ROULET

An out-of-the-rut parasol-type design intended for the sport flyer. May be flown with any radio system from one to six channels, and takes engines of from .15 to .29 displacement. Simple construction, realistic, and no vices.

By HOH FANG-CHIUN

Aiming for a different and nice-looking model intended primarily for sport flying, I chose the parasol-type design because of its scale-like effects and its excellent pendulum stability.

The basic idea of the Roulet was to provide simple construction and good flying characteristics in combination with a realistic appearance. It has also been designed with the effort to represent at least in some aspects an out-of-rut style, but without the sacrifice of simplicity in structure. Therefore, the construction of the model has been kept as simple and as conventional as possible.

As you will notice on the plan, materials specified are often generous in dimensions. I feel that it is easier and more rewarding to work with light, oversized wood than hard and thinner materials. Always select medium to medium-soft balsa wood throughout the entire structure and you won't face any weight problem of the completed model. The prototype has an all-up weight of approximately 4 lbs.

Although originally designed for 6-channel operation, controlling rudder, elevator and motor throttle, the Roulet can also be flown as a rudder-only plane, using either servo or escapement rudder actuator. Because of the large vertical tail area, the rudder response is excellent, making ailerons superfluous on this model. However, builders who want to go "full house" may, of course, add on either full-span or orthodox built-in tip ailerons.

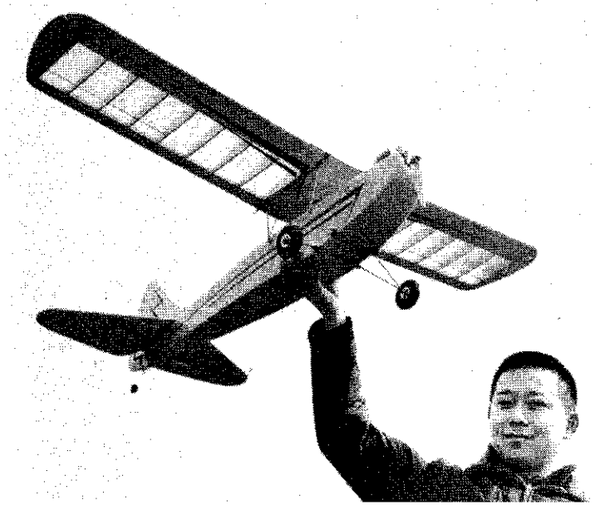
The wing airfoil is of semi-symmetrical section. This type of airfoil was selected in order to provide more stable inverted flight characteristics as well as smoother inside and outside loops without too much loss of lift compared with flat-bottomed sections.

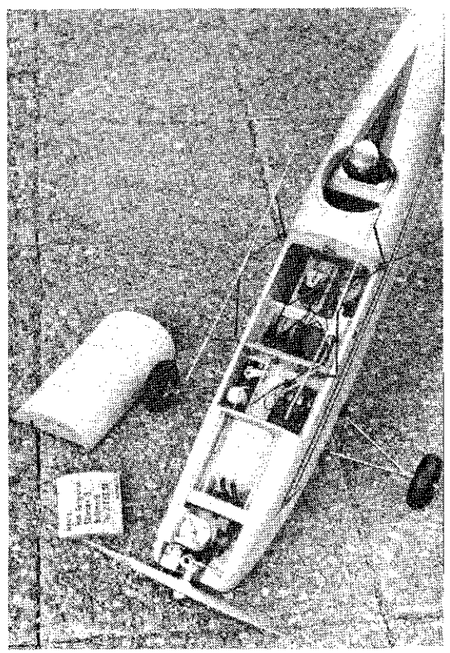
The model spans 54" and has a wing area of 500 sq. in. The powerplant may be any engine of .15-.29 capacity. The prototype is powered by a .15 diesel engine and equipped with a German Variophon-Variton 6-channel radio set, with Bellamatic servos for rudder and elevator and a Servo-autoMatic servo for throttle, the installation of which is clearly shown on the photograph.

As you will notice, I did not specify any particular radio installation on the plan because there are so many suitable systems available on the market. However, I believe that no difficulties should be encountered in the RC installation since the fuselage compartment is amply dimensioned to accommodate either reed or proportional outfits.

Construction: Start with the wing which is built in two pieces, join at final assembly by adding plywood dihedral braces and balsa sheet covering. After cutting the ribs and spars, pin down the lower main spar directly on the plan over wax paper. Glue all ribs in place over the spar, except for the center rib. Be sure to prop up the semi-symmetrical ribs in alignment while the assembly is drying, otherwise you will have built-in warps in the wing which will be difficult to eliminate fully. Add top main spar (*Continued on page* 62)

Original used German Variophon-Variton 6-chan., Bellamatic servos, Servo-autoMatic for engine. Ship can be full-house, too.





Looks like an actual aircraft, but it's not really scale. Wings and landing gear knock off. Living in Sweden, author, long-time contributor to international mags.

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and leading edge stock while the panel is still on the working board. After drying, remove the panel and lay it vertically on the leading edge. Carefully slip the trailing edge notch into each rib end, checking frequently that the trailing edge follows the rib contour correctly.

Incidentally, when cutting notches in the trailing edges, make them slightly undersized for a tight fit to the ribs. The opposite wing panel may be built on the same plan since all rib spacings are equal. To join wing panels, first glue plywood brace BB to the 3/16" thick center rib WA, checking carefully that the joint is at a right angle. Fill the gaps between brace and wing spars with 1/16" balsa strips and cement this unit to one panel side, allowing several hours for drying. Now join opposite wing panel very carefully with all spar ends joining each other precisely. Cement the leading and trailing edge braces in place, using spring-loaded wood clamps to hold them in position. Add all sheetings as specified on the plan, using white glue exclusively for this assembly. Capstrip all ribs and build the tips as shown, and your wing is ready for sanding. Finally, add the trailing edge protector wire reinforced with gauze or fiberglass.

Construction of the stabilizer is conventional and should not present any problems. Bear in mind to choose soft balsa wood for this part in order to keep the tail as light as possible. Build the framework of balsa strips directly on the plan and then white glue the top sheet in place. Remove the assembly from the plan and add the bottom sheeting. The elevators are cut from 3/16" balsa sheet.

The fuselage is of straightforward box-type construction, but without the common framed structure. Cut fuselage sides from matched sheets of 1/8" medium balsa. The sides are reinforced with several layers of doublers in the forward part as indicated on the plan. Contact cement the one-piece 1/32" plywood doublers to the sides. Next, glue the three-piece 3/32" sheet triplers in place, leaving a 1/8" gap at formers FD and FE to allow for these later. Finally, add the 3/16" sheet quadruplers in front of former FC and the 1/16" sheet doublers at rear. While side assemblies are drying, cut all formers to proper shape. Use aircraft plywood (5 layers) for all plywood formers and drill all holes required. To assemble the fuselage, first cement formers FD and FE to the sides. Then add forward formers. To lock fuselage assembly into alignment, join the sides at rear with a piece of 1/8 x 3/8" trailing edge tail post. Glue the remaining formers in place and complete the fuselage according to the plan. Before adding balsa blocks to the nose assembly, install blind mounting nuts in the motor bearers.

Construction of the radio compartment hatch should be carried out directly on the fuselage. Carefully pin down the two 1/4 x 7/8" main strips onto the sides and glue all hatch formers in place. Set the assembly aside, allowing several hours for complete drying. To plank the hatch, start on top and work towards the both sides simultaneously. Be very careful at this point, not pressing too hard on the hatch formers when pinning down the planking strips. Both the tank and radio compartment hatches are locked into former FC with small hardwood dowels. They may be retained in place either with rubber bands or built-in attachments.

It is very important that the wire wing mount, the so-called "bird-cage", is made exactly to the plan. This set-up will provide the wing a plus-one degree incidence. Bend the vertical struts and bolt them firmly to formers FD and FE with tin plate brackets, then lightly solder wing saddle wires onto the struts, checking that all measurements are to the plan. When exact settings have been achieved, wrap joints with soft copper wire and solder securely. Add brace struts and you have this critical part completed. Loosen tin

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plate brackets and remove "bird-cage" from the body. Later, when the fuselage is finished, the struts are inserted from each side and bolt in place permanently.

Finish the fuselage with sandpaper before the empennage is cemented to it. Prior to this, shape the body in accordance to the various cross-sections for proper contour. Bend the landing gear from piano wire or dural aluminum, the former being shown on the plan and is used in the original model.

My finishing is started by brushing a few coats of thinned clear dope on the entire structure, sanded lightly between coats. Before this doping, I coated the entire nose, as well as the engine and fuel tank compartments with two coats of fiberglass resin, sanded down wherever possible. This not only adds fuel proofing, but greatly increases nose strength. For covering, I use lightweight silk, applied to the entire structure. Since the Roulet is not a scale model, I consider sanding sealer filler dope unnecessary. I then gave the silk covered model at least ten coats of slightly thinned clear dope before final trimming and sanding. I used wet sanding between last coats to obtain a smooth and shining finish. My original model is covered with white silk and trimmed with orange and green decorative markings.

For the radio installation, a general rule applicable to all outfits is to house motor servo and battery packs in the forward compartment and use the main compartment between formers FD and FE for the accommodation of tail servos and receiver unit. Cut opening in former FD beforehand, to suit your particular equipment (if necessary).

The engine should give about three degrees of right thrust to offset torque effects caused by propeller stream as it hits the huge vertical tail. The downthrust may vary from model to model and also depending on engine size used. To start with, the built-in downthrust should be sufficient. Before commencing flight tests, check C.G. location and for freedom from warps in the flying surfaces.

If you have built the model true to the plans with all settings as specified, you will need little adjustment to get it to fly properly. On your initial flights, start with a small amount of rudder and elevator throw to avoid violent reaction. Also, use the open throttle in limitation since the Roulet is rather fast. Apply full power during takeoff and climb and observe the flight pattern carefully. Slow down the engine immediately if any abnormal situation should arise. Try to obtain a straight power flight with thrust corrections, if necessary. If the glide is not satisfactory, correct it by adjusting the elevator angle of attack or slightly shifting the C.G. location. I prefer to land with the engine on. I always apply a little power during approach to maintain full control until touchdown.