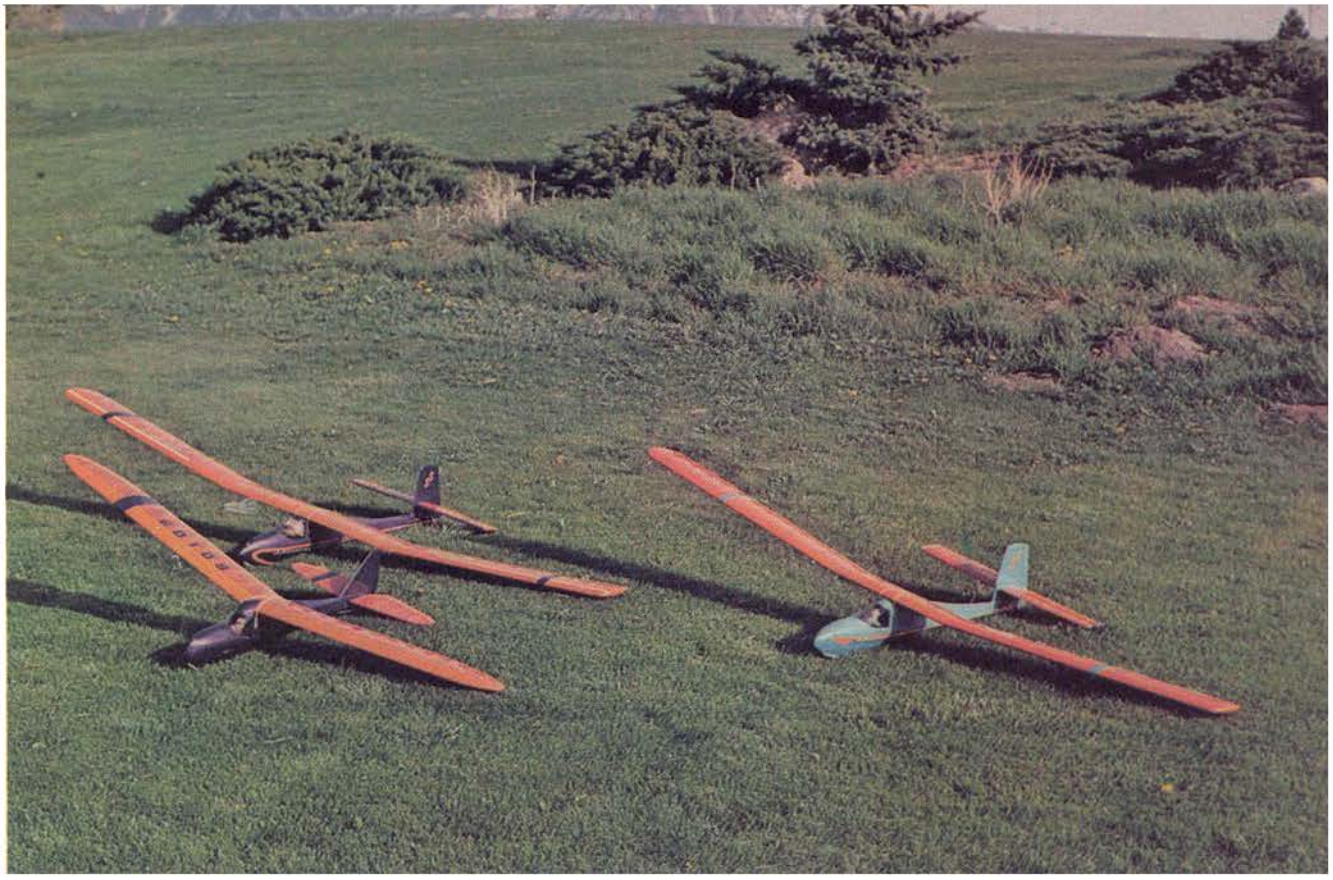
ABOVE: The unique lines of the Sinbad Supreme will make it stand out at any flying field.



Two Sinbad Supreme prototypes with the Super Sinbad built from the Sig kit.

SINBAD SUPREME

BY LARRY SWARD

● Model aircraft are becoming more expensive to build with each passing season. This is mainly due to the skyrocketing prices of construction materials. Being a rather active modeler, but not a particularly rich one, I felt that it was about time to reduce the cost of model building. The Sinbad Supreme is a result of this cost reduction effort. By using spruce and balsa laminations and incorporating the no-cost "foam wing rib", the total cost of the sailplane presented here was held to less than $30.00. This price includes the MonoKote, canopy, glue, towhook and other associated hardware (except radio).

The Sinbad Supreme is an outgrowth of the old Super Sinbad sailplane, originally produced by Berkely, but presently available from Sig Manufacturing Company. The wing, fuselage, rudder, and stabilizer have been completely redesigned to be more compatible with today's Standard Class sailplane. The flat bottom airfoil was taken from the Windfree sailplane because of its good, yet forgiving, characteristics and because it simplifies overall construction.

There have been a total of three prototypes built. Each prototype incorporated various design features which I felt were important to a versatile sport sailplane.

The seven major design criteria for the Sinbad Supreme consisted of the following: (1) Simple construction; (2) light structure; (3) repairability; (4) good maneuverability; (5) accept a removable power pod; (6) withstand the loads of a high start; (7) low cost.

The projected weight of the finished model was established to be between 34 and 37 ounces. This would allow the wing loading to be between 7.2 oz./ft.^{2} and 8 oz./ft.^{2}. The three prototypes all weighed less than 35 ounces. All of the aircraft flew right off the board with no undesirable flying characteristics.

The major reasons for choosing the construction materials and techniques employed in the model were cost, strength, and weight. It is quite surprising how strong a laminated keel and stringer fuselage can be. I have landed many times nose first with each of the prototype models, and no damage was ever incurred. Also, laminated keels and stringers provide very nice curves without built-in stresses.

The foam ribs were cut using the hot wire technique. This is a very clean and fast process. I don't know how many have noticed, but the supply of foam ribs is unlimited. All of the ribs for the wing of the Sinbad were cut from "egg carton" tops. This foam is about 1/8" thick and with the 3/16" x 1/16" balsa capstrips, the ribs are extremely strong. In fact, I use "foam ribs" on all my pattern planes and believe me, they can take more punishment than ever would be possible with a balsa rib. Not only that, but the foam doesn't cost anything. I saved over three dollars on the Sinbad by using the foam instead of balsa. Foam rib blanks are stacked between two plywood templates and then cut using a hot wire.

CONSTRUCTION

The construction of the Sinbad Supreme is very straightforward and should present no problems to the intermediate model builder. The model goes together very quickly - - - in fact, I built one of the prototypes at work during six weeks of half-hour lunch breaks. (A little work each day is all it takes to complete any model.) Since this is not a beginner's model, I will only emphasize the important points of construction.

Wing: The wing is started by cutting two 3/32" plywood rib templates. Put these ribs together and sand them to ensure that they are identical. Drill the 7/32" and 1/8" wing rod holes in them at the locations shown on the plans. These ribs not only serve as rib cutting templates, but will be used at the wing center section where the wing tubes are bonded in place. Cut 32 of the foam rib blanks (1/16" balsa may be substituted, if desired) and stack enough rib blanks for half of the wing between the two templates, then cut and shape. Do the same for the other wing half. I cut half of the number of ribs required each time since it makes handling easier.

Once the ribs are cut, the construction of the wing can begin. Be sure to use an aliphatic resin glue if foam ribs are used. The center section is built as one piece with the 3/16" ID and 3/32" ID brass tubes epoxied in before sheeting the leading edge. Be sure to mark the center of the wing section when the center section is built. Cut it in half at these center marks and then install the left and right panels, reinforcing the dihedral joints with the 1/32" plywood doublers. This method ensures a perfect alignment of the wing rods without the normal "fuss and muss" associated with other wing alignment procedures. Two final points should be brought out about the wing. First, the spars of the outer panels are balsa. This helps to eliminate excess weight. The center section spars are spruce since this section must withstand higher stresses than the outer panels. The second point is the use of a spruce leading edge. The spruce is heavier than balsa, but it resists nicks and dings better. The slight weight penalty is more than compensated for by the increased durability of the wing.

Rudder and Stabilizer: The rudder and stabilizer build up very fast, especially if Hot Stuff is used. The rudder and stabilizer are all-flying which simplifies construction. Be sure to choose uniform, medium weight balsa to reduce any warping tendency. It should be noted that the stabilizer has a slight lifting section. This helps to reduce nose weight that may be required for balancing and

ABOUT THE AUTHOR

Larry Sward has been an active modeler for the last 18 years. Radio control sailplanes have been his major interest for the last 9 years. The Sinbad Supreme is the 15th model sailplane designed by Larry and he considers it as one of his best.

Mr. Sward has a Bachelors Degree in Mechanical Engineering and a Masters Degree in Industrial Engineering. He has been on active duty with the Air Force for the last three years. Larry is currently working towards a Commercial Pilots Certificate. Radio controlled model aircraft have not only provided a challenging hobby for Larry but they have also contributed to his professional background.

thus reduces the overall weight of the model. To help ensure correct alignment of the stabilizer, build the halves before installing the 3/32" OD and 3/16" OD brass tubing. When the halves are completed, lay both of them flat on the work table and epoxy the tubes in place using the 1/16" piano wire connecting rod and the 5/32" OD brass connecting tube to maintain proper positioning.

Fuselage: The fuselage is begun by laminating the side keels of the fuselage directly over the top view of the fuselage on the plans. An aliphatic resin glue was used for the lamination of all fuselage keels and stringers. All cross pieces are installed in the fuselage after the side keels are laminated. After the side keels are laminiated and the cross pieces are installed, build the formers from the materials indicated on the plans. Install the bottom formers on to the side keels while it is still on the plans. When the formers are secured, laminate the bottom keel and bottom stringers directly on to the fuselage. Laminate only one layer at a time. Don't try to laminate all three layers of either the keels or stringers at once since this is too much to handle. The lamination construction may sound like a lot of work, but it is very simple and fast if care is taken and if a large number of clothespins are used for clamping.

When the bottom half of the fuselage is dry, remove it from the building board and install the top formers. Then, laminate the top keel and stringers in place. Once again, take care during the lamination process and don't be afraid to use all the clothespins that are needed. When the laminations are dry, install the rudder wing pylon support, hardwood tow hook mounting block, nose and cockpit blocks, associated sheeting, filler blocks, and other hardware as indicated on the plans. Sand and shape to the outlines shown. After shaping, the canopy can be installed. The canopy shown is cut from the rear section of a 13" Sig bubble canopy. To add a little color, tint the plastic by putting it in a bucket of medium warm water containing 3/4 package of Rit dye. Leave it in for about 1½ hours to obtain a medium strength tint. The tint intensity can be varied by adjusting the length of time the canopy is left in the dye. It is important that the surface be completely free from dirt and oil before dyeing. If it is not clean, the tint will end up blotchy.

Radio Installation: The two channel radio installation should present no problems and is left up to the discretion of the individual builder. The main thing to watch for is complete freedom of movement of all controls. The radio is installed before covering since this makes threading the pushrods much easier. The Sinbad Supreme was designed around the Heathkit radio using the KPS-11 servos and square 500 mah battery pack. Minor modifications to former locations are all that would be required for installing a

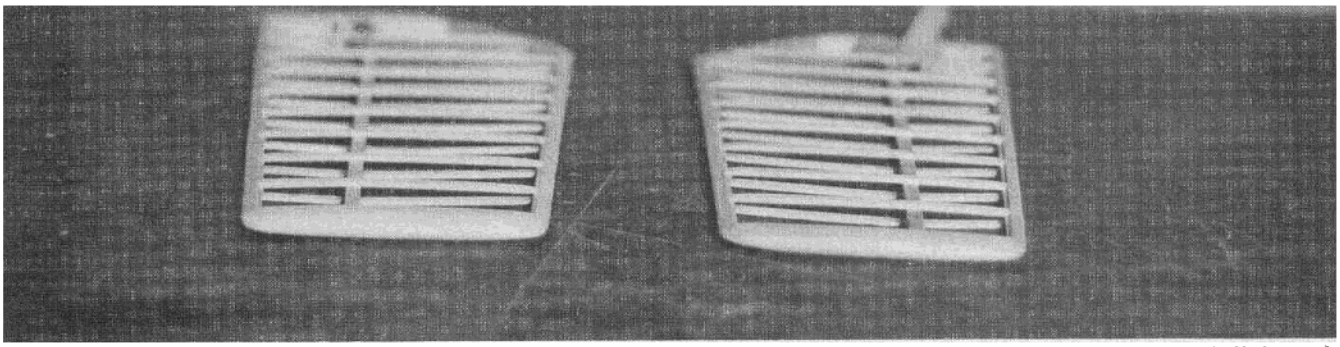
BILL OF MATERIALS

Qty	Size	Use
	Fuselage	
3	1/16 x 1/4 x 36 spruce	Bottom keel
1	1/16 x 1/4 x 36 balsa	Bottom keel
6	1/16 x 3/16 x 36 spruce	Side & top keel
3	1/16 x 3/16 x 36 balsa	Side & top keel
16	1/16 x 1/8 x 36 spruce	Stringers
8	1/16 x 1/8 x 36 balsa	Stringers
1	1 x 3 x 18 balsa	Hatch & nose block
1	1/4 x 1/2 x 3 maple	Tow hook mount
3	3/16 sq. x 36 hard balsa	Formers
1	3/16 dowel	Wing hold-downs
1	3/32 x 3 x 36 balsa	Formers & pylon support
1	1/32 x 6 x 12 plywood	Doublers
1	13" Sig Canopy	Canopy
1	1/16 x 6 x 12 plywood	Wing pylon
	Stabilizer and Rudder	
10	3/16 x 1/16 x 36 balsa	Ribs
2	1/4 sq. x 36 balsa	Rudder & stab tips
1	3/16 sq. x 36 hd. balsa	Spars
2	1/4 x 1/16 x 36 balsa	L.E. & T.E.
1	3/16 OD brass tubing	Stab connectors
1	5/32 OD brass tubing	Stab connectors
1	3/32 OD brass tubing	Stab connectors
1	1/16 Piano wire	Stab conn. & rud. hinge
1	3/32 x 6 x 12 plywood	Rudder support
1	1/4 x 1/8 x 36 balsa	Rudder ribs
1	Scrap 1/4" sht. balsa	Filler blocks
	Wing	
3	3/4 T.E. stock balsa	Trailing edge
5	1/16 x 3/36 balsa	Wing ribs & L.E. Sht.
12	1/16 x 3/16 x 36 balsa	Rib caps
3	1/8 x 1/4 x 36 balsa	L.E. back
3	1/8 x 3/8 x 36 spruce	L.E.
10	3/32 sq. x 36 balsa	Diag. & spacer
1	1/32 x 6 x 12 plywood	Face ribs, dih. doubl.
2	1/8 x 1/4 x 36 spruce	Main spars
4	1/8 x 1/4 x 36 balsa	Main spars
2	1/16 x 3/16 x 36 spruce	Drag spars
1	3/32 I.D. br. tub.	Wing sockets
1	3/16 I.D. br. tub.	Wing sockets
1	3/16 piano wire	Wing rod
1	3/32 piano wire	Wing rod
2	1½ x 1 x 7½ bal. blk.	Tips

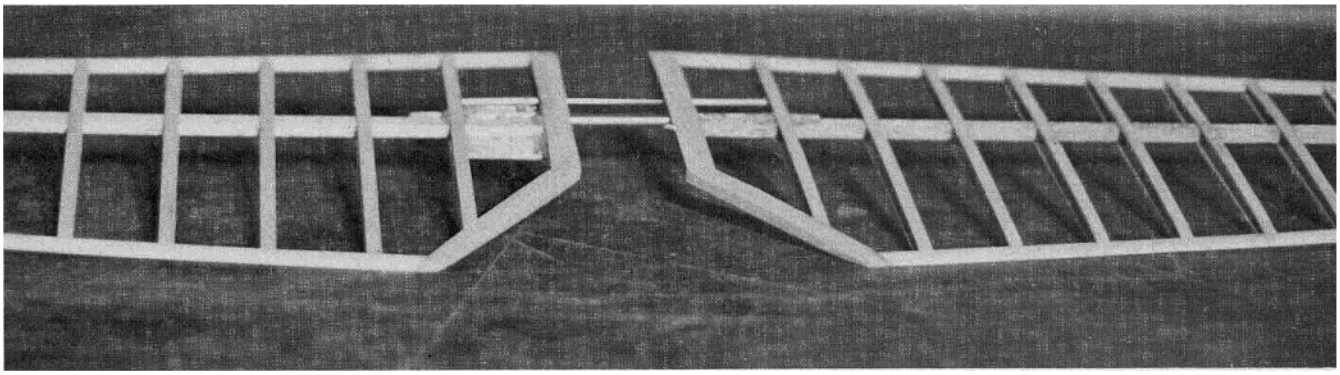
SINBAD SUPREME

Designed By: Larry Sward

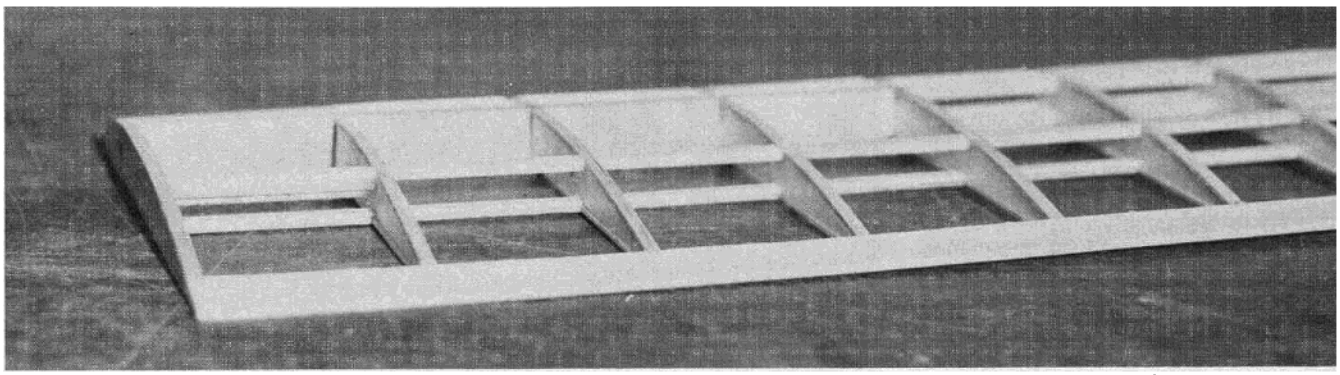
TYPE AIRCRAFT
Standard Class Sailplane
WINGSPAN
94 Inches
WING CHORD
7 Inches
TOTAL WING AREA
660 Square Inches
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
4 Inches
O.A. FUSELAGE LENGTH
42.75 Inches
RADIO COMPARTMENT AREA
(L) 9" x (W) 2¾" x (H) 2"
STABILIZER SPAN
23.5 Inches
STABILIZER CHORD (incl. elev.)
4.75" Average
STABILIZER AREA
100 Square Inches
STAB AIRFOIL SECTION
Flat Bottom
STABILIZER LOCATION
Mid-Way on Fin
VERTICAL FIN HEIGHT
9 Inches
VERTICAL FIN WIDTH (incl. rudder)
5.75" Average
REC. ENGINE SIZE
NA
FUEL TANK SIZE
NA
LANDING GEAR
NA
REC. NO. OF CHANNELS
Two
CONTROL FUNCTIONS
Rudder and Elevator
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply & Spruce
Wing ..... Balsa, Ply, Spruce & Foam
Empennage ..... Balsa and Ply
Weight Ready-To-Fly ..... 34 Oz. (min.)
Wing Loading ..... 7.2 Oz/Sq. Ft.



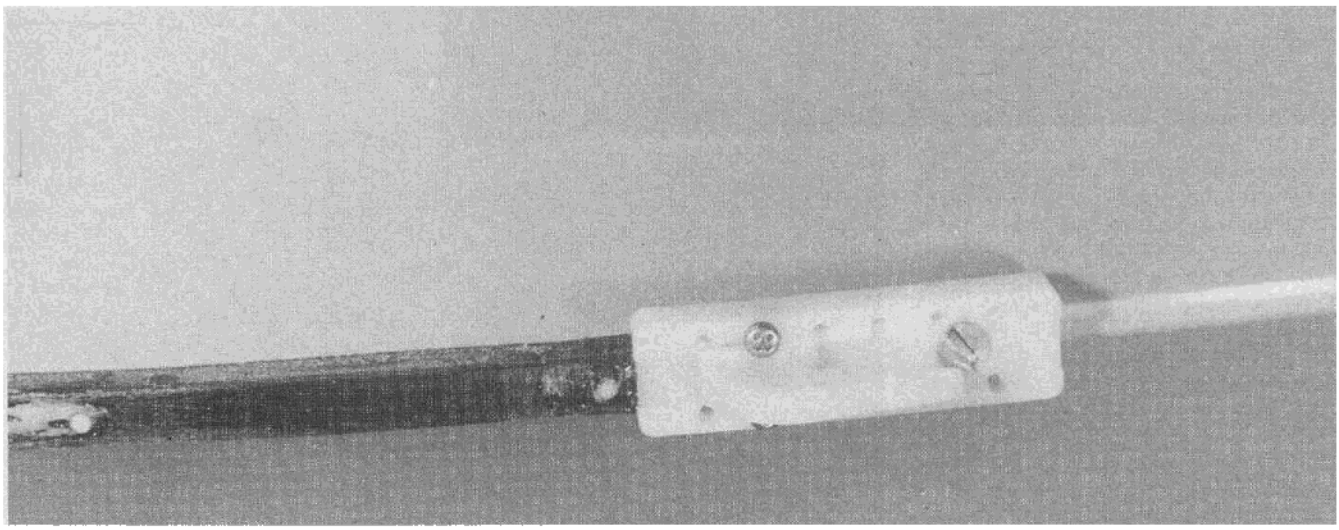
A view of the method of constructing the stabilizer ribs using capstrips over and under the spar. This structure is light and strong and has been used ever since the early days of gas models.



Proper alignment of the connections used in the stabilizer is important. Use 1/16" piano wire for the connector rod and 7/32" diameter brass tubing for the connector tube.



A view of one wing panel. The shear web only extends for four rib bays beginning at the root. This method helps eliminate excess weights while maintaining structural integrity.



Tow hook and skid detail. The EK-logictrol tow hook is mounted with wood screws rather than using the nut plate that is provided with the tow hook hardware package.

The all flying tail surfaces provide excellent control. Center photo illustrates how even the largest radio will fit. The plywood wing pylon, shown below, provides good wing support and is attached after the fuselage is covered.

"brick" type radio.

Covering and Finishing: As far as I am concerned, the plastic covering materials are the only way to finish the Sinbad Supreme. Not only are they light, durable, easy to repair and beautiful, but the transparent types provide the maximum in visibility. Since sailplanes can reach rather healthy altitudes, visibility is vital, and I have found transparent orange to be excellent in this respect. The only notes concerning covering are to ensure that 3/8" washout is put into the outer wing panels while shrinking the covering, and install the 1/16" plywood wing pylon after the fuselage is covered. Be sure to remove the covering from the top of the 3/32" balsa pylon support to ensure a good bond.

FLYING

Make certain that all surfaces are true and warp free. Also, ensure that the same amount of washout is put in both wings. One addition that I also feel helps is to put on two layers of 1/8" trim tape 1" back from the leading edge on the upper surface of the outer panels of the wing. These act as "turbulators" which delay stalling of the outer portion of the wing. This, then, allows the Sinbad to turn very tightly without any tendency to snap roll.

Check the Center of Gravity carefully. If the airplane was built according to the plans, no weight should have to be added to the nose. All the prototypes required no nose weight for balancing.

Set the control movement to the least sensitive positions for the first few flights. Once you become familiar with Sinbad Supreme, the controls can be set to a more sensitive position for very snappy response. My Sinbads have been flown thermal, slope, hi-start, power pod, and aerobatically. No bad tendencies were ever encountered. One point should be made about the hi-start launch, however. The nose of the plane should be pointed up at about a 30° to 40° angle. This may sound quite steep, but I have found this to give the optimum height on launch. Also, use a heavy duty hi-start. The lighter hi-starts just don't give the Sinbad Supreme the necessary "zing" to make it climb.

CONCLUSION

As far as I'm concerned, the "foam rib" and spruce laminate concept is superb. It is cheap, fast to build and very durable. If anyone has questions, my address is: 96 North 1st East, Bountiful, Utah 84010. I am sure anyone who builds the Sinbad Supreme will be very pleased with its interesting construction techniques and pleasing performance.

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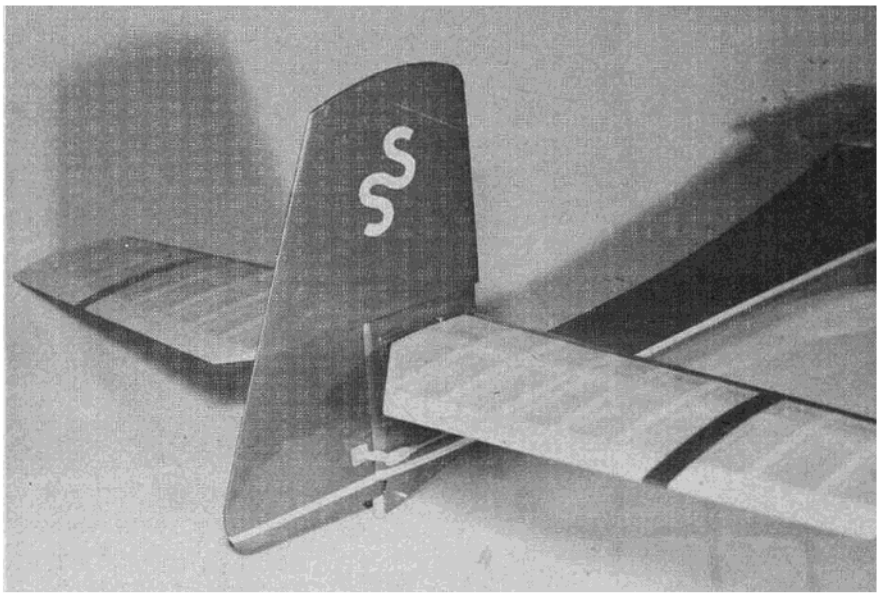

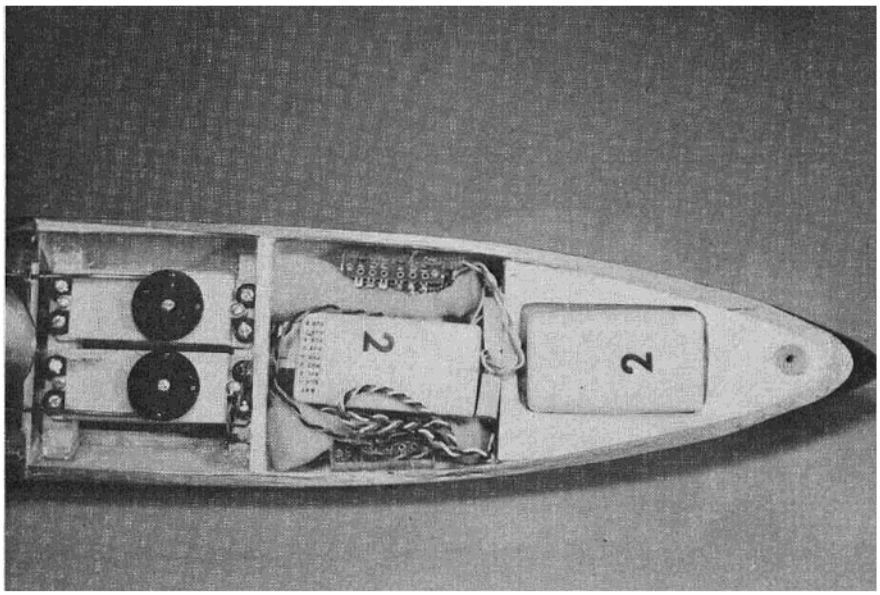

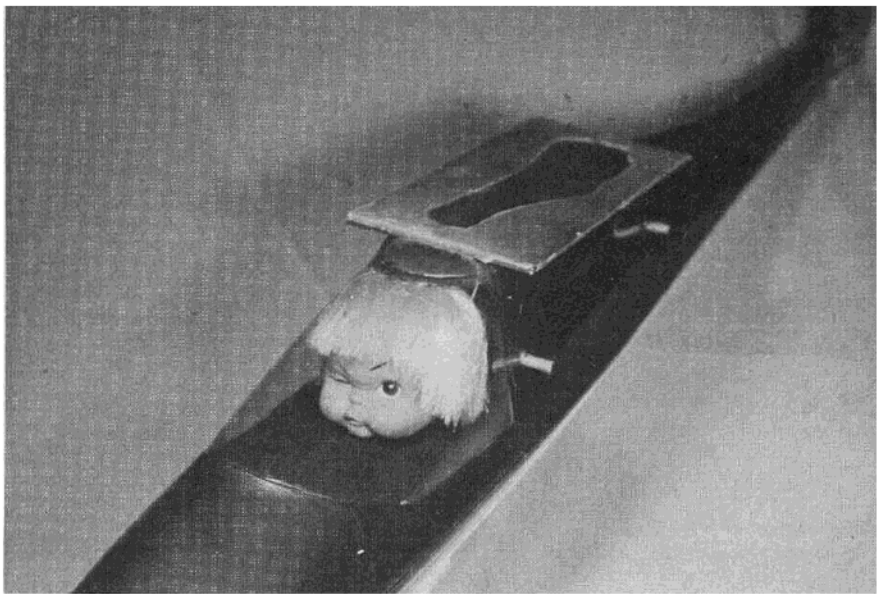

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