



Attractive Gail Roberti holds the Mk. V Javelin. Based on the long, slender, tubular fuselage, the name is very appropriate. Building technique is fully explained.

PHOTOS BY AUTHOR

The *Javelin* MK. V

By RON BOBERTI . . . This Unlimited Rubber model is contemporary in design and construction, and will provide the beginner or expert with the best in competition equipment.

• The Javelin Mark V is a very competitive Unlimited Rubber model, with an excellent contest record. For beginner or expert, it will give much satisfaction and hopefully a lot of wins. The Javelin V is simple in design and simple to build. The basic design was built many years ago, and as you older modelers can see is Hatscheck influenced. During the last 2 years, I have really started to improve the airplane. I built 5 models in 2 years until the final result was what I wanted; consistency being the ultimate goal and finally the end result. Let's build this thing.

The most important part of building the Javelin is the weight. It carries a lot of rubber, so keep it light. The total weight of the Mark V model was 8.45 oz. with the rubber, which is pretty light considering its size.

FUSELAGE

The fuselage is made of one sheet of 1/16 x 4 x 48, very light, tangent cut, and rolled on a 1-1/8 inch form into a tube. Soak the sheet in water and roll it on the form using heavy brown wrapping paper. It's a little too large to fit in an oven, so let it stand in the sun until it is dry. When dry, remove the paper and rolled tube from the form. Now tape a small strip of waxed paper about 1 inch wide down the length of the form so the glue at the seam of the motor tube will not stick to it. Install the tube on the form and carefully glue the seam of the tube together. The most important part

here is making sure the seam is glued perfectly straight. This will prevent the tube from having a bow in it. A tube that is bent or bowed is no good because it loses its strength. So be extremely careful here. When the tube has dried, remove it from the form again and check it for alignment. If it is true and straight, put it back on the form.

I use a slightly different method in tissue covering the tube that adds no more weight but quite a bit of strength. Instead of covering with tissue using a single sheet, I cut the tissue in 3/4 inch strips and spiral wrap it so it looks like a peppermint stick when finished. When you have completed this, brush on 4 coats of 50-50 dope and let dry at least overnight. When the tube is dry, remove it from the form. Cut two strips of .032 aluminum 1 inch wide. Bend them around a form and glue one in front for the nose block insert, and one in rear for the motor peg. The rear insert should be put in one inch forward of the rear of the tube to give clearance for the tail boom. Glue both inserts with epoxy and drill a 1/4 inch hole through the rear insert for the motor peg. Now make a 1-1/16 inch dia. circle of hard, 1/4 inch thick balsa. Cut off a small end and glue in place in front end. This is the nose block key. The remaining piece we will use on the nose block.

The tail cone is made of 1/32 sheet, 10 inches long and rolled to a tapered tube in the same manner as the motor

tube. I use a tapered pool cue as a form. Tissue wrap it and insert 1/8 thick circles of light balsa in front and rear for strength. The tail boom insert is made of 1/16 x 1 inch sheet balsa formed in a circle to fit inside the rear of the motor tube. Glue this to the tail boom and add hooks to the tail boom and motor tube as shown on the plans. The hooks are standard dress hooks and are purchased at the local 5-and-10 or sewing shop. The stab platform is made of 3/32 balsa, making sure you have 0 incidence in the stab when completed. Add DT hook, snuffer tube, and DT string as shown. The fuselage and tail boom are complete, so let's get to the stab and rudder.

STABILIZER

The wood for the stab should be very light, using 1/32 quarter grain for ribs and medium hard for the leading and trailing edges. Leading edge is 3/32 sq. and the trailing edge is 1/4 x 3/32 tapered stock. All spars are 1/16 sq. Build stab in conventional manner, on the plans. When dry, add one coat of dope to the tip ribs, leading and trailing edges and sand to shape. Covering is very light tissue, covered with the tissue grain running cordwise to prevent warps. A tip on preventing warps is to wet tissue and pin the frame on three sticks of 1/4 inch balsa, one at each tip, and one in the center. This will help keep the tissue from warping the frame. I use this method, and it seems to work real well. When this is done, brush three coats of 50-50 dope on the tissue and pin the stab back down on the 3' sticks of balsa and set it aside for a couple of days. Hook for DT string can be added at this time. Epoxy wire to top of trailing edge.

RUDDER

The rudder is built exactly like the stabilizer. Build this very light also. The top and bottom ribs are 3/32 sheet. The rest are 1/32 sheet cut rectangles for ribs. Add spars to both sides and sand to an airfoil shape with the curved side on the right for left glide wing.

WING

The wing is built in the same conventional manner as the stab and rudder. Carefully select good light 1/32 quarter-grain sheet for ribs and medium hard strips for leading edge, trailing edge, and spars. The plans show the center section and one tip. You can build both tips without oiling up the plan by just moving the tip rib to the opposite side as shown. Make sure that you use a straight edge for pinning down leading, trailing edges, and lower spars. Make an .032 aluminum template of the ribs so they will all be exactly alike.

After the leading and trailing edges and lower spars are in place, add ribs, as shown on the plans, making sure you use the template for the dihedral break. Dihedral is made by butt-gluing the center panel rib to the tip panel rib.

Tip ribs are 3/32 soft balsa as shown. Add top spars. When dry, remove each panel from the plans, sand leading and trailing edges to airfoil shape, and brush two coats of dope on the frame. Cover with light tissue and use the same method of pinning down each panel as explained on the stab. Do not build any wash-in or wash-out in the wing. It is not necessary. Two to three coats of 50-50 dope is sufficient. When each panel has dried for a couple of days, glue the tips to the center sections, and if the template for the dihedral was used properly, you should have the same dihedral on both tips.

The wing mount is made of 1/16 med. sheet as shown on plans. Make sure you have 2 degrees of positive incidence in the wing mount. The wing mount slides are 2 strips of 1/16 sq., glued as shown to the motor tube so it can be moved fore and aft for C.G. purposes. Dowels of 3/32 diam. aluminum tubing are used for rubber banding the wing mount to the fuselage and the same pegs are used for mounting the wing to the mount. Now the hard part.

PROP

As you know, the prop is the most important part of any rubber model. Extreme care should be taken here. The prop on the Mark V is 24 x 26 inch pitch, with laminated blades. The prop form is cut from a block 3 x 2 x 11 inches as shown on plans. Use prop outline to cut the 3 laminations you will need for the prop. The laminations are as follows: Bottom sheet, 1/64 plywood which you can get from Sig. Second layer is 1/16 quarter grain light balsa. Third lamination is 1/32 straight grain light sheet balsa. This makes an extremely strong, warp-free blade with a thin airfoil section. Slight camber is achieved by gluing a strip of 1/32 hard Balsa 1/4 inch wide down the center of the prop block.

Cut each lamination about 1/16 inch wider than blade on the plans so that you will have room for trimming. After all the lamination are cut out, glue the three sheets for one blade together with 50-50 water and Titebond. If you try to use the glue at full thickness, it will be very difficult to sand the blades (I have ruined a lot of blades). While the glue is still real wet, form the blades to the block, using 1/2 inch wide elastic bands from the 5-and-10 or fabric store. Make sure that as you wrap it the sheets don't slip and that no bubbles form inside the blades. You can secure the elastic tape with thumb tacks. When the blade is all taped, spray it with water and put in a very low oven and bake for 20 to 30 minutes. Let cool before removing. You can now make the other blade in the same manner. When both blades are completed, put one on top of the other on the prop block form, wrap them together and let them sit for a couple

of days to sort of cure.

When this is done, drill the holes in the blades as shown on the plans, using a piece of 1/8 I.D. tubing as an aligning tool for the drill. The tubing is glued parallel to the bottom of the form so that the hole is drilled in the center of the blade 3/4 of an inch from the blade shank. When this is completed, add 2 pieces of 1/6 x 12 inch plywood one on each side of the blade shank for strength and then drill the hole for the hinges as explained above. I used Hot Stuff here because it's strong and fast.

Sand the blades to airfoil shape and install 3/32 diam. tubing in the holes for the hinges. Hot Stuff these in place. Ream the holes with a number 43 drill. This will give you a 2mm hole for the wire hub and hinge you will use. Finishing the blades is simple. I use 2 coats of K & B polyester resin, sanding between coats and finishing with rubbing compound and clear shop polish. Well, you now have 2 perfect blades! If you used wood from the same sheets to make each blade, balancing should be no problem. Using a balance beam, you can add weight to whatever blade is necessary. I used masking tape in the tip of the lighter blade and it works real well.

The nose block is made of laminated pieces of 3/16 sheet, glued with Titebond and clamped until dry. At this time, add the rest of the circle block we cut for the nose block stop. Fit the complete block on the fuselage and trim as needed. The prop hub is made of 2mm pre-shaped wire that you can get from F.A.I. Model Supply. It comes complete with wire, shaft, spring and thrust bearing. Solder and bind shaft with copper wire as shown on the plans. The plans explain it better than words.

Finish nose block the same as the blades, install the blades, and add blade-stops of 1/16 wire, making sure that the prop tracks evenly. This is important. If the prop is out of track it will make the airplane vibrate. Always take a little more time in balancing and tracking the prop. When the entire assembly is complete, install the nose block to the fuselage, find where the blade will fold flat with the least amount of resistance, and install the stop screw. Remove the nose block and sand in 2 degrees down thrust and 2 degrees of right thrust at the nose block insert on the motor tube. This is a good starting point, as fine thrust adjustments can be added at the flying site. Well now lets assemble the Javelin and send it up.

The power I use for the Javelin will vary with the wind and weather conditions. Anywhere from 14 to 18 strands. Most of the time I settle for 16 strands of 1/4 inch Pirelli or Filati. F.A.I. rubber is okay to use, but it is heavier than the Italian rubber. I have used F.A.I. rubber but, more turns are needed. You will

just have to use what is available. I won't go into pre-stretching rubber because that has been covered by many other articles.

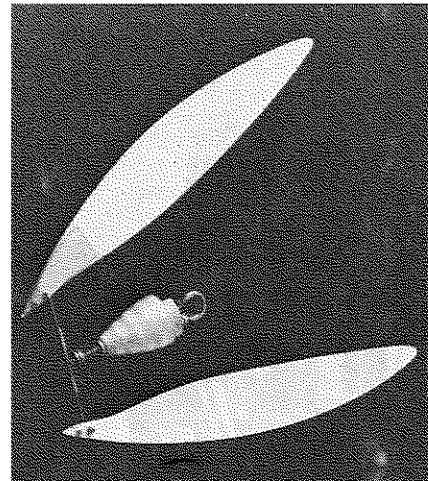
TRIMMING & FLYING

First locate the C.G. It should come out anywhere between 95% and 105%, the airplane being so long it is more than safe between these points. Test glide the model until a smooth, flat, slight left circle is achieved. Add positive or negative to the stabilizer as needed to achieve this. When this is done, wind the rubber to about 400 turns (don't forget the fuse), and let it go. All of the 5 Javelins flew well right off the board. The airplane should have a nice flat circular climb to the right, with a good transition to a left glide. Watch the glide closely. If it needs more glide turn and the power pattern is okay, tilt the stab.

Do not use a rudder tab. None of my airplanes need a rudder tab. If the power pattern is not good, add shims at the nose block for thrust adjustments. Now that its trimmed, try 800 turns, as she should climb with her nose high in right circles. As I said, use thrust adjustments as needed, this seems to be much safer. At full turns (I usually get 1,000), the airplane, if trimmed correctly, will pretty nearly climb out of sight. Using 16 strands and 1,000 turns, my motor runs have always been at least 1 min., 35 secs., which is more than enough.

I think you will enjoy building and flying this model at your next contest. It's as competitive as any, and if you have any problems, drop me a line at 1629 Claudia Drive, Norman, Okla. 73069.

Good luck.



Most important part of any competition rubber model, the propeller. Sheet blades.

**MODEL
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COPY LINE

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