eaglet 50

Instructions

Welcome to the sport of Radio Control flying!

It may seem a bit too early to speak of flying now, but your successful first flight begins right here. Read this instruction booklet thoroughly. It doesn't take that long, and building the model and installing your equipment will seem easier, since you will know where you're going. In order that your model flies as well as it was designed to, remember to work slowly to build it right.

The EAGLET was designed as a trainer you can be successful with. It can fly slowly on reduced engine power so your reflexes have time to develop. And after you have learned the basics, you will find the EAGLET a nimble and maneuverable fun-flyer and sport model capable of loops, rolls and beautiful landings.

Additional Items Needed

- ☐ 2-channel (or more) Radio Control set
- ☐ CA Glue and Epoxy glue
- ☐ .09 to .25 R/C engine
- ☐ Propeller, fuel tank and tubing to suit engine
- ☐ 1-3/4″ CG Snap-On Spinner
- ☐ 6 running ft. of covering material
- ☐ Small can of touch-up paint (fuel-proof)
- ☐ 1/8″ CG Color-Stripe tape
- ☐ One 2″ and two 2-1/4″ Wheels (If axle hole is over 1/8″ dia., use 1/8″ I.D. brass tube as a bushing)
- ☐ ¼″ x 8″ x 12″ CG R/C Foam Rubber
- ☐ 1/16″ x ¼″ Wing Seating foam tape
- ☐ Box of #64 rubber bands

Tools & Supplies Needed
(You probably already have most of these)

- ☐ Miscellaneous rubber bands
- ☐ Wax paper or plastic wrap
- ☐ Modeling knife or single edge razor blade
- ☐ Sandpaper block & sandpaper, any grade 100 to 200, and any grade 240 to 320
- ☐ A few dozen straignt pins ("T" pins best)
- ☐ Light power or hand drill & drill bits (sizes 1/16″, 1/8″, and ¼″)
- ☐ Two Allen wrenches (.050 for #4 set screw & 3/32″ for #4 socket head screw)
- ☐ Flat building board (that you can push pins into) 24″ x 48″
- ☐ Pliers
- ☐ Small screwdrivers (1/8″ and 3/16″ blade tips)
- ☐ Iron for applying covering (small household or travel iron may be okay)
- ☐ Masking, drafting, or scotch tape (for holding parts during assembly)

OPTIONAL TOOLS

- ☐ Propeller balancer
- ☐ Combination prop/glo-plug wrench

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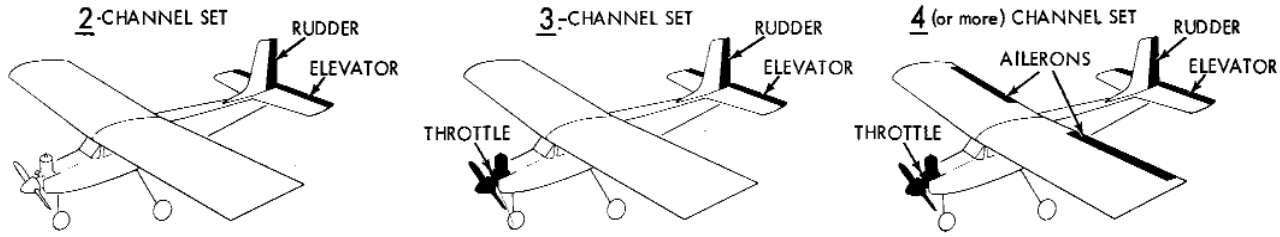
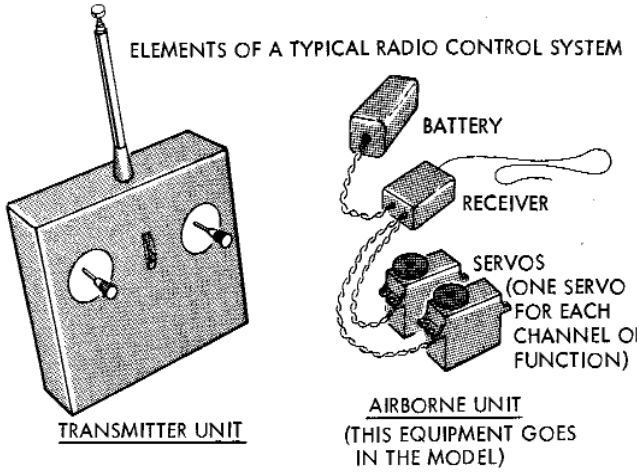
SELECTING RADIO CONTROL EQUIPMENT

The number of channels your radio control set has will determine how many controls you can use in your model.



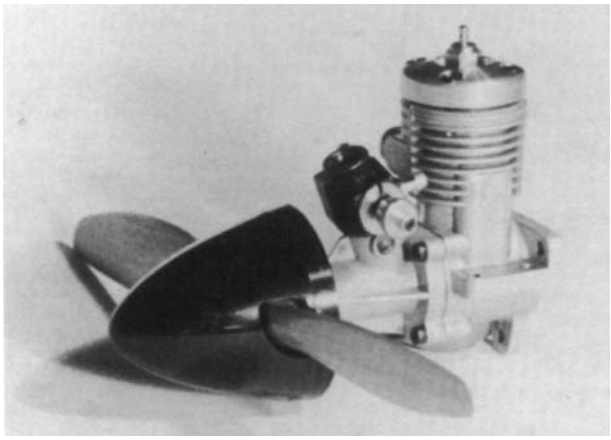
An experienced R/C flight instructor is strongly recommended for learning to fly any of these set-ups, but for 4-channel it is most important!



The EAGLET is designed to use two, three or four channel radio control equipment. A two-channel system gives you two separate controls; one channel is used for the rudder which controls left and right direction, a second channel operates the elevator, which controls climbing, level flight, and descent. Two-channel equipment is not recommended for engines larger than .10 (.10 explained below). A three-channel radio allows an additional control for engine throttle. With throttle control you can taxi the model on the ground, apply full power for take off, reduce power for level flight, and cut power to idle to glide in for landing. With a 4 or more channel radio, the fourth channel can be used for optional aileron control. by purchasing a 4-channel set now, you will not need to get one later as you move up to more sophisticated models.

Radio sets are battery-powered with either dry cells (small flashlight type batteries) or more reliable rechargeable nickel-cadmium batteries (ni-cads). Sets powered with ni-cads come equipped with a recharging unit, and are more expensive than dry-cell sets. However, if you intend to do a lot of flying, the cost of routinely replacing worn-out dry cell batteries may be much greater than the higher initial cost of a re-chargeable ni-cad radio system; something to consider. Many of the radio systems now available feature "servo reversing" switches which allow you to reverse the response of the servo. This feature simplifies radio installation and is a worthwhile consideration when selecting a radio system.

ENGINE & PROPELLER



The EAGLET flies well using any engine size from .09 to .25. The numbers .09 to .25 refer to the amount of space the piston moves through inside the cylinder of the engine. This space is called displacement; larger displacement generally means more power. Engines smaller than .15 size will fly the EAGLET; in that case take-offs will have to be from a paved strip or the model will have to be hand launched. If you live in a hot climate, or your flying field is approximately 3,000 feet or more above sea level, you should use a .15 engine or larger. Selecting an engine that is popular at the flying field is a good idea, since if you have engine problems other modelers there will already be familiar with the engine.

The propeller size must be matched with the engine. For example, an .09 or .10 engine may use a 7" diameter prop while a .15 can use 8". While learning to fly, everyone replaces a few propellers. A rough landing can easily break a prop. Having a few spare props is a good idea.

Balancing your propeller helps to protect your radio from the damaging effects of vibration. Good balancers are on the market, and generally easy to use. We recommend sanding or scraping the heavy blade on the curved face rather than the flat face, and out near the tip. Try to maintain the normal airfoil curvature. Avoid scratches which might cause the prop to break.

PROP AND FUEL TANK CHART
(NUMBERS IN PARENTHESIS
REFER TO 4-CYCLE ENGINES)

FOR ENGINE SIZE	USE PROP SIZE	AND TANK SIZE
.09 - .10	7/3, 7/4	2 OUNCE
.14 - .20	8/4	4 OUNCE
.25	8/4, 8/6	6 OUNCE
(.21)	(9/4, 9/6)	(4 OUNCE)

ADHESIVES

All our test models were built using CA Instant Glue which is specially formulated to firmly glue the plywood, hardwood, plastic, and balsa used in your EAGLET, and we strongly recommend it. Other good glues to use are "15 Minute Epoxy" or Aliphatic Resin. They will, however, add considerably to the assembly time required (they dry a lot slower than CA glue). Also, Aliphatic Resin does not glue plastic, so you will need one of the adhesives mentioned above (or similar) for the plastic parts.

Be careful when using instant glue to install windows, as applying too much glue can sometimes cause fogging to occur. This can be easily wiped off with a damp rag. A sure way to avoid fogging is to use either epoxy or Wilhold R/C 56 glue. Also, while on the subject of windows, if you want to "tint" them, do not try to dye them (the plastic does not dye well). Instead, we recommend "transparent" spray enamels be carefully applied to the inside window surface (they are not fuel proof).

IMPORTANT !

Do not use watery thin types of instant glue (such as Regular Jet, Hot Stuff, Etc.) on the EAGLET since they don't glue plywood adequately, and also require that your workmanship must be near perfect.

After you have finished gluing the model together, go back and re-glue all the joints for added strength, and just in case some joints may have been missed the first time. Be careful not to use too little glue. Too little leaves a model weak.

Since CA glues almost eliminates waiting for glue joints to dry, you can work straight through and finish each assembly by following the step-by-step building sequence. If you use epoxy, you can save time while waiting for one assembly to dry (the stabilizer, for example) by turning a few pages ahead and starting another part (the fuselage, perhaps). Check-off boxes are provided at each step so you can tell at a glance what steps you have completed.

TACK-CEMENTING. Sometimes it is necessary to temporarily glue a part in place that must later be removed. To provide for easy removal of the part without damage, it should have been glued in place using only a small dab of glue. This is referred to as "tack-cementing" later on in the instructions.

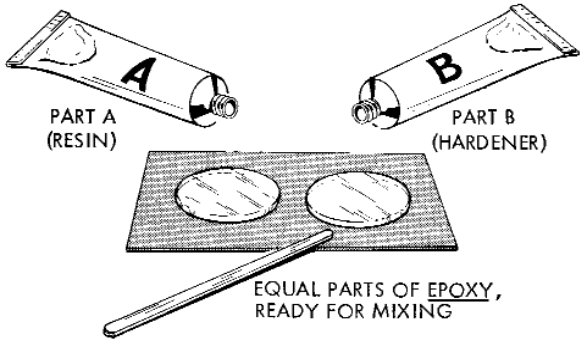
USING CA glue. CA glue lets you build almost as fast as your hands can press parts together! When pressed into a very thin layer, it sets almost instantly. So be careful, read instructions thoroughly and use check-off boxes to avoid errors (like building two right-hand wings—instead of a left and a right)! CA glue allows only for momentary positioning of parts. So be sure to trial fit parts together to check fit and placement before applying glue. After its initial bond, CA glue continues to strengthen. CA glue sets up a bit slower with plywood and hardwood. so hold such joints together a little longer than you would for balsa. CA glue in corners takes a while longer to dry because of its not being a thin layer. The tendency for all instant glues to set slower on hardwood or plywood and when in a thick layer can be eliminated by using **JetSet**, a treatment for cyanoacrylate glue.

USING EPOXY. Epoxy comes in two parts which need to be mixed before using. Paper cups and wood coffee stirrers are useful for mixing. When buying epoxy, check the package to see how long it takes to set (some formulas set in 5 minutes, others may take hours). We recommend 15 minute epoxy. Disposable wood strips, cotton swabs, cheap stiff bristle brushes, or acid brushes from auto stores make good applicators.

Because epoxy is so thick, it's easy to apply too much. If you use epoxy to build the entire model, be especially careful to use it sparingly when assembling the fin, stabilizer and wings.

CAUTION

Some people may experience allergic reactions when exposed to fumes from instant glue or epoxy. This is very rare. However, it is always important that such glues, and also paints, thinners and solvents, be used with adequate ventilation to carry fumes away.

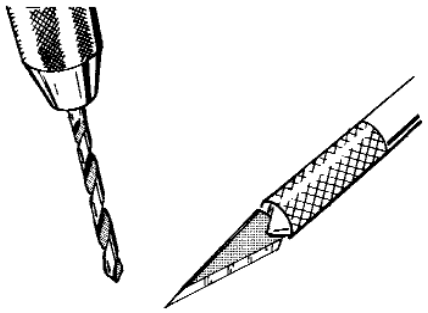


GENERAL INFORMATION

CONSTRUCTION. If you have never made a "built-up" model before, the following describes the basic building procedure.

The EAGLET is built mainly from die-cut and machine-shaped plywood, hardwood, and balsa parts. The Wood Parts Identification on the next page shows where to find each part on the die-cut sheets. It also lists wood sizes to further identify parts.

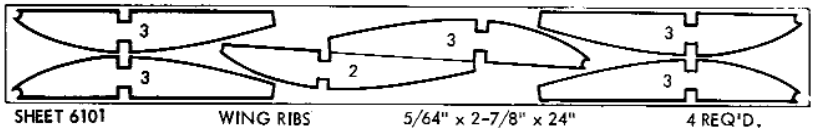
The first step in building the model is to unfold the plan, lay it flat, and study it carefully throughout. You need a flat table top or work bench on which you set a "pinning" board (such as celotex insulation board), and the EAGLET plan is then laid flat over the board. Pull the plan flat with tape at the corners (see sketch at bottom of page 5). Cover the plan with wax paper or plastic kitchen wrap to prevent gluing parts to the plan. Then wood parts for one unit (for example, the stabilizer) are placed in their correct locations over the plan, and held in place with straight pins and then glued together.



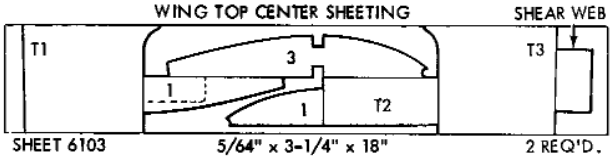
We suggest that you ask an experienced R/C modeler to look at your model at several stages during construction and especially before you cover it. He should also carefully check your radio installation before your first flight. If corrections are needed, they are more easily made at these times.

WOOD PARTS IDENTIFICATION

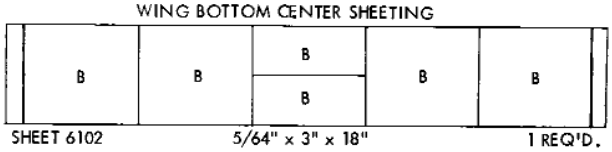
Be careful when removing parts (such as fuselage sides) from Laser sheets. Long parts are fragile until glued into a structural unit. If necessary, use a razor knife or razor saw to assist in the removal of parts from sheet. Sometimes a little trimming and sanding can improve parts where desired. Save scrap until model is completed, in case you should miss a part. Scrap is used also in some building steps on the plan. Other easily recognized parts, such as engine bearers, are not shown here.



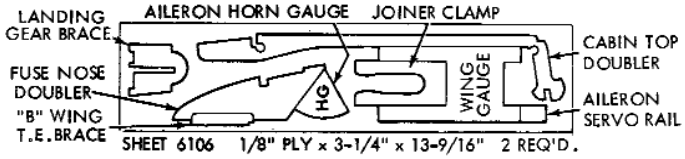
SHEET 6101 WING RIBS 5/64" x 2-7/8" x 24" 4 REQ'D.



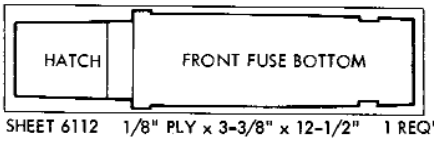
SHEET 6103 5/64" x 3-1/4" x 18" 2 REQ'D.



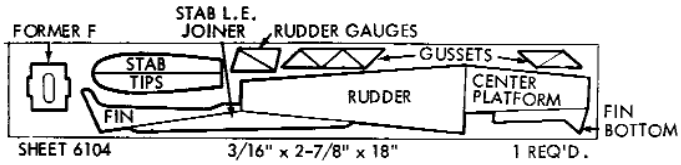
SHEET 6102 5/64" x 3" x 18" 1 REQ'D.



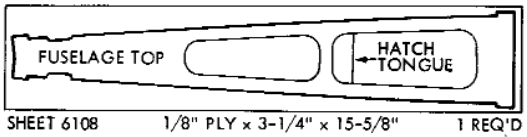
SHEET 6106 1/8" PLY x 3-1/4" x 13-9/16" 2 REQ'D.



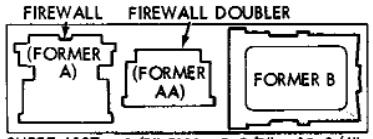
SHEET 6112 1/8" PLY x 3-3/8" x 12-1/2" 1 REQ'D.



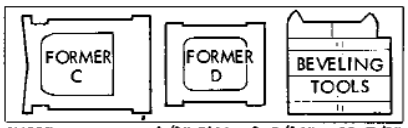
SHEET 6104 3/16" x 2-7/8" x 18" 1 REQ'D.



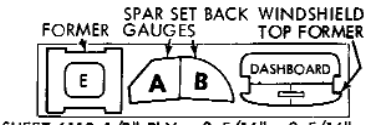
SHEET 6108 1/8" PLY x 3-1/4" x 15-5/8" 1 REQ'D



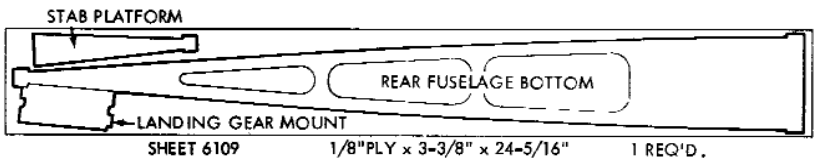
SHEET 6107 1/8" PLY x 3-3/8" x 10-3/4" 1 REQ'D.



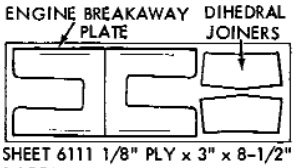
SHEET 6110 1/8" PLY x 3-5/16" x 11-7/8" 1 REQ'D.



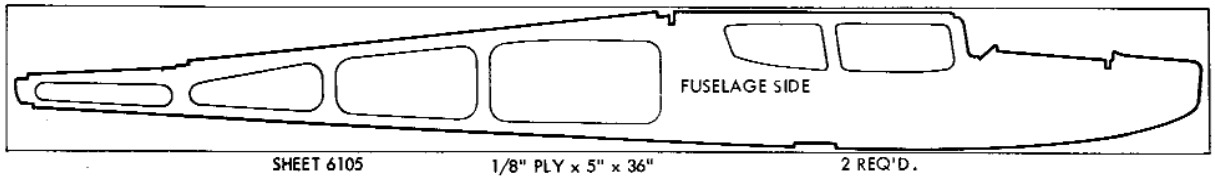
SHEET 6113 1/8" PLY x 2-5/16" x 9-5/16" 1 REQ'D.



SHEET 6109 1/8"PLY x 3-3/8" x 24-5/16" 1 REQ'D.



SHEET 6111 1/8" PLY x 3" x 8-1/2" 1 REQ'D.



SHEET 6105 1/8" PLY x 5" x 36" 2 REQ'D.

FULL SIZE END VIEWS OF STRIP WOOD PARTS

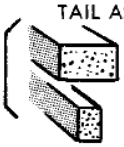
BASS WOOD

WING SPARS
5/16" SQ. x 24"
(4 REQ'D.)

HATCH SUPPORTS
4-1/8" LONG
(2-REQ'D.)

BALSA

TAIL ASSEMBLY

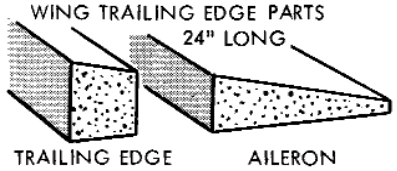


3/16" x 5/16" x 18"
(3 REQ'D.)

1/8" x 3/16" x 60"
(FROM ASSORTED LENGTHS)

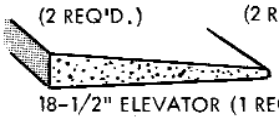
PUSHRODS
1/4" SQ. x 18"
(2 REQ'D.)

WING TRAILING EDGE PARTS 24" LONG



TRAILING EDGE (2 REQ'D.)

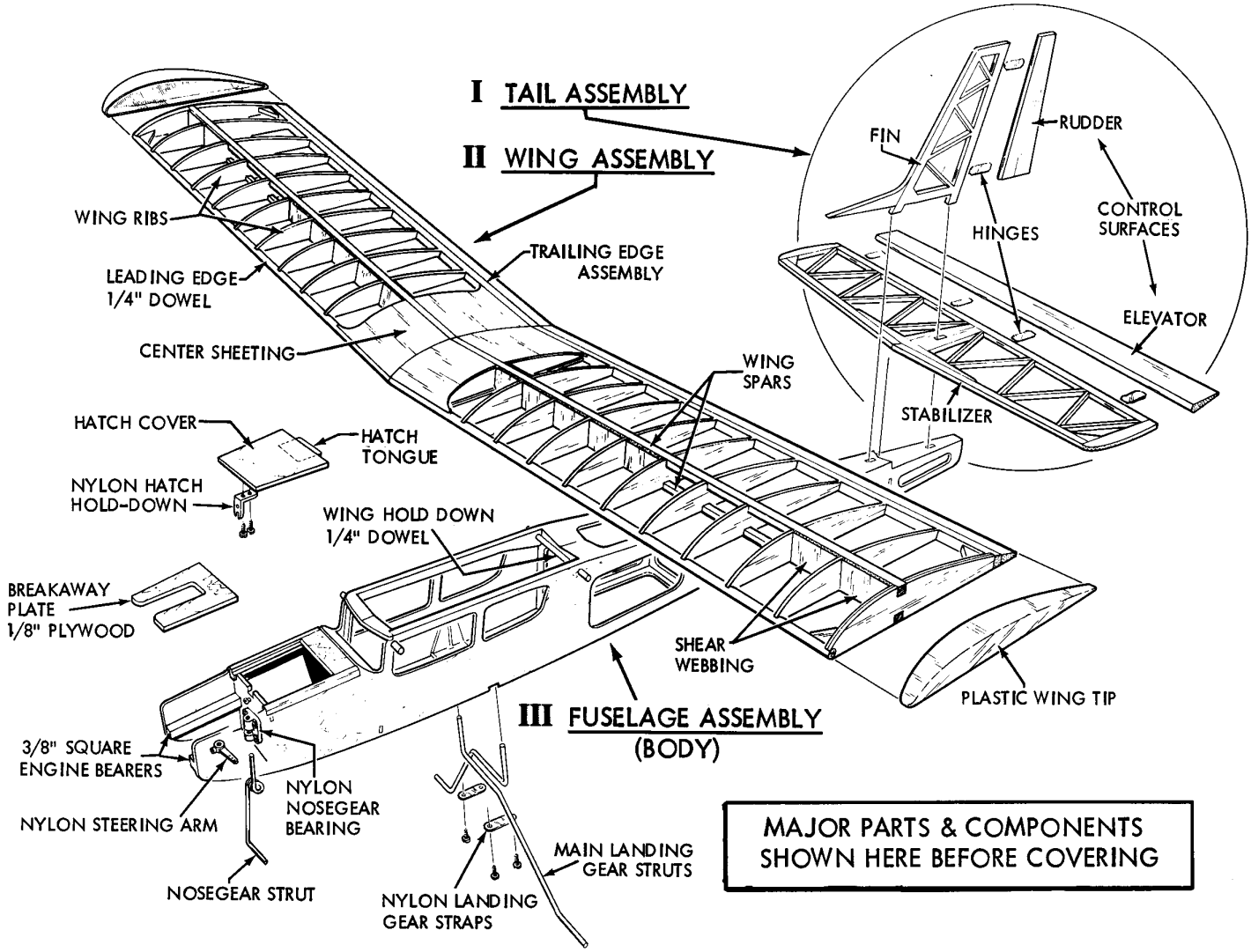
AILERON (2 REQ'D.)



18-1/2" ELEVATOR (1 REQ'D.)

BEFORE STARTING ASSEMBLY OF MODEL, read instructions carefully and construct your model in the following order:

I. TAIL ASSEMBLY (Steps 1 thru 11, Page 6 of this booklet)
II. WING (Steps 1 thru 34, Page 8) Aileron Option (Page 13)
III. FUSELAGE (Steps 1 thru 16, Page 14)
ENGINE INSTALLATION & FUSELAGE COMPLETION (Steps 1 thru 15, Page 17)
IV. COVERING and TRIM (Page 20)
Hinge Installation (Page 22)
Windshield & Windows (Page 19 & 23)
V. FINAL ASSEMBLY (Page 24)
VI. PREPARATION AND INSTALLATION OF RADIO (Page 25)
VII. WHERE TO FLY (Page 29)
VIII. RADIO CHECK & FLIGHT PREPARATION (Page 29)
IX. ILLUSTRATED FIRST FLIGHTS (Page 30)
X. RADIO CARE & UPKEEP (Page 32)



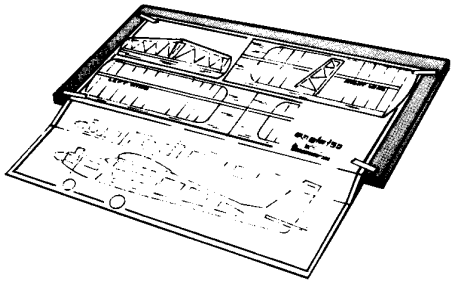
MAJOR PARTS & COMPONENTS SHOWN HERE BEFORE COVERING

PREPARING FOR ASSEMBLY

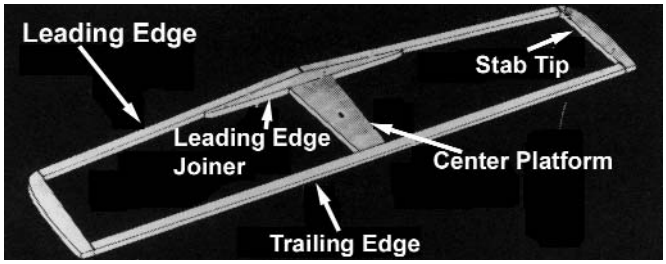
Set flat warp-free pinning board on work bench.

Tape Eaglet plan in position so both wing halves and stabilizer fall over the pinning board.

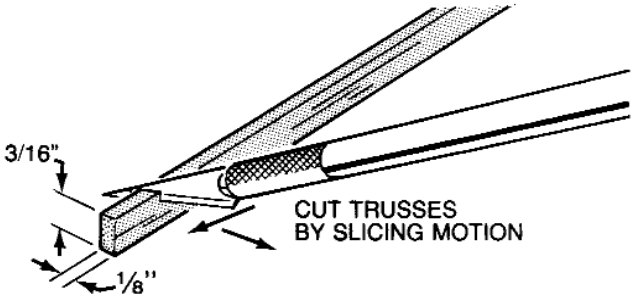
Lay a sheet of waxpaper over stabilizer and fin to prevent gluing parts to the plan as you build.

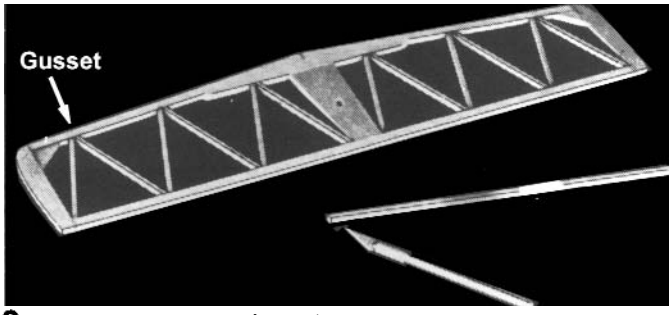


I TAIL ASSEMBLY

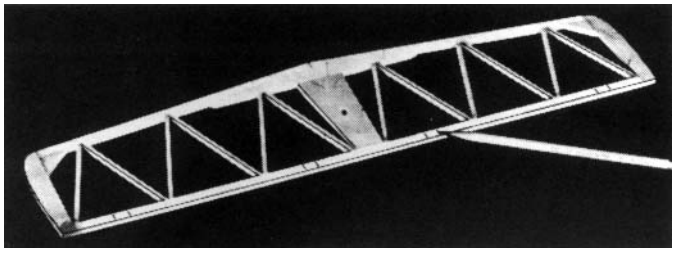


1. ☐ Make stabilizer (stab) leading edge (L.E.) from 3/16" x 5/16" balsa sticks. Cut balsa carefully to match with plan at center joint and exact length at tips.
☐ Pin in position, and glue at center joint.
☐ Using die-cut stab tips, L.E. joiner, center platform and balsa sticks , glue stab outline together.

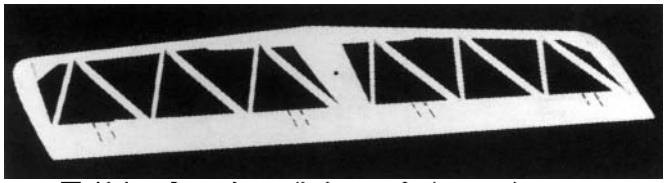




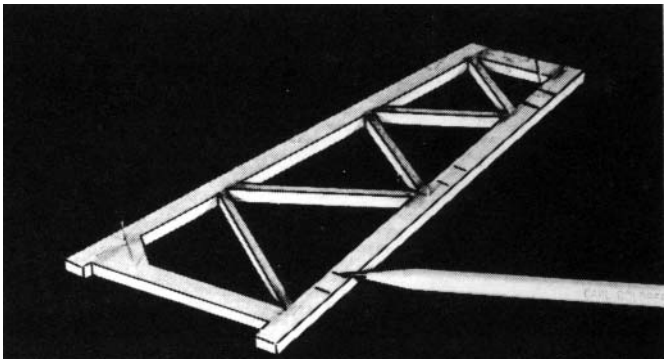
2. ☐ From 1/8" x 3/16" Strip balsa, cut all trusses to size over plan. Trim to fit well — don't force into place. Glue in place.
☐ Glue gussets in place.
☐ Let dry thoroughly.



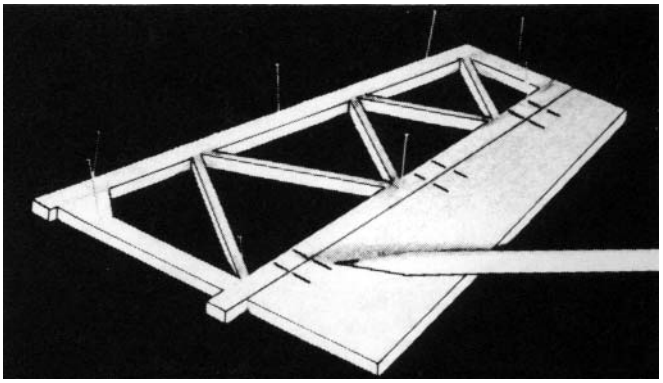
3a. ☐ Lightly mark hinge locations on T.E. from plan.



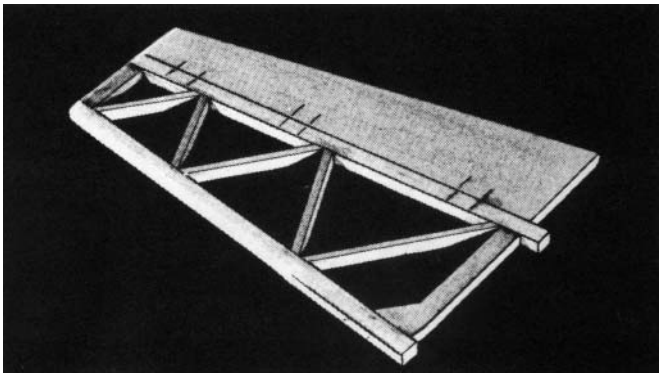
3b. ☐ Using 3 or 4 small drops of glue, tack-cement elevator to stab. Carefully transfer hinge locations onto elevator.

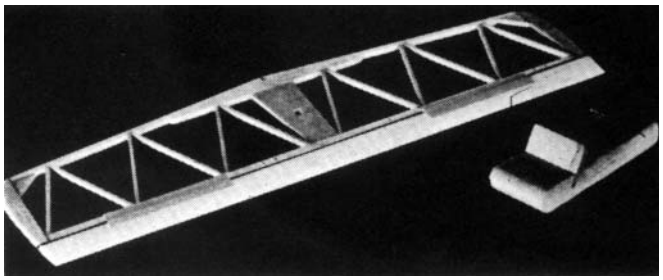


4. ☐ Assemble fin in same manner as stab. Let dry.
☐ Mark hinge locations on fin T.E.



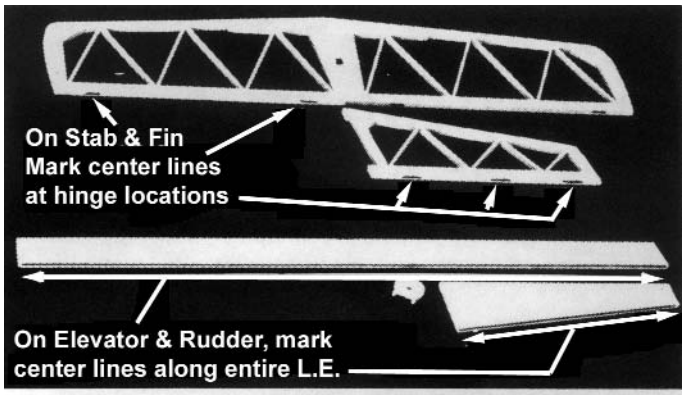
5. ☐ Tack-cement rudder to fin. Carefully transfer hinge locations onto rudder.

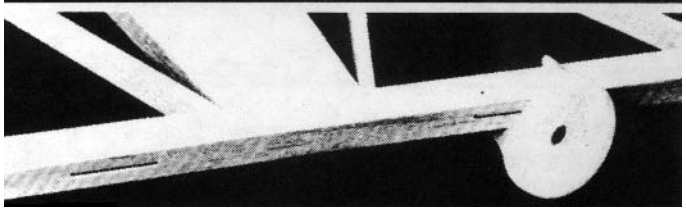




TYPICAL EDGE ROUNDING

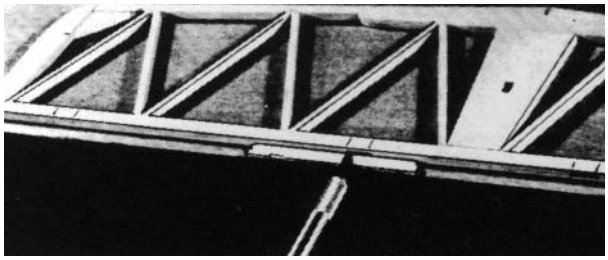
6. ☐ Flat sand fin and stab, round outer edges except bottom & lower 2" of fin L.E. Be sure hinge locations remain. Sand elevator tips to blend with stab.

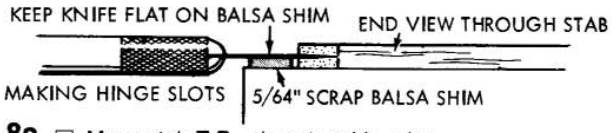




7. ☐ Carefully separate elevator from stab, and rudder from fin. Gently sand to remove rough spots from tack-cementing.

☐ Using CG Center-Line marker provided, mark center lines along edges of parts as shown above. Tilt marker so guide pegs touch the wood, then lightly pass the marker back and forth. Point will scribe center line.

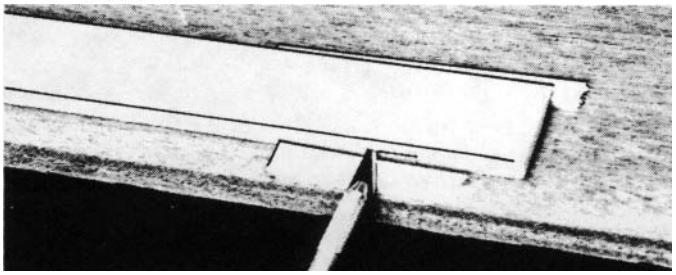


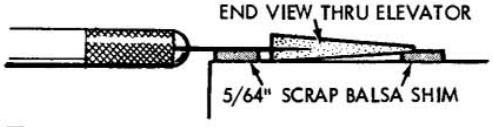


8a. ☐ Move stab T.E., close to table edge.

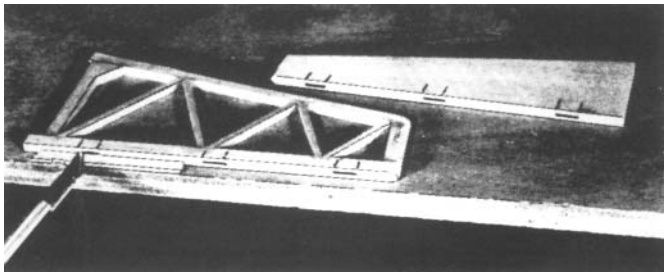
☐ Using scrap ply from a fuselage sheet as a shim, cut slots for hinges as shown in sketch. Sand ply if necessary so blade cuts exactly on center.

NOTE: Although you are slotting for hinges now, the hinges are not permanently installed until **after** model is **covered.**



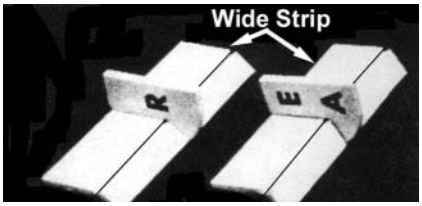


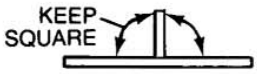
8b. ☐ Move elevator close to table edge, support thin edge of elevator with wing rib scrap as shown in sketch and make hinge slots.



9. ☐Repeat slotting method in steps 8a & 8b for fin and rudder.

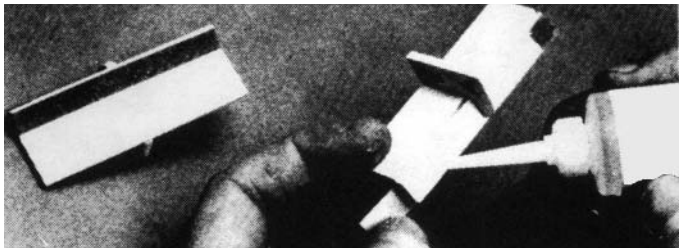
ASSEMBLING DIE-CUT BEVELING TOOLS
(FROM 1/8" PLY)



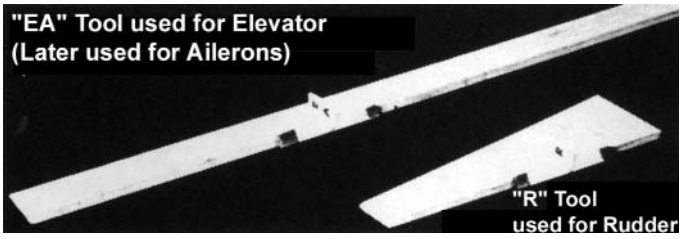


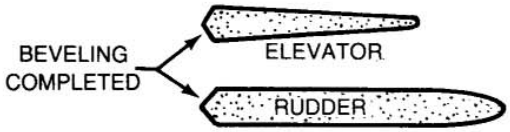
10a. ☐ First, glue narrow strip to handle, keeping them square, as shown above left. Then glue wide strip to handle and narrow strip, again keeping things square.

CUT TWO STRIPS SANDPAPER THIS SIZE



10b. ☐ Cut two strips of 100-200 grit sandpaper to size shown above. Tack-cement sandpaper to tools as shown below.





11. ☐ Tape T.E. of elevator and rudder to work surface. Using **appropriate** beveling tool, sand L.E. to center line. Turn parts over and repeat beveling for other side.

THIS COMPLETES THE TAIL ASSEMBLY CONSTRUCTION.

II WING ASSEMBLY

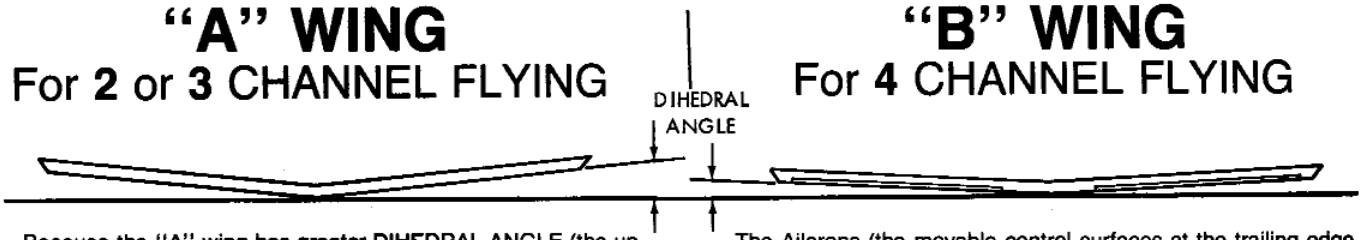
IMPORTANT! READ THIS BEFORE STARTING ASSEMBLY

YOUR EAGLET'S WING CAN BE BUILT TWO WAYS

Select the wing that fits your radio and flying requirements.

"A" WING
For **2** or **3** CHANNEL FLYING

"B" WING
For **4** CHANNEL FLYING



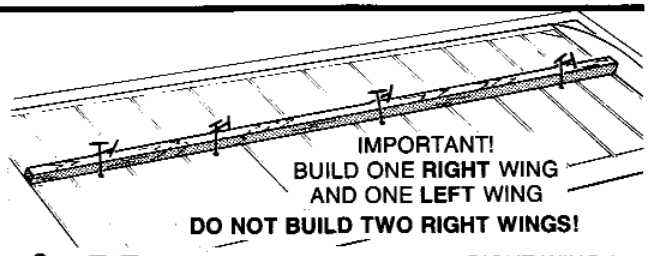
Because the "A" wing has greater DIHEDRAL ANGLE (the upward bend of the wings), it inherently is more resistant to banking, and more responsive to being turned. The model is turned by the rudder, which then reacts against the dihedral. The "A"wing is recommended for 2 or 3 channel equipment, or to keep things simple, or for learning to fly without an instructor.

The Ailerons (the movable control surfaces at the trailing edge of the wing), and the lesser DIHEDRAL ANGLE of the "B" wing, allow more precise control of maneuvers. Ailerons require 4 (or more) channel equipment, and more work in the wing construction.

To build either the "A" or "B" wing, simply proceed with the following instructions.

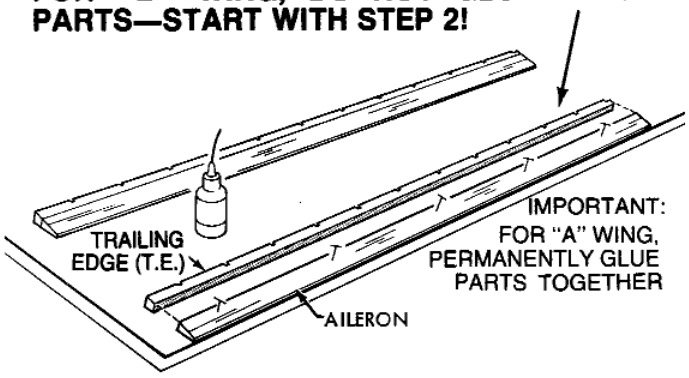
After you have finished gluing the wing together, go back and re-glue all the joints for added strength and just in case some joints may have been missed the first time. All the glue joints are important to the strength of the entire wing. So make glue joints carefully with this in mind.

SINCE THE WING IS BUILT IN TWO HALVES, AND STEPS 2 TO 14 ARE REPEATED IN THE PROCESS, TWO CHECK BOXES ARE PROVIDED WITH EACH OF THESE STEPS, ONE FOR RIGHT WING AND ONE FOR THE LEFT. THE RIGHT WING IS BUILT FIRST.

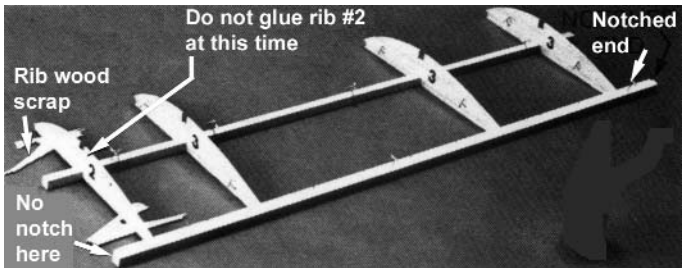


2. ☐ ☐ Position one spar in place over RIGHT WING (or LEFT WING) on plan. Align spar end at center of wing on plan. Hold spar in exact position by crosspinning at circled locations on plan. CAUTION; Do not build two RIGHT WINGS!

FOR "B" WING, DO NOT GLUE THESE PARTS—START WITH STEP 2!



1. ☐ THIS STEP **FOR "A" WING ONLY** (for "B" wing start with Step 2). Align aileron along any straight line on plan and pin in place. Glue trailing edge (T.E.) to aileron. Note: from Step 3 on in the wing assembly photos & sketches, the "B" wing is shown (ailerons not glued to T.E.), but the wing assembly procedure is the same for the "A" wing.

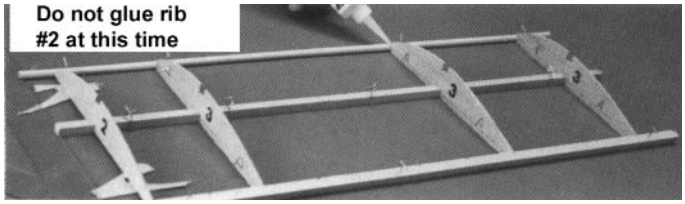


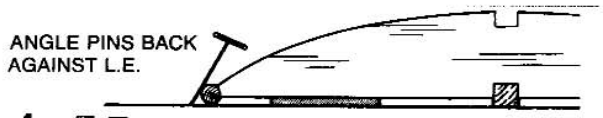
3. ☐ ☐ Using **no** pins, set TRAILING EDGE (T.E.) in place on plan. **IMPORTANT:** The T.E. has no notch at one end - **this unnotched end** must be at the **wing center** as shown.

☐ ☐ Using no glue, place the following four ribs in their respective T.E. notches; ribs nos. 2,3,3, & 3, hooking them over the spar as you go. Place rib wood scrap under rib 2 as a shim.

☐ ☐ Align T.E. and ribs over plan and pin in one place. (Note: if a part appears not to "fit" the plan, don't worry, this is due to expansion and shrinkage of the plan paper).

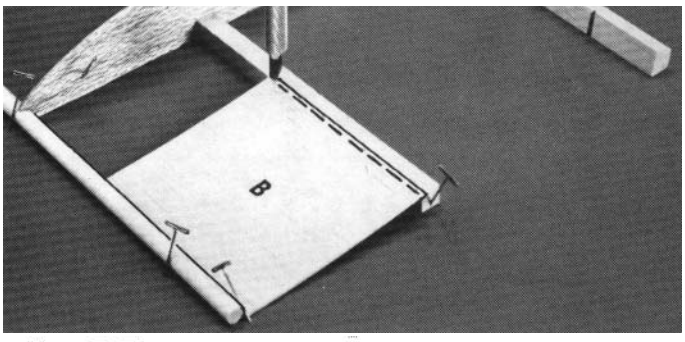
☐ ☐ **Do not glue rib No. 2 at this time.** Glue ribs 3 to T.E. and spar.





4. ☐ ☐ Position 24" LEADING EDGE (L.E.) dowel in place over plan. Press L.E. into rib recesses, holding it tight with angled pins as you go.

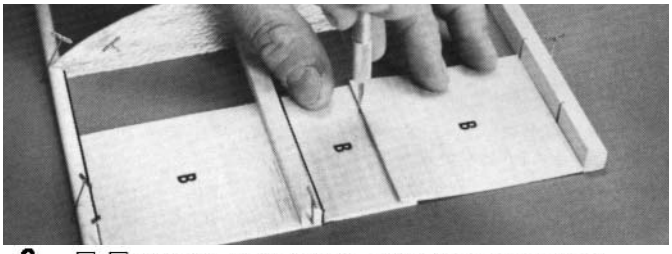
☐ ☐ **Do not glue Rib No. 2 at this time.** Glue ribs 3 to L.E. and spar.



5. ☐ ☐ Pin end of L.E. and spar in place as shown above. Remove rib No. 2 and scrap shims.

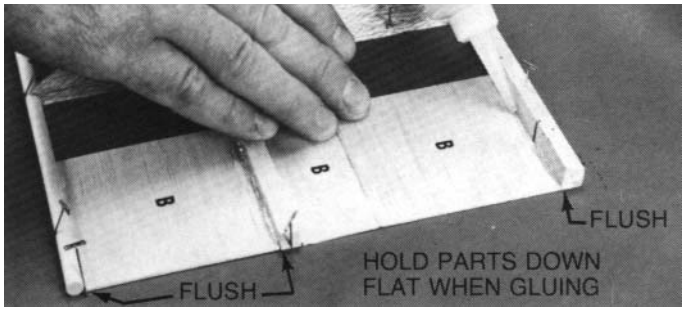
☐ ☐ Slide sheet B forward until it just touches the L.E. and align it with end of L.E. (Note: wood grain direction). Gently hold sheet in position and mark spar location on both edges of sheet with your knife.

Remove sheet from wing and using metal straight edge, cut a line across sheet at spar "marks." Replace sheet in wing, trim slightly if required until it fits well.



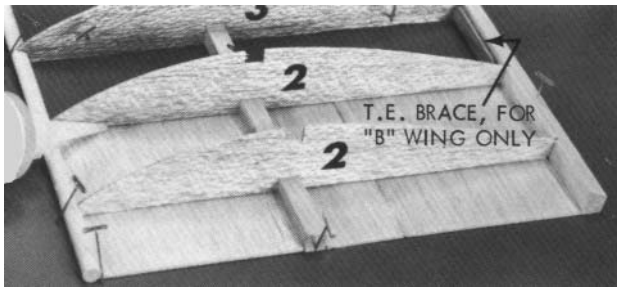
6. ☐ ☐ Position short bottom sheet B at rear of spar.

Place a long bottom sheet B at T.E. so it overlaps the first one. Holding both sheets in place, trim first sheet even with edge of second sheet.



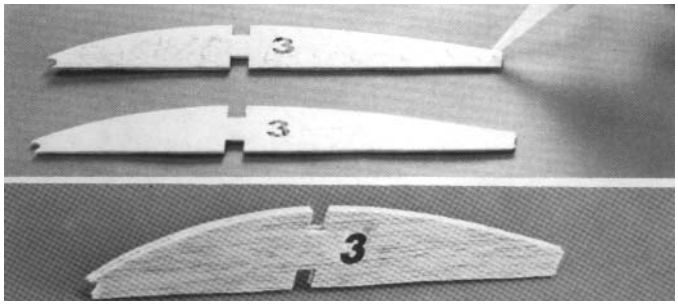
7. ☐ ☐ Glue L.E. sheeting to L.E. and spar.

☐ ☐ Glue two rear sheeting halves together, and to spar and T.E.

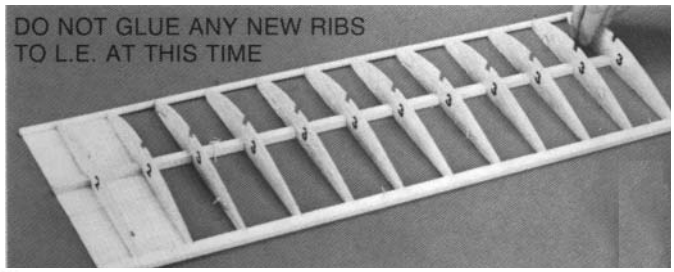


8. ☐ ☐ Position and glue two ribs No. 2 to L.E., bottom sheeting, spar, and T.E.

☐ ☐ For "B" wing only, glue die cut 1/8" ply T.E. brace to T.E. as shown.

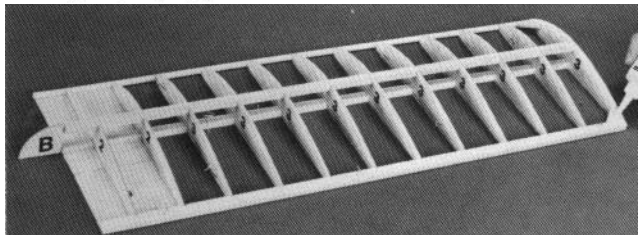


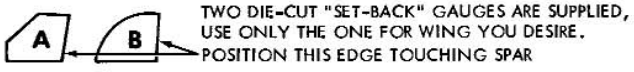
9. ☐ ☐ A doubled rib is necessary at the wing tip so that when you cover the wing, the tip rib won't bend. Glue two No. 3 ribs together: apply SUPER JET to one rib, stand them next to each other to check alignment, then press together.



10. ☐ ☐ Glue double thickness rib No. 3 in place at wing tip, gluing to spar and T.E. only. Hold rib straight up until it sets.

☐ ☐ Working one at a time, glue remaining ribs 3 in place. Glue to **spar & T.E. only.** Hold each rib up straight as it dries.



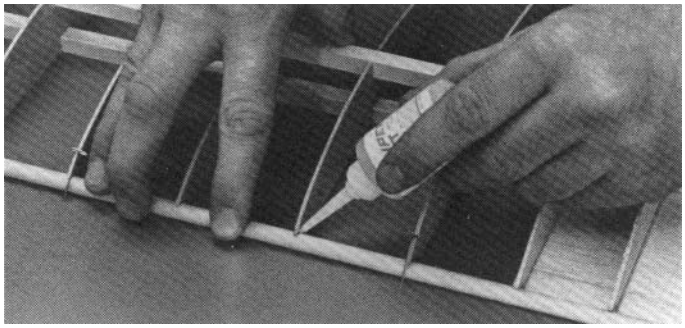


11. ☐ ☐ Position proper "set-back gauge" touching bottom spar (two gauges are supplied, one for "A" wing and one for "B" wing).

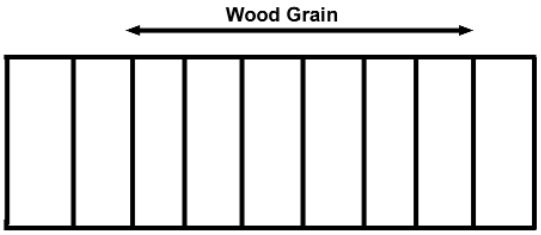
Touch end of top spar to gauge, and set spar in rib slots.

☐ ☐ Glue top spar to all ribs.

☐ ☐ Glue wing tip gussets to L.E. and T.E.

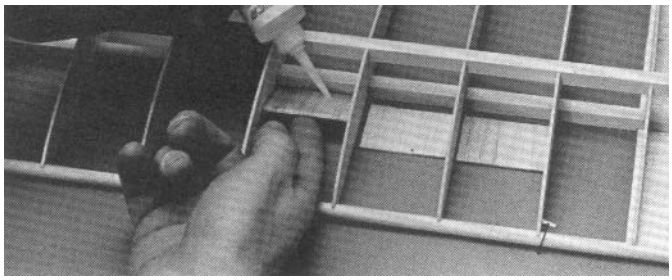


12. ☐ ☐ Working a few ribs at a time, apply SUPER JET to glue loose ribs to L.E. Gently squeeze L.E. into ribs and hold until set. Repeat until all ribs are glued to L.E.

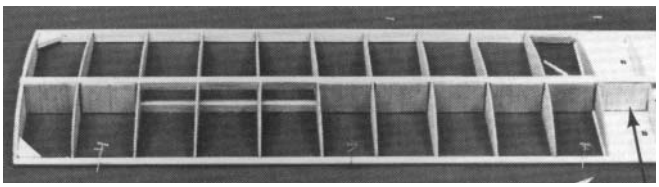


IMPORTANT!

13. The shear webs to be installed in the next step are **Laser cut pieces.**



14. ☐ ☐ Install pre-cut webs in wing at positions shown on the plan as follows: Apply two ribbons of glue (near top and bottom), position webs equally on spars then press web up in place against spars until set. You should use enough glue so that when the web is pressed in place, glue squeezes from joint. The web between ribs 2 is from die sheet #6103. Trim 1/8″ from webs next to center sheeting for sheeting clearance. Also, the web at wing tip may need trimming to fit between ribs.

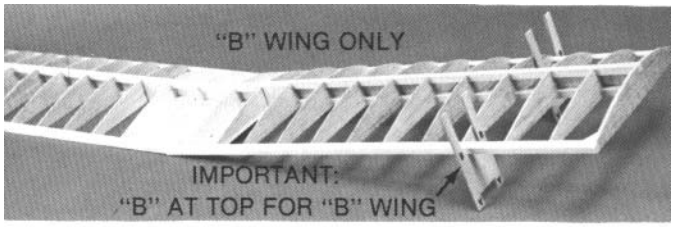


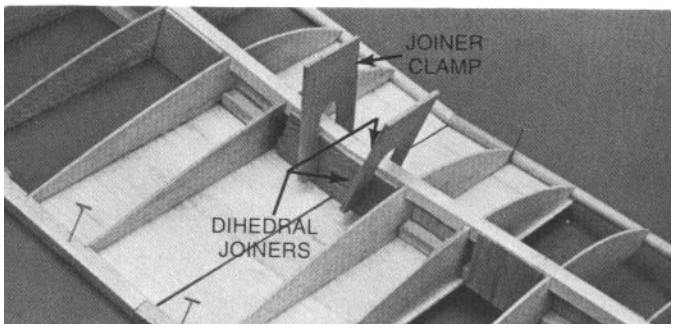
NOTE: THIS WEB ONLY FROM RIB DIE SHEET!

15. ☐ Repeat steps 3 through 14 for LEFT WING.

16. ☐ With left wing still pinned down, position RIGHT WING in place next to it. Raise RIGHT WING tip and

support it at **4th rib in from tip** using die-cut gauges. NOTE: gauge ends are stamped "A" and "B"; for "A" wing - gauge end "A" must be at top (as shown above) for "B" wing - gauge end "B" must be at top (as shown below). Hold gauges firmly to the ribs by tack-cementing or stationery clamps, clothespins, etc.

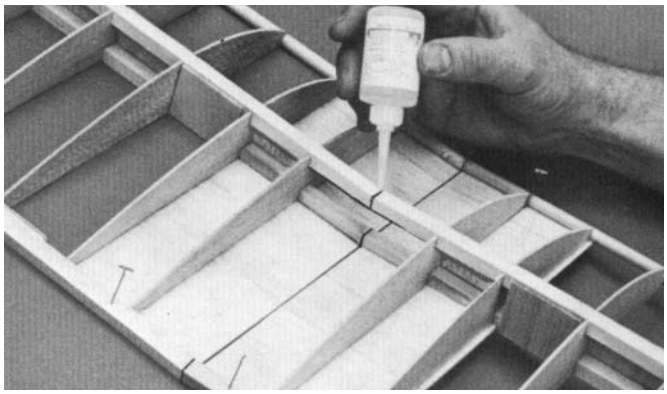




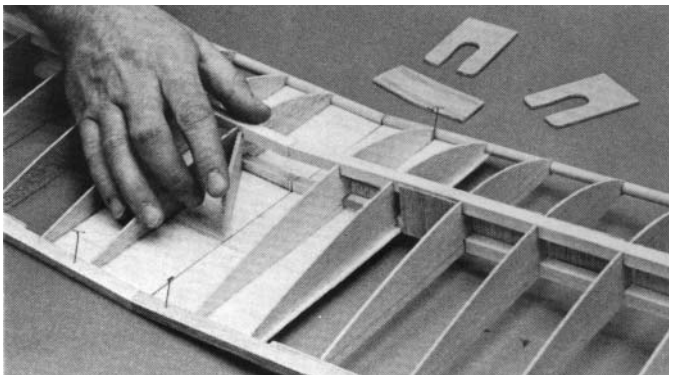
17. ☐ Study entire center joint; all end parts of right wing should just touch those of the left (tiny gaps are alright). If the fit between most parts is a little loose because one part protrudes too much, **slightly** sand only the protruding part for better fit. When sanding, it is better to take off too little than too much!

☐ TEMPORARILY set dihedral joiners in place on each side of spars, using die-cut clamps provided to hold joiners tight against spars.

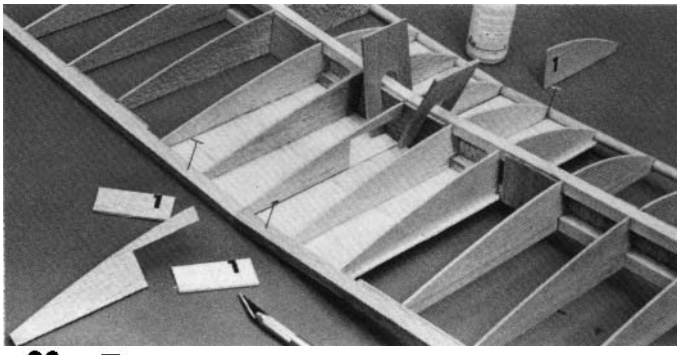
☐ Be sure RIGHT WING is held firmly against LEFT WING and **pin in place as shown above.** Remove joiners.



18. ☐ Apply a liberal bead of SUPER JET to joints of L.E., spars, sheeting, and T.E.



19. ☐ Apply two beads of SUPER JET to one side of both joiners, near the top and bottom. Position one end of joiner in place and swing the other end up against spars—hold momentarily. Repeat for other joiner—immediately reinstall clamps (from step 17) to hold both joiners tight on spars.

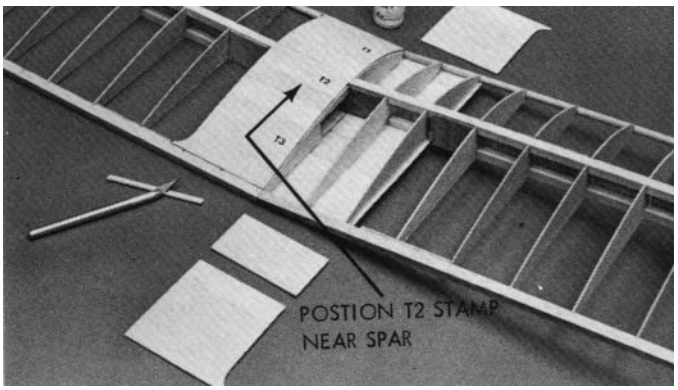


20. ☐ For "B" wing, cut opening rib No. 1 for your servo at stamped line on rib.

☐ Position front and rear halves of one rib No. 1 so one side aligns with centerline of wing. Adjust rib to align with spar center joint, T.E., bottom sheeting, and L.E. joints. Glue in place.

☐ Glue remaining halves of second No. 1 rib to first rib, making double thickness center rib at center joint.

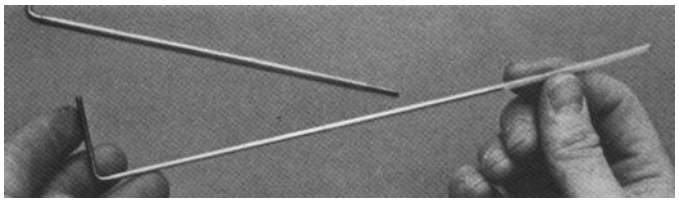
☐ Be sure to glue any joints in the wing still needing glue.



21. ☐ Remove all clamps, etc.

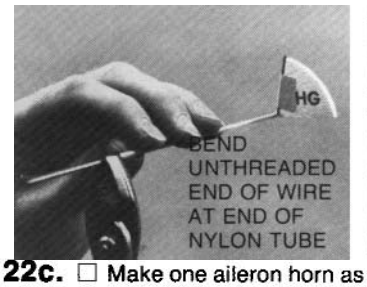
☐ Try top sheeting in place, trimming to fit as required. Match edge of sheeting with center of rib No. 1. Glue in place.

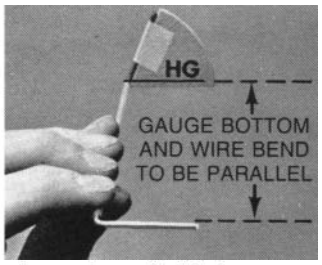
☐ Turn wing upside down and glue any joints still needing glue. *For "**A**" **wing only**, proceed directly to step 31a.*



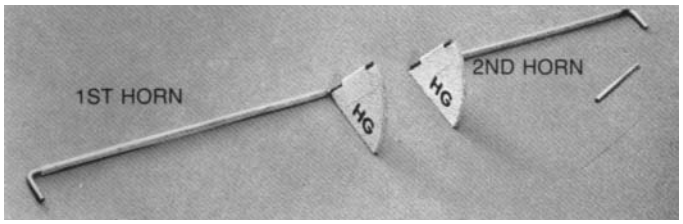
22a. ☐ Measure and cut 6-1/8" long nylon tube to 4-¾" long. Slide tube onto aileron horn wire. Repeat for other tube and wire.

22b. ☐ Tape Horn Angle Gauges securely to THREADED ends of strip aileron horns as shown.





22c. ☐ Make one aileron horn as shown above. Hold wire so bottom of gauge is horizontal. Firmly grasp UNTHREADED end of wire at end of nylon type (see above) and bend wire horizontally 90°. Check on table, adjust as necessary.



22d. ☐ Make 2nd aileron horn opposite to first one by bending UNTHREADED end as shown. After bending, measure and cut wires so only 3/8" length remains. Wires should rotate easily in tubes; binding between wire bend and tubing may be relieved by shortening tubing slightly.

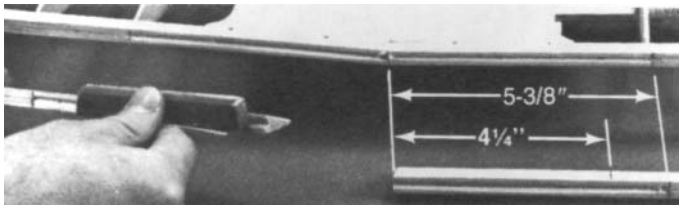
☐ File cut ends of wire to a pointed shape for easier mounting of ailerons later on.

23a. ☐ Carefully remove aileron from T.E. Mark a center line along entire lengths of T.E. and aileron. Optional: the CG "Center-Line Marker" does it in one simple sweep (near center right of photo).

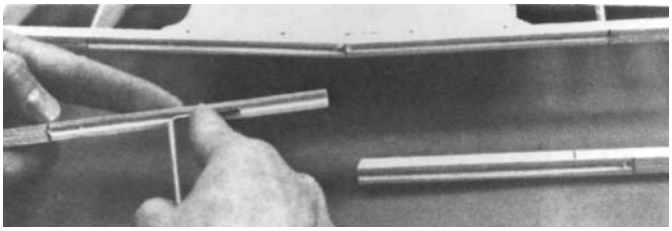
☐ Mark each T.E. 5-3/8" from center joint, entire lengths of T.E. and aileron.

☐ Mark each T.E. 5-3/8" from center joint.

☐ Mark **front** of ailerons 5-5/8", and **bottom** of ailerons 4-¼" from inner ends.

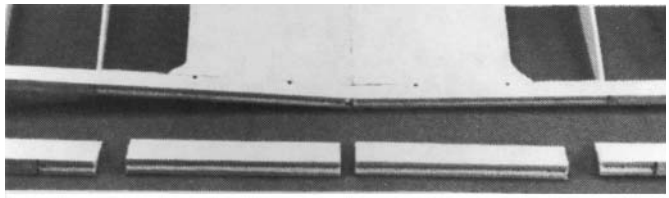


23b. ☐ Wrap sandpaper around a square-cornered block (engine bearer shown above) to make grooves 5-3/8" long x1/16" deep in T.E. and **ailerons** (as shown above) on both wing halves.



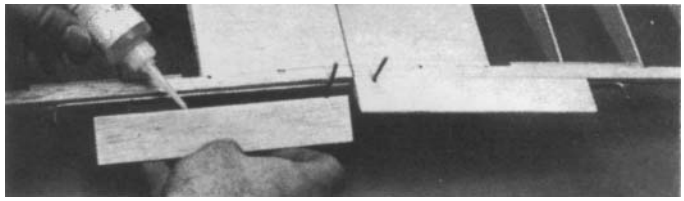
23c. ☐ Using the threaded end of an aileron horn, file the grooves to a rounded shape so half of the nylon tubing will lie recessed in both the aileron and the T.E.

23d. ☐ Carefully cut ailerons at 4-¼" marks (these two short pieces will later form the T.E. inboard sections).



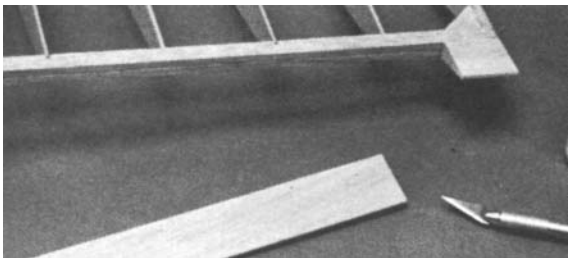
Ailerons & Inboard sections shown reversed

24. ☐ Using threaded end of aileron wire as a file, make two clearance slots ½" from center joint in wing T.E., and ½" from inner ends of T.E. inboard sections.

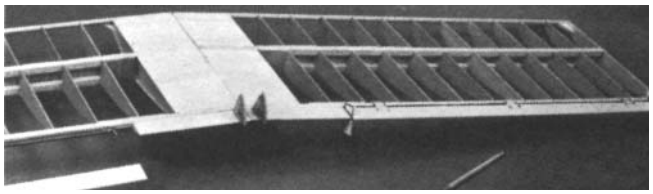


25. ☐ Using NO GLUE AT FIRST, temporarily place horns in wing grooves, position both T.E. inboard sections and check for horn movement—top to move about ¾" total fore and aft.

☐ Remove T.E. inboard sections, and carefully glue horn wire **tubing** and T.E. inboard section in place (CAUTION: Keep glue off wires).



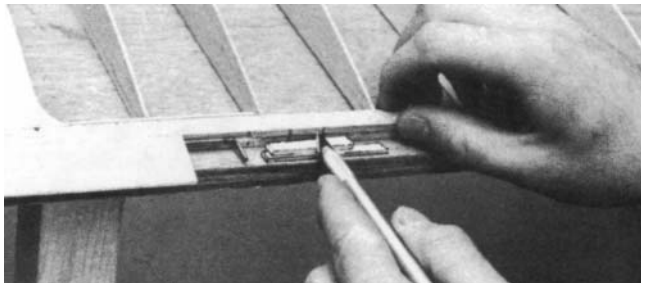
26. ☐ Cut 1" off wing tip end of ailerons, and glue to T.E., flush with end of T.E. as shown above.

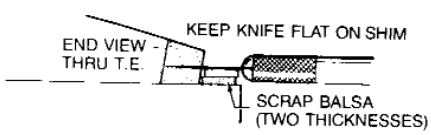


27. ☐ Position ply horn angle gauge at threaded end of horn wire, slowly press aileron on other (3/8" long) end of wire to make a mark. With a small nail, make a hole for the wire. Work carefully, keeping hole centered inside aileron. Repeat for other aileron.

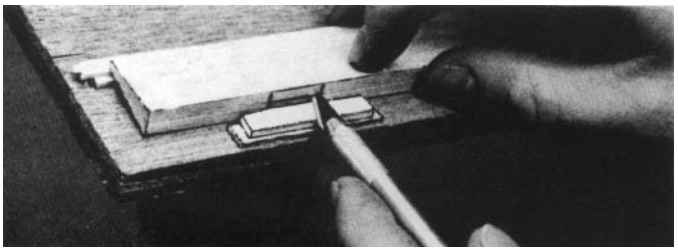
☐ So aileron ends don't fit "tight" after everything gets covered, gently sand both ends of aileron. The clearance is correct when you can fit each aileron in place with a piece of matchbook cover at both ends as shown above.

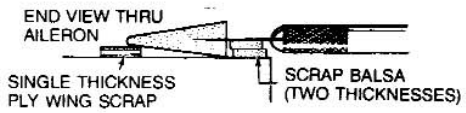
28. ☐ Install hinges according to the instructions on page 22.





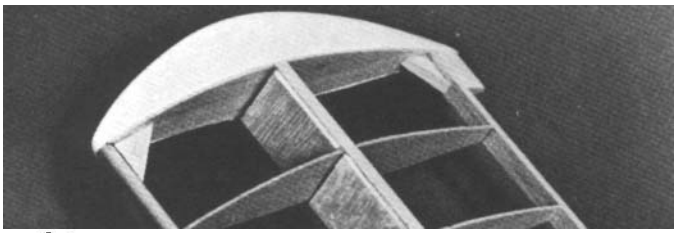
29a. ☐ Make a double thickness shim as shown above using **two pieces** of scrap **balsa** from a wing rib sheet. Cut hinge slots as shown above.



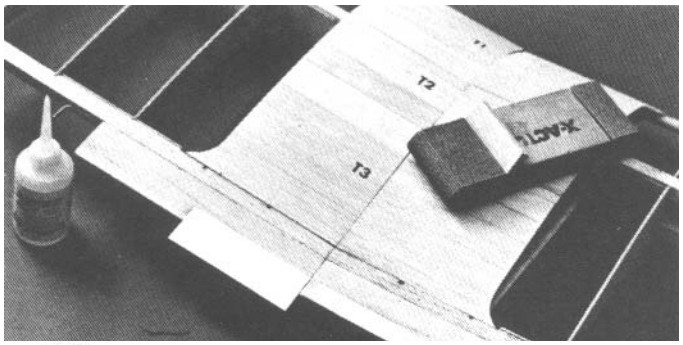


29b. ☐ Set aileron close to table edge, support thin edge of aileron with one piece of scrap ply from a fuselage sheet as shown in sketch, and make hinge slots using balsa shim from previous step. Repeat slotting for other aileron.

30. ☐ Using beveling tool "EA", bevel front edge of aileron to centerline. Turn aileron over and repeat sanding. Repeat for other aileron.

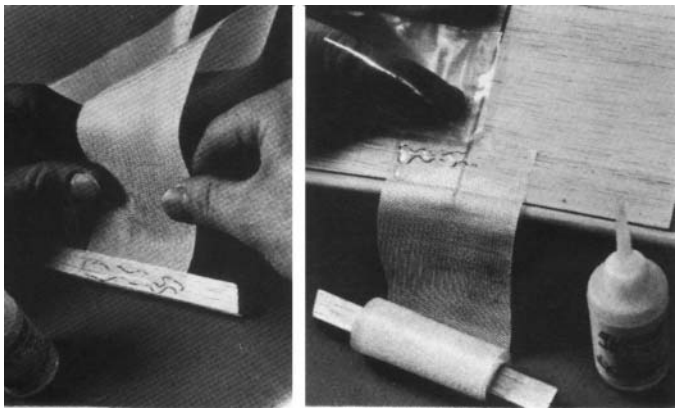


31a. ☐ Lightly sand plastic wing tips to remove burrs from pre-cut edges. TEMPORARILY fit tips in place (they are permanently installed after wing is covered as shown on page 21). If they bind at T.E., try gently forcing them on, or sand a slight recess for them in T.E.



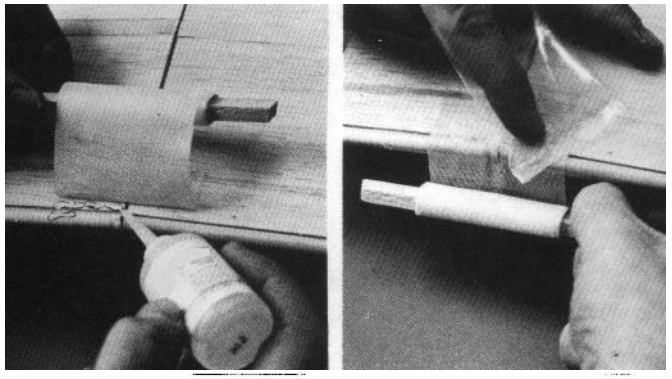
31b. ☐ Using 240 grit (fine) sandpaper, flat sand entire wing to blend surfaces and remove high spots.

☐ Cut 1″ x 6″ half-hard aluminum sheet into 3″ pieces. Lightly sand aluminum surfaces for better gluing. Apply a bead of SUPER JET to half of a 3″ aluminum sheet and glue it to wing T.E. as shown above. When dry, apply glue to other half and then wrap it around T.E. Repeat for other 3″ piece.

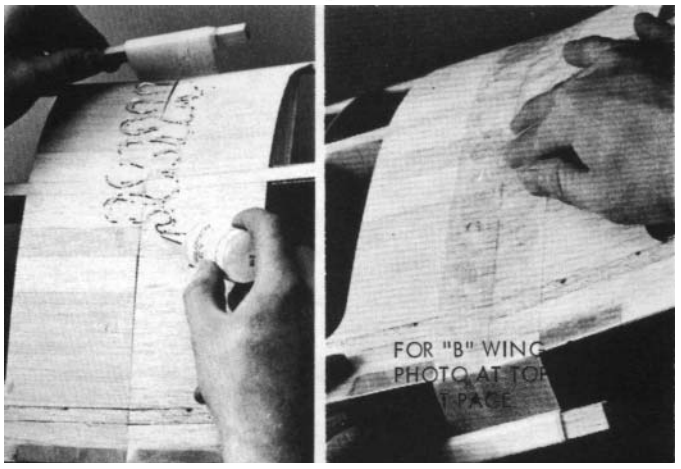


32. ☐ Glue one end of 2½″ wide nylon fabric to scrap wood. Let dry until the nylon is **glued solidly** to the balsa.

33a. ☐ Apply a line of SUPER JET at center joint on wing bottom and stick one end of 2½″ wide nylon to it. Let dry until the nylon is **glued solidly** to the balsa.



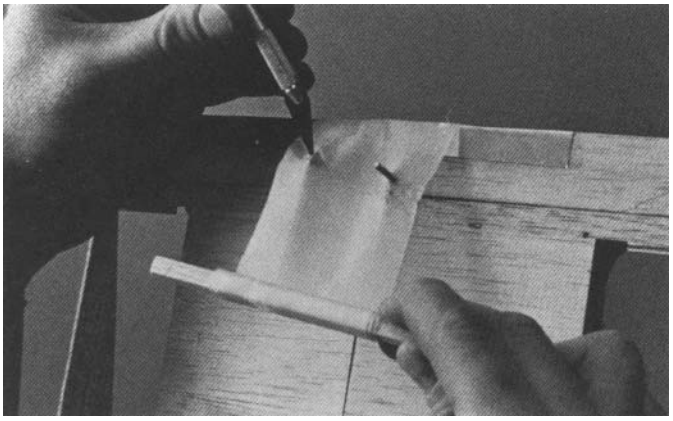
33b. ☐ Apply a squiggle of glue to wing and pull nylon fabric into it. Rub nylon into glue with your finger (cover finger with plastic bag or similar).



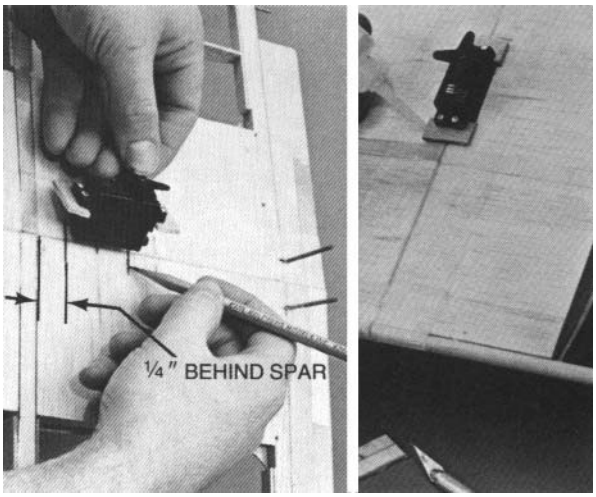
33c. ☐ Repeat gluing procedure and apply nylon around L.E., across top of wing, around T.E. and finally overlapping where you started on wing bottom.

☐ After entire center joint has been wrapped with nylon, apply another coat of glue and force it down through the nylon. Let dry thoroughly.

THIS COMPLETES THE "A" WING ASSEMBLY



FOR AILERON WING, SLIT NYLON AS REQUIRED TO FIT AROUND AILERON HORNS.



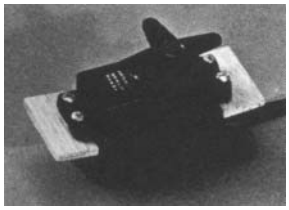
34b. ☐ Carefully position servo ¼" behind bottom spar and mark size for opening.

34c. ☐ Cut-out bottom sheeting. Remove material from rib No. 1 as required to suit your servo.

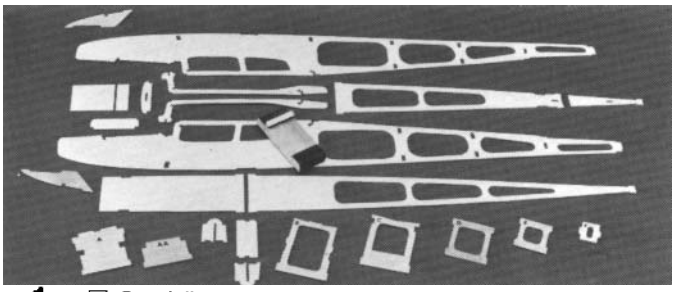
☐ Glue servo rails to wing, and fill any gaps under the rails with slivers of scrap balsa. Avoid getting glue on servo!

THIS COMPLETES THE "B" WING CONSTRUCTION. The servo should be removed before covering.

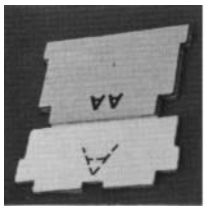
34a. ☐ Temporarily mount servo on die-cut rails. See fuse side view on plan for added details of aileron servo installation.

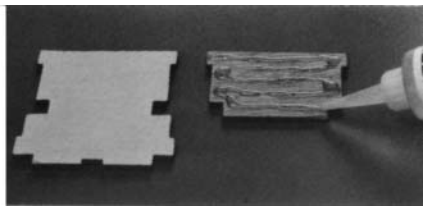


III FUSELAGE ASSEMBLY



1. ☐ Carefully remove all fuselage (fuse) parts from die-cut plywood sheets. Lightly sand any rough edges.

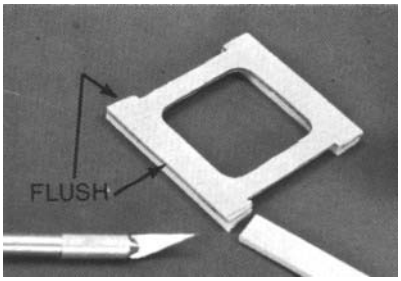




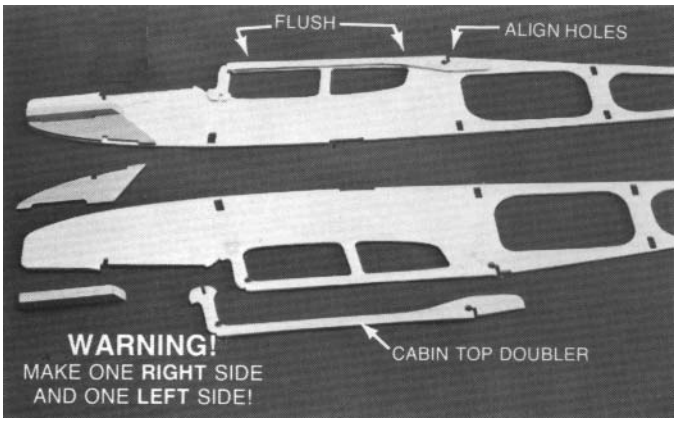
2. ☐ Place Former "A" (firewall) with side stamped "A" face down on table.

☐ Using no glue, **temporarily** position double "A-A" on firewall, flushing edges as shown above.

☐ Remove 'AA" and set it next to firewall. Apply a bead of SUPER JET to "AA" as shown. Do not use ordinary "thin cyano-acrylates. Carefully reposition "AA" on firewall and press in place; hold until set.



3. ☐ From 1/8" x ½" x 18" balsa, cut and glue strips to match formers as shown. Apply strips as shown below (Note; formers B & C have strips at bottom only).



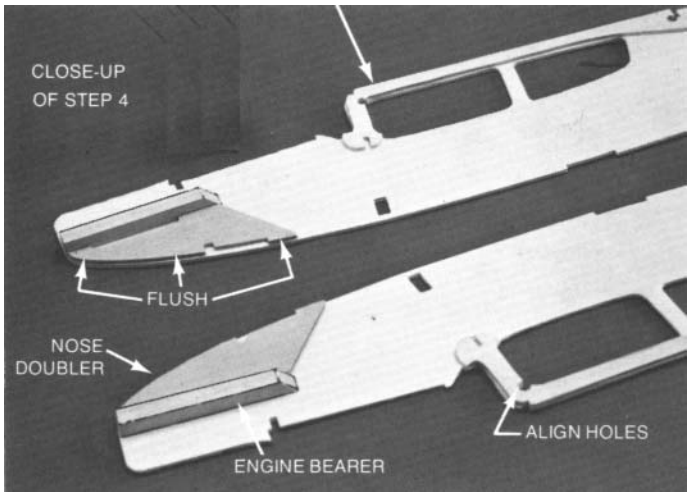
4. ☐ Be sure sides are laid down **left** & **right** as shown.

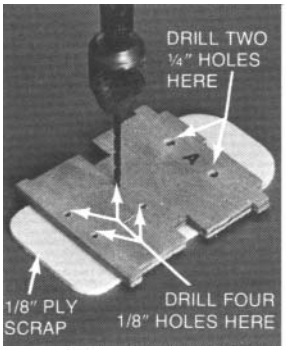
☐ **Temporarily position cabin top doublers, nose doublers, and engine bearers on fuse sides. Check fit** and **placement** of parts before gluing.

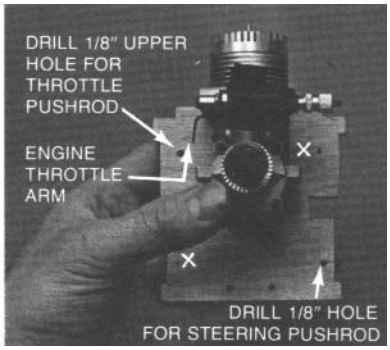
☐ Glue nose doublers to body sides, making sure to flush parts as shown above.

☐ Glue engine bearers solidly to fuse sides and edge of nose doublers (**longest edge** to be glued to fuse side).

☐ Glue cabin top doublers in place on fuse sides.



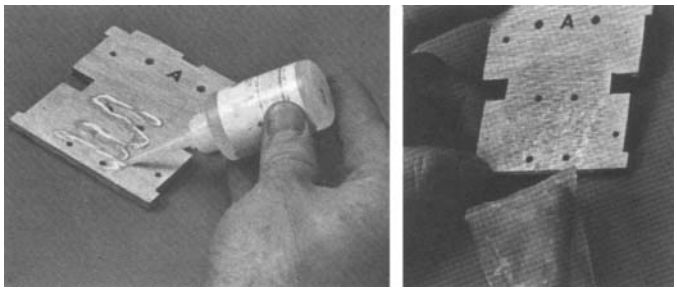




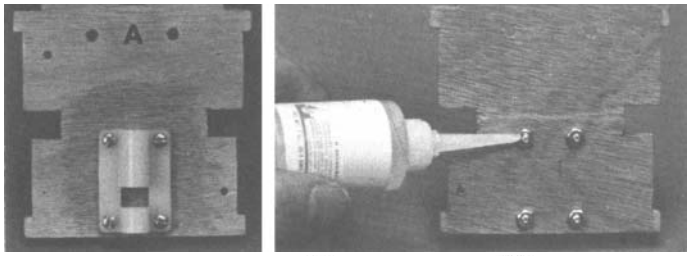
5. ☐ Dril two ¼" diameter holes through firewall at upper punch mark locations as shown above (place scrap wood under backside while drilling to avoid split out).

☐ Drill four 1/8" diameter holes through firewall at four lower punch marks.

☐ Study engine above; most engines have throttle arm on the side shown, and require two more 1/8" holes to be drilled as indicated for throttle and steering pushrods. If your throttle arm is on the opposite side, use the opposite locations shown with an X.



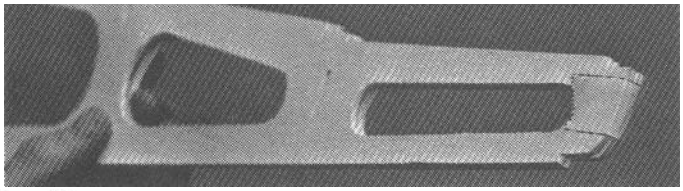
6. ☐ To prevent oil penetration, seal area around four holes as follows. Apply a bead of SUPER JET and smear it into the wood with your finger wrapped in plastic bag.



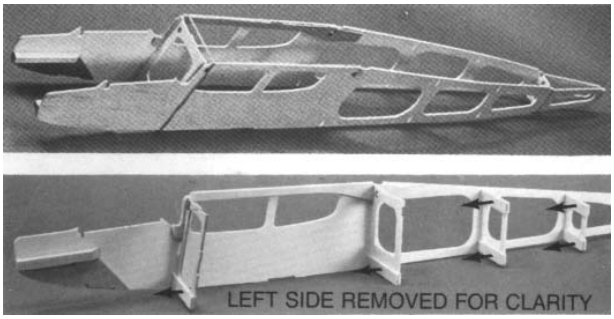
4-40 x 1/2" MACHINE SCREW   NUT

7. ☐ Install nylon nosegear bearing on firewall using #4-40x½" machine screws and nuts as shown.

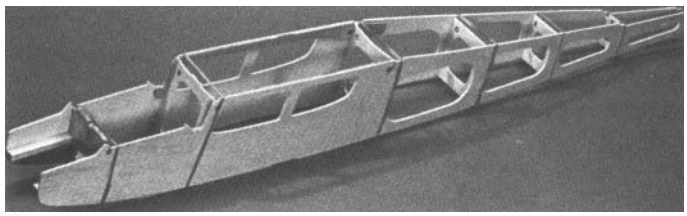
☐ Place a drop of SUPER JET on nuts to lock them in place.



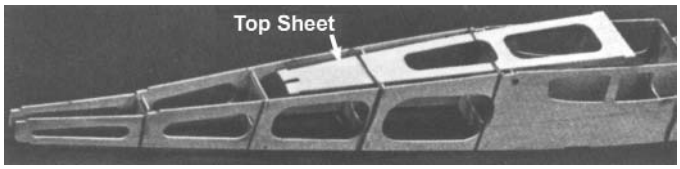
8a. ☐ Place fuse sides one on the other, and tape rear together around the back end. Spread fuse fronts apart, and plug former "B" into holes in body sides. Hold parts together with a rubber band. Carefully spread fuse rear open, and plug former "F" in place, and hold with a rubber band. Remove tape from tail end.



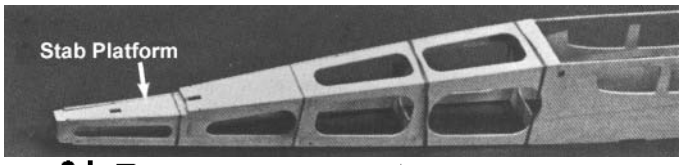
When installing formers in step 8, be sure to position the formers so the balsa strips face the nose of the model.



8b. ☐ Install firewall & remaining formers "C", "D", and "E" in same manner, using rubber bands to hold parts.

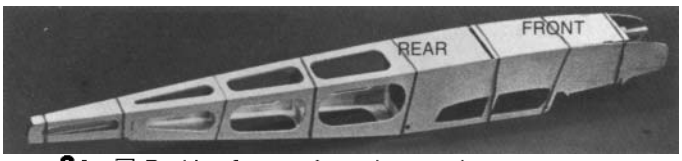


8c. ☐ Insert top sheet under rubber band at former C, and work it towards tail, slipping it under bands as you go.

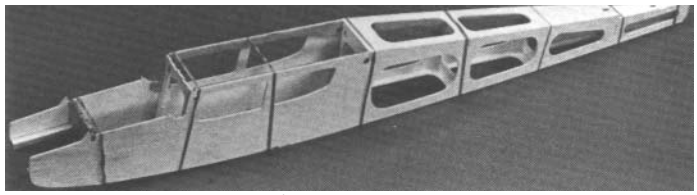


8d. ☐ Lock tabs at both ends of top sheet into corresponding notches in fuse sides.

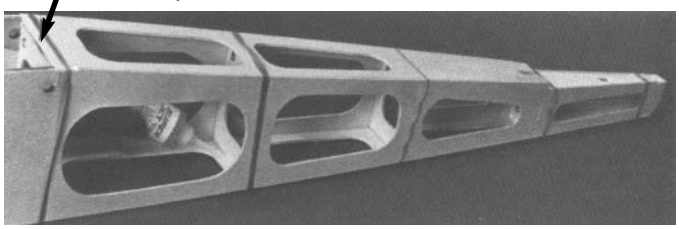
☐ Position stab platform between fuse ends, and hold parts in place with rubber bands.



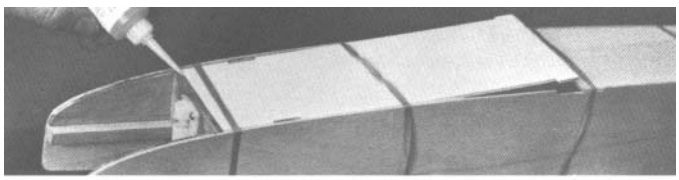
8e. ☐ Position front and rear bottom sheets in same manner.

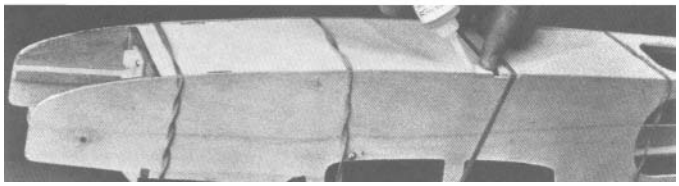


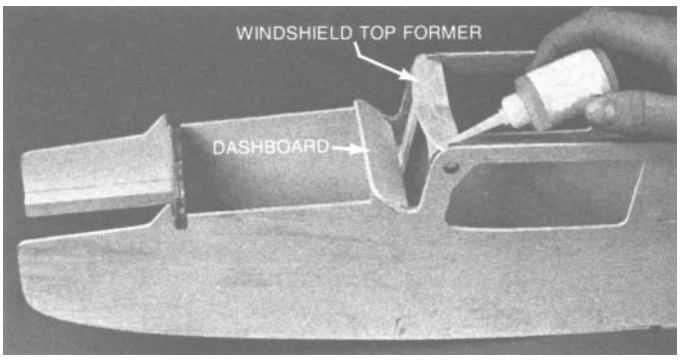
9. ☐ Place fuse over TOP VIEW on plan sheet. Viewing from above, carefully align the fuse to match plan outline. If an area of the fuse is off, adjust that portion in the direction required. **Tape parts to hold in position.** Gently press top sheeting to match with top of former C, hold with tape.



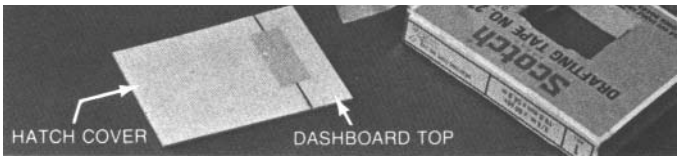
10. ☐ When satisfied with alignment, permanently glue sides, formers, and sheet parts in place. Apply a bead of SUPER JET along all joints inside and outside, or from both sides in the case of formers—it will penetrate the joint and leave a slight reinforcing fillet.



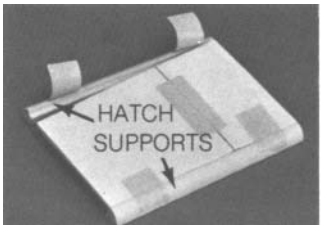


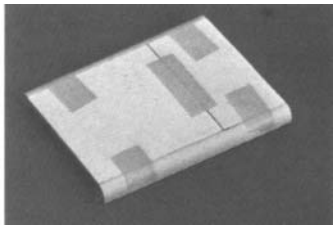


11. ☐ Glue windshield top former and dashboard solidly in place (Press windshield top former at center so it matches top of former B, hold with tape).

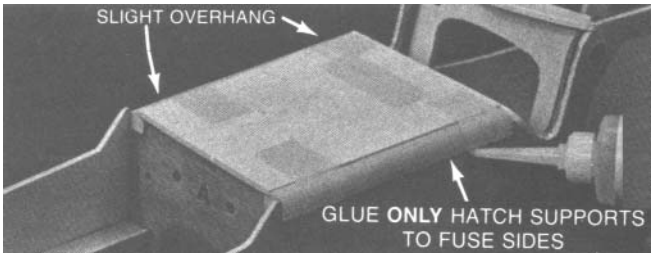


12a. ☐ Tape hatch cover and dashboard top together (as they fit from die-cut sheet).

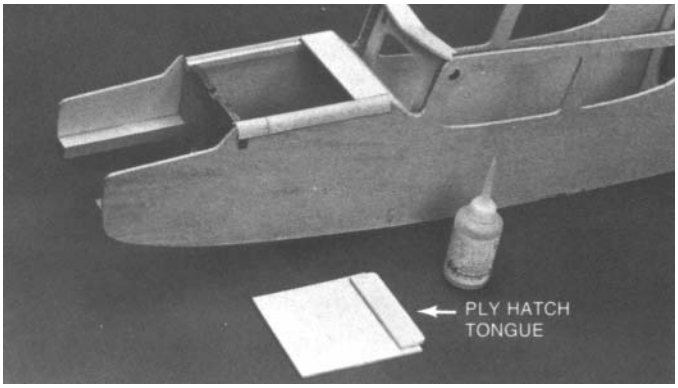




12b. ☐ Tape hatch supports to both sides.

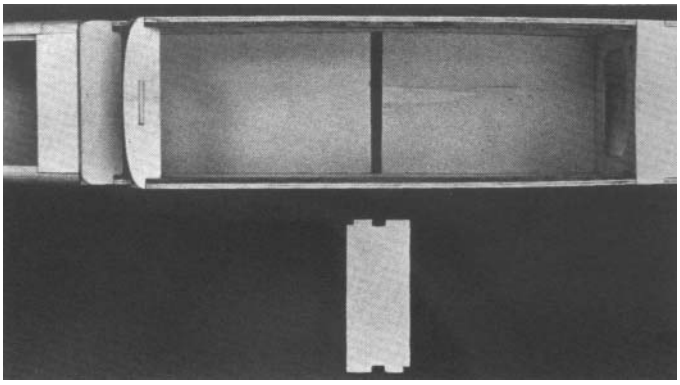


13. ☐ Position taped parts in place on fuse. Because of curvature, the hatch supports can overhang the sides slightly (the overhang to be sanded off later.) Glue **only** the hatch supports to the body sides.

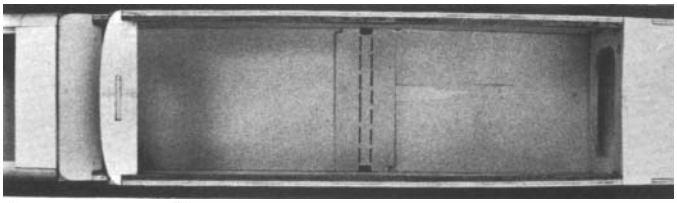


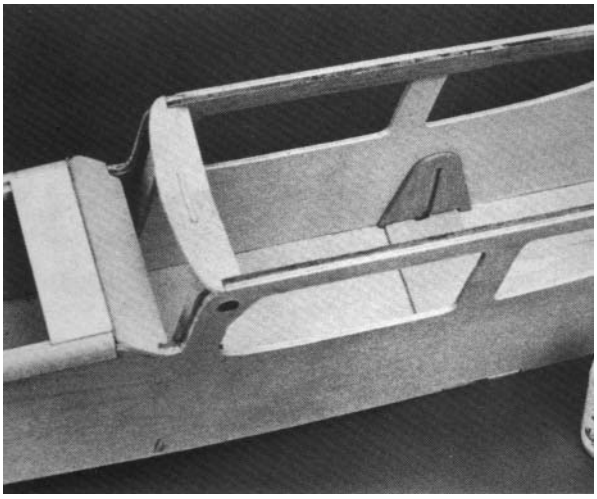
14. ☐ Remove hatch cover from fuse. Refer to plan for **correct** placement of ply tongue, then glue tongue to hatch cover. Try in place.

☐ Glue dashboard top to hatch supports and dashboard.



15. ☐ Place the landing gear (L.G.) mount on inside bottom of fuse. The cutouts at each end of mount **must** be positioned evenly over the slot in the fuse bottom. Glue mount in place.

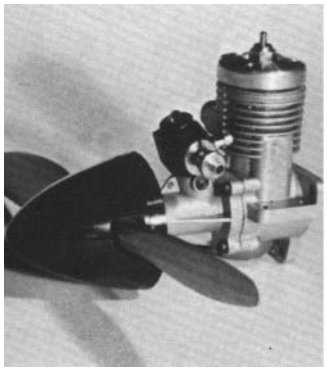


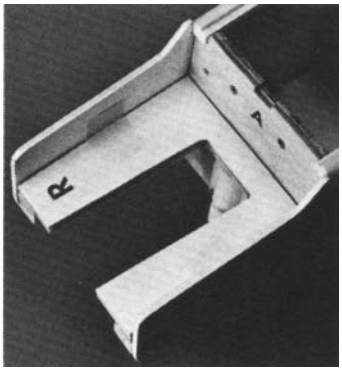


16. ☐ The L.G. braces interlock with L.G. mount. Glue braces solidly to fuse sides and L.G. mount.

ENGINE INSTALLATION AND FUSE COMPLETION

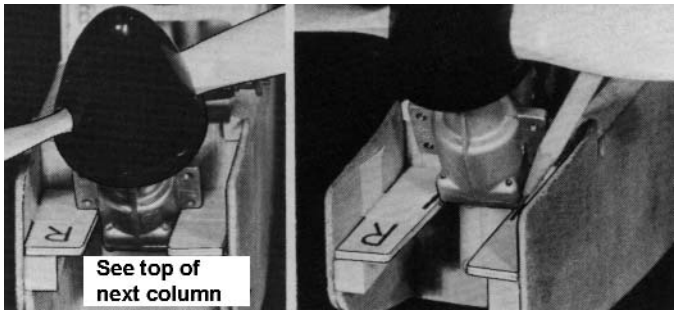
For clarity, the engine installation is shown in many small steps rather than a few general ones. It is not difficult—just thoroughly explained.



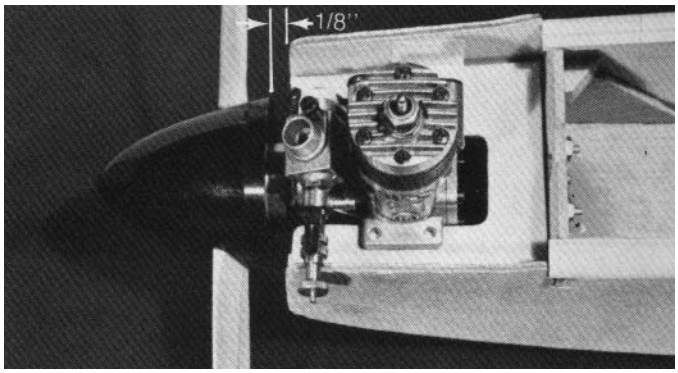


1a. ☐ Mount propeller and spinner (if used) on your engine.

☐ Tape 1/8″ ply breakaway plate on engine bearers. IMPORTANT: The cut-out in the breakaway plate is purposely cut on an angle. The letter "R" stamped on the breakaway **must** be on the Right side as shown. The "Right" side is thought of as it would be to a pilot sitting in the cabin (two breakaway plates are supplied, the second one is a spare).

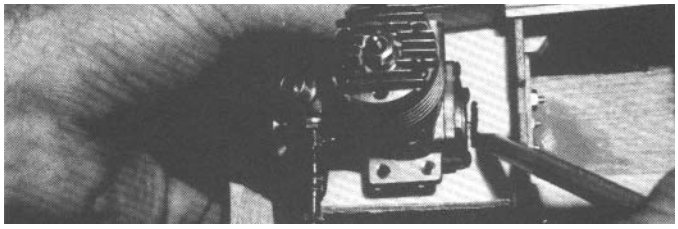


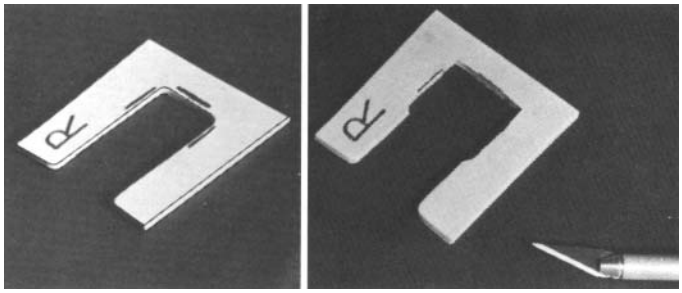
1b. ☐ Place engine over opening in 1/8″ ply breakaway plate. If engine is too wide and doesn't fit, center engine bottom over opening and mark on breakaway plate the engine width as shown .



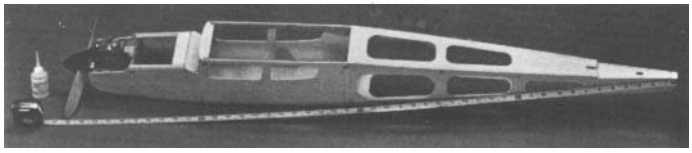
REAR OF SMALLER ENGINE FITS IN OPENING

2a. ☐ Position engine on breakaway so there is approximately 1/8″ between fuse front and spinner back (or propeller if spinner isn't used.) Back of engine should fit inside of breakaway opening. If engine is longer than the opening, mark on breakaway the engine rear location as shown below.





2b. ☐ If during the preceding steps you found your engine too wide or too long, the breakaway plate must be modified accordingly. Remove breakaway from fuse, and using a coping saw, or your knife, proceed to enlarge the opening back to marked lines as shown.

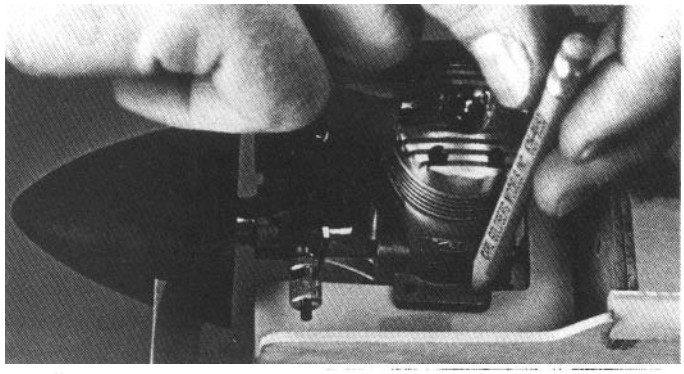


LEFT SIDE DISTANCE SHOULD BE ¼" LONGER THAN RIGHT SIDE

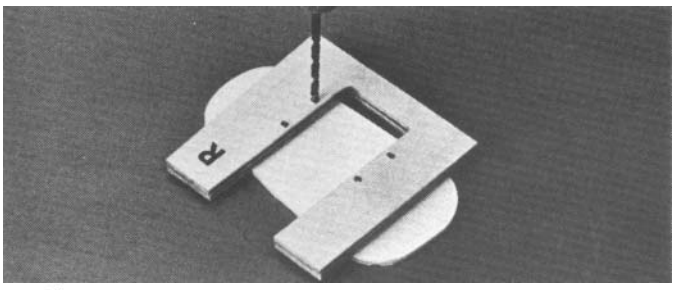
3. ☐ Reposition breakaway plate on fuse and tape in place.

☐ Notice the engine in the top view on the plan is **angled slightly** to the right. this "RIGHT THRUST," although small, is important.

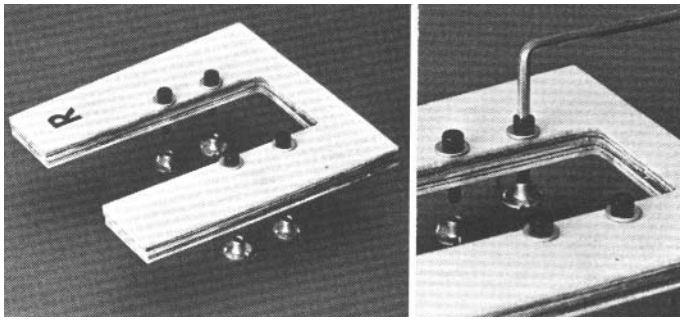
View your model from above, and carefully measure distance from tail end to one propeller tip (propeller must be horizontal). Then measure other side of model in same manner. **Left side** distance should be about ¼" longer than right side. For example, if right side measures 36", left side should be 36¼". Add 2-3 drops of SUPER JET to hold engine temporarily in place.



4a. ☐ Mark straight down through engine mounting holes onto breakaway plate.

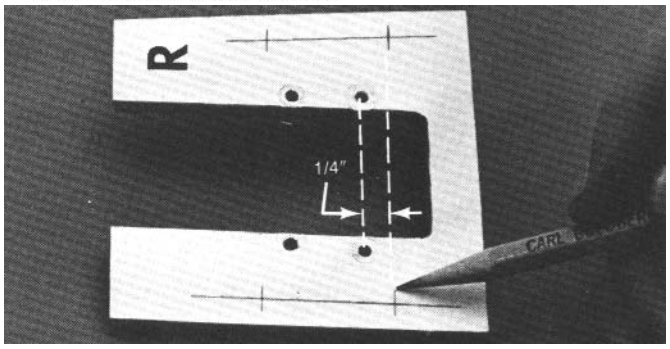


4b. ☐ Remove engine and breakaway plate from fuse. Drill four 1/8" holes through breakaway at engine mounting hole locations (place scrap ply under parts when drilling to avoid splintering.)

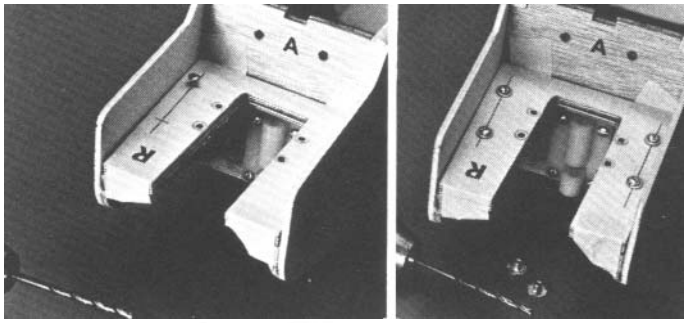


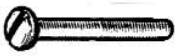
4-40 x 3/8" SOCKET HEAD SCREW WASHER BLIND NUT

5. ☐ Permanently install four blindnuts in **bottom** of breakaway using socket head screws (and washers) to pull blindnuts up into the screw holes as shown. Remove screws after seating blindnuts.



6a. ☐ On die-cut lines, mark cross lines about ¼" ahead of and ¼" behind holes as shown.



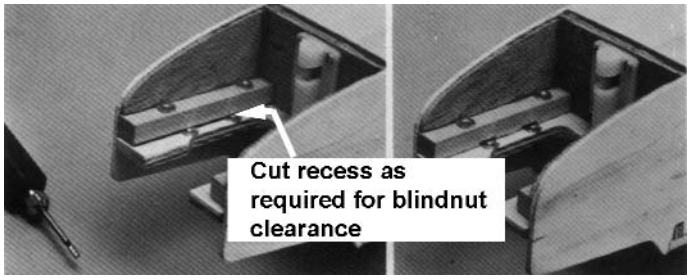


4-40 x 3/4" MACHINE SCREW

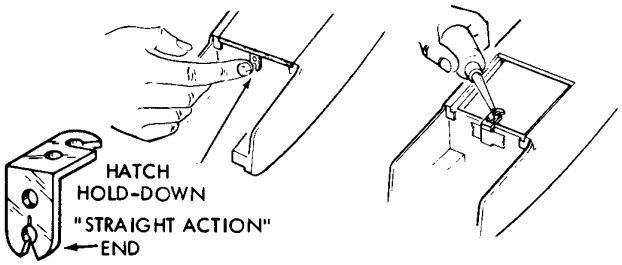
6b. ☐ Tape breakaway plate in position. At one of the locations marked in step 6a, drill a 1/8" hole straight down through it and engine bearer. Insert a #4-40 x¾" pan head screw through hole.

6c. ☐ Continue this procedure, one hole and screw at a time, until all four screws are in place.

☐ Draw blind nuts up into bottom of engine bearers (as you did for breakaway in Step 5) using #4 x ¾" screws.

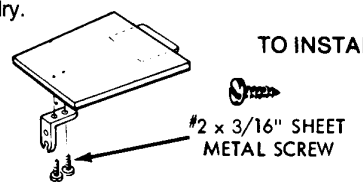


7. ☐ This step may apply only if your engine is larger than .25 size. Turn fuse upside down and check that breakaway plate blindnuts do not contact engine bearer. If they do (as shown in photo above) remove breakaway plate and cut blindnut clearance recesses in bearer. This is easily done using power cutting tool, small carving gouge, etc. The breakaway plate should make **full contact** on the engine bearers.

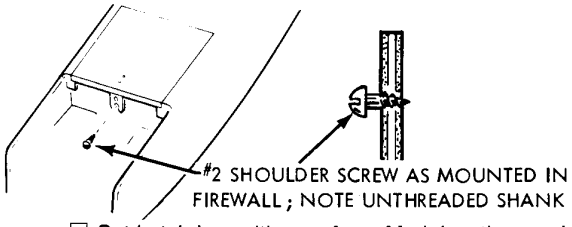


8. ☐ Position hatch cover on fuse. Press hold-down against front of firewall and up against bottom of hatch cover as shown. "Straight action" end should point towards fuse bottom. Tape in position.

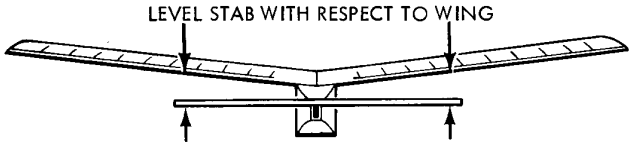
☐ Remove hatch cover and apply SUPER JET to hold down. Replace hatch on fuse, gluing it to hold-down. Let dry.



☐ Secure hold-down to hatch with two#2 x 3/16" screws.



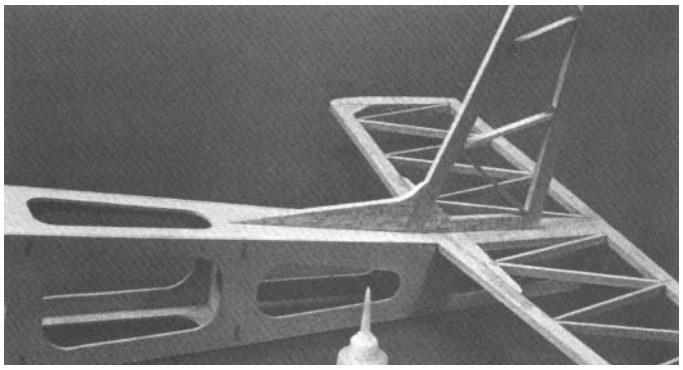
☐ Set hatch in position on fuse. Mark location as shown for #2 shoulder screw. Install screw in marked location, exposing enough unthreaded shank to engage hold down. Snap on and off several times.



9a. ☐ **Temporarily** install wing hold-down dowels in fuse. Rubber band wing in place on fuse, making sure it is centered. Viewing model from rear, see if stab sets level with respect to wing.

☐ Sand stab platform area as may be necessary to provide a good level fit for stab. Do not alter the die-cut angle of the fuse sides.

☐ Center stab on fuse, measuring to obtain equal distance from side to side, and from nose fo fuse to rear corner of each stab tip (see dimension "C" at upper right side of page 24). Pin in place.

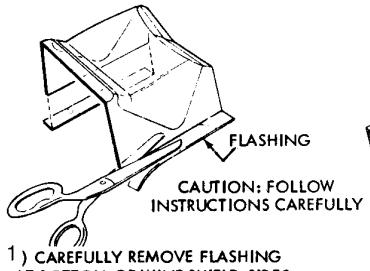


9b. ☐ Trial fit fin in place. Glue dorsal fin to main fin but not to fuse, as shown. When dry, watch grain and very carefully trim off die-cut bumps. Finish sanding.

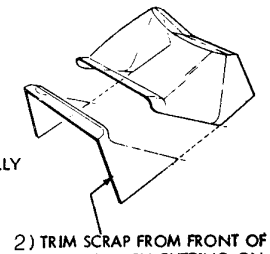
10. ☐ Carefully remove side windows from vac-formed sheet by cutting on lines (about ¼" all around windows).

☐ **Using no glue** at this time, temporarily fit windows into fuse openings. If they fit too tight, causing them to bulge, remove and lightly sand openings the minimum required for good fit. Remove windows from fuse and set aside until later.

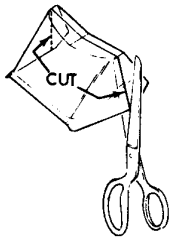
11a. ☐ Remove windshield from vac-formed sheet by cutting on lines as shown in sketches below.



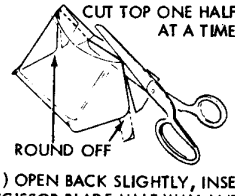
1) CAREFULLY REMOVE FLASHING AT BOTTOM OF WINDSHIELD SIDES.



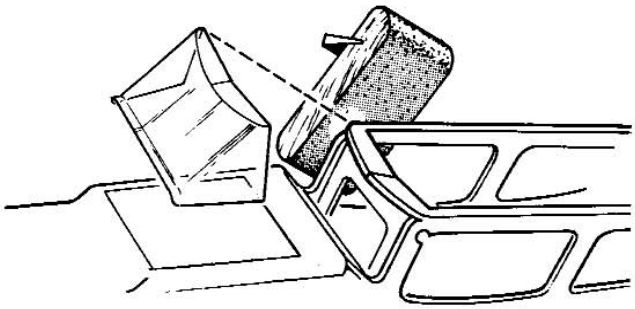
2) TRIM SCRAP FROM FRONT OF WINDSHIELD BY CUTTING ON MARKED LINE.



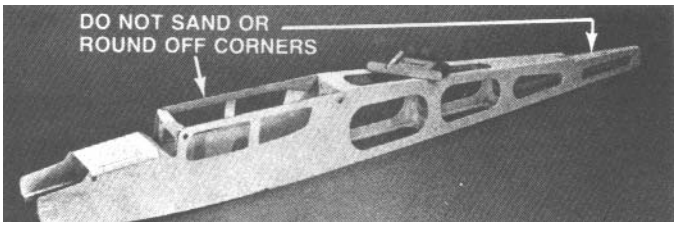
3) MAKE TWO VERTICAL CUTS AT MARKED LINES.



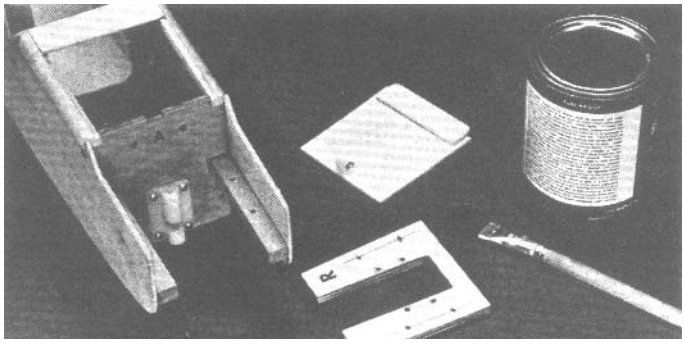
4) OPEN BACK SLIGHTLY, INSERT SCISSOR BLADE HALF WAY AND CUT ON LINE. REMOVE SCISSORS AND FINISH CUT FROM OTHER SIDE. ROUND OFF BOTTOM CORNER OF WINDSHIELD AT MARKED LINES.



12. ☐ Temporarily set windshield in place on fuse, it will probably be tight at the top corner of the cabin sides. Lightly sand the fuse where required for better windshield fit. Set windshield aside until later.

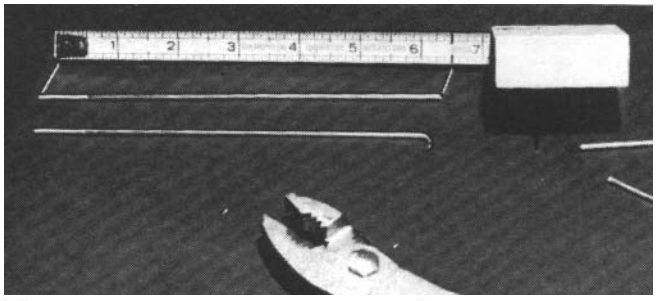


13. ☐ Flat sand fuse and round off corners, except in the following areas: **top** of cabin, **top** of tail mounting area, and window openings—repeat: do not sand **these** areas, except very lightly to remove burrs!

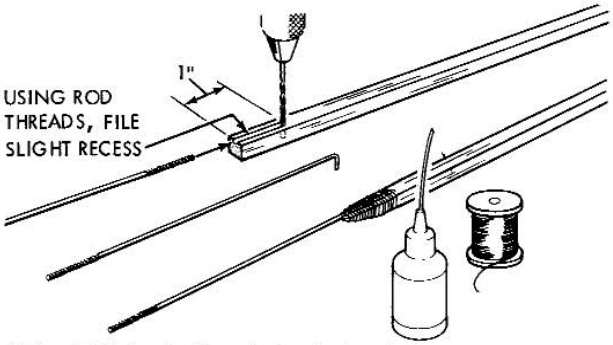


14. ☐ To protect the engine and tank areas from becoming oil soaked, they need to be "fuel-proofed". Either polyurethane enamel, CA glue , or epoxy, is good for this. Polyurethane is available in colors so you can match close to your color scheme.

☐ Apply your fuel-proofer to entire engine area and breakaway plate, inside tank compartment, and bottom of hatchcover. Open up screwholes with toothpick while paint is wet. Let dry thoroughly.



15a. ☐ From the **threaded** end of two **10″ rods,** measure and cut rods down to 6½″ rods, bend down about 3/16″ making a square hook.



15b. ☐ Using the threaded end of a rod, file a slight recess 1″ long at one end of each ¼″ square x 18″ balsa pushrod. (The other end of the pushrods is completed later during radio installation).

☐ Drill a 1/16″ diameter hole 3/16″ deep at end of recess in both pushrods.

☐ Glue rods into balsa pushrods as shown.

☐ When dry, taper ends of pushrods and round off corners. Bind with strong thread, coat with glue and let dry.

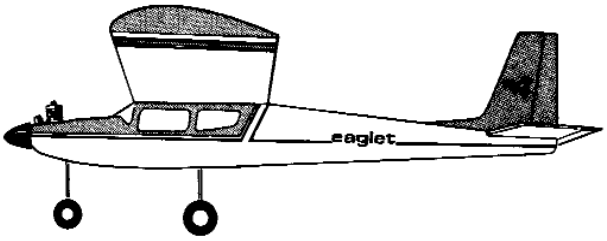
THIS COMPLETES THE FUSELAGE ASSEMBLY

COVERING IV

GENERAL. Any irregularities in the wood will show through the covering, so a good covering job must be preceded by careful sanding, filling dents and knicks, and then more sanding. Use CGM Model Mate filler for a truly professional job, followed by final sanding with 240-320 grade sandpaper.

IMPORTANT! Raw fuel and engine oil residue, if allowed to puddle or stand, can eventually deteriorate the finish, resulting in loose edges of the covering and striping, peeling paint, etc. Wiping the model down after each flight will help maintain your plane's finish for years.

The following instructions show how to cover the model in three different color schemes. Two of the schemes use basic covering techniques—they are recommended for novices. The color scheme shown on the large label photo is recommended only for experienced builders because it requires carefully splicing two colors of covering together.



SIMPLIFIED CIVILIAN SCHEME

Military insignia decals are available at most hobby shops.

NAVY SCHEME

COVERING THE WING

Using a fresh razor knife or razor blade, cut a piece of covering 1" larger in each dimension than one-half of the wing bottom. Strip clear film from adhesive side. For NAVY scheme, cut white covering shorter so two end bays of wing are left uncovered (see sketch A).

Set iron at proper working temperature—test by applying strip of covering on scrap balsa. Lay covering over balsa, and gently press with iron. If iron burns through covering, iron is too hot. If covering pulls easily away from balsa, iron it not hot enough to melt adhesive.

Position covering on bottom of wing, and using iron, tack covering across center of wing.

Work outward, tacking the perimeter edges of the panel, and gently pulling out the main wrinkles as you go.

Seal all around edges of panel. Besides sticking the film firmly to the end rib of the panel, run some of the film down the vertical side of the rib.

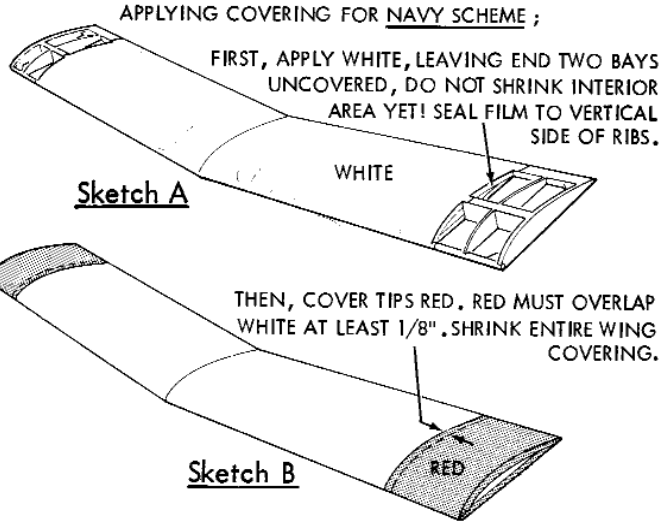
For NAVY scheme only, cut red covering for wing tip. Apply it, make sure to over-lap at least 1/8" of the red film over the white, and that it adheres firmly (see sketch B).

Glide iron over interior area to tighten covering.

Seal covering to all ribs. Trim edges.

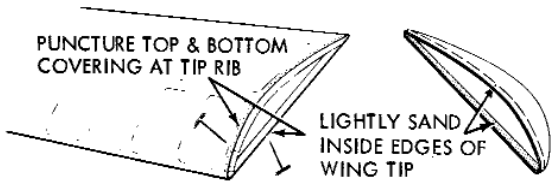
Following same procedure, cover entire bottom, and then top.

For civilian color scheme, red wing tip bands are made from 1-5/8" wide strips of covering and applied over finished wing. Puncture red band to remove bubbles. Apply black 1/8" CG Color-Stripe Tape to finish wing trim.



For aileron wing, immediately go back and slit covering to open hinge slots while the locations are still fresh in your memory. See plan for help in locating slots.

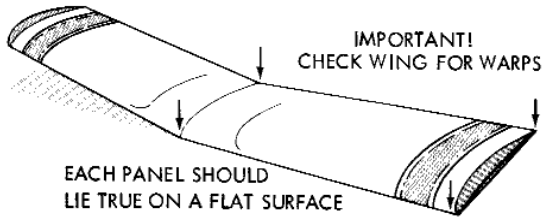
INSTALLING WING TIPS



For better bonding of plastic wing tips, use a pin to make a series of many punctures through covering into top and bottom edges of tip ribs. Also, lightly sand the edges inside the plastic wing tip that will contact the tip ribs.

Apply a bead of SUPER JET to top and bottom edges of tip ribs, and slip plastic wing tip in place.

TRUING WING ***Truing the wing is an important step, and should not be rushed or omitted.***



☐ Set one half of wing on a flat surface to detect warp. To counter any warp found, twist panel slightly in direction opposite to warp, and hold position while gliding iron over covering to re-tension structure. Repeat process until panel is true.

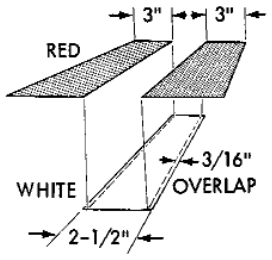
☐ Follow same procedure with other half of wing.

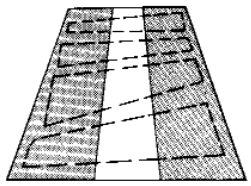
COVERING THE TAIL

Following same procedure as the wing, cover the stab/elevator and fin/rudder. After covering over hinge slots, immediately go back and slit covering to open slots while the locations are still fresh in your memory. Instructions for applying a white band across the fin and rudder as shown on the label are given below. Applying this band is not difficult, but does require careful splicing and therefore is recommended for experienced builders only. WHITE BAND ACROSS FIN AND RUDDER. Cut a strip of white covering 2-½" wide x 12" long, and cut two red strips, 3 x 12".

With protective film facing down, check one edge of white strip with straight edge and tape ends in place (See sketch in Step 2, "More Intricate Civilian Scheme" on next page).

Remove protective film from one red strip, and lap the red about 3/16" over the edge of the white. Tack together in many spots then use the tip area of the iron to bond the red to the white in a good seam.





CUT BANDED STRIP INTO FOUR PIECES TO COVER FIN & RUDDER

Repeat and bond other red strip to opposite edge of white strip.

Cut this banded covering into four pieces to cover fin and ruddee—check placement of white band so it will appear level relative to wing.

Cover dorsal fin.

INSTALLING JET HINGES

IMPORTANT: Read instructions carefully before beginning.

1. ☐ Use the CG Hinge Marker to mark the center of the wood surfaces to be joined.

2. ☐ Carefully cut a slot approximately 1/2" deep and slightly wider than the hinge, using your favorite knife blad.

3. ☐ After all slots have been made, mark the center of the hinge and insert a pin (See illustration). This will hold the hinge in place while sliding the matching part (aileron, etc.) onto the JET HINGE. **DO NOT GLUE!**

4. ☐ With both surfaces hinged and assembled, chick the alignment. For good control response, the hinge gap should be as small as possible, but should allow for full deflection when needed.

5. ☐ When satisfied that all is aligned and working properly, remove pin. Apply 3 or 4 drops of **INSTANT JET** (thin) glue to the exposed JET HINGES. Turn over and apply another 3 or 4 drops to the hinge line of the other surface.

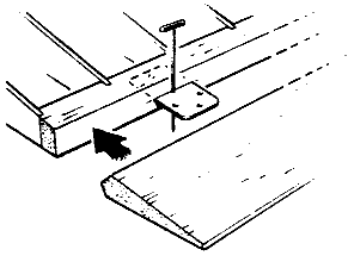
6. ☐ Allow 10 minutes for the glue to cure before flexing the surface.

7. ☐ Tug hard on each hinge to check bond.

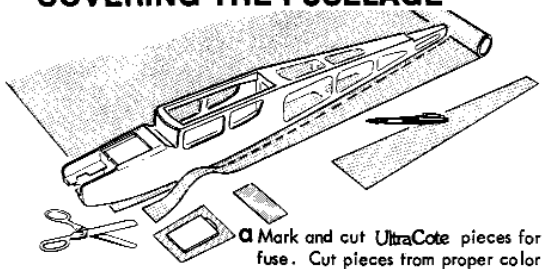
8. ☐ Work the surface up and down to remove any stiffness you may feel.

9. ☐ Repeat this process for all hinges in the tail assembly, ailerons and wing.

IMPORTANT: When hinging ailerons to wing, be sure to glue strip aileron horn wires into ailerons, but DO NOT GLUE AILERONS TO NYLON TUBING!

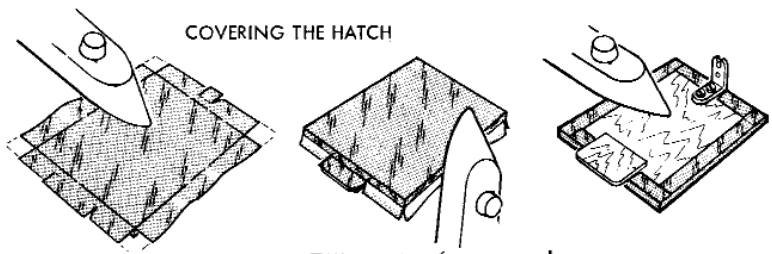


COVERING THE FUSELAGE



1. a Mark and cut UltraCote pieces for fuse. Cut pieces from proper color as they relate to your color scheme.

COVERING THE HATCH



b ☐ Apply covering to hatch top. ☐ Cut corners and slit sides.

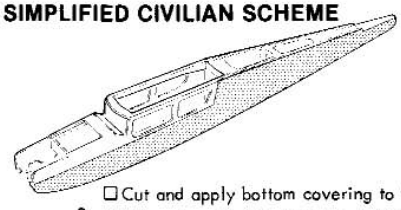
c ☐ Wrap and seal covering around edges.

d ☐ Trim and wrap covering around to hatch bottom.

NOW FOLLOW THE PROPER SEQUENCE ★ BELOW FOR THE COLOR SCHEME YOU HAVE SELECTED

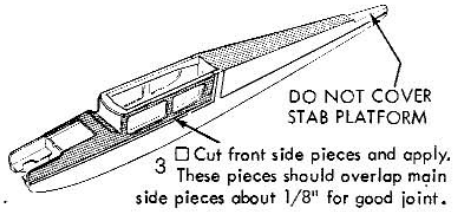
IMPORTANT: IN THIS SERIES OF SKETCHES, NEW APPLICATIONS OF COVERING IN EACH STEP ARE SHOWN SHADED

★ SIMPLIFIED CIVILIAN SCHEME



☐ Cut and apply bottom covering to fuse.

2 ☐ Cut and apply side covering to fuse.



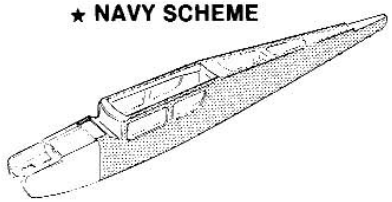
3 ☐ Cut front side pieces and apply. These pieces should overlap main side pieces about 1/8" for good joint.

☐ Carefully trim window openings.

☐ Apply top covering.

☐ Apply 1/8" wide Color-Stripe as final trim.

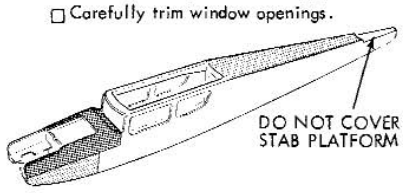
★ NAVY SCHEME



2 ☐ Cut and apply bottom covering to fuse.

☐ Cut main side pieces, and apply.

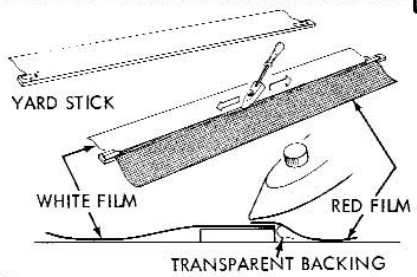
☐ Carefully trim window openings.



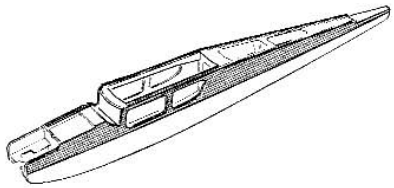
3 ☐ Apply top covering.

☐ Apply red and then black nose markings as shown on label. Lap colors 1/8" over each other for good joint.

★ MORE INTRICATE CIVILIAN SCHEME



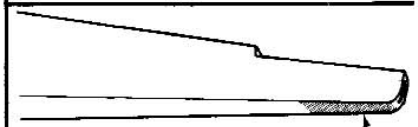
2 ☐ Cut two strips of covering for side. Using splicing procedure shown above, join covering strips; allow at least 1/8" overlap.



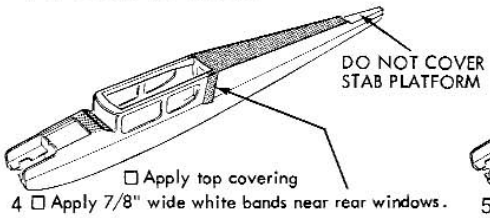
3 ☐ Cut and apply bottom covering to fuse.

☐ Apply spliced pieces to fuse sides.

☐ Carefully trim window openings.

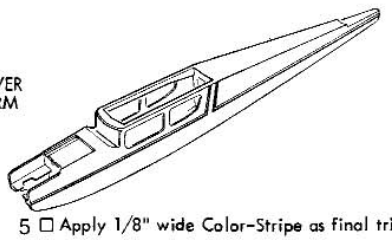


☐ To minimize abrasion from landings, triple coat bottom of tail end with covering . CG Scuff-Guard is a transparent scuff resistant strip that is also recommended.



☐ Apply top covering

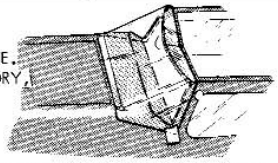
4 ☐ Apply 7/8" wide white bands near rear windows.



5 ☐ Apply 1/8" wide Color-Stripe as final trim.

WINDSHIELD

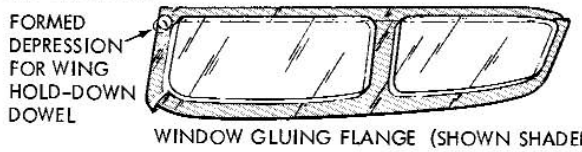
TAPE WINDSHIELD IN PLACE ON FUSE. APPLY GLUE UNDER EDGES. WHEN DRY, REMOVE TAPE & FINISH GLUING.



☐ Temporarily set windshield in place on fuse and note where its outline contacts fuse. For better gluing, lightly sand covering in this outline area - light sanding only, just dulling the surface. For added gluing strength, also make a series of pin hole punctures through covering so glue can grab wood underneath.

☐ Glue windshield in place. Optional: for appearance and added strength, apply colorstripe to joint between fuse and windshield.

SIDE WINDOWS



WINDOW GLUING FLANGE (SHOWN SHADED)

☐ Lightly sand window gluing flange for good bond to fuse. Permanently glue side windows in fuse.

☐ Carefully cut open the formed depression at the front of the windows for the wing hold-down dowels.

☐ Insert 1/4" wing hold-down dowels through cabin with a twisting motion. Dowels should protrude an equal distance from sides of cabin. Glue in place.

☐ Using fuel-proof paint, seal exposed ends of wing hold-down dowels and any other unprotected wood surfaces.

DECAL INSTRUCTIONS

☐ Clean model surfaces thoroughly before applying decals. Cut decal sheets apart in sections as needed. Using scissors, trim to within 1/8". Carefully position decal on model and stick in place. Working from center, rub decal down while peeling off backing.

FUEL SYSTEM

☐ Assemble your fuel tank per manufacturer's instructions.

☐ Refer to full size views on plan, and install fuel tank and lines. Support bottom of tank with foam rubber.

☐ Attach the fuel line (leading from the "clunk" weight inside the tank) to your engine's carburetor. This is also the line to use for fueling. You simply slip the line off the engine, fill the tank, and re-connect line to engine.

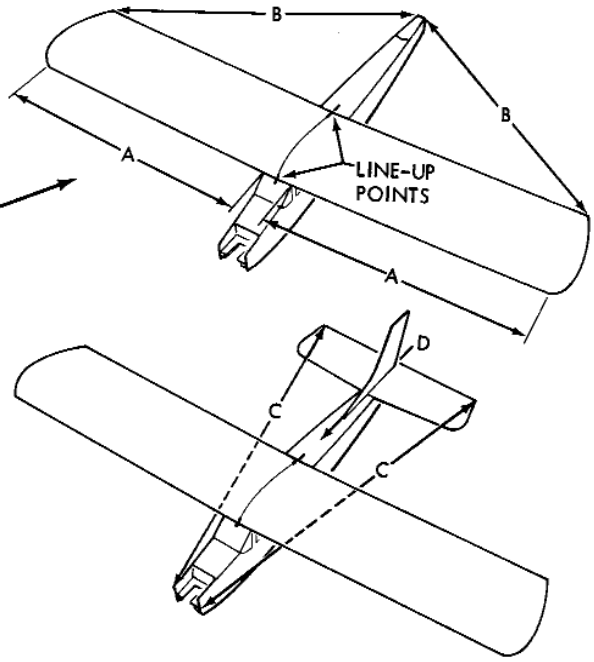
OPTIONAL PRESSURE FEED

☐ If your muffler has a fuel-line type fitting on it, you can use it to "pressure feed" fuel to the engine for smoother and more reliable running. In this case, the vent line is connected to the muffler fitting.

V FINAL ASSEMBLY

☐ The top edge around the cabin area should be lined all around with 1/16" x 1/4" self-adhesive foam wing seating tape. When the wing is in place, the tape seals against entry of exhaust oil and dirt into the radio compartment. Also, the tape is a cushion between wing and fuse to prevent abrasion of the covering.

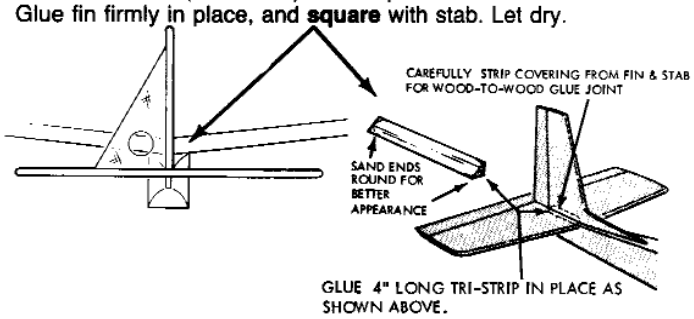
☐ Mount wing on the fuse using rubber bands. Measure carefully from the fuselage sides out to the wing tips (arrows 'A') to be sure that the wing is centered. Then measure from the wing tips to the back end of the fuse (arrows 'B') to make sure wing is square with fuse. Mark the wing center at leading and trailing edges, and the fuse, with matching line-up points. Color-Stripe tape can be used for this, or certain marking pens.

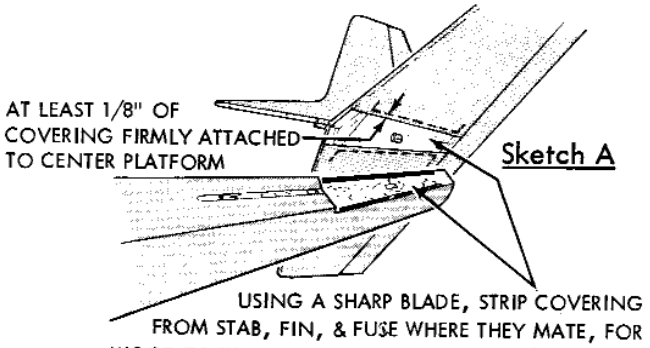


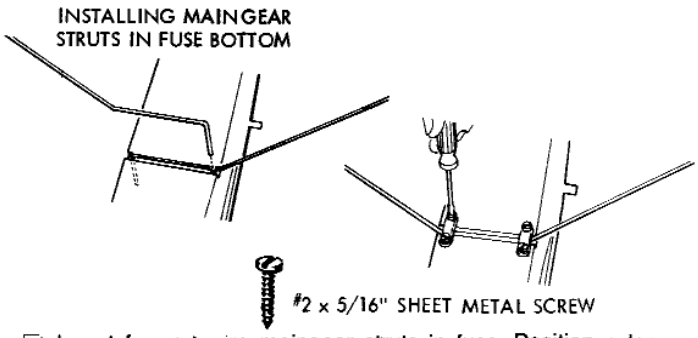
☐ Using no glue, trial fit stab in place on fuse, marking it for center, and adjust as necessary to line up with wing. Then measure from the stab tips to the fuse front (arrows 'C') to make sure stab is square with fuse. Mark match-up lines on fuse and stab for alignment.

☐ To provide a firm wood-to-wood glue joint, strip covering from bottom of stab center where stab contacts fuse (see sketch A). **Avoid cutting structure underneath.** Be certain to leave enough covering **firmly bonded** to stab center (minimum 1/8" to 3/16"). Likewise, if stab area on fuse was covered, remove covering. Glue stab firmly to fuse and let dry.

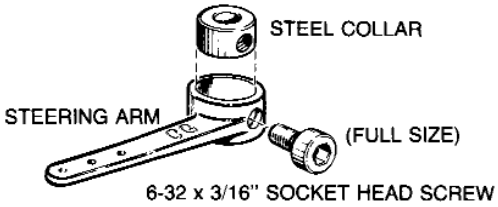
☐ Trial fit fin in place on fuse/stab (arrow 'D'). Strip covering from fin bottom (if covered) and respective area on fuse/stab. Glue fin firmly in place, and **square** with stab. Let dry.





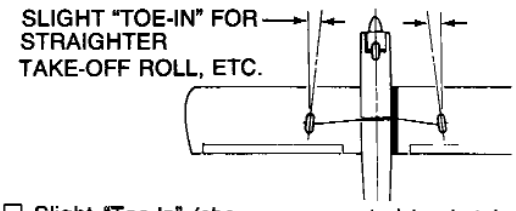


☐ Insert formed wire maingear struts in fuse. Position nylon landing gear straps; then mark, drill, and mount with #2 x 5/16" screws (see sketches above and illustration on page 5).

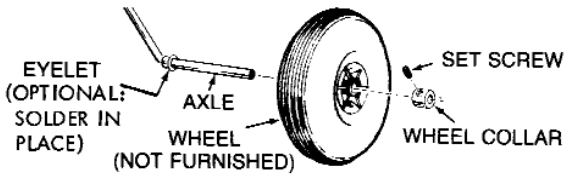


☐ Press one of the four steel collars into the pocket in the nylon steering arm (side holes must be aligned). Thread #6-32 x 3/16" socket head screw in a few turns.

☐ Install nosegear strut in bearing and steering arm (refer to illustration on page 5). Tighten socket head screw with Allen wrench.



☐ Slight "Toe-In" (shown exaggerated in sketch above), makes taxing, take-off roll, etc., straighter. For toe-in, gently bend axles slightly in towards nose.



☐ Install wheels on axles as shown: eyelet first, wheel, then wheel collar and set screw.

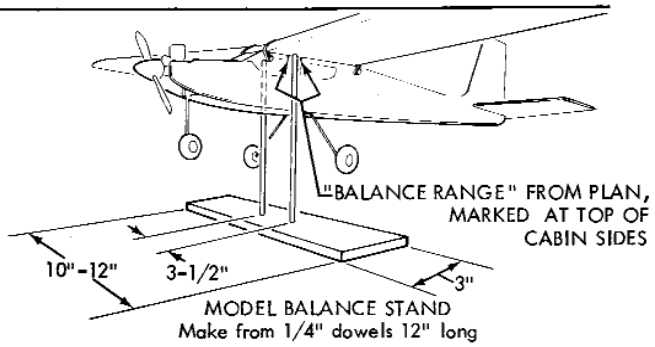
VI PREPARATION AND INSTALLATION OF RADIO

1. **Check List. Each Item Must Be Completed Up To This Stage.**

- ☐ Model is fully covered and painted wherever necessary (Page 20).
- ☐ Control surfaces are covered, and hinged in place (Page 22).
- ☐ Tail assembly is glued solidly to fuse (Page 24).
- ☐ Engine screwed in place (Page 17).
- ☐ Muffler on.
- ☐ Prop and spinner in place.
- ☐ Fuel tank installed, with foam rubber supports to hold it level.
- ☐ Stab and rudder pushrods complete, rear end only (Page 20).
- ☐ Landing gear and wheels installed.

2. **Balancing The Model.**

- ☐ Tape stab and rudder pushrods to side of fuse with rear ends in approximate final position (refer to full size view on plan).
- ☐ Set R/C airborne equipment temporarily in fuse (refer to plan for approximate location).
  - a) Battery most forward.
  - b) Receiver (Rx) next.
  - c) Servos rearmost.
  - d) For "B" wing, install aileron servo in wing.
- ☐ Refer to fuse side view on plan for "BALANCE RANGE," then measure and mark this range at top of cabin sides.
- ☐ Temporarily rubber band wing in place on top of fuse. When flying, use at least eight #64 rubber bands.
- ☐ Lift the model under the wing near the fuse by finger tips. A better way is to use a simple set-up with a couple of 1/4" dowels with rounded tops, spaced 4" apart.
  - a) Move finger tips or balance stand through the balance range until model is level.
  - b) If you need to support the model outside the balance range to get it level, remove wing and shift R/C equipment away from heavy end of model until model will balance within the range. The preferred location is at the wing spar.



MODEL BALANCE STAND
Make from 1/4" dowels 12" long and 1/4" ply or hard balsa base.

  - c) If shifting the R/C gear still doesn't balance the model, add weight to extreme nose or tail respectively until it's right. The least weight is needed when added as far forward or back as possible. Fasten weight permanently in place.
- ☐ Carefully remove the wing, and mark on fuse interior the locations of all R/C parts.
- ☐ Completing stab and rudder pushrods:
  - a) Measure about 2" from the backsides of the servos to the balsa pushrods, and mark them at this point.
  - b) Remove pushrods from fuse, and cut them at marks.
  - c) Cut one 1/16" x 12" wire in half, and use these pieces to complete forward end of pushrods.

SEE BACK COVER FOR ADDITIONAL TIPS ON RADIO CARE & UPKEEP

3. **Radio Installation.**

A. Read and follow the instructions that came with your radio.

B. If your batteries are dry cells, they should be fresh. If rechargeable nicads, they should be fully charged.

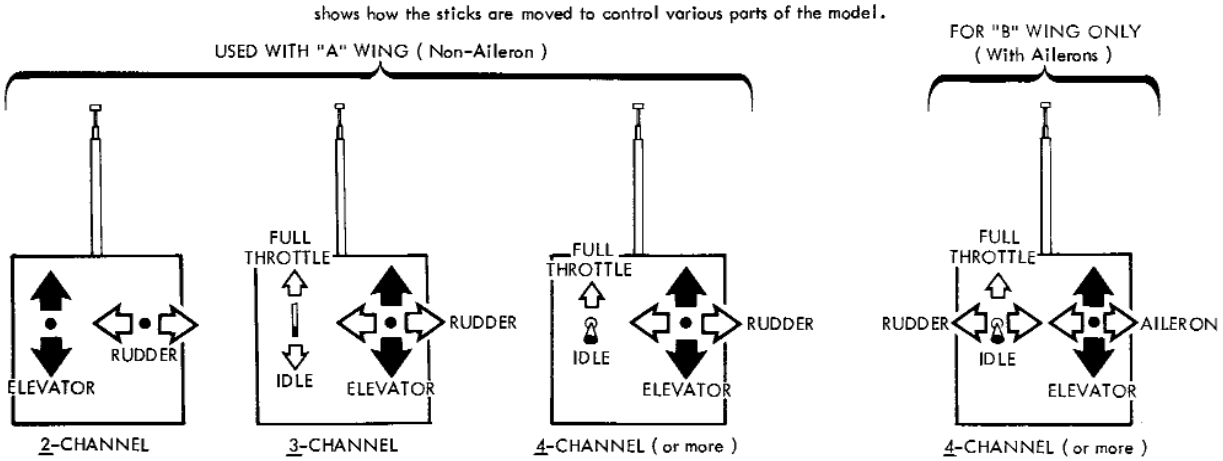
C. Hook-up Radio and Try Operation.

- ☐ Refer to "Transmitter Function Sketch," and observe which servo wheels move when stick is moved for various controls.

continued on next page . . .

TRANSMITTER FUNCTION SKETCH

Your transmitter is built like one of those illustrated below. Each sketch shows how the sticks are moved to control various parts of the model.



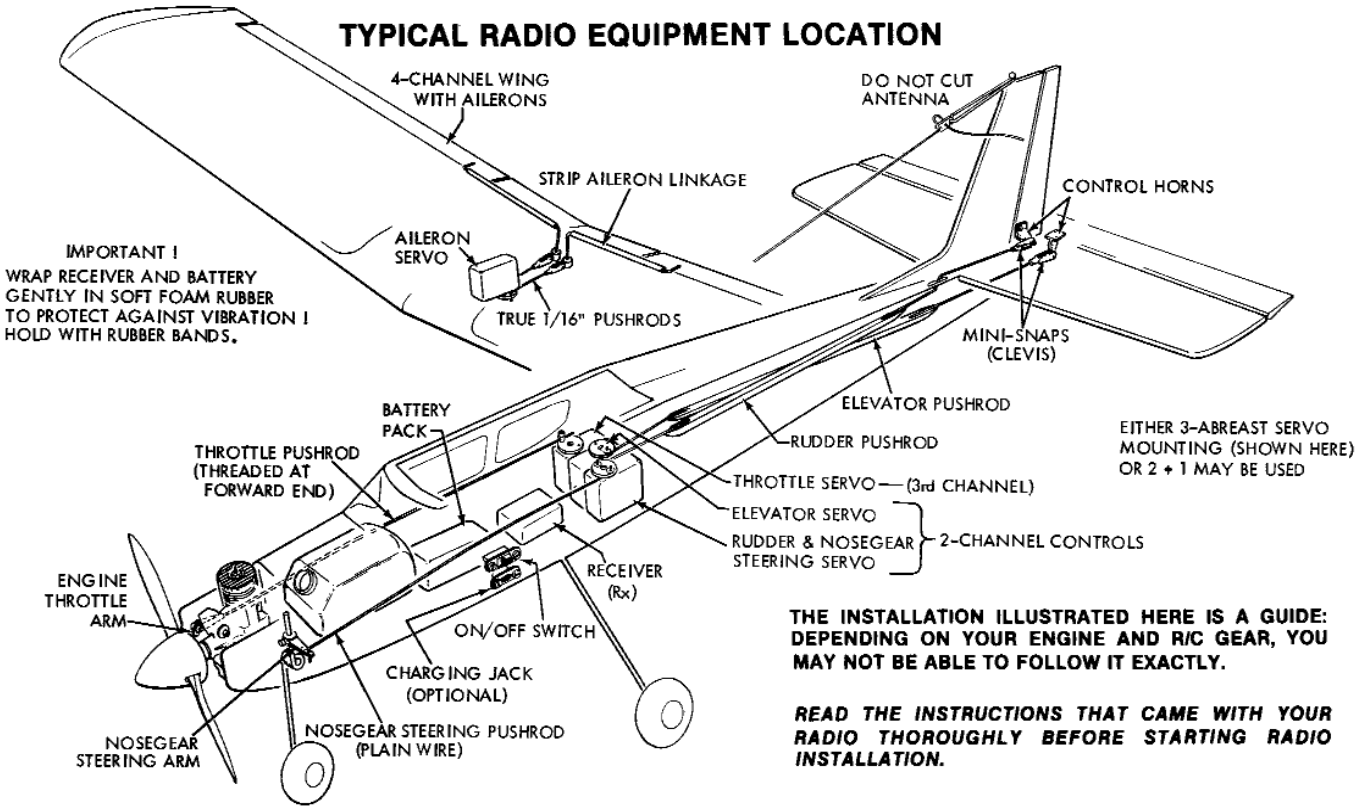
2-CHANNEL
Transmitter with two sticks
Controls 2 Servos (Use only with .09 or .10 engine)

3-CHANNEL
Transmitter with single stick and one sliding tab or button.
Controls 3 Servos (2-Channel Single Stick transmitter is like above, but does not have throttle control).

4-CHANNEL (or more)
Transmitter with two sticks. When used for 3 Channels, it controls 3 Servos.

4-CHANNEL (or more)
Transmitter with two sticks.
Controls 4 Servos.

TYPICAL RADIO EQUIPMENT LOCATION

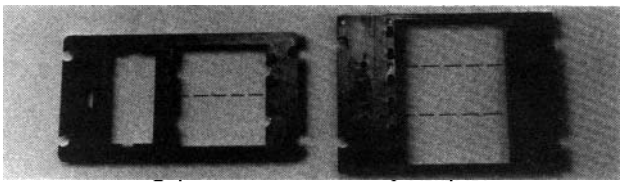


THE INSTALLATION ILLUSTRATED HERE IS A GUIDE: DEPENDING ON YOUR ENGINE AND R/C GEAR, YOU MAY NOT BE ABLE TO FOLLOW IT EXACTLY.

READ THE INSTRUCTIONS THAT CAME WITH YOUR RADIO THOROUGHLY BEFORE STARTING RADIO INSTALLATION.

☐ Apply tape (which you can write on) to each servo. Identify each servo for its control function. Mark the plug to each servo the same way: "R" for rudder, "E" for elevator, "T" for throttle, "A" for ailerons if you have them. If your receiver doesn't have separate plugs for each servo, but places for the servos to plug in, apply a piece of tape nearby that you can mark for each application.

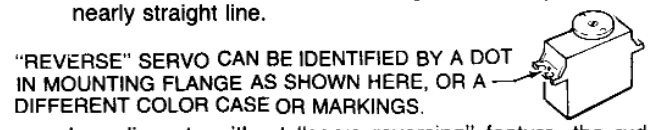
4. Servo Arrangement.



If a servo mounting tray is furnished with your radio, it makes it easier to mount servos. The most common tray is a "2+1" type (as shown above left and at bottom center of plan, side 1). Either a 2+1 or a 3-abreast can be used. If a tray is not used, the 3-abreast mounting is recommended with servos mounted directly on plywood rails (as shown in the main plan view).

☐ For "2+1" mounting, with throttle servo at forward position, place servo so output wheel is on same side as engine throttle arm. For 3-abreast mounting, place throttle servo on same side of model as throttle arm.

☐ Rudder servo should be on side opposite to throttle servo so it can drive the nosegear steering arm in a nearly straight line.



In radio sets without "servo reversing" feature, the rudder servo is usually a "reverse" servo. A "reverse" servo can be identified by a dot (see above), or a different color case or markings.

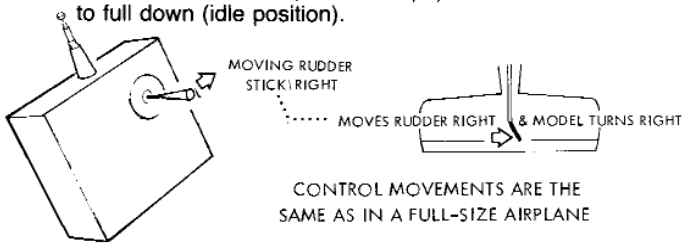
☐ Elevator servo occupies remaining rear position for "2+1", and is in the center for 3-abreast.

5. Servo Movements

As mentioned in the introduction on page 2, radio systems with "servo reversing" simplify radio installation. With a **regular non-reversing** system, you must match each pushrod to its corresponding servo's rotation. With "servo reversing," pushrods can be hooked up to either side of the servo's output wheel, and after checking the control response, a servo responding in the wrong direction is easily, switched to correct action (see your radio manufacturers instructions).

The 2+1 arrangement on the plan shows standard servo placement for a "servo reversible" system. The 3-abreast arrangement shows the elevator pushrod hooked up on the other side of the servo wheel, as required on regular radios. For **either** type of radio system, check your equipment out with the following procedure.

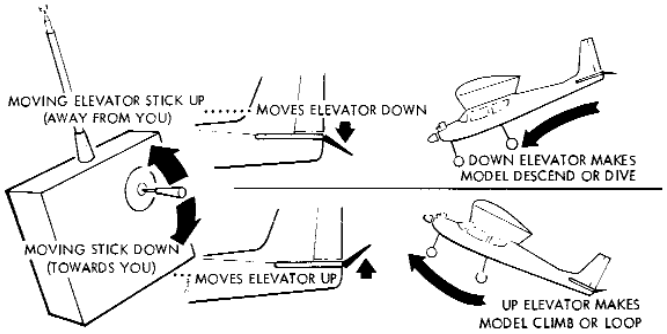
☐ Push the transmitter (Tx) throttle lever up away from you, and observe where throttle servo wheel should connect to the throttle pushrod to give full throttle. Mark this on the servo wheel (write on tape). Return throttle lever to full down (idle position).



CONTROL MOVEMENTS ARE THE SAME AS IN A FULL-SIZE AIRPLANE

☐ Move rudder stick to the right, and observe where rudder servo wheel should connect to give right rudder and nosegear steering. Mark this on the servo wheel.

Remember, for non-reversing radios, that the rudder servo usually needs to be a "reverse" servo.



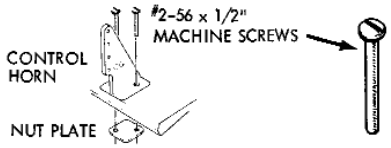
☐ Move the elevator stick up, and observe where the elevator pushrod must be attached to the elevator servo to pull the elevator down. Mark servo.

☐ Ailerons ("B" wing). Move the aileron stick to the right, and observe that the right aileron must be connected so it moves up.

6. Mounting The Control Horns and Pushrods.
Rudder Horn (Small):

☐ Refer to fuse side view on plan for correct location.

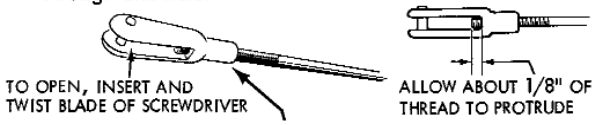
☐ Tack-cement small horn on correct side of rudder.



☐ Drill through holes in horn, and mount nut plate on other side using screws as shown. Trim screws flush with nut plate.

☐ Remove covering from die-cut hole in fuse top (adjacent to dorsal fin) for rudder pushrod.

☐ Lay pushrod over pushrod views on plan, and make bends as required. Working from cabin, feed rudder pushrod (threaded end) through fuse rear and out exit hole. Use a loop of string or wire to pull threaded end up through exit hole.



☐ Twist snap-link (large clevis) onto threaded rod. Hold pushrod wire with pliers while installing snap-link. Connect to rudder horn.

ELEVATOR HORN (Large):

☐ Insert threaded end of elevator pushrod from cabin through fuse rear and out slot opening about 2".

☐ Install mini-snap (small clevis) on rod, and connect to elevator horn.

☐ Position horn under elevator — refer to plan for correct location. When horn is centered so mini-snap moves in and out of tail opening without scraping sides, mount horn on elevator.

7. Mounting Servos, using a tray (for mounting without tray, follow instructions as applicable).

☐ Tape front end of rudder and elevator pushrods up out of the way under cabin top doublers.

☐ Insert the soft rubber grommets into the mounting holes of your servos and tray.

☐ Correctly position servos in tray and gently fasten them in place with screws provided with radio system.

☐ Measure from the bottom of your servo to the underside of a grommet. Add about 1" to this measurement. The total is the height of the top of the servo rail above the fuse floor.

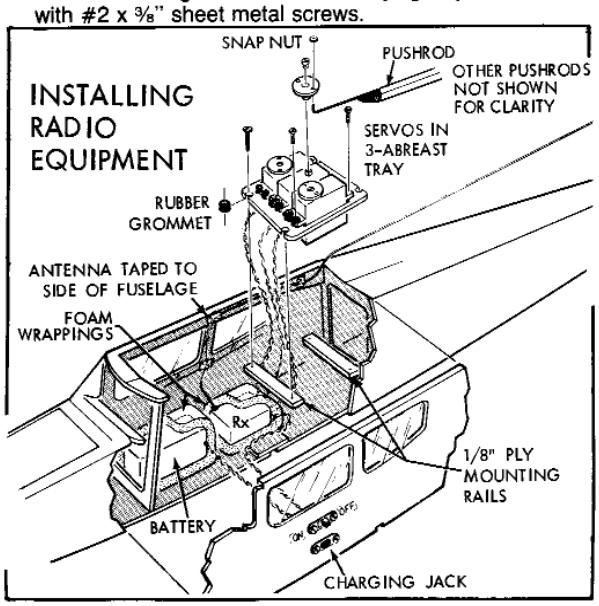
☐ Mark the inside of the fuse for the height of the rails at servo locations previously marked during balancing.

☐ Try fitting a ½" x 2¾" ply rail at the rear rail location. If the rail is too long to fit inside fuse, sand one end until it fits snug. Glue it in place.

☐ Place servo tray between rails, and adjust the forward rail for mounting tray. Glue this rail in place. (IMPORTANT: for mounting servos directly on rails without a tray, allow 1/16" clearance all around each servo — only servo grommets to contact rails, and glue forward rail in place.) Mark through the grommets for the location of the mounting screws.

☐ Remove the tray or servos. With a 1/16" drill bit, drill holes in rails, and fasten tray in place with screws provided with your radio system.

When mounting servos without tray, gently fasten them with #2 x ⅜" sheet metal screws.



8. Installing The Throttle Pushrod.

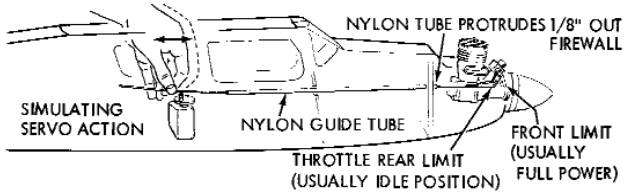
☐ Screw mini-snap on the extra-long remaining threaded rod.

☐ Refer to full size view on plan of throttle pushrod installation, and use it as a guide in bending pushrod to attach mini-snap to your engine's throttle. Caution: do not bend threaded portion of wire—it might break!

☐ Cut an 8¾" throttle pushrod guide tube from long nylon tube (remainder is steering pushrod guide tube).

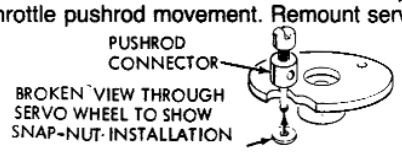
☐ Starting at hole in firewall, slide throttle guide tube into fuse and through side slot in former B. Nylon guide tube should protrude 1/8" out firewall as shown in sketch below. Slide rod through guide tube and connect mini-snap to engine throttle arm.

☐ At rear end, make sure bend in wire leads it towards throttle servo wheel as shown on plan.



Move pushrod back and forth to simulate servo action. The pushrod should move freely; if not, adjust wire where necessary. Feel the front and rear "limits" of the throttle arm. Later, when setting controls, be sure to set the throttle servo linkage within the range of throttle arm movement. Glue guide tube to firewall, former B and fuse side.

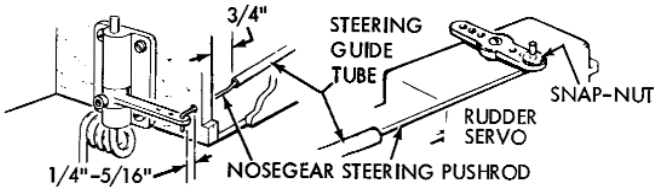
☐ Remove servo wheel, and install the CG Pushrod Connector as shown below. This device lets you easily adjust throttle pushrod movement. Remount servo wheel.



Make sure throttle servo is at idle position. Engine throttle arm also should be at rear or idle position. Align and cut the pushrod wire so it extends ¼" to the rear of the pushrod connector, and attach. Check action with radio, and if OK, throttle pushrod hookup is completed.

9. Installing The Nosegear Steering Pushrod.

☐ Make a square bend down ¼" from one end of 1/16" x 12" wire, and a slight upward bend 1" further back as shown on plan side view. Slide steering guide tube over wire, and insert unbent end of wire through hole in firewall, side slot in former B, and back towards the rudder servo. Slip bent end into outermost hole in steering arm. Guide tube should remain about ¾" behind firewall.



☐ Bend the wire towards proper hole in rudder servo wheel, but DO NOT CUT YET! Move pushrod to check for free movement; correct as necessary. Glue guide tube to former B and fuse side.

☐ With nosewheel pointing dead straight ahead, the end of the steering arm should be ¼" - 5/16" away from the firewall. Back at the servo, allow additional ⅜" past servo wheel hole, and cut it there. Bend cut end up ¼".

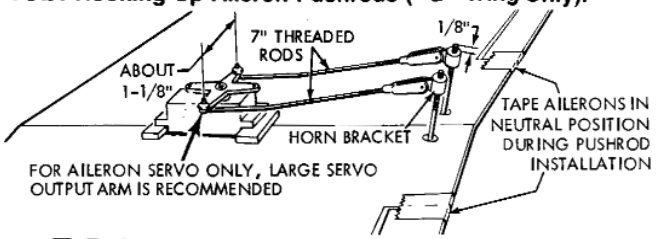
☐ Roughen ¼" bent end with sandpaper for better grip of snap-nut. Remove servo wheel to insert pushrod, add snap-nut, and then remount. Check action with radio. This completes the nosegear pushrod hookup. Later, during taxi tests, you can adjust nose wheel steering by loosening steering arm socket head screw.

10a. Hooking Up Elevator and Rudder Pushrods.

☐ Position elevator pushrod so that the top of elevator is about flat with top of stab. Allow additional 5/16" past servo wheel hole, then cut and bend forward end of pushrod. Roughen bent-up wire with sandpaper, remove servo wheel and insert wire, and retain with snap-nut.

☐ Position rudder pushrod so that the rudder is aligned with fin. Cut and bend forward end of pushrod as above, and attach to rudder servo wheel.

10b. Hooking Up Aileron Pushrods ("B" Wing Only).



☐ Re-install aileron servo in wing. Tape ailerons in neutral position (so flat bottom of wing and ailerons are flush).

☐ Install horn brackets on aileron horns as shown. Install snap-links on each 7" True 1/16" threaded rod, then connect snap-links to horn brackets. Align each rod to its respective hole in servo wheel. Allow additional 5/16" past servo wheel holes, then cut and bend forward end of pushrods, same as elevator pushrod procedure.

11. Installing Switch and Charging Jack.

☐ Temporarily set battery and Rx in fuse. Position switch and charging jack cover plates on outside of fuse on side opposite to engine exhaust, and where they will not obstruct the battery or Rx. Mark through cover plates for holes and openings. Remove battery and Rx.

☐ Make holes through fuse side. Make sure hole for switch button is long enough for it to move to ON and OFF positions.

☐ Install switch and jack.

☐ Later, when radio is operating, identify ON and OFF positions with decals provided. Preferred "ON" position is forward.

12. Battery Pack.

☐ You must have fully charged nicads or fresh dry cells for flying.

☐ Wrap battery in ½" very soft foam rubber to cushion it from vibration and shock. Use rubber bands or tape to hold the foam around the battery. It is also good to place battery and Rx in individual plastic bags to protect against fuel and oil.

☐ Position battery in fuse, and hold in place with additional foam rubber.

13. Receiver (Rx).

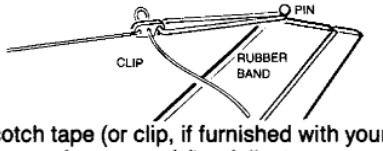
☐ Do not cut the antenna wire attached to the Rx.

☐ Wrap Rx carefully in foam like the battery.

☐ Re-connect all cables so R/C system is operational; be sure that each servo is plugged into its respective Rx terminal.

☐ Place Rx in fuse behind the battery.

☐ Lead the antenna wire up and back along cabin top doubler and out top rear of cabin. Tape wire inside cabin.



☐ Using scotch tape (or clip, if furnished with your radio), suspend antenna from top of fin. Adjust antenna so it is just slightly taut, not tight. Let excess wire hang loose from fin.

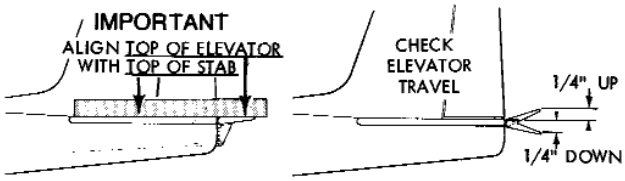
☐ Gather all excess cables together behind Rx, and hold them down with foam.

☐ Apply "ON/OFF" decals to outside of fuse to identify switch positions.

14. Setting Control Surfaces.

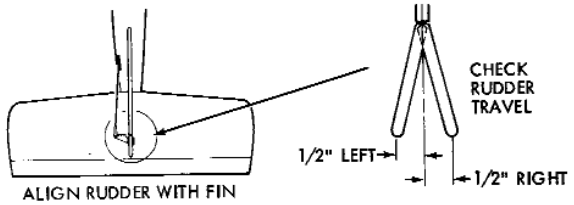
All pushrods must move freely, without binding; adjust if required for smooth operation. When setting control travel, be cautious that no servo is hooked to a control in a manner that prevents the servo wheel from moving through its complete range of rotation. For example, if the throttle servo "buzzes" when moved to "full-throttle" position, the servo still has movement left, but is jammed against the engine's full-throttle limit position. This can damage the servo and drain the battery, leading to loss of control, and a crash.

☐ Move throttle lever on Tx to cycle the throttle from idle to full power. Minor adjustments can be made by shifting the mini-snap location on the engine throttle arm.



☐ With elevator trim tab on Tx set in center, adjust elevator mini-snap until top of elevator is flat with top of stab as shown above.

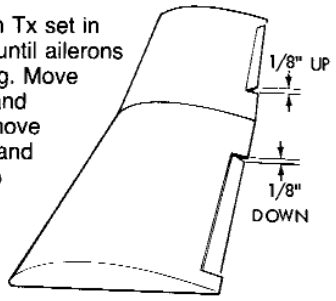
☐ Move the elevator stick on Tx full up and down. The elevator should move down about 1/4" and up 1/4".



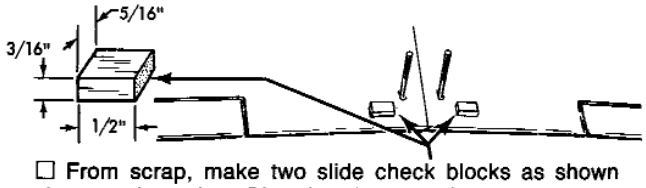
☐ With rudder trim tab on Tx set in center, adjust mini-snap until rudder aligns perfectly with fin. Nose wheel should point straight ahead.

☐ Move the rudder stick on Tx full right and left. The rudder should move to the right about 1/2" and left 1/2". The nosewheel should move only very slightly, as it doesn't take much to steer on the ground.

☐ With aileron trim tab on Tx set in center, adjust mini-snaps until ailerons are flat with bottom of wing. Move the aileron stick full right and left. The ailerons should move respectively up about 1/8" and down 1/8" (slightly more up than down is desireable).



☐ Important! To provide safe clearance for the aileron control linkage, carve away about half the thickness of the rear wing dowel (see plan side 2, fuse side view). Glue entire length of dowel to former C.



☐ From scrap, make two slide check blocks as shown above and on plan. Glue the blocks to the bottom of the wing T.E. as shown. Remove the wing covering from under the blocks for wood to wood glue joint.

THIS COMPLETES THE RADIO INSTALLATION

VII WHERE TO FLY YOUR MODEL

Fly only in areas sanctioned for R/C, and known to be free of radio interference. There may be a local R/C flying club that uses a flying field near you; this is the natural place to fly. Ask your dealer or other modelers how to find it. But remember, R/C flying fields need to operate by rules to help prevent accidents. Most important of these rules is cautious use of your transmitter. Always make sure no one else is using your radio frequency before switching your transmitter on! For this reason, DO NOT TEST your radio gear in the parking lot - you might "shoot down" someone out on the field. That would make you very unpopular!

At the R/C field, ask one of the better flyers if there is someone who can help you through your initial flights. This is very important. Some R/C clubs have their own authorized instructors - inquire about that. If you don't know the whereabouts of an R/C club near you, write the Academy of Model Aeronautics (AMA) and ask if they have a club on file in your area. Most clubs are chartered with the AMA and we recommend you become a member. Their address:

Academy of Model Aeronautics
1810 Samuel Morse Drive
Reston, VA 22090

If you determine that no club or related flying site is available, you need to locate a large square space at least the length of four or five football fields, free of trees, poles and other obstructions. A grassy field is ideal. For safe control, this field must be at least two to three miles away from any areas where other R/C models (such as boats or cars) are operated. At the field, turn your receiver on for 2 or 3 minutes to check that no one in the vicinity is operating at that time an R/C device which could affect your receiver and crash your plane. The site should be safely away from houses or busy streets—leave yourself plenty of room for errors. The runway area should be a relatively smooth surface at least 200 feet long and 30 or 40 feet wide. If grass or brush is too thick to permit the model to fly itself off the ground, the model can be hand launched, as described later.

VIII RADIO CHECK

Before going to the field to fly, with batteries fully charged, turn on receiver and transmitter and actuate all controls many times until you are satisfied with all functions.

Prior to the beginning of each day's flying, make a range check of your equipment in accordance with the manufacturer's instructions. In general, with transmitter antenna collapsed to 6" to 8", you should have at least 100 feet range on the ground. To check this, turn on both the transmitter and receiver switches, set the model heading away from you, and walk away while transmitting signals. Watch to see that no signals are missed until you are at least 100 feet away. Only if the equipment works perfectly should any flights be attempted. Be careful not to use your transmitter when someone else on the field is flying or testing on the same frequency.

ABOUT LEARNING TO FLY . . .

It enormously increases your chances for success if you have an instructor. Learning to fly is harder than it looks —and a mistake can seriously damage or destroy your model. Even full-scale pilots have problems learning to fly models, because it's different—they're not in the cockpit. It's worth real effort to find someone to teach you. Ask your dealer for suggestions. **And only if there is no other way** open should you attempt to learn on your own.

As a first step, repeat the range check of your radio, following the manufacturer's directions. Then, stand behind the model, and make sure that the control responses are correct. Moving the control stick to the right should give right rudder (on 2 or 3 channel set-up), or the right aileron should go up (on 4 channel set-up). Moving the stick back or down on the Tx should move the elevator up, and vice versa.

Check also to see that your nose wheel turns to the right when you give right rudder. Your throttle should open to permit full power when the stick or tab is moved forward or up. Make sure that everything is neatly and firmly in place—engine fastened down, servos snugged down, receiver and battery wrapped in foam rubber, tank properly supported, etc. Prop and spinner must be tight. Nothing should be loose, or unfinished, or unchecked. Receiver antenna must be extended, not coiled up inside the model.

With everything ready, the engine should be started and broken in for at least a tank or two at no more than moderate speed. While the engine is running, the control surfaces should not jitter or move until you command them. The throttle also should respond to your command.

PRACTICE STEERING THE MODEL ON THE GROUND (3 or 4 channel only)

For the next couple of hours, practice taxiing the model around at low speed. This is a very helpful step in making you feel more at ease in controlling the model. Do not rush it. Use a parking lot rather than a street where you are likely to run into a curb and damage your model. Practice taxiing in light breezes or when the air is calm; strong or gusty winds can catch a wing and flip your plane over.

It is very important in flying to make all your control movements slow and measured. Rapid movements tend to throw the model out of control. Apply minimum throttle so that it just keeps the model moving at a walking pace. With rudder stick and rudder trim in neutral position, the model should move straight ahead. If it constantly turns left or right, the nose wheel is not pointing straight ahead, and should be adjusted until it is correct. Adjust the nose wheel only, loosening the steering arm to do so.

Do a lot of practicing with the model coming towards you, as it often will in the sky. When the plane is pointing at you, the steering will appear "reversed." When you give right rudder, the plane turns to your left—but the model actually is turning to its right as you commanded. With practice, you will soon overcome this. When the model comes towards you, simply push the stick left or right towards whichever way the ship is turning. Another helpful technique is shown in sketch A on page 31 . "Head-on" disorientation is a nuisance on the ground, but dangerous in the air where things can happen pretty fast. The more familiar you become with the behavior of the model as you control it on the ground, the better prepared you will be for flying.

After taxi runs are completed, thoroughly examine the model, and tighten loose screws, etc. First flights should be made on a day that is not very windy or gusty. There should be very few people or other distractions around. You will need to concentrate. Your success doesn't depend on following the instructions here to perfection, but you should have a flight sequence in mind. Think ahead of the model—don't chase it around the sky always one thought and one control command behind it. Your first flights should last no more than 2 or 3 minutes.

PRE-FLIGHT CHECK LIST, THINGS TO DO, AND THINGS TO TAKE TO THE FIELD

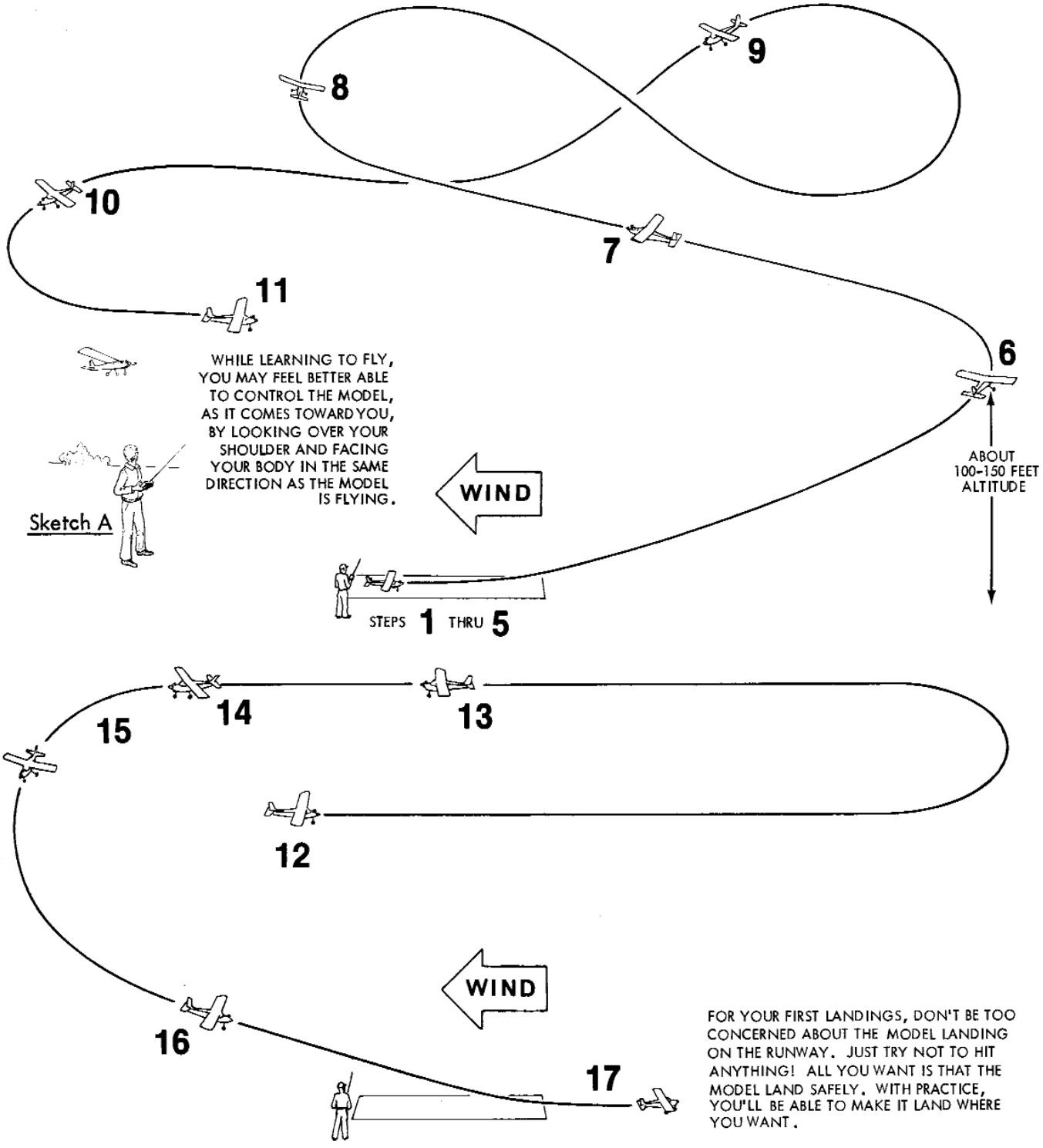
- ☐ Flight batteries fresh or fully charged
- ☐ Radio transmitter (DON'T LEAVE IT AT HOME!)
- ☐ Fresh 1-½ volt starting battery & Glo plug clip
- ☐ Tools to tighten anything that can vibrate loose
- ☐ Fuel and fuel bulb or pump ☐ Extra props
- ☐ Paper toweling (for clean up) ☐ SUPER JET
- ☐ Extra #64 rubber bands

IX FIRST FLIGHTS

One of the most important yet sometimes neglected pre-flight checks is to always make sure the wing is securely banded to the fuse! Use **at least four #64 rubber bands** on **each side** of the wing.

The first flight instructions below show the essential flight elements. If you have a helper, acquaint him with these steps, and have him call each of them off to you at the appropriate time.

1. Head the model directly into the wind before starting the take-off run. Check to see that the control surfaces respond to commands.
2. Look at your Tx meter to see that it is registering power in the "safe" zone. Make sure the trim tabs are centered.
3. Release the model, and smoothly advance the engine to full throttle.
4. Make gentle right or left movements as necessary to straighten the take-off run.
5. As the model gains speed, hold a touch of back-stick, and it will fly itself off the ground. DO NOT PERMIT the nose to rise so the model climbs too steeply.
6. Remember your control movements must be slow and measured. Keep the wings level. If your engine is a .15 or larger, reduce throttle somewhat to maintain a gentle rate of climb, and gain 100-150 feet of altitude.
7. Make a very wide and gentle 180° left turn until the model is heading downwind. Adjust the stick as necessary so the ship does not bank much. When the turn is completed, center the stick (or even use slight opposite stick) to level the wings.
8. As the model passes you on the downwind leg, start a very gentle right turn. When the model is heading upwind again, complete a horizontal figure eight by going into a wide left turn.
9. Perform 1 or 2 more figure 8's.
10. Fly the model straight downwind a few seconds in a slight climb. Allow the model to get almost as far downwind as it went upwind.
11. Make another wide and gentle 180° left turn onto the upwind leg of the pattern. The model should now be coming towards you. Whenever it is coming towards you, remember to push the stick left or right towards whichever wing is dropping. An alternative way is to face your body away from the model, and look at the plane over your shoulder (see sketch A, next page.) Try to keep the altitude constant.
12. You have now completed the pattern. Fly the model around the same course once or twice more.
13. Prepare for landing. As the model passes opposite you on the downwind leg, begin to judge where you will want to start turning.
14. Make your wide and gentle 180° turn. Keep it open enough so you can line-up with the runway.
15. Hold enough altitude so that, if the engine quits, you can still reach the runway. The stronger the wind, the longer you will have to keep the power on.
16. When you are sure you can reach the runway, reduce the power smoothly. Try to keep your glide steady and gentle—not too steep. Keep the wings level. Avoid causing the model's nose to rise abruptly, as this can cause a stall (lack of lift), followed by a dive.
17. If it looks like the model will land short of the runway, add a little power to bring it in. If it appears to be overshooting somewhat and will land in soft brush —well, that's fine. A controlled landing into the wind is your prime concern. If your landing approach is too high, add power smoothly, climb gradually back up into the pattern, and set up for another pass.



As you get used to the controls, you probably will notice the model turning somewhat to the left or right, or climbing or descending, without any stick pressure on your part. These tendencies can be corrected in the air by moving the trim tabs on the Tx. After landing, the setting of the rudder or elevator should be similarly adjusted as best you can by means of the clevises. This, in turn, permits the Tx trim tabs to be re-centered. Further flights will show if more adjustment is required.

A severely out-of-trim condition (caused by a warped wing, for example), might not be correctable using above trim techniques. In that case, taking the model home and straightening the warp with heat is necessary.

Finally, if you encounter a few discouraging setbacks, take heart and keep on plugging. The goal is worth the struggle, and the enjoyment of flying on your own is just around the corner. Keep this in mind: "Success is not a destination, but a journey. The mountain has no top . . . . only plateaus from which to start another ascent." (From "Hear Ye," club newsletter of the Valley Forge Signal Seekers, Pennsylvania).

BEST OF LUCK!

HAND LAUNCHING

If you are unable to locate a flying site where there is a runway or a take-off area of grass no more than 2" high, it will be necessary to hand launch the model into the air. This takes practice to do well, and should be tried a number of times without operating the engine or radio.

Facing into the wind, hold the model in one hand, and raise it above your head. The wings should be level and the nose pointing straight ahead—not slightly up or down. Run into the wind as fast as you can safely run, and get a feel of the model trying to lift out of your hand. Do this several times. When ready, do this again and throw the model at the horizon. DO NOT throw the model UP. It's a natural tendency, but it will make the model stall and dive to the ground. When thrown properly, it will glide ahead and land safely by itself.

After several such launches, turn on the Tx and Rx and make sure the control surfaces are responding correctly. See that the Tx trim tabs are centered, and the meter registers power in the "safe" zone. With the engine at half throttle, hold the model in one hand and the Tx in the other. Now, run and launch the model just as before. Immediately take the Tx in both hands, and remember to operate the controls smoothly. Add slight back stick if necessary to start the model climbing. If the climb is too sluggish, advance the throttle as necessary, but do not cause the model to climb steeply. From here on, follow the regular flying instructions beginning with 6.

TREAT YOUR RADIO RIGHT — AND IT WILL DO THE SAME FOR YOU! by Hal deBolt Famous R/C Pioneer

Today's RC systems are very well engineered and constructed. However, they will remain only as good as the way in which they are USED. Experience has shown us how to use them to perfection. Follow the proper rules religiously, and anyone can have success.

CONNECTORS: In using connectors, never pull on the wires to disconnect; grasp the plugs instead. Clean them by dunking in solvent; dope thinner is fine. Do tape the connectors together when installing, and be sure that there is no strain on the cables.

BATTERIES: Nicads can suffer from vibration. Wrap them in soft foam rubber before installing. Check their condition by measuring the voltage with a volt meter or battery tester periodically. Charge them before EVERY flying session. When stored (winter months), charge them every 30 days. Never store in a discharged condition.

RECEIVERS: Receivers must be vibration free. Wrap them in a minimum of ½" soft foam rubber (not plastic foam) when installing. Keep clear of all cables and batteries. Tune annually as indicated below under "Check-Ups."

RECEIVER ANTENNA: The receiver antenna must be routed directly out of the airplane and to the top of the fin, or preferably to the stabilizer tip. At no place should it be close to anything metal or electronic. Visualize it as being about 3" in diameter instead of 1/16". Do not allow anything other than wood or plastic to be within the 3" diameter.

SERVOS: Servos are vibration prone. Do mount them with grommet shock mounts in servo trays which are in turn shock mounted. Keep them clean. If a neutral position should drift, it is a sign of a change; find out WHY before flying again. Servo pots and wipers should be cleaned and adjusted annually. Do not lubricate.

TRANSMITTERS: Keep your transmitter clean and free from fuel residue and dirt. Battery condition and RF output should be monitored, and the system should be aligned and tuned annually. Do not transport under vibration (floor of a car); place them on something soft.

PUSHRODS: Obviously, pushrods should be installed freely so that they place no load on the servo. Using a servo's power to move a tight rod or heavy surface by force increases the battery drain, shortens the electronic life, and can cause neutralizing problems. While being free, the pushrod must not flex or vibrate. Any vibration is transferred directly to the servo, its gear, motor and pot. While maintaining freedom, flexing and vibration can be prevented by the use of guides and fairleads on the rods.

CHECK-UPS: When—at least once annually, and it should include the tuning and alignment of the system, plus TESTING the batteries. Also, any time anything unusual occurs during usage. A malfunction or "glitch" is the first sign of an impending failure; it should not be ignored.

Where—at a factory authorized center that understands your particular equipment. If not available, an established center can offer advice.

AND: ADD A SMALL PORTION OF GOOD LUCK.