 1" pins to hold the fuselage shape. You are going to need quite a few sheets of 1/4" x 3" x 36" medium and medium hard balsa, since most of the fuselage is made up of this material. Some of this sheet will be cut into 1" x 1/4" strips while some will be used for doublers and formers.

With the basic curves dry, the next step is to take two pieces of your previously cut one inch strip medium hard balsa and join them at the position shown on the plan, which, when joined, will reach the entire length of the fuselage. While we will designate this (A), you may call it the back-bone if you like. Do not glue it to the spruce frame yet because you have to make the half-lapped joints at stations B, C, D, E. This will enable you to lift out the horizontal piece to cut and glue the joints accurately. Use epoxy on each 1" upright and place in that order - - - don't glue to the spruce until you have completed the four joints B, C, D, E.

Now that you have the uprights completed, you can epoxy them to the spruce curves. For the filling in of the basic frame, use medium hard at the nose area,

starting with piece (F). This leads to the next stage which is the bottom curve. This is composed of 1/4" sheet pieces at the front end and in the area where the landing gear blocks will fit. One modification that I would like to mention at this point is to reposition the main landing gear 1" to 1 1/2" forward of the point shown on the plan. This will also mean repositioning the landing gear plywood mountings and dowels. While this was not done on the prototypes, there was a tendency to nose over when taxiing or landing. Now, after the 1/4" sheet pieces have been installed, start to fill in all of the other 1" strips, 1/4" square strips, as well as the 1/4" sheet gussets where shown on the plan. Remember when you come to the 1/4" square pieces at the detachable empennage, space the upright 1/4" square pieces 1/8" apart by slipping in a piece of 1/8" balsa sheet until dry. This allows you to sheet the rear of the fuselage where the tailplane fits and the front of the tailplane fairing with 1/16" sheet when the sides are joined. The detachable empennage will be cut out, only when the two sides are joined and with all the formers and cross members in place.

Now that you have one side out of the way for the moment, build side two exactly as you did the first one, except that you will build it on top of the first side, separating the two assemblies with Saran Wrap or waxed paper.

FAT PORTER

Designed By: A.J. Wiseman

TYPE AIRCRAFT

General Sport

WINGSPAN

72 Inches

WING CHORD

13 Inches

TOTAL WING AREA

900 Square Inches

WING LOCATION

High Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

1 Inch

O.A. FUSELAGE LENGTH

64 Inches

RADIO COMPARTMENT AREA

(L) 10" (W) 2" (H) 3" (servo area)

(L)-4 1/2" (W)-2" (H)-3 1/2" (rcvr., batt. area)

STABILIZER SPAN

25 1/4" (Plus Elevator Tips)

STABILIZER CHORD (incl. elev.)

10-5/16 Inches

STABILIZER AREA

272 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid Fuselage

VERTICAL FIN HEIGHT

12" (Average)

VERTICAL FIN WIDTH (incl. rudder)

10 Inches

REC. ENGINE SIZE

.60 — .80 Cubic Inch

FUEL TANK SIZE

11 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

Three — Four

CONTROL FUNCTIONS

Rudder, Elevator, Throttle (Ailerons)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Ply, Spruce
 Wing Balsa and Ply
 Empennage Balsa and Ply
 Weight Ready-To-Fly 168 — 176 Ounces
 Wing Loading 26.8 — 28.1 Oz./Sq. Ft.

After both sides have dried and you have them safely parted, you must mark which is the left and which is the right. Now you can start to cut out your 1" x 1/32" ply doublers which will be contact cemented to the rear section, starting at a point shown as a dotted line on the plan under the wing to over station (C) to the dotted line at the rear above the tailplane. These are also cemented to upright (B) flush with the top and bottom curve.

You can now glue the main 1/4" x 3" doubler which starts from the 1/4" plywood firewall to station (C) behind the gussets. Before you do, however, you must decide how much down thrust and side thrust you are going to need. With a .60 engine the plan shows 3 degrees down and 3 degrees right thrust, however 5 degrees down thrust is to be preferred and should be utilized. On the prototype I used an H.P. .61 which really moves the Fat Porter out. If you have a venturi type silencer, it will really improve the power when you need it. I also changed the standard H.P. carburetor with a Kavan carburetor.

Mark the right side frame for the positioning of the doubler, allowing for the side thrust, then cut the 5 degree down thrust angle on both doublers, and glue in place, making sure that, before the glue sets, the engine firewall seats well on all faces. You will have to weight the doublers until dry. Also, glue and weight the 1/4" x 3" doublers under the wing area.

When the doublers are dry, the next task will be to build up the 1" areas with another piece of 1" x 1/4" where the formers appear so that all formers are of the same width when you cut them from 1/4" sheet medium balsa cut crossgrain. Next, face in the sides where you will glue the formers with 1" strips of 1/32" plywood contact cemented leaving them 1/4" short at the tops. Now, cut all formers marked (G) on the plan to size. Mark one side for the positioning of the formers, then epoxy them in place again 1/4" short at the top. Use a square to make certain that they are at right angles to the sides. Next epoxy 1/4" square strips on each side of the formers again making them 1/4" short at the top in order to allow the 1/4" sheet spacers to lie flush for proper wing seating.

Now, epoxy the sides together, using a slow drying epoxy to allow you sufficient time for squaring up the fuselage "box." You may have to use weights until the epoxy has dried sufficiently. Also check to make sure that your 1/4" plywood firewall will fit on all faces with the correct side and down thrust angles. Do not glue this in place yet. When the structure has dried, epoxy a 1/4" square strip to the other side frame on each side of the formers.

After drilling and inserting the blind nuts for your engine mount, fit your 1/4" firewall in place. All cross pieces must now be epoxied in the proper positions as well as the two pieces of 1/4" plywood landing gear mounts. Remember to leave a 3/8" square hole in the cross piece at the rear that

accepts the 3/8" square thin leading edge. This gives the fin its rigidity and should be done carefully.

Now, at this stage, you can cut away the rear portion of the fuselage for the detachable empennage as indicated by the two arrows on the plan. Now the portion you have just cut out must have another piece cut from it to allow for the thickness of the tailplane. This, then, becomes a fairing, which you can lay aside until you have completed the empennage. When the latter is completed, this fairing is glued permanently in place.

Next, sheet the sides cut from 1/32" plywood to the frame as shown on the plan by the black triangles from upright (C) forward to a level from the highest part of the nose section. Use contact cement for this application. The final sheeting now will be the top and bottom of the fuselage using 1/16" and 1/32" plywood where shown. Every modeler has their own favorite method for a fuel tank hatch so I will leave that up to you - - if you look at the plan you will see how I did it.

You'll need quite a narrow fuel tank to fit in the 2" available space. I found that the 11 ounce IM Products tank from Japan would fit quite well as would the new flat Sullivan tanks. While I did not have enough room to pack the tank in foam rubber I experienced no fuel foaming that would effect the smooth running of the engine. In order to enable the tank to fit, the engine throttle cable will have to be sunk in that compartment so that it lies flush with the inside 1/4" doubler. When the tank and throttle cable installations have been completed, epoxy all the dowels in place for the wing, empennage, and landing gear.

LANDING GEAR

As shown on the plans the main landing gear is formed from 5/32" and 1/8" music wire, although with the weight and size of this aircraft you may feel more comfortable with 3/16" and 5/32" music wire, respectively. In either case, be sure to bind the joints with copper wire and solder well. Repeat this same process for the tail gear, using 3/32" and 1/16" piano wire. When you are finished you will notice that the tail gear does look a little hefty, but believe me, it needs to be since there is a lot of weight there and it's up top. I found that, on take-offs with a single wheel and leg, she slowly dipped a wing as she gathered speed if I was not careful. With double wheel set up and bands for springing, this tendency was completely eliminated. Again, remember that while the prototype was flown with the landing gear as shown on the plan, I would recommend moving it 1" to 1 1/2" forward of that point.

WING

Cut out all ribs and sub ribs from 3/32" balsa using the sandwich method. Be sure to select light balsa for the tip ribs graduating to hard at the center, remembering the two 1/8" soft balsa tip ribs and two 3/32"

plywood center ribs. Be sure to make the spar notches wider on the two plywood ribs as well as on the four hard balsa ribs, to enable the 3/32" plywood dihedral braces to be epoxied to the spars. Now pin down a 4" wide sheet of 3/32" balsa over the plan, followed by the two 1/4" square hard balsa bottom spars. Glue one dihedral brace to the rear of the rear spar then glue your ribs into position, omitting the sub ribs for the moment. Glue in all the 3/32" spar webbing making certain that they are of the correct height, so that the top spar seats on top. Keep checking each section as you go along with a short length of 1/4" square.

With the webbing now in place, glue the top spars in place. The sub ribs are next, again checking carefully so that they all line up with the main ribs and are of the same length. Check this with a straight-edge so that it will make it easier to fit the leading edge onto the ribs. Pre-shape your leading edge from 1" x 1/2" hard balsa checking for proper leading edge contour as you go using a template made from the plans. There are so many grooves on the leading edge for the ribs to be glued into that I have found it best to mark the leading edge for right and left panels, then tape it to the ribs firmly, marking the rib positions on top and bottom. Then, it is a simple matter of joining up the two marks with hack saw blades bound together to groove 3/32" x 3/32" deep. Then, glue the leading edge in place, leaving 1/8" over for sanding to fit when joining the panels.

If you prefer to have ailerons in your Fat Porter, cut them out as shown on the plan before gluing the top 4" wide balsa. Cut the aileron ribs back at an angle, as shown on the plan in the sketch of the wing rib/aileron cross section. Make the control horn sandwich with 1/16" plywood or 1/8" balsa, then sheet the top and face the front of the ailerons with 3/32" balsa. Fit the mounting and bellcrank at the angle shown on the plan and sheet the bottom of this bay with 1/16" balsa.

If you are not using ailerons, the next step for you is to glue the top 4" sheet in place. But, before you do, epoxy another plywood dihedral brace at the rear of the top rear spar. Now add the sheeting and fit the strut attachment as shown.

Build the other wing panel repeating the previous instructions. When completed, join the panels together before gluing the top rear 4" wide sheeting on the second panel so that you can epoxy the dihedral braces to the spars. Then add your sheeting, and epoxy the remaining 6 dihedral braces in place. The dihedral is 1" at each wing tip. If you are using ailerons, no dihedral will be needed, although the same length dihedral braces will be used.

Finally, sheet the center section, where shown, on both top and bottom with 1/32" plywood and reinforce over the center joint of this sheeting top and bottom with a 2" wide strip of fiberglass cloth. For those using ailerons, be sure to leave an opening for the servo location.

Shape and hollow out your wing tips from 2" square soft balsa and glue in position. When completed you will find that you have a really tough wing that is warp free and warp resistant, providing that you have persevered and followed the building instructions carefully.

EMPENNAGE

The vertical fin and horizontal stabilizer are both built-up, sheeted structures, so commence with the fin by pinning the 1/16" sheet for one side, then build the internal structure as shown, on top of this. The 3/8" square leading edge and rudder post are of medium hard balsa while the balance is fairly soft. Be sure to leave the leading edge extra long, as shown, to anchor into the fuselage. You will note that the rudder post is also so anchored.

After this portion of the structure is completed, sheet and round the edges as shown, then carve and sand your 1/2" sheet rudder to shape, tapering from the 1/2" thick hinge line section to 1/8" at the trailing edge. Next, hinge and pin the rudder in place.

To fit the fin, cut two 3/8" square holes in the 1/32" plywood fuselage sheeting where the leading edge and rudder post pass through. Shape the fillets from 3/4" soft triangular balsa and glue in place. Repeat the instructions for the horizontal stabilizer but do not fit the fuselage fairing on the bottom until the model is trimmed. Rather, tape on the equivalent weight of the fairing for initial flying. On my prototype the model was nose heavy even with 10 ounces of fuel aboard, but this is entirely dependent on the grade and density of wood that you have selected for the fuselage structure.

RADIO INSTALLATION

The installation of the servos was a bit tricky with such a narrow deep fuselage. I solved it by mounting the servos with servo mounting tape to a 1/8" plywood removable plate which, in turn, was secured to the fuselage with blind nuts on each corner. A separate plate was used for each servo and a 1/8" plywood buffer at each plate position front and bottom (1/2" wide) was epoxied to the side of the fuselage. This allows you to position the servo plate for fitting your blind nuts and also for later ease of refitting the servo if you transfer your servos from one model to another. The buffers also will take the strain of the screws if there is any shift of the plate due to a mishap in flying. It may sound complicated but it is really worth all the fiddling because, to me, the prime importance of my modeling has been radio care, since I believe a lot of the radio malfunctions are caused by poor installations that do not have sufficient insulation from vibration caused by the engine, shock from a crash, or heavy landing. I think this system does something to guarding against these eventualities. Of course, be sure to pack your receiver and batteries with foam rubber on the 1/8" plywood shelf against a wall of 1/16" ply. Mount the on-off switch inside the fuselage,

attach a length of piano wire to the switch, protruding outside the fuselage, and make sure that push-in is **off** and pull-out is **on**, as shown.

FINISHING

My finishing technique is to paint on one coat of finishing resin, sand all the structure smooth, seal and sand, then cover the entire model with medium weight nylon applied wet. Then dope thinned 50—50 with hundred feet up, and away you go.

Landings are safest with a long gradual descent-approach. Don't land in a hurry, but take your time, using full size aircraft practice if you like. You'll find that, utilizing a larger than normal prop, the Fat Porter will fly in a very scale-like fashion. After awhile try loops, Immelmans, wing overs, and whatever other maneuvers you would care to perform. The Fat Porter will do them all in an almost slow motion-like effect that will virtually hypnotize the spectators and other fliers on the field.

Be sure it doesn't hypnotize you to the point where you forget to fly her back! □

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