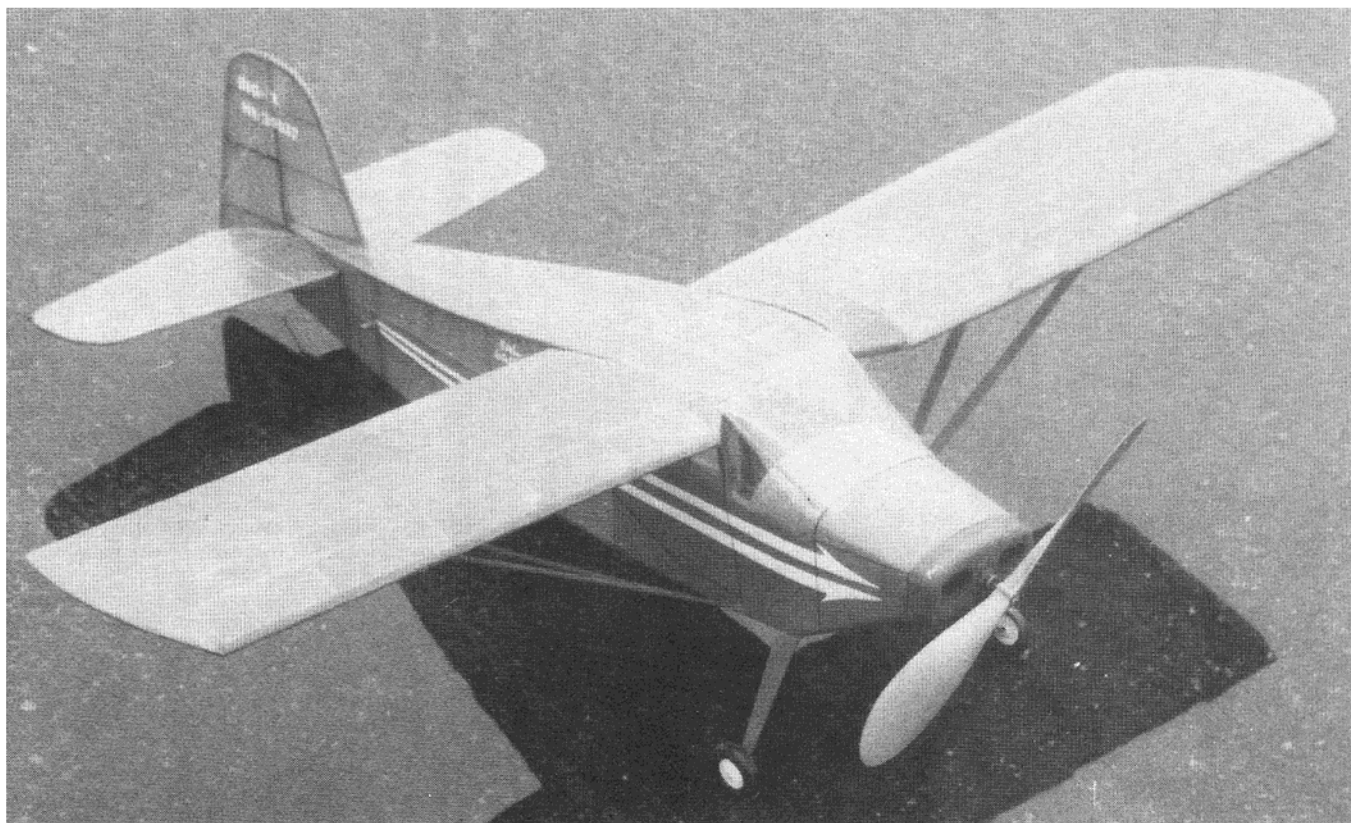




PHOTOGRAPHY: DOC MATHEWS

A Rubber Scale

Wittman Big X

To actually discover a living and working prototype for a rare airplane that has always interested you is every scale builders dream. This modeler did it and here is the result/**Doc Mathews**

Steve Wittman is often referred to as the "Dean of the Homebuilders," designer of the highly popular "Tail-Wind," he lives on the edge of the airport used annually for the E.A.A. National Fly-in in Oshkosh, Wisconsin. Wittman's designs range from the Curtiss Challenger-powered "Miss Oshkosh" of 1931 to the contemporary "V-Witt" Volkswagen-powered pylon racer of today. Steve's "Buster" Goodyear racer currently is on display in the Smithsonian Institute as an undisputed bench mark design of the early postwar racing period.

In a racing career that began in 1929 when he flew a borrowed OX-5 powered "Pheasant" H-10 at the Cleveland Air Races, Steve has become a living legend. After 50 years of competition, Wittman finished first in For-

mula V at the revived Cleveland races of 1979. Surely no other motor sport can boast of a competitor with a fifty year participation span: Steve Wittman truly is "America's Senior Motor Racer."

The Big-X design is one of Wittman's more obscure efforts, having been developed for possible production by Fairchild Aircraft, then dropped. In the late 1930's Steve was flying a two place "Buttercup" as a personal transport when he happened to stop in Hagerstown, Maryland. His novel design generated so much interest on the part of the Fairchild management that they entered into a preliminary business agreement with Steve to place the "Buttercup" into production.

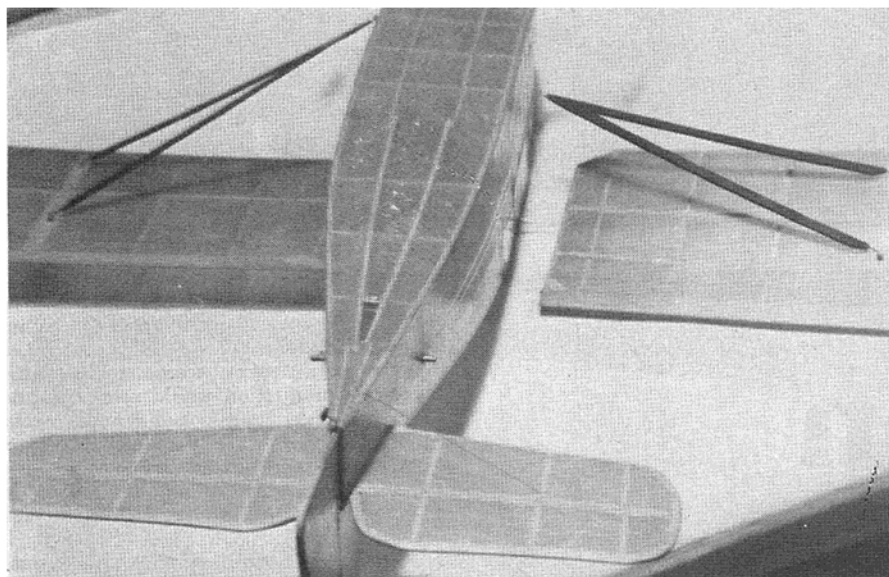
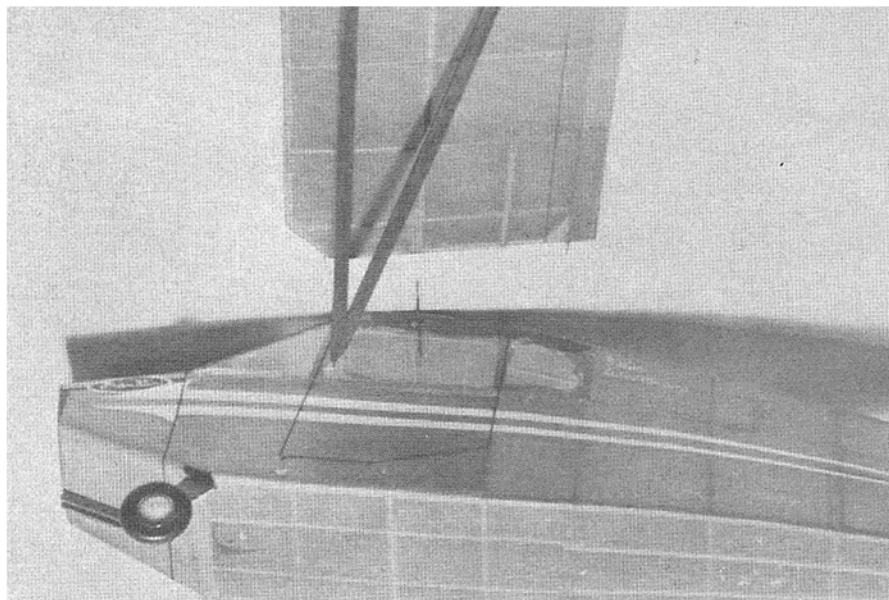
The events of December 7, 1941, ended any

consideration of production of civilian aircraft, and Fairchild became deeply involved in the War Effort with their PT-19 trainer series, the Ranger power plants and aerial cameras. By 1944 it became apparent that wartime production would soon end and Fairchild once again looked at entering the light plane market. They contacted Wittman to re-design the "Buttercup" into a four place aircraft. Work was begun on the "Big-X" in the Spring of 1944, with the first flight made on January 6, 1945.

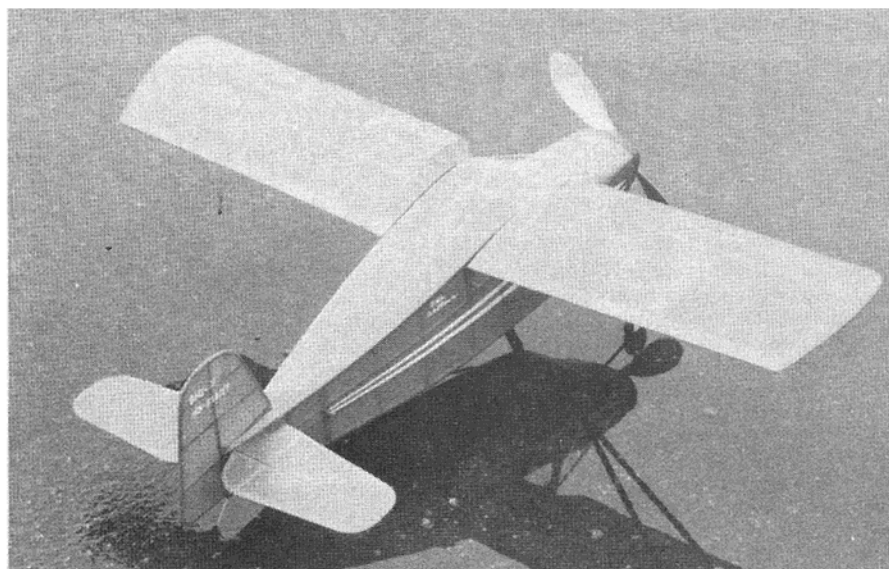
Big corporations have a very deliberate and calculating slowness about decisions sometimes, and nothing much was happening between Wittman and Fairchild when another name appeared on the scene ... Cessna. The small Wichita firm contacted Steve about his patented landing gear design. They were considering incorporating it into their four-place design (became the 195).

Steven flew the Big-X down to the Kansas prairie, Dwayne Wallace purchased the right to use the spring steel gear, the production rights to the Big-X and the prototype itself. The aircraft was then sold back to Steve for "\$1.00 and other considerations." Cessna of course had no intention of producing the Big-X; they wanted to use the spring leaf gear without a similarly equipped competitor appearing on the market.

Characteristically for Wittman designs, the Big-X does not have elaborate compound curves or fancy elliptical shapes, but rather has a simple planform with careful attention paid to drag reduction and aerodynamics. This attention to detail is no doubt responsible for the aircraft cruising 10 m.p.h. faster than a new Cessna Skyhawk on slightly less power. The gross weight and other figures are amazingly close as well, especially when we consider Wittman's is 25 years older.



The stringer locations can be seen here, as well as the motor peg. Note the scale flying wires on the bottom of the stab. Here we see the wing attachments (top). Note the use of modified Sig nylon hinges as strut fittings. The construction is evident in this photo (below). A plastic propeller is used.



The Big-X and her sister ship the Buttercup were used as crew and equipment haulers for the Buster and Bonzo Goodyear racing team. The racers were flown to the meets with cruising props, while Big-X carried the special racing units as well as parts, tools, and crew. Goodyear Racing, as well as the other racing events, faded away in the 1970's and the Big-X was relegated to storage until purchased and restored by Forrest Lovely of Richfield Minn. It is at this point the story of the model begins.

Modelers who are "into" scale are often walking encyclopedias of subjects they are going to model "someday". Many of the dream projects remain so from a lack of adequate documentation. Frequently a lack of three views, and or, photos cause them to reject full sized prototypes they would otherwise love to model. To discover adequate documentation in some obscure publication, or photos in someone's scrapbook, is every scale modelers dream. When they gather at contests or club meetings the usual cry is "Anyone got any thing on a _____?"

The Big-X was one of those dream projects filed away in my memory banks as a superb subject for which little documentation could be located. While wandering around the exhibit aircraft at Oshkosh '79, a small, red, four place aircraft came into view. My mental computer cycled a few times and out popped Witman Big-X. Forrest Lovely had parked her next to Wittman's Oldsmobile powered Tailwind. Numerous photos were taken to add to the three view by Cal Smith from Air-Trails 8-51 I'd filed away years before. Right there in Wisconsin's beautiful Fox Valley, I started designing a rubber powered scale of this never before modeled prototype.

The first model was designed, built, and flown in only 3 weeks, as the Fort Worth Plainsman Contest was coming up. At the contest the model received top judging points (perhaps due to its novelty; mixed in with 20 or so more ordinary designs as it was) however, in its less than optimum flight trim it finished third to a pair of "ghost" scale models which each accumulated over 350 seconds for their four flights.

Subsequent to the contest I have redesigned for lightness and am now getting flights consistently in the 50 second range (in dead air) with the second model. Some further experimentation with power and trim might add more duration to the model, but it R.O.G.'s and flies so well I frankly hate to "hype" it more. I have elected to present a construction article in the form of a rugged, relatively simple to construct, easy to trim and fly rubber scale model with excellent competition potential and superb durability for sport flying. Bill Warner refers to this type rubber scale as an "intermediate model." More flyable than the average kit, but more durable and easy to construct than the all out competition machine.

Construction

All wood sizes are standard stock. Try to select light but solid pieces, free of knots and blemishes. The sheet should be light C-grain for the wing ribs, and light A-grain for the nose planking. Primary adhesive through the project is aliphatic resin (Sig-Tite-Bond etc.), Cyanoacrylate (Hot Stuff, Jet, etc.) is used for planking, and 5-minute epoxy holds the wires and tubes.

The fuselage is constructed in the classic second side over the first technique. Con-

struct a box by assembling the cabin area with one side pinned flat on the board. Use 90 degree triangle to check for absolute squareness in all plains. Allow for thorough glue setting, then remove from board and pull tail post together over top view, adding cross members as you go. Repeat the sequence for the nose.

Install formers A-B-C- & D then plank nose and cabin sides with soft sheet. Bend landing gear wire over drawing, attach it to ply mount with carpet thread and C.A. Epoxy wire through holes and against F, drill a small hole in window sheeting for rear wire. Epoxy $\frac{1}{32}$ " ply doubler to inside of cabin frame.

Cut nose blocks to rough outline and epoxy the stack together, epoxy $\frac{1}{4}$ " bass plug to rear of nose block to match cut out in A, then sand unit to shape while spot glued onto fuselage. Remove and drill $\frac{1}{4}$ " hole for a Peek nylon thrust bearing. Note that the hole is drilled perpendicular to the nose block (down thrust is built in) although a drill press is desirable, a hand drill can be used if a small pilot hole is drilled very carefully then enlarged with increasing sizes of bits.

Construct the empanage over the plan using pins to hold pieces in place (do not place pin into wood). Remove, sand and cover. Install it into the appropriate slots in the fuselage. Add stringers to all four sides of the fuselage, sand to a smooth feather edge at rear, and flair into the side sheet in front. Cover fuselage.

Wings are built for stack sawn ribs developed with a ply or metal master pattern. Note the $\frac{3}{32}$ " wash out shim in the right panel. Pin L.E., T.E., and bottom spar over plan (rub with cooking oil and build from the back to create a left panel). Glue ribs into place, add top spars and tips: spars taper into root rib by cracking. Glue $\frac{1}{16}$ " x $\frac{1}{4}$ " strut mount flush with ribs and bottom spars.

The wing struts are cut from $\frac{1}{16}$ " bass sheet and assembled with epoxy over the drawing. Drill $\frac{1}{32}$ " holes for the wire but do not epoxy until the wings are mated to the fuselage. The strut anchors are small segments of Sig Nylon hinges cut down to a single loop, then drilled $\frac{1}{32}$ " through the pin holes for the wire. Although ridiculously simple, these little anchor brackets work amazingly well.

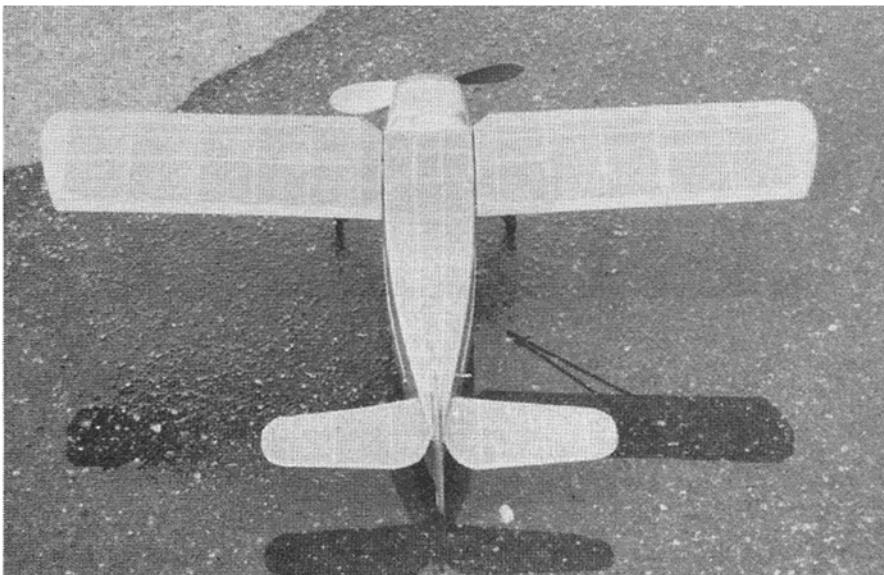
Epoxy $\frac{1}{16}$ " aluminum tube to rear of the bottom spar (note the angle) either wrap with carpet thread, or build up a box around them with scrap balsa and epoxy. The rear wire peg is epoxied against the front edge of the trailing edge. Complete the wing by temporarily positioning it, with struts attached, onto the fuselage side. Sand the root rib for a flush fit, C.A. strut pins into the holes, then epoxy them permanently. Cover completed wing.

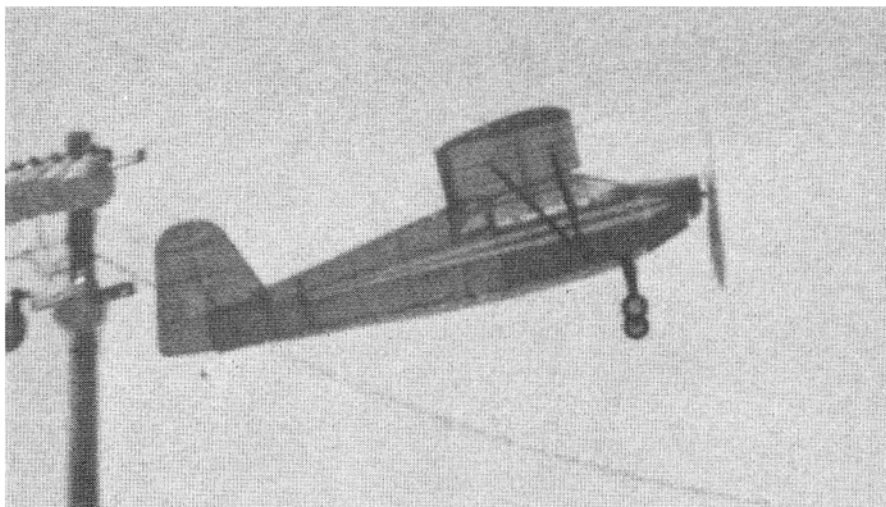
All structures are covered with red Japanese tissue (Peck superlight or equivalent). Use the time honored three coats of clear nitrate on the frame, thinned nitrate to stick the tissue to the frame, and 3 coats of plasticised nitrate to seal the tissue. Note that we do not use butyrate dope, it seemingly never stops shrinking, causing severe warping trouble on a light structure such as this. If you do not have nitrate, be advised it is available in the K&B matched finished system.

The wheel centers were painted with chrome paint for plastics, the letters are white paint used in a drafting pen. The block letters are vinyl items from an office supply.



The full-scale Whittman Big X is shown here. It's construction is almost model-like. Note the small amount of rudder area. Author Mathews has captured the feeling of true scale in this model, without adding the weight common to such detailing (top). This plan-form view shows-off construction (below).





The long landing gear assure prop clearance for those long prototype takeoffs. The Big X climbs out for another long flight (top). The author reports good stability and glide characteristics. Try one soon.



The dark blue components are painted with Floquil purchased at a model railroad supply. The window frame dowls and sills were pre-painted with red Floquil before cementing to place. We also painted the nose block with Floquil. The side trim stripes are cut from vinyl trim tape stuck to a glass pane and cut with a straight edge and razor blade.

Windshield is attached with R.C.54 or C.A. Some trimming of the pattern will be necessary for an exact fit. The landing gear struts are epoxied to the wire but not to the fuselage bottom: this provides a free swinging effect to

reduce damage upon landing. The wheels are held to the wire with 00 railroad brass washers and solder, although a drop of epoxy would also work.

Make up a prop hook from a Peck $\frac{3}{64}$ " unit, install it with the Peck prop and a Sig SH-474 bearing into the nylon thrust bearing and nose block. I use a winding hook on the motor in order to wind with the prop off, however, a loop can easily be bent on the front of the shaft for the winder. Although a winding tube would be useful I don't use one, "live dangerously" is my motto.

Prepare a 15 foot length of Sig Contest $\frac{3}{16}$ " rubber, tying a knot to form a double strand of rubber. Lube with Sig rubber lube or "Armor All"® (a polymer for use on automobiles). Braid the motor by having someone hold one end while you wind in 250 to 275 turns, grab the knotted end while still holding the winder end and place both over your finger. Pull and twist the now 4 strand motor several times to produce a nicely braided look. If the length is too short, unwind some. Conversely, if it is too long to hold the nose block under tension, or bunches up, add turns. A special thanks to Roland Schmidt of Arlington, Texas, for showing me this technique, it really works.

The rubber motor is inserted into the fuselage with the illustrated loading stick. I left the covering off the small section of the bottom immediately below the rear peg to better visualize the loading sticks position and the tubeings passage into it.

It is helpful and reassuring to know the "maximum turns" available in a given batch of rubber, therefore I make up three motors at a time. One to wind to the "explosion point" and two for use in the model. One should always remember the longevity of a rubber motor is proportionate to its age, use, and condition. As a rule of thumb I go up to maximum winds *only* if I'm forced to, preferring to stay about 15% behind the maximum. Conversely, underwinding is self defeating in that the motor weighs just as much half wound as full. It all goes right back to how dangerously one wishes to live.

Ballast the model to obtain the proper C.G., then hand glide, trying for a flat glide with a gentle right turn. Begin powered flights with about 200 turns, this will give a straight ahead climb with a slight right turn as the motor runs down. As the winds are increased the pattern will tighten to the left with increased torque. Should it turn too steeply, add right thrust with small scraps under the nose block. Add down or up thrust to produce a steep left turning climb which opens up into near straight ahead as the motor runs down, and transitions into a right glide. Essentially adjust the power pattern with thrust settings and the glide with rudder and elevator twist. Although the described trimming technique will not necessarily produce optimum duration, it is a safe one for the less expert rubber flyer.

The Big-X is designed for the rough and tumble of local contests and sport flying. Have you ever noted the "tall grass" so often recommended for test flying frequently grows in fields littered with stones and other hard stuff? For that reason I prefer models more resistant to such abrasive and traumatic encounters, at some sacrifice in performance to be sure. The more expert rubber scale builder could easily substitute 3/32 for 1/8 in the fuselage and 1/16 for 3/32 for the enphange.

The resultant weight reductions could easily increase the 50 second durations we are presently getting. Should the builder elect to make these changes we caution him to be sure the model knows how to avoid hitting immovable objects.

After dreaming about a model of the Big-X for 29 years, a pure dumb piece of luck has made it possible. I must say the wait has been worthwhile as the little model has been delightful to develop and present to you the prospective builder. Build one for yourself and satisfy a dream or two. What ever you do, enjoy.

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