

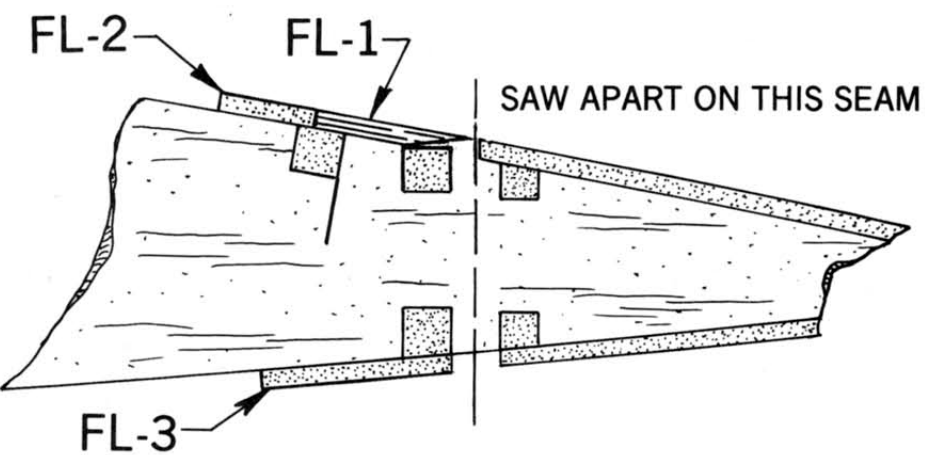
## MORRISEY BRAVO FLAP CONVERSION

The flaps are built into the wing and detached from it in the same manner as are the ailerons. Study the aileron instructions and pictures in the book. They will help you understand the flap installation and the appropriate times to put in the extra flap parts.

1.) Add 3/32" balsa stub rib WF-2 (from pattern given here) to be the inner end of the flap. Use 1/16" spacers against the W-1 rib (as used in booklet paragraph 15 and accompanying drawing). The W-3C rib will be the outer end of the flap.

2.) Cut the WF-1 stub rib from 1/8" Lite Ply to beef up the center section next to the flap.

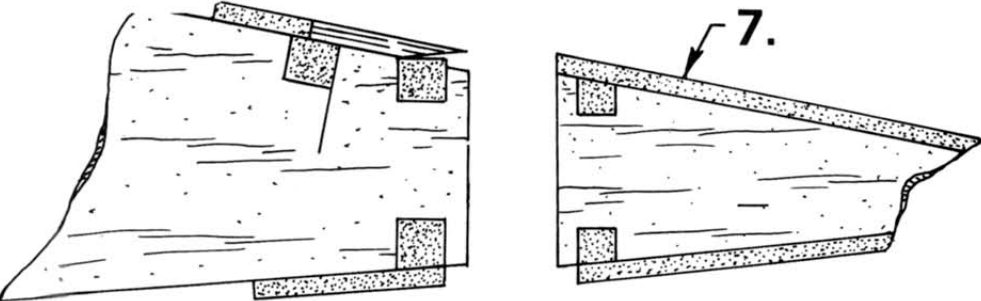
3.) Using the rib modification pattern shown here, put the extra notches A, D and E into ribs W-2 and W-3A. Note the pre-cut slit.



4.) Spar "A" is 1/4" sq. balsa. Spar "B" need not be pre-beveled in the flap area since the shape of FL-1 does not require it. Look ahead to see that Spar B and adjacent area will be removed. Do not glue in places that will be removed so the task will be easier. Look ahead also to "17." You will want to install the nylon horn at the appropriate point in construction. 3/16" sq. Balsa spars "D" and "E" should be pre-beveled.

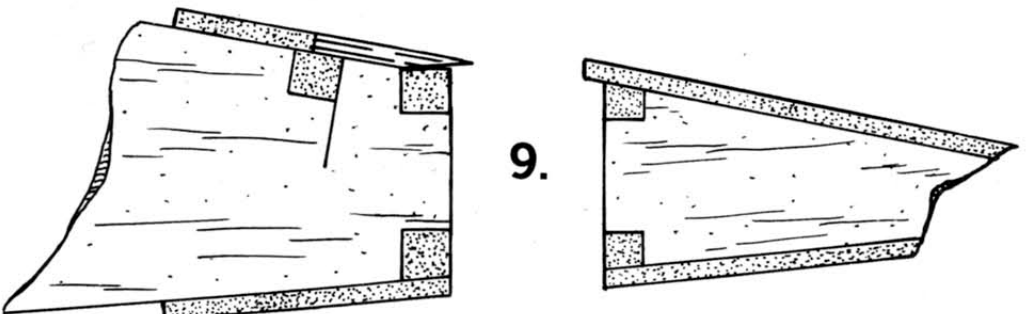
5.) FL-1 is a strip of 3/32" x 7/8" x 20" plywood, pre-beveled to a sharp edge. Plywood is suggested because of the tendency of this type of sharp, unsupported edge to warp if made from balsa. However, it is not easy to work this ply strip to shape without power equipment. We suggest switching to a piece of basswood the same size if you are unable to get the ply strip pre-beveled.

6.) FL-2 is a strip of 3/32" x 1/2" balsa wood. FL-3 is a strip of 3/32" x 1" balsa wood.

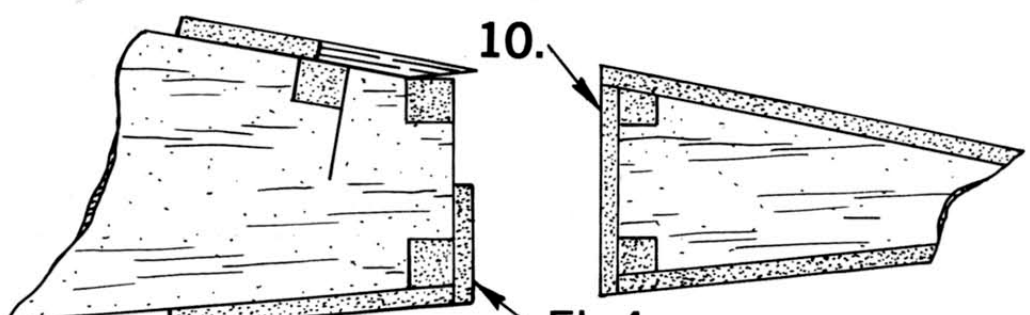


7.) The flap is sheathed on top and bottom with 3/32" balsa using a beveled joint trailing edge, same method as shown for the ailerons.

8.) Saw the flap out of the wing in the same manner as the aileron was constructed.

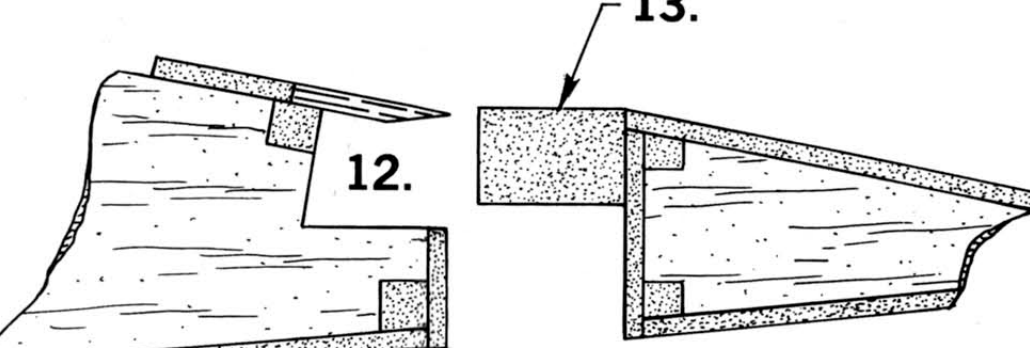


9.) Remove the rib fragments from the wing and flap, just as in book picture 44. for the ailerons.



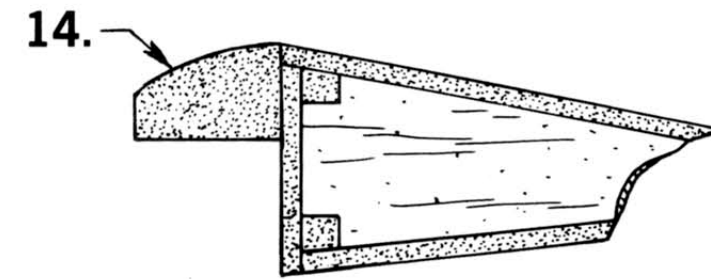
10.) Face the front of the flap with 3/32" sheet.

11.) FL-4 is a strip of 3/32" x 5/8" balsa.

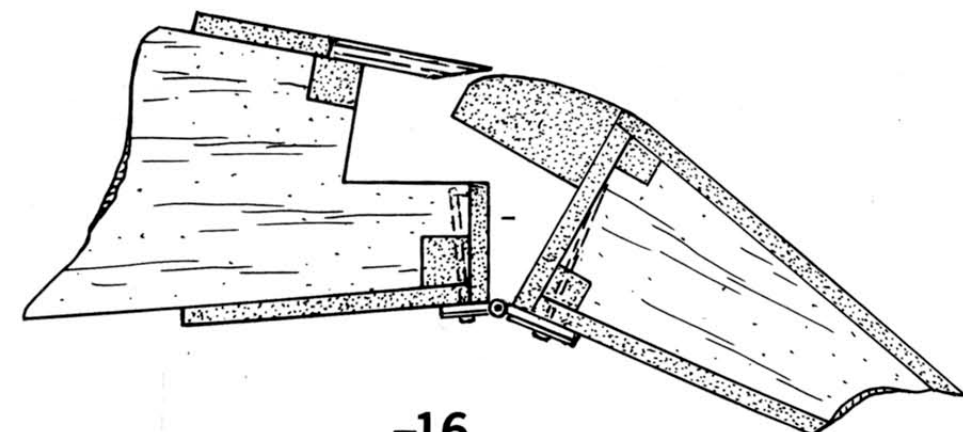


12.) Cut into the ribs to the pre-cut slit. Remove the area shown, including Spar "B".

13.) Glue a 1/2" x 3/4" x 20" soft balsa block to the front of the flap.



14.) Rough shape the block for clearance during movement.

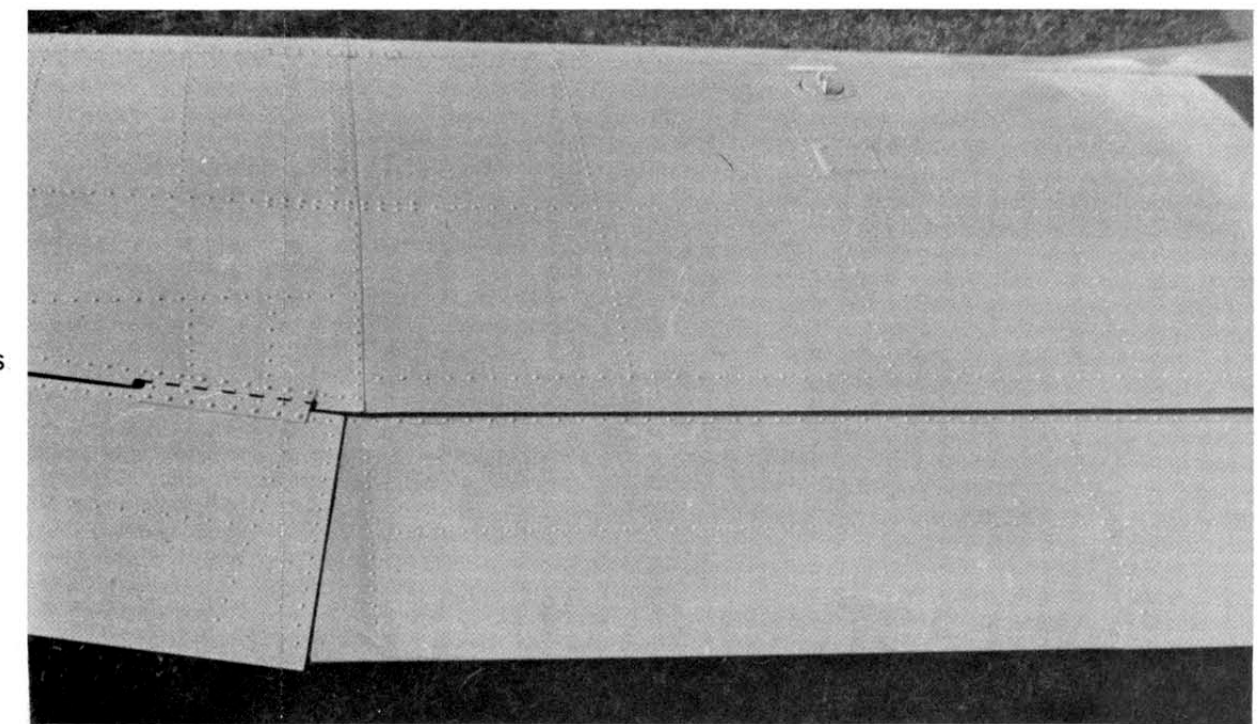
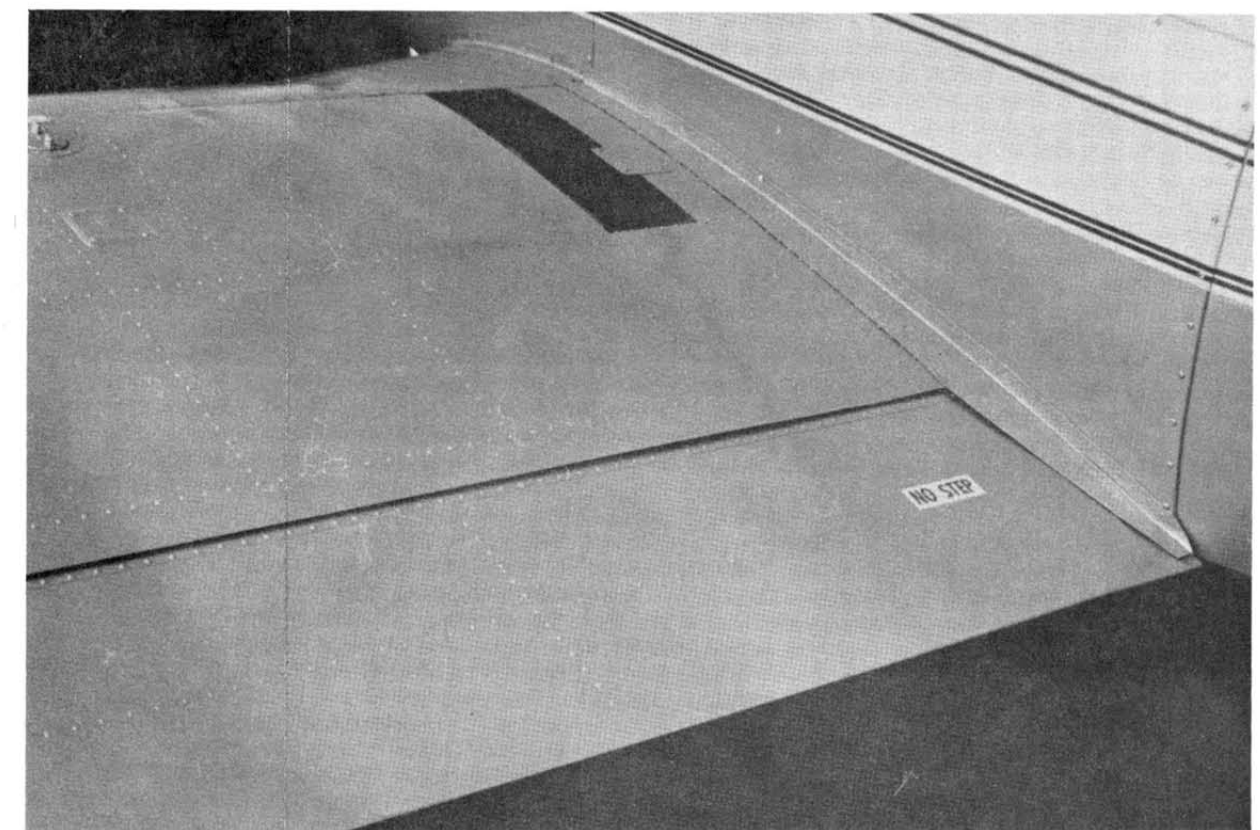


15.) Temporarily install the flap and fine sand the shape of the nose of the flap so as to clear the wing during movement. Flap hinges are same as the aileron hinges

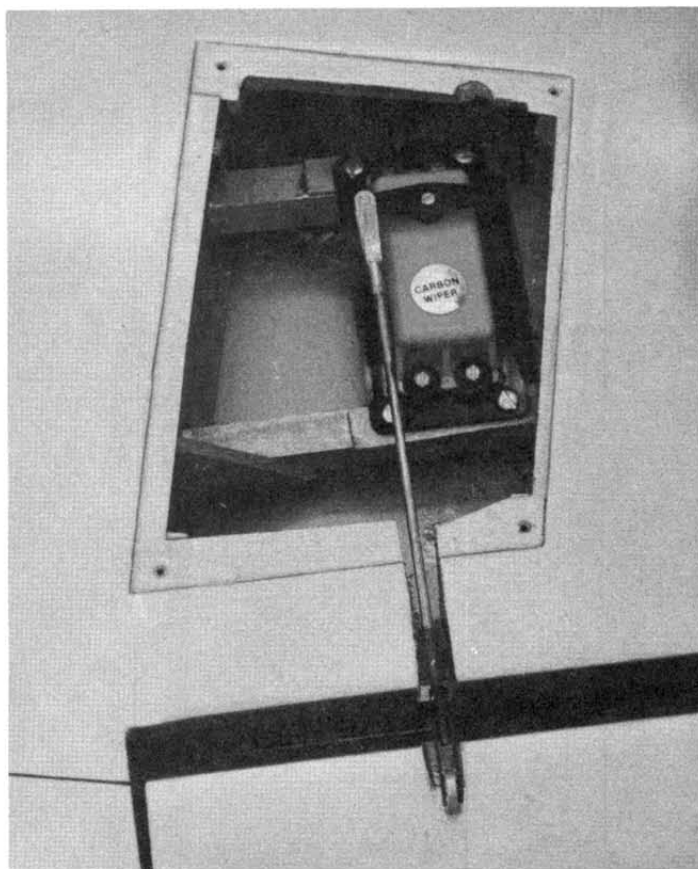
16.) Fit a wedge of balsa under FL-1. This helps prevent warping. Also the wing opening and flap should be covered and doped (if used) on both sides for anti-warp reasons. Be sure to allow clearance for the covering and paint on these parts.

17.) Install a 90° degree bellcrank on WF-1 for a flap horn, just as was done for the ailerons in instruction book picture 31.

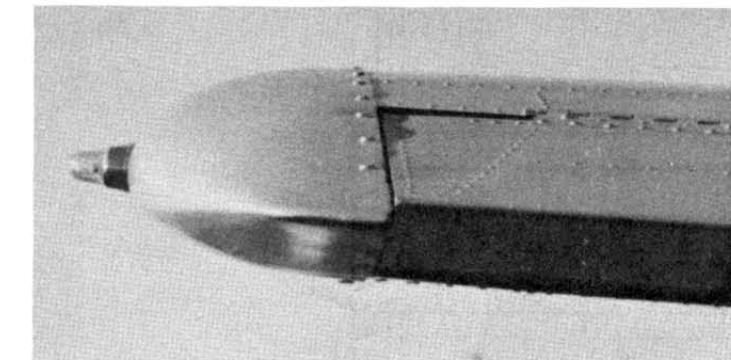
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## BRAVO SUPPLEMENT SHEET



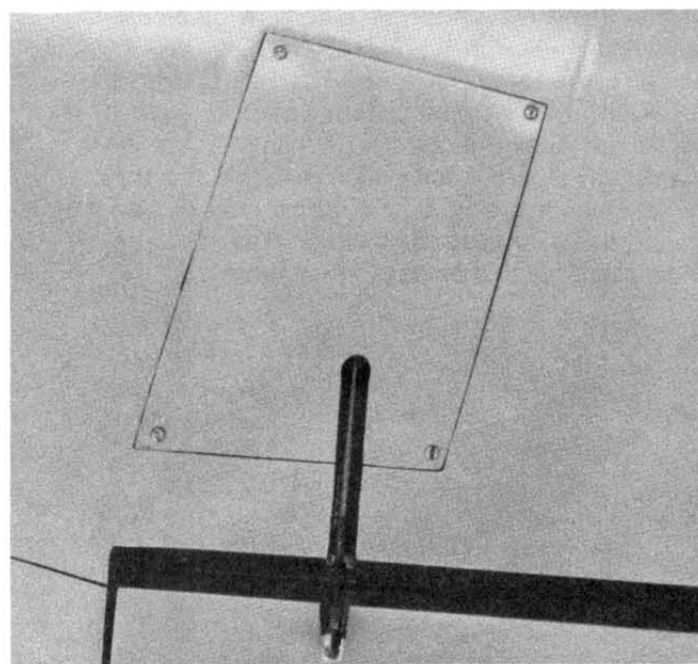
The cables for the tailwheel enter the fuselage through the nylon tubing guides in the bottom. When installing the cables, cinch them up a bit and pull some tension on the springs. They always loosen up some in use and if you install them without pulling on the springs, they will soon be sloppy and will have to be tightened. Secure the copper wire binding on the end loops in the cable with cyanoacrylate glue. Should you need to open them, soak the glue with debonder and unwind the binding.



### WING SERVO COMPARTMENTS

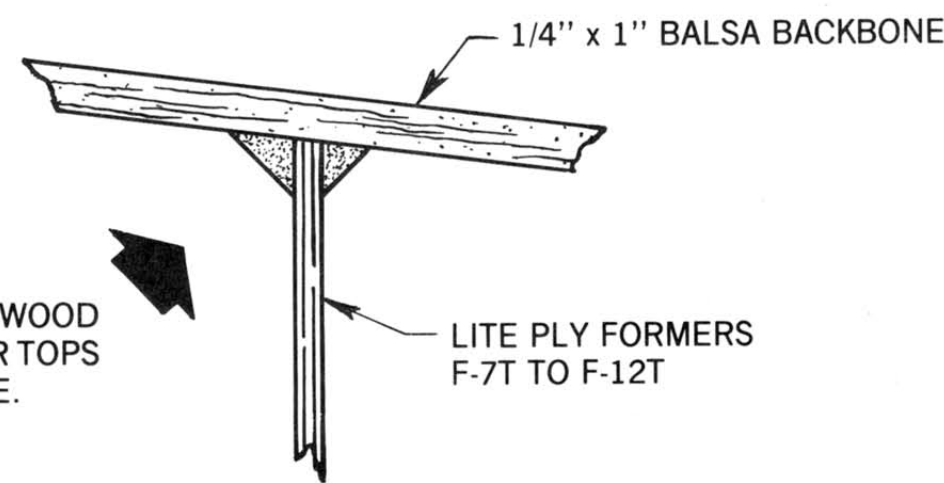
Make the openings in the bottom of the wing between Ribs 3 and 4 for the aileron servos only as high as is necessary for access to the servo. Put small basswood blocks for the No. 2 hatch screws in the corners, against the ribs and frame the rest of the opening with scrap balsa. Recess these parts .030 inch so that the plastic sheet hatch covers will be flush with the surface of the wing when installed.

Carefully cut the hatch covers from ABS sheet plastic and fit snugly into the recess in the wing. Cut a slot as may be required to pass the aileron pushrod.



### ABOUT THE NYLON STAB SCREWS

The nylon stabilizer attachment screws furnished are 10-32 x 1-1/4". If you lose or break them, DO NOT substitute 1" screws, since there will not be enough threads for safety. Get replacement 10-32 x 1-1/4" screws from Sig or cut off a longer screw to 1-1/4".



GOOD INSURANCE: SCRAP WOOD BRACES TO TIE THE FORMER TOPS SOLIDLY TO THE BACKBONE.

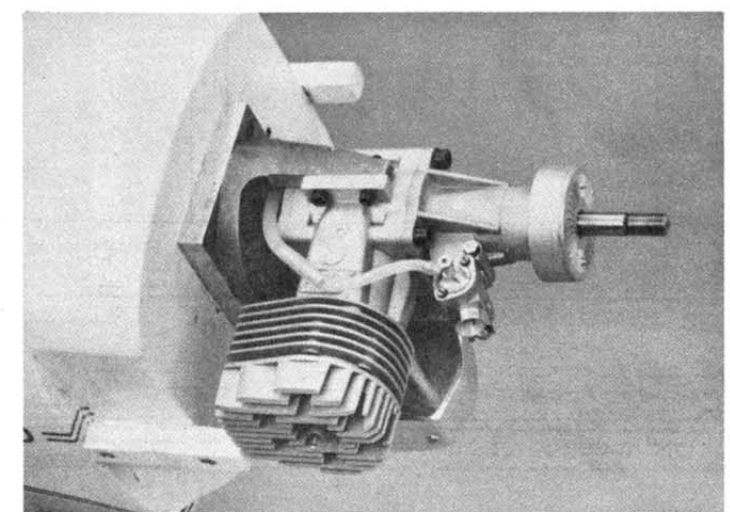
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### RUDDER PUSHROD

The servo for the rudder should be positioned in the fuselage while the rudder pushrod is in and attached to the rudder. It goes through the opening in F-11T and under F-10T. Locate the servo for best clearance of the pushrod.

## BRAVO SUPER TIGRE 3000 INSTALLATION

The Quadra 35X powered Bravo shown in the kit instruction book was a very lively aircraft. This glow-fueled engine had power to spare. We have recently mounted a Super-Tigre 3000 in the model. It does not quite come up to the power of the 35X but still provides excellent performance. A 1/2" thick square of aluminum was mounted on the firewall and secured by countersunk screws into the blind nuts originally used for the Quadra. A C.B. 90 mount was fitted to the 3000 and the combination screwed to aluminum plate. At first it was flown inverted but since this sometimes caused starting problems, the engine was changed to horizontal position, as shown in the photos. It was necessary to grind a little off some of the headfins to clear the cowl, but not enough to affect cooling. The glow plug top sticks through the cowl. A Tatone No. 13015 Upright Muffler proved ideal. The exhaust tubes were made from Tatone

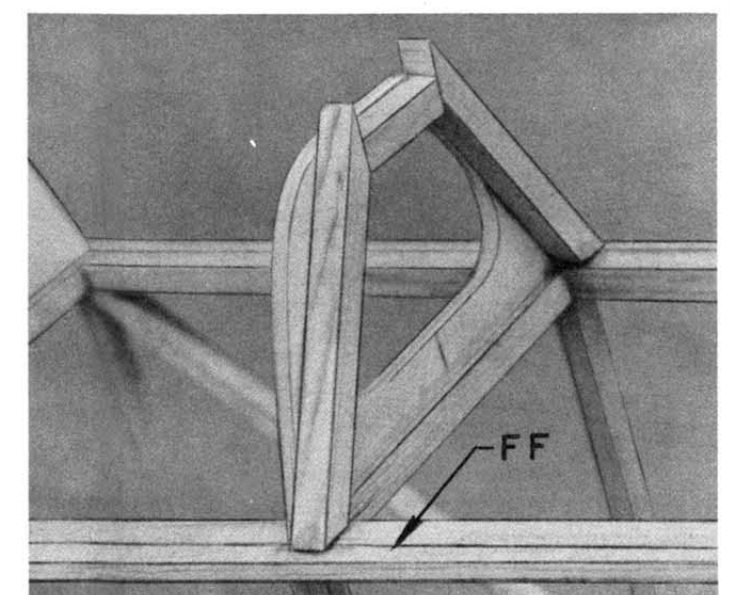
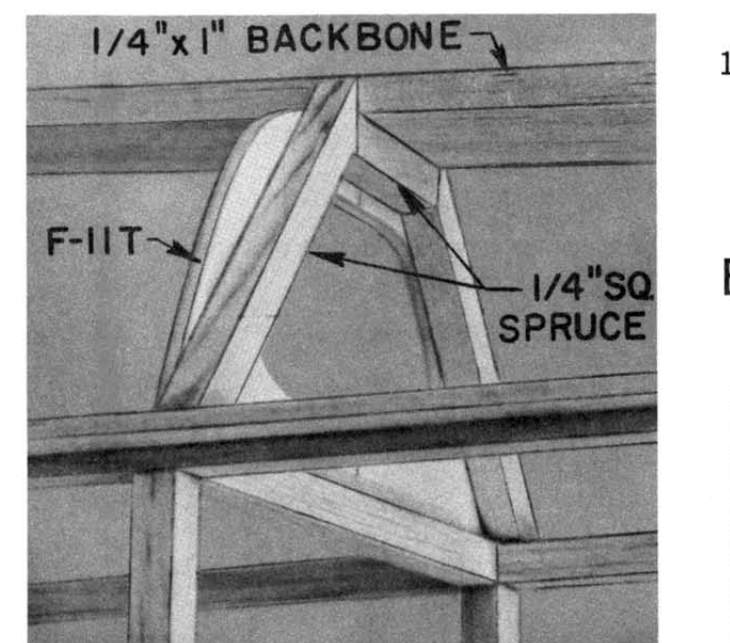


### OTHER ENGINES

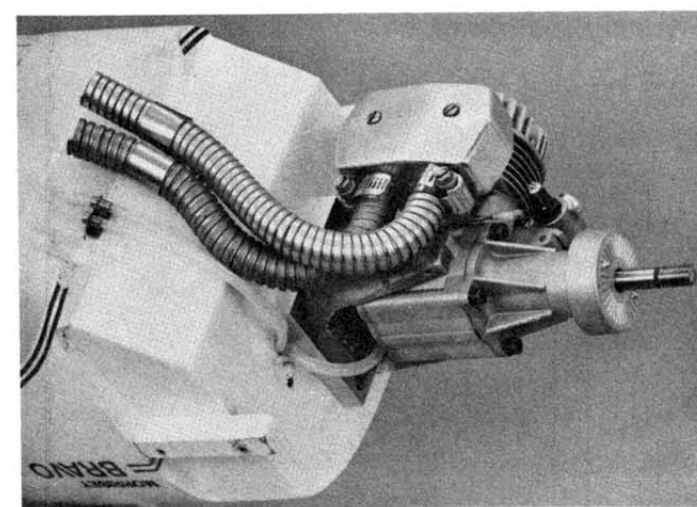
At only 1.6 cu. inches, and a 4-stroke as well, the O.S. Gemini FT-160 might seem at first not to be enough power for so large a model. But the Bravo has an airfoil section with excellent characteristics and a reasonable wing loading of 30 to 32 ounces per square foot. It can fly on the wing instead of brute force power. Maxey Hester has been flying a Bravo using the Gemini with excellent results. Scale-like performance and loops made easily from level flight feature a pleasing combination. This engine will fit entirely within the Bravo cowl.

Mike Gretz has flown his Bravo at the Nationals and Las Vegas QSA Fly-In with the OS Gemini FT-240. Bernie Fields from Florida demonstrated his Bravo at Sig Field with the Saito 270. Both of the engines are too wide to be covered by the cowl and openings need to be made for the rocker arm covers. Most recently Maxey has installed a 4-cylinder O.S. Pegasus FF-240 in his Bravo. The engine fits neatly in the cowl but some baffling shrouds for proper cooling will probably be necessary as shown in the photo at right.

Since the S.T. 3000 Bravo installation was made, other mounts intended for the 3000 have come on the market. One of those, the JTEC 125, is listed in the Sig Catalog.

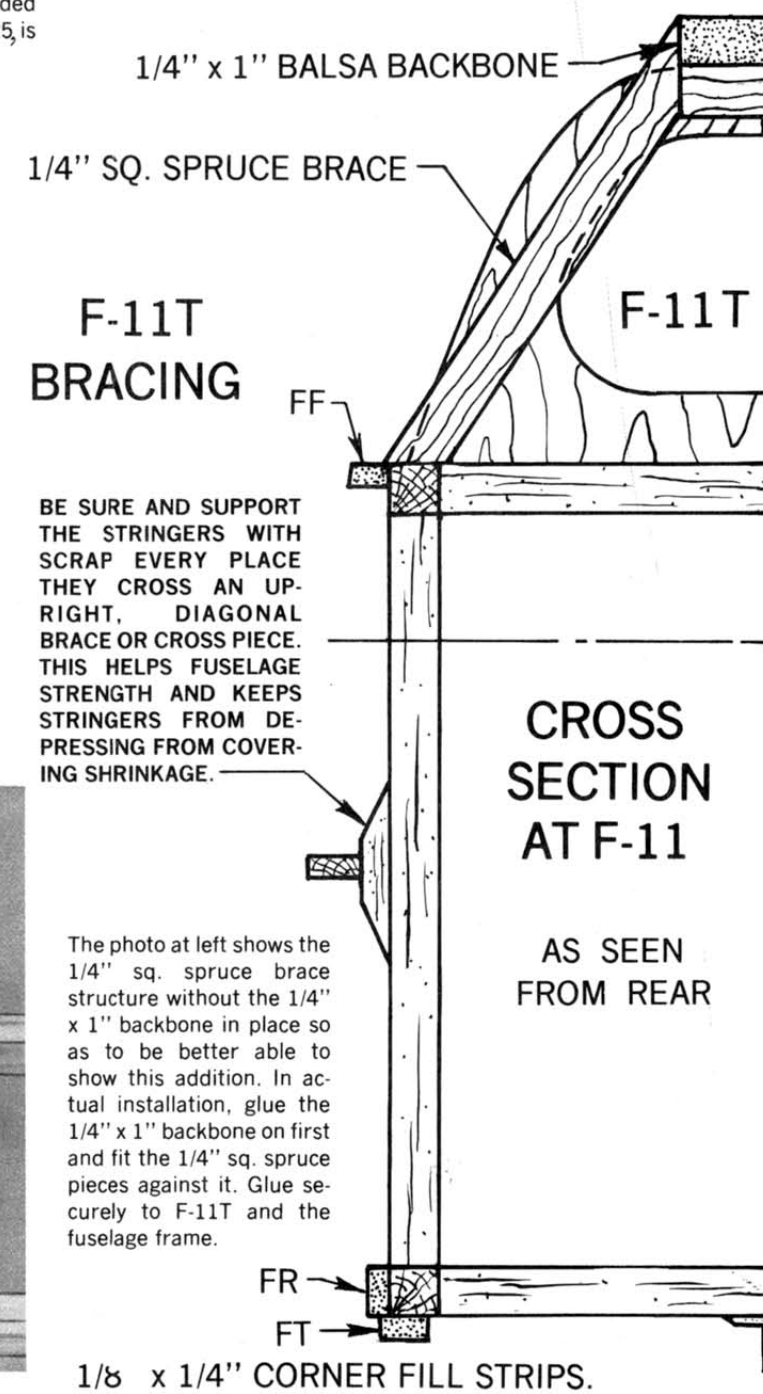
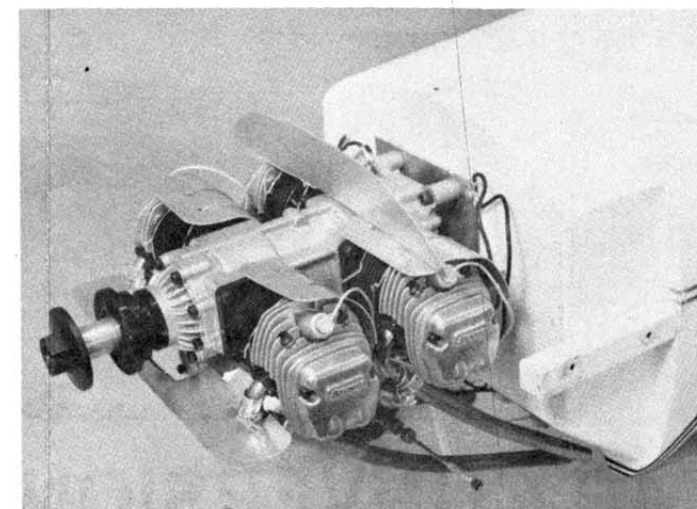


No. 15236 5/8" metal conduit.



When making an initial installation of the S.T. 3000 or similar engine (when the 1/2" aluminum back plate would not be needed), select a long enough mount so that the firewall can be placed back away from the head. Cooling air flow will be better if the engine head is not right up against the firewall.

Remember that proper fuel flow requires that the tank be placed with its centerline about 1/4" below the needle valve body. An inverted engine requires a different tank location than a horizontal installation. We used a 32 oz. (B & B or U.S. Quadra) tank on the S.T. 3000 and cut out the Lite Ply fuselage top enough to recess the tank into the top of the nose for the horizontal mounting.

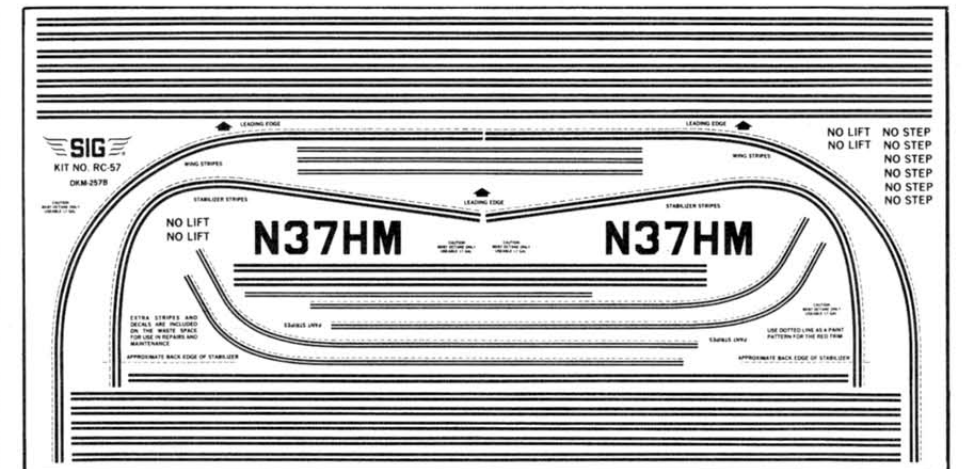


BE SURE AND SUPPORT THE STRINGERS WITH SCRAP EVERY PLACE THEY CROSS AN UPRIGHT. DIAGONAL BRACE OR CROSS PIECE. THIS HELPS FUSELAGE STRENGTH AND KEEPS STRINGERS FROM DEPRESSING FROM COVERING SHRINKAGE.

The photo at left shows the 1/4" sq. spruce brace structure without the 1/4" x 1" backbone in place so as to be better able to show this addition. In actual installation, glue the 1/4" x 1" backbone on first and fit the 1/4" sq. spruce pieces against it. Glue securely to F-11T and the fuselage frame.

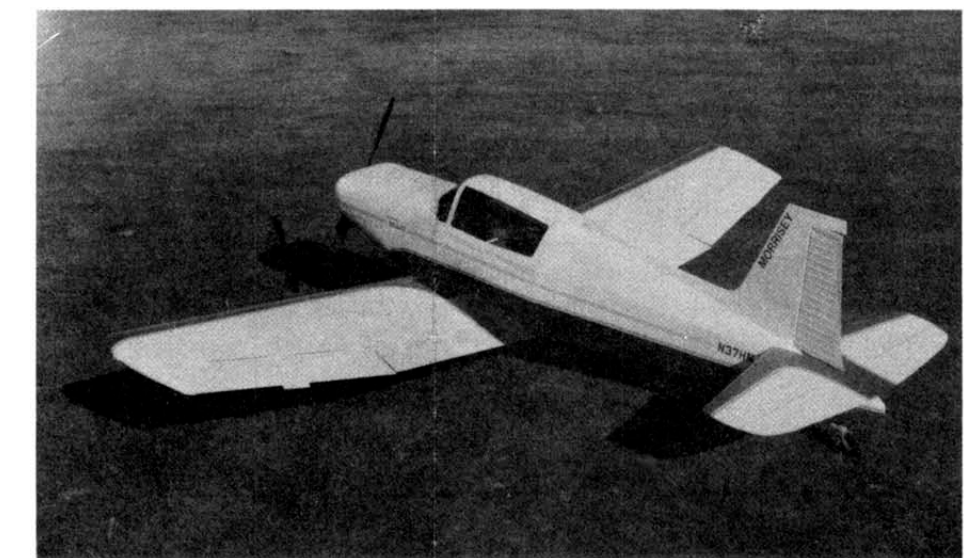
## NEW COLOR SCHEME FOR MORRISEY BRAVO

The red, white and black markings on Bravo N37HM as seen on the front and back of Catalog 48 can now be easily reproduced with this new mylar pressure sensitive decal. The fuselage pin stripes and fin logo remain in the same places as shown on the plan so the decal sheet furnished in the kit (DKM-257) is used on the fuselage. Red is the trim color instead of the original silver. To do the new color markings on the wheel pants, stabilizer, and wing we are introducing DKM-257B, a one color (black) decal. Two of these are required because of the long pin striped sections. Extra pin stripes and decals are provided in the waste areas so that repairs and maintenance can be done on the model as needed. A layout sheet is included with the DKM-257B decal, showing the dimensions and positioning of the trim.



**DKM-257 DECAL . . . \$4.95 EA. SHEET**  
(Included in Kit)  
Red and black — 10" x 24" Sheet  
1 Decal Sheet Required

**DKM-257B DECAL . . . \$4.25 EA. SHEET**  
Black only - 12" x 24" Sheet  
2 Decal Sheets Required  
Includes color layout sheet



**PP-257A . . . . . \$5.50**  
12 3-1/2" x 5" color prints  
Photo Pak color scheme as shown on Catalog 48.

All prices subject to change without notice.

### GLUING ON THE FIN

Cover both the vertical tail fin and the fuselage separately before final assembly. For a doped covering, the base coats can also be applied before final assembly. Do not glue the fin on top of the fuselage covering. Cut away most of the covering under the fin so that there will be wood-to-wood contact between the bottom of the fin and the fuselage backbone. Drill a series of about 3/32" holes along the backbone and into the bottom of the fin at an angle so that these will fill with epoxy glue and "nail" the two pieces together. Use plenty of epoxy. Form the epoxy that oozes out of the crack into a small fillet. Since there will be some drippage of epoxy through the holes and the stub, pull a rag through the fuselage to protect the bottom covering. We minimized the drip problem by thickening the epoxy used in the stub hole (but not on the rest of the fin) with talcum powder or microballoons. This thickened epoxy will also fill any gaps around the stub hole in the backbone. The "nail" holes need not be all the way through the backbone, so they will not drip much on the bottom. A fine pin hole through the bottom of each hole is a good idea to prevent air lock, so that the "nail" holes will fill with glue, not a bubble.

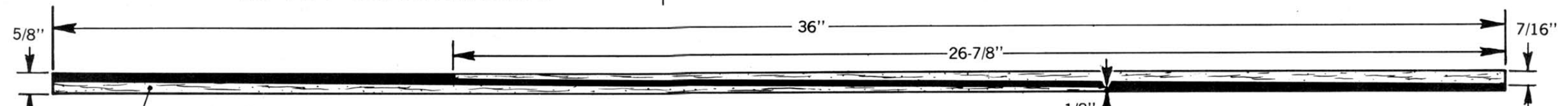
### WARNING — DANGER!

Important: Read These Warnings:

Do Not fly control line or towline models within 300 feet of electric power lines. Instant death from electrocution can result from coming near them. Direct contact is not necessary.

A model airplane motor gets very hot and can cause serious burns. Do not touch the motor during or after operation. Keep clear of the propeller. It can cut off a finger or put out an eye. Make sure the propeller is securely fastened in place and is not cracked. Model airplane fuel is flammable and poisonous. Take the same precautions while transporting and using it that you would with a can of gasoline or a bottle of poison.

Remember that it is possible to lose control of a model airplane. Do not fly in locations where the model may hit people or damage property if loss of control occurs. Check your model and equipment regularly to insure it is in safe operating condition.



FF IS 1/8" x 7/16" Balsa tapering to 1/8" x 1/8", 26-7/8" long. USING A STRAIGHTEDGE, CUT TWO FROM THE PIECE OF 1/8" x 5/8" x 36" Balsa SUPPLIED IN THE KIT. CUT SLIGHTLY OVERSIZE AND SAND DOWN DURING FUSELAGE SHAPING.

FF CUTTING DIAGRAM

