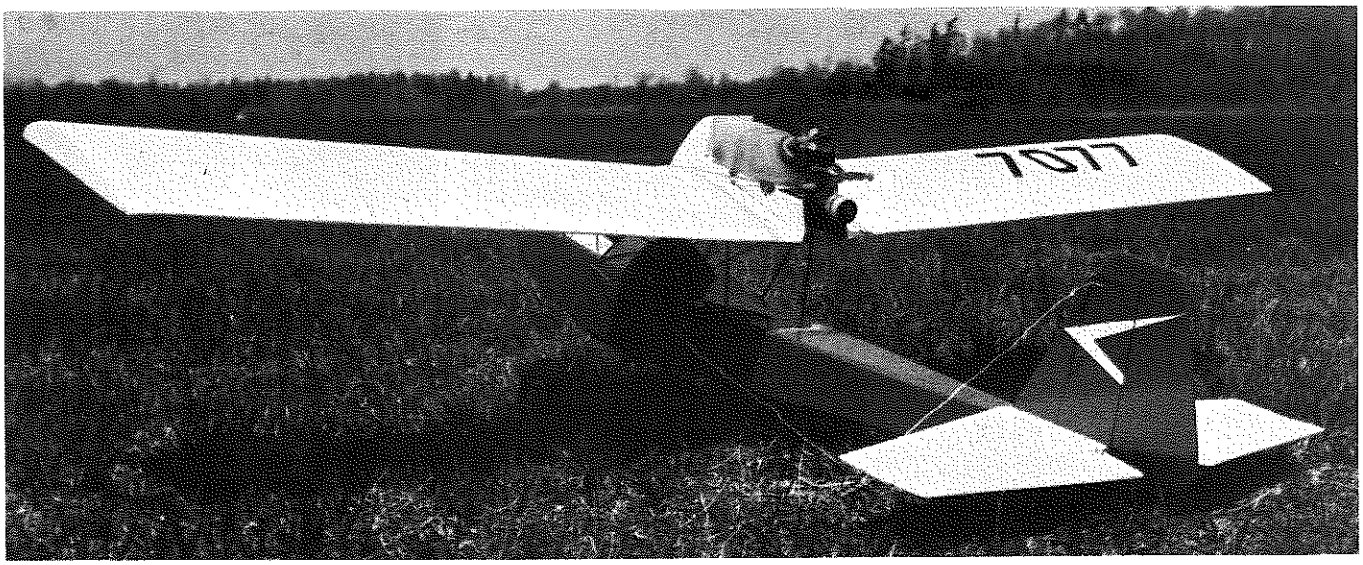


No doubt about the origin of the Woody Pusher design in this photo. It's a squared off Curtiss-Wright Junior, and that's that!

The WOODY PUSHER

"Different, yet fun and easy to build and fly." This was the author/designer's objective when creating this model. To that we add, "What's more, it's scale!" By CHRIS MOES.

● In their search for something a little different, full-size aircraft homebuilders have come up with some pretty nifty configurations. The Woody Pusher is a classic example of this type of thinking. Powered by a 65 h.p. engine, mounted on the wing center section, it "pushes" pilot and passenger along at a comfortable 85 m.p.h. The reason for the first half of the name is twofold. First of all, the prototype was designed by Harris L. Woods (Woody), and secondly, it features a largely all-wood construction.

In looking for an R/C sport flyer, I had much the same objectives in mind as Mr. Woods and his colleagues. It had to be different, yet fun and easy to build and fly. I think the Woody is a solution to the problem.

Actually, I don't even classify this model as a stand-off scale, since it has a number of changes made to the structure and areas, and no real attempt has been made to add "detail". But, just the same, the character of the full size Woody is still very much there. The model is powered by engines in the .10 to .15 range. A .19 is perhaps a little hot for this plane, but if it is all you've got, and it will run on an 8 inch prop, why not?

WING

Start the wing by cutting out and assembling the center section/motor mount from 1/8 ply. Note that the 2 center section "ribs" are notched to accept two 1/8 ply dihedral braces which should also be added at this time. Be sure that everything is perfectly square. The tank fairing and 1/16 balsa sheeting could also be added at this stage.

Incidentally, I used Titebond glue for the entire model except for the fuselage doublers. Epoxy is wonderful stuff, but for wood joints, there is still nothing that matches aliphatic resin for strength and low weight.

Now, take out that perfectly flat building board, put the wing plan on it and cover it with old Monokote or Solarfilm plastic backing. I have yet to find any adhesive which will stick to this stuff.

Cut out and pin down the 1/16th bottom sheeting, and this includes the bottom capstrips. Pin down and glue a very hard 1/4 inch square spar. Now take that center section you've already built, prop it up to the appropriate dihedral angle and glue to the bottom sheeting and spar.

Now add the 10 ribs, including one which is butted right up to the ply center section. Note that the tip rib, which is 1/4 inch sheet, also serves as a wing tip. Glue and pin down all the top sheeting and cap strips and take a break (or better still, start on the fuselage).

Once the glue has dried, remove the wing from the plan and add the 1/4 X 3/8 hard balsa leading edge. Set the center section down flat and measure the dihedral of that wing (it should be 1-3/4 to 2 inches, but it's really not that critical). The second panel is built the same as the first, but, prop the first panel up twice your measured dihedral (about 4 inches).

The wing is finished by shaping the leading edges and adding wire reinforcements to the trailing edge where the rubber bands will pass. For added strength, you may wish to add fiberglass reinforcing tape to the bottom of the dihedral breaks.

TAIL

What can I say? Cut 'em out and sand smooth, but be sure to use medium light wood, since even though the tail moment is short, the engine is fairly far back, and some difficulty in balancing may arise if the tail is too heavy.

FUSELAGE

Fuselage sides are cut from medium 1/8 inch balsa. When choosing wood for fuselage sides, I always try to pick two pieces that were side by side in the log. This is easy to find out by simply comparing the grain patterns of one piece to another. Usually, they are packed close to or next to one another in the stack.

Nose doublers are added (use contact cement for a quick job) and all longerons and uprights are glued in place. Be sure to make one left and one right side! Making two identical fuselage sides doesn't exactly do much for the ego. *(You can cover up by going on to build two models! wcn)*

The fuselage is first framed up using Formers C and E, and the 1/8 ply landing gear mount, keeping things square. Former A is then added and at the same time, the nose is pulled together. Masking tape is excellent for this job. Pull the tail together, using pins and clothes pegs, and checking for proper alignment.

Now add the other formers, cross

pieces (dimensions from top view), and tailwheel block. Sheet top and bottom with 3/32 sheet crossgrain. Curve 1/16th sheet over formers A, B, C, and D. The rear headrest could be made from a soft block, 1/16th sheet, or if you're really lazy, omit it altogether. The nose cone is now added, carved, and sanded to shape.

The wire cabane is formed almost entirely of coathanger wire. I find this is quite sufficient for models of this size, but care should be taken to make clean, strong solder joints. Don't use coat hanger wire for the wing rails; these should be made from 3/32 or even 1/8 music wire.

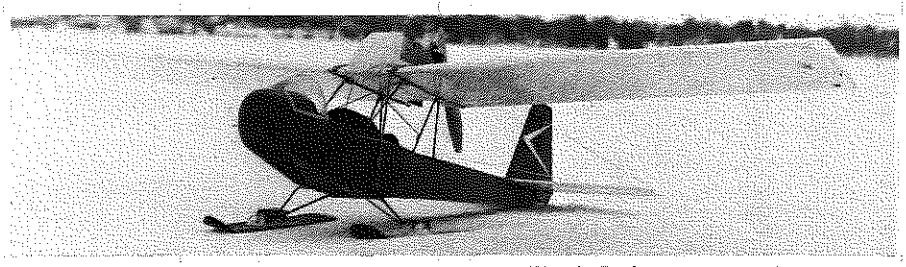
The fuselage should be covered before adding the wire cabane. Once it's covered, the cabane structure, which is bound and cemented to notched hardwood cross pieces, can be glued in place. Form and solder up the landing gear and bolt in place. The windscreen too, is added at this time.

FINAL ASSEMBLY

Strap the wing in place and use this as a guide for lining up the tail pieces as you glue them in place. Finish covering everything and hinge the tail surfaces. Use some scrap pushrod wire as an elevator coupling. It is far more substantial than 1/16th wire and doesn't crack or split like a dowel torque rod can.

Don't use a steerable tail wheel on this model since it receives a fair amount of abuse when starting the engine. Besides, with that prop blasting directly over the rudder, the plane, with its free swivelling tail wheel, will out-taxi anything on the field!

Radio installation is a cinch. Just put that battery as far forward as possible. I didn't put any hatches over the radio bays and found that absolutely no oil gets in this area. But a big, smiling pilot would look great in the cockpit, in which case he (or she, I'm not a chauvinist) could be attached to a removable front hatch. However, put the receiver and battery pack in plastic bags, just in case.



With the non-scale grass missing, this winter shot of the Woody Pusher on skis is of the take-a-second-look type. Plane is a real prop-saver.

Flex-Cable control is used for the throttle, with a nylon link at the motor end. The nylon tube is attached near the motor with a metal strap and a small woodscrew since this has to be uncoupled each time the wing is removed.

FLYING

With everything installed and hooked up, the model should balance at the spar. Mine came out dead on and no lead had to be added.

The flight characteristics of the Woody really have to be seen to be believed. It's not exactly a primary trainer, but anyone who has passed those critical early stages will have no problems. Because of the unorthodox thrust/drag set up, I should give a few pointers on flying technique.

With everything set up neutral and the engine running, point the model into the wind. Now hit the throttle! You will notice that the model moves about three feet before attempting to bury its nose in the turf. Also notice that despite the nosed over condition it is in, the engine is still running! Well . . . throttle back, and let's try again.

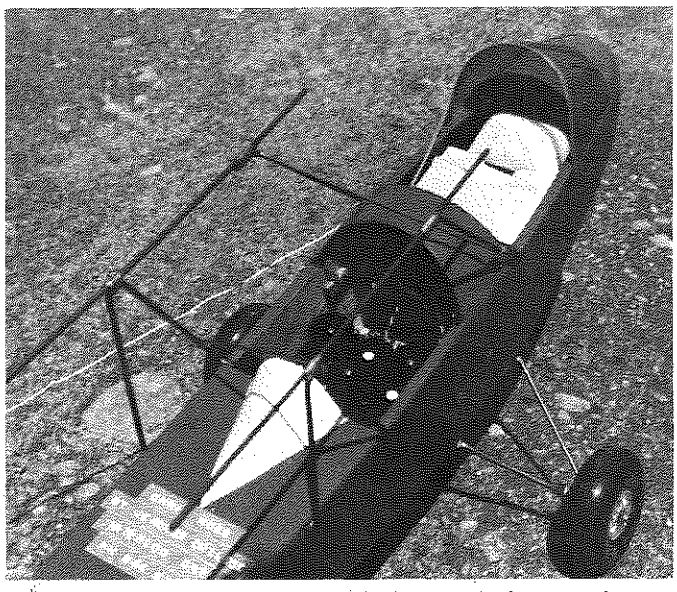
Apply full up elevator this time, then hit the throttle. As the speed increases, the tendency to nose over will constantly decrease, so you can gradually let off on the amount of up elevator until almost neutral elevator is reached. Remember though, that this is still a tail-dragger, so rudder corrections during the take off run should be gentle. Once flying speed is reached, lift-off is accomplished with only slight up elevator. Takeoffs have been made from snow, tarmac and grass. Snow of course is the best, but the Woody seems more at home on grass than tarmac.

Once in the air, the Woody does loops, Split-S's, Stall turns, slow barrellish rolls and even flies inverted. For some unknown reason, it performs better rolls with skis than wheels. Ailerons, of course, would improve the roll rate but if that is what you're after, there are better aerobatic airplanes around, and I really don't think they would be worth the trouble.

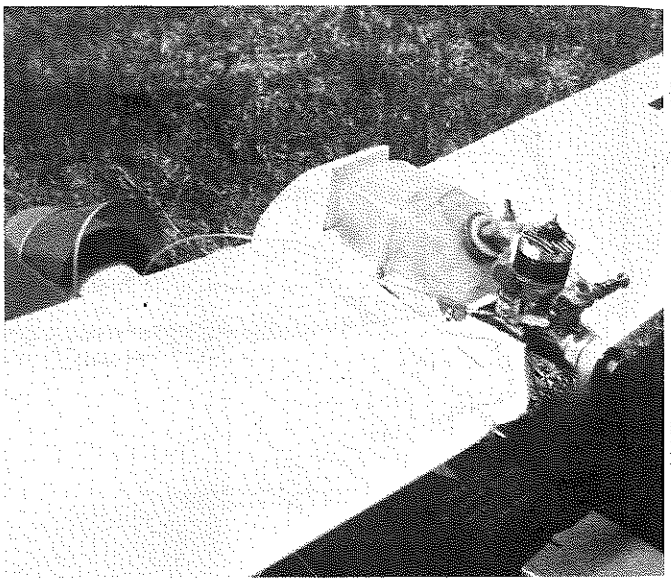
One thing you will have to get used to when flying the Woody, is that sudden application of throttle should always be accompanied by up elevator. After a few flights this will come naturally.

I hope I haven't scared anybody away with the flying techniques, since the Woody really IS a fun plane to fly. I've flown the prototype smoothly in 20 to 25 mph winds, much to the amazement of onlookers. I have yet to see a .15 powered airplane handle the wind as well (except some Q.M.'s) as the Woody. On the other hand, in calm air you can tool around at 1/4 throttle and relax. Like most good things in life, the Woody may take a bit to get used to, but it's funny, it really grows on you!

Happy flying and good luck!



Though cockpits have been left open, Chris says no exhaust residue gets in. Pilot and passenger on hatch/floors could be added.



Nylon left-hand props are available for .09's to .15's. In theory, a short fuel pick-up at back of tank is best for pushers. Experiment.

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but since the wire cabane struts determine the final alignment of surfaces, some suggestions will be made.

First of all, and let's take strut No. 3 for an example, don't start at one end and work your way around. Rather, determine the total length of wire required for the strut, divide the figure in half, add an inch for good measure (looks like about 11-1/2 inches), and start by making the two bends that will give you the two main legs and the part across the top. Now measure 8-1/4 inches down each leg, make the right-angle bends and cut off the excess. At this point, and no sooner, you can cut out the plywood strut supports, altering the slot positions in accordance with how your bends came out.

Incidentally, if you don't have the use of a table saw for routing the grooves in 3/16 inch ply, build up the strut supports from 1/16 and 1/8 ply, using epoxy for the assembly.

The center section/engine nacelle is made up of plywood and balsa. The bottom, under the 3/32 inch ply floor, is open. This area houses the aileron bellcrank which links the individual wing-mounted pushrods to the nylon tube and cable pushrod from the fuselage-mounted servo. This area under the floor also provides access for attaching the wing hold-on rubber bands to the root rib cup-hooks. Note that the 1/16 inch ply sides of the nacelle must be slipped over the wire wing dowels *before* assembly of the nacelle.

Depending on the engine used, a left-hand prop may be necessary. For some engines, you can obtain a left-hand crank. If not, it isn't all that bad to carve your own prop, and chances are you'll never need more than one. If you still have your September 1969 M.A.N. around, you'll find an excellent article on prop carving by Chuck Gill. Grish makes 8 x 6, 9 x 6, and 10 x 6 pusher props, but a low pitch, larger diameter prop seems better for this model.

The wings are standard construction, with two inner main spars, false ribs, and a sturdy leading edge set diagonally. The dowel supports are hardwood pieces drilled to take 1/8 inch inside diameter brass tubing. The plug-in design may seem inadequate at first glance, but remember, the wings aren't cantilevered in the same fashion as most gliders, but are supported by very functional struts.

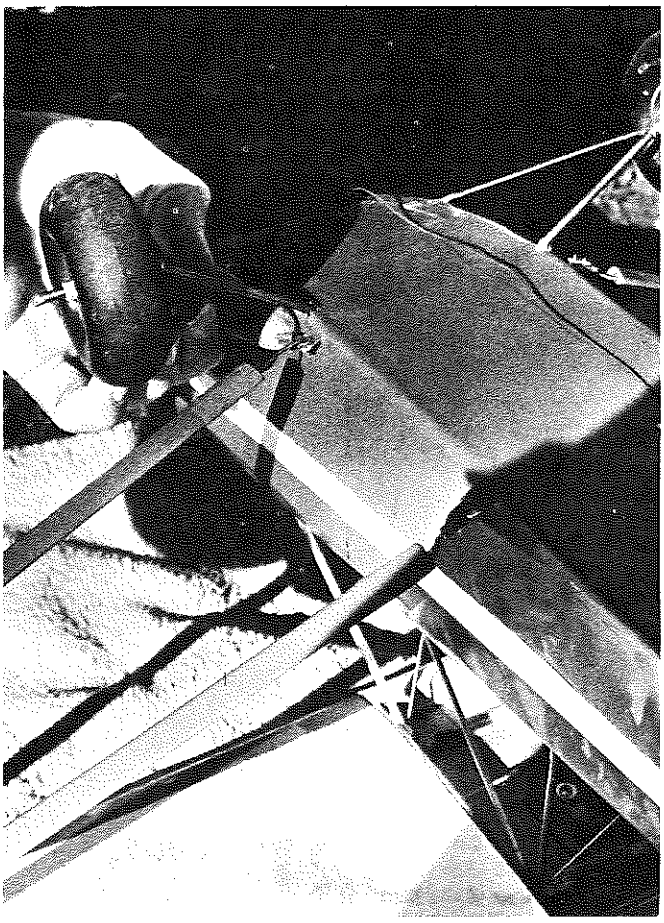
The best way to position the dowel support blocks is to install them loosely, block the wings up on a flat surface with the proper dihedral, and insert temporary 1/8 inch music wire dowels. When everything is in alignment, sock the epoxy to it.

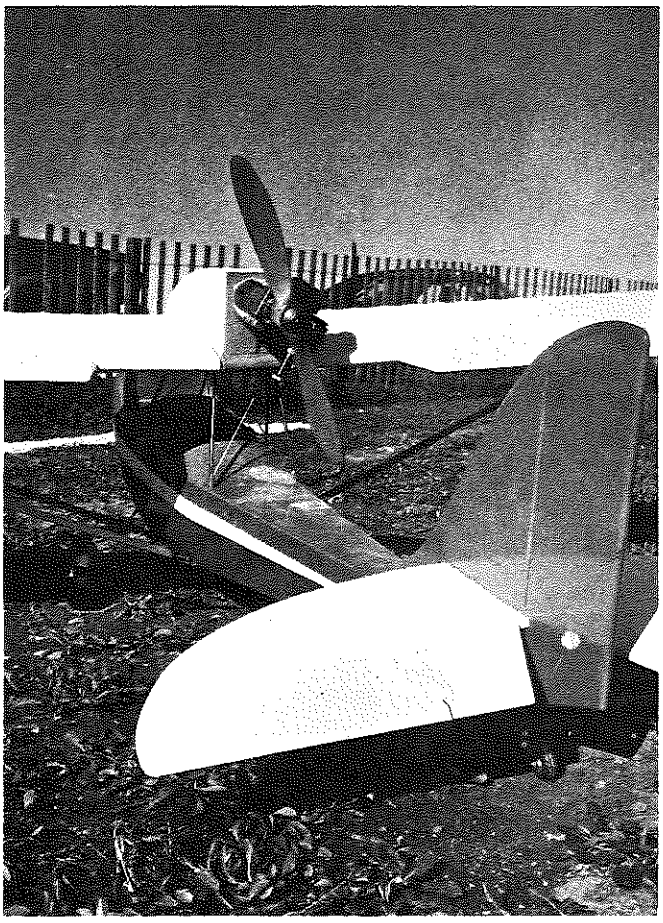
Radio-electronic supply houses usually carry spade bolts, if you can't find them in the hobby shops. These are installed in well-epoxied plywood beds to hold the strut ends.

When building the struts, first rig up the wings and block them into proper alignment and dihedral. Now, with the plane in front of you as a guide to proper strut length, you can make up the four required. Unless you're an absolute perfectionist, none of the four struts will come out the same length. When they're all in place and adjusted to length (small changes can be made by bending the 1/16 inch wire ends), remove them one at a time and scribe identification marks on one end of each dowel. We use FR, FL, RR, and RL. The balsa streamline fairing is a final touch that is not necessary, but certainly improves the appearance.

The landing gear is scale in size and position. When flown from grass fields the plane will sometimes ride up on its nose, mostly due to the high thrust line. If you feel this will be a problem, the gear could be moved forward; however, generous portions of up-elevator when first applying power will usually overcome the problem.

The plane as shown is very close to scale. Karlstrom 3-views were published in the July 1957 M.A.N., and U.S. Civil Aircraft Vol. IV by J.P. Juptner has the full particulars. Whether you build it for scale competition or not, putt-putting around with the C.W. Junior is different, relaxing, and just plain fun . . . and one prop can last forever. ●





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