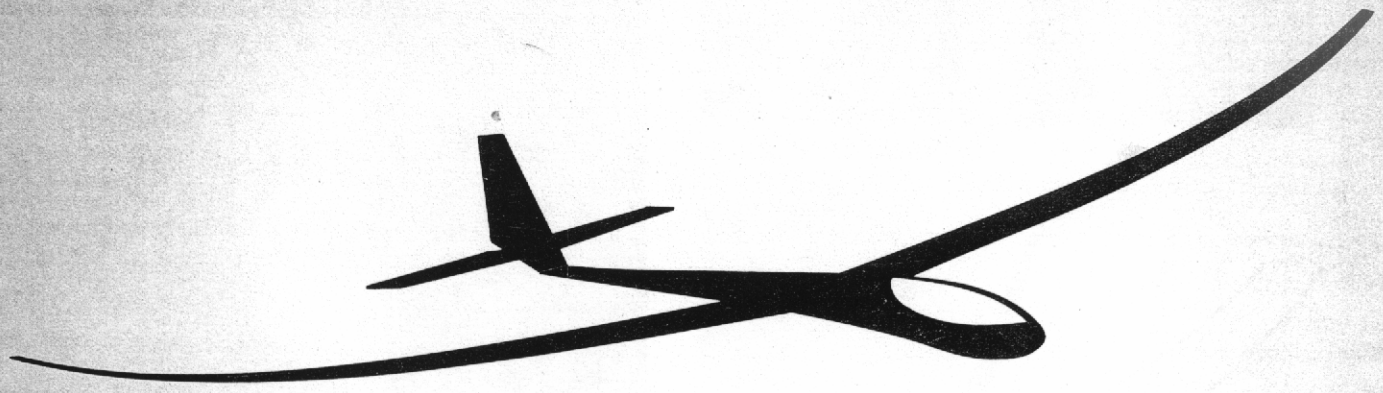
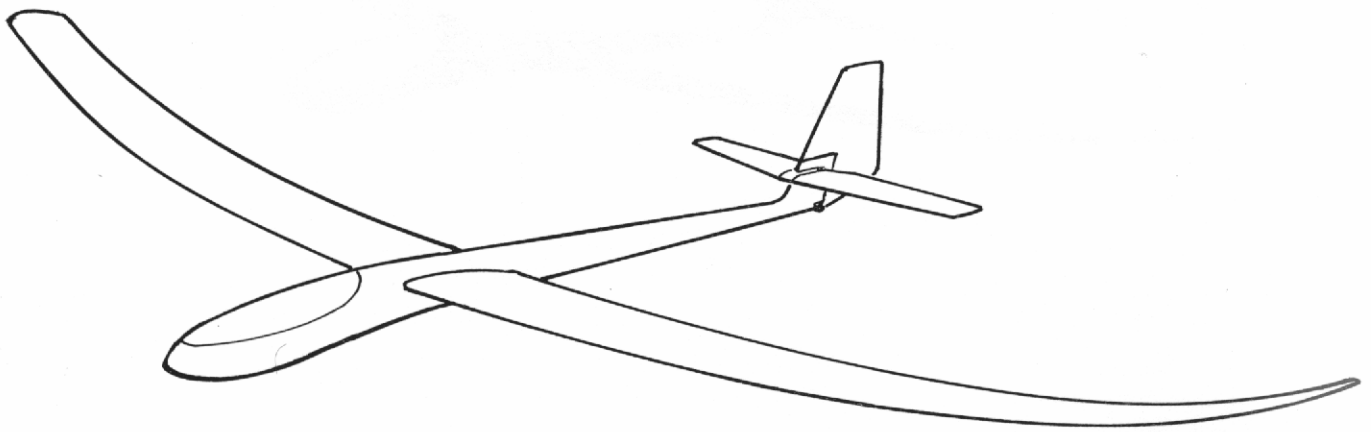


HOBIE HAWK®

ASSEMBLY & FLYING MANUAL



Enclosed is a copy of our HOBIE HOT LINE. If you would like a *FREE* subscription for one year (8 issues), please fill out the coupon inside the HOT LINE.

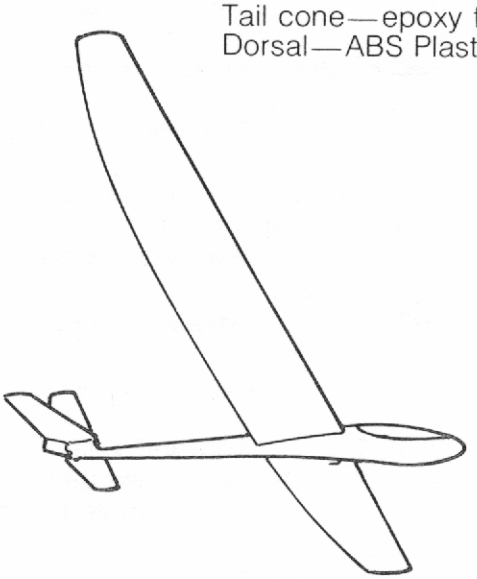
This is written primarily for those who have little or no experience with building and flying RC models. For those with experience, there are possibly some points of interest and even necessity regarding this particular model. Take a few moments to read it now, and chances are, you will "do it right the first time."

SPECIFICATIONS — HOBIE HAWK

Weight	30 ounces (less R/C)
Wing span	98 inches
Wing area	590 sq. inches (4.1 sq. ft.)
Wing loading	9.2 ounces (w/8 oz. R/C)
Overall length	42 inches

CONSTRUCTION

Wing	Top Skin—1/32" plywood Inner Core—High Density Styrofoam Bottom Skin—1/64" plywood Root Rib—ABS Plastic Leading Edge—Pine Tips—ABS Plastic
Stabilizer	Same as wing w/ 1/64 PLY Skins
Rudder	Same as stabilizer w/polycarbonate rudder facing
Fuselage	Nose cone—Cross linked polyethylene Tail cone—epoxy fiberglass Dorsal—ABS Plastic



CONTENTS AND DESCRIPTION OF KIT

ITEM NO.	NAME	QTY.	PART NO.	NOTES
1	Fuselage	1	9901	Primed—requires light sanding and/or filling for final painting. Note—finish is determined by degree of smoothness prior to painting. (See text)
2	Wings	2	9904 Left 9905 Right	Require light sanding, installation of tips and wing rod support sleeves.
3	Rudder	1	9902	Requires light sanding, installation and shaping of tip.
4	Elevators	2	9903	Interchangeable—require light sanding, installation and shaping of tips.
5	Canopy	1	9901-5	Furnished in clear only—requires two 1/16" holes for installation. (May be tinted with common clothing dye, i.e. Rit, Tintex, etc. Use cold to warm only or shape may distort.)
6	Control Tubes	2	9901-11 9901-12	Complete with threaded rods and clevises, may require adjustment. (See text)
7	Miscellaneous Hardware			
	(A)	1	9906-2	Wing attach rod—alum. 5/16" dia. x 9"
	(B)	1	9906-1	Wing attach wire—music wire—.093 dia. x 6"
	(C)	1	9902-5	Rudder hinge pin—music wire—.045 dia. x 3" shaped.
	(D)	1	9903-8	Elevator hinge pin—music wire—.093 dia. x 4¼".
	(E)	1	9903-7	Elevator actuator pin—music wire—.064 dia. x 3".
	(F)	1	9901-6	Tow hook—music wire—.045 dia. x shape.
	(G)	1	9901-7	Screw, tow hook—#4—24 x ½".
	(H)	1	9901-8	Washer, tow hook—curved 5/16 x 1/8 x 1/32.
	(I)	2	9901-5	Screws—canopy #2-56 x ¼.
	(J)	1	9907	Actuator, switch—nylon, set.
8	Case " "	1 1	9910-1 9910-2	Top and bottom—medium density foam box—for continued use as transportation and storage of completed, disassembled model.

MATERIALS REQUIRED TO COMPLETE KIT (SUGGESTED)

Material/Item	Notes
Epoxy Glue	For wing support sleeves and tip installation. We use and recommend "Devcon" 5-minute epoxy, although there are several equal brands available.
Sandpaper	For wings, tail, and fuselage. **Dry sanding—**Wings, etc.—wood surfaces—use 100 to 220, then to #400 for final smoothing. **Wet sanding**—220 to 400 wet or dry paper with generous water for fast cutting and smooth surface on fuselage.
Fillers	For fuselage—recommend light, easy sanding filler material—avoid hard fillers as certain epoxy auto body materials. Hobby poxy "stuff" is recommended.
Paints	Fuselage—as supplied, is primed with urethane primer: thus will accept all common urethanes, enamels, dopes hobby poxy, etc.
Covering	We use and recommend Super Monokote, and several alternate brand name synthetic covering materials are quite acceptable. A standard 26″ x 6′ sheet is sufficient provided care is exercised. (See text)
Exacto knife or Razor Blades	Trimming and cutting tips, nose cone radio access holes and covering materials.
Sealing iron	For tacking and shrinking synthetic covering materials—there are several types of small hand held irons suitable. Even a common clothes iron is adequate, although more difficult to handle. See your local hobby dealer for suggestions.
Heat gun	For shrinking/tightening synthetic covering—(again, a cloth covered iron will suffice, but not as efficiently.) Most hobby stores can provide the "Top-Flite" Monokote heat gun or acceptable alternates. (See text)

Materials Compatibility

Additive Material	ABS Plastic	Fiberglass	Styrofoam	Polyethylene	Plywood
Epoxy Glues	Excellent	Excellent	Excellent	Good (1)	Excellent
Typical* White Glue	Fair	Good	Good	Not Recommended	Excellent
Keytones Mek	X (2)	Not Recommended	X	Not Recommended	——
Enamels	Good	Good	Not Recommended	Good (1)	——
Epoxy Paints	Excellent	Excellent	Not Recommended	Excellent (1)	——

*Air drying—will not dry if trapped between two non-porous surfaces.

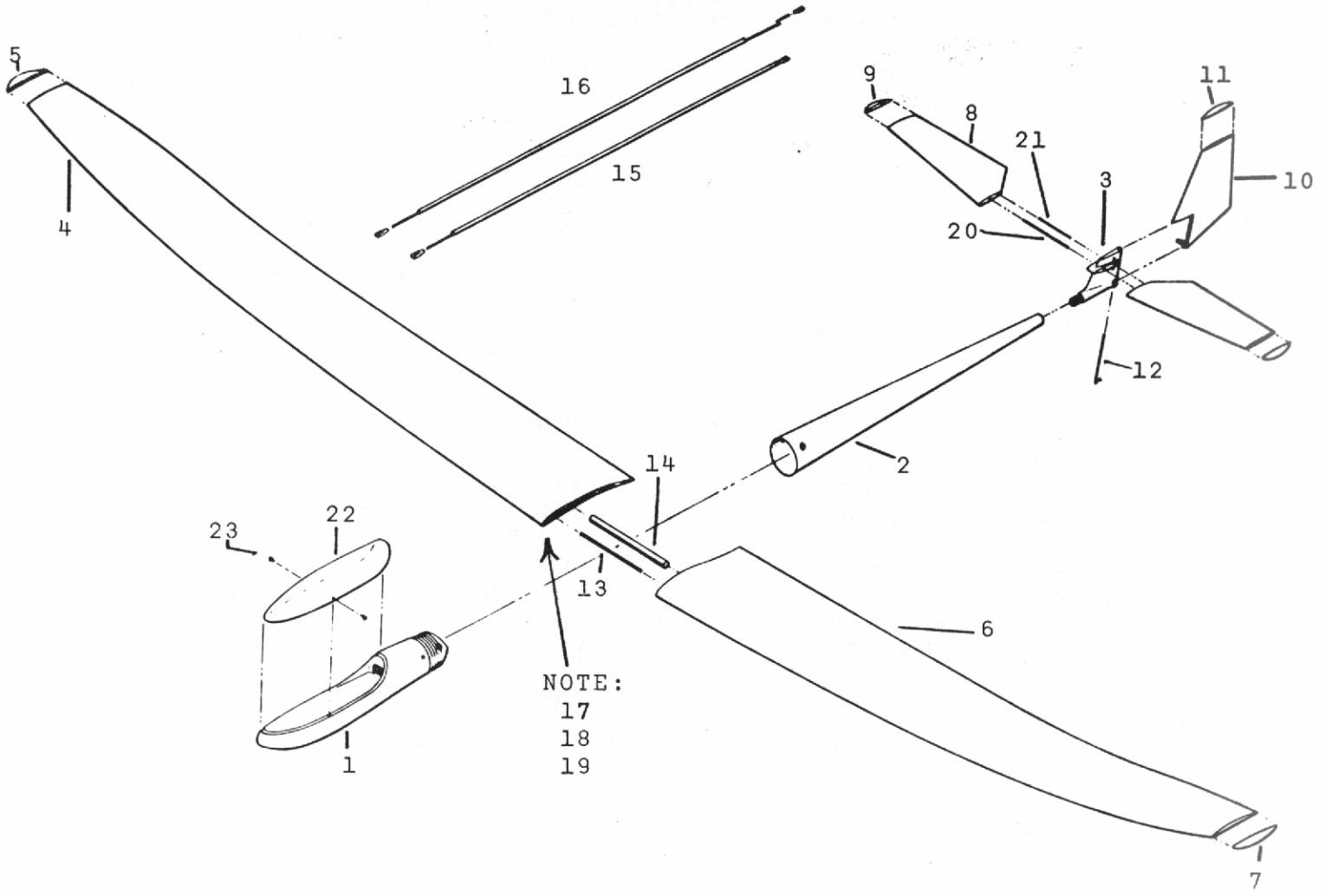
(1) Flame treating required if contacting bare polyethylene.

(2) Makes good agent for bonding ABS to ABS used sparingly—will dissolve material if used excessively.

Environmental Characteristics:

Heat	175°F. Max.	300°F.	175°F. Max.	250°F. Max.	——
Cold	40°F. Brittle	No Effect	No Effect	No Effect	No Effect
Moisture	No Effect	No Effect	No Effect	No Effect	Swell—De Laminate

Excellent; Good—acceptable, not maximum bond or strength; Not Recommended—no bond, may damage surface; X—do not use, will destroy material.



NOTES: #17—ROOT RIB
#18—SMALL SLEEVE NOT SHOWN SEPARATELY
#19—LARGE SLEEVE

#1—NOSE CONE
#2—TAIL CONE NORMALLY SUPPLIED AS COMPLETE ASSEMBLY
#3—DORSAL

EXPLODED VIEW PART NUMBER REFERENCE

Name	Part #	Reference
Nose Cone	9901-1	1
Tail Cone	9901-9	2
Dorsal Assembly	9901-16	3
Right Wing	9905	4
Right Wing Tip	9905-8	5
Left Wing	9904	6
Left Wing Tip	9904-8	7
Elevator (L & R identical)	9903	8
Elevator Tip (L & R identical)	9903-4	9
Rudder	9902	10
Rudder Tip (Same as elevator)	9902-4	11
Rudder Hinge Pin	9902-5	12
Wing Pin	9906-1	13
Main Wing Rod	9906-2	14
Elevator Push Tube Assembly	9901-11	15
Rudder Push Tube Assembly	9901-12	16
Wing Root Rib L & R	9904/5-1	17
Small Wing Root Sleeve	9904/5-10	18
Large Wing Root Sleeve	9904/5-9	19
Elevator Hinge Pin	9903-8	20
Elevator Actuator Pin	9903-7	21
Canopy	9901-4	22
Canopy Screws	9901-5	23

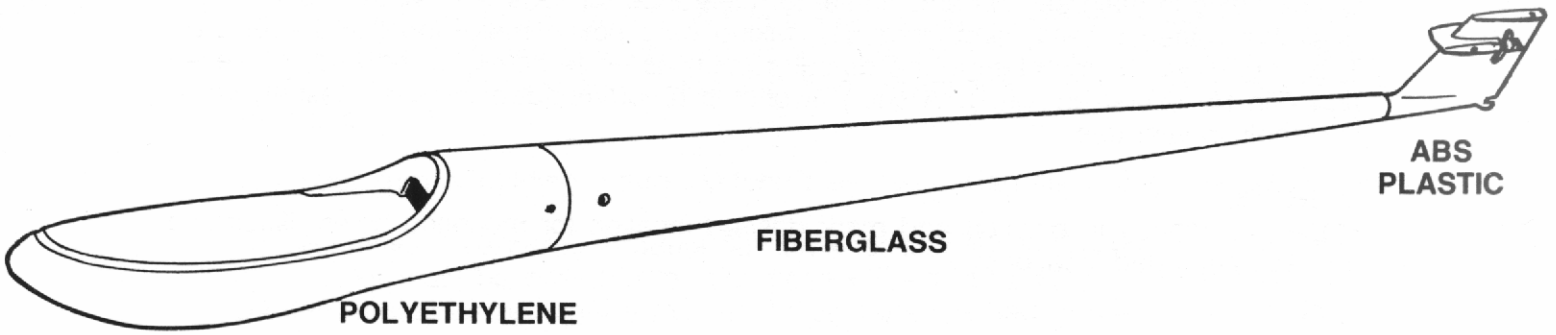
KIT FINISHING AND ASSEMBLY

FUSELAGE

Examine fuselage to determine amount, if any, of filling to be accomplished prior to sanding.

Fill any recesses noted with a reasonably soft filler material. Avoid hard type automotive body fillers.

Sand entire fuselage lightly with #220 wet or dry, then to #400. A flexible sanding block is recommended to prevent exaggeration of wavy surfaces. Be sure that no fuzz is sticking up from spots on polyethylene. If present, smooth with #600 grit paper.



CAUTION: Light sanding is emphasized, as, if the nose material is exposed, paint adhesion is seriously affected. If the primer should be sanded through, flame treating will be absolutely necessary prior to repriming and painting, for best adhesion.

Flame treating is easily accomplished with a standard portable propane type torch, or any other blue oxidizing flame. (The propane cannister type torch is readily available from most hardware stores at a very nominal cost.)

With the torch turned on full, providing a clean blue flame, pass flame tip over exposed area as if painting with a brush and at approximately one foot per second. One or two passes over the area is sufficient and should not burn the material or surrounding primer. There will be no noticeable difference in the surface appearance. Do not touch treated surfaces before repriming, or painting. IMPORTANT: DO NOT ALLOW THE SURFACE TO BECOME OVERHEATED. THE FLAME SHOULD "SINGE" ONLY AND NOT CAUSE ACTUAL HEATING. IF THE PART APPEARS TO BE GETTING WARM, STOP AND LET COOL OR SEVERE WARPAGE WILL OCCUR.

The fuselage may be painted then, with any choice of finishes. Hang fuselage in manner acceptable to your painting facilities with wire hook or other suitable means that will provide proper holding for rotation without having to touch painted surfaces. An undersize curved wire in the forward hole may provide for easier handling.

Dust all surfaces to remove lint, dust, etc. A clean bare hand works best.

Do not plug holes with wing rods, wires provided, as they are very close tolerance fits and will be extremely difficult to remove after paint dries.

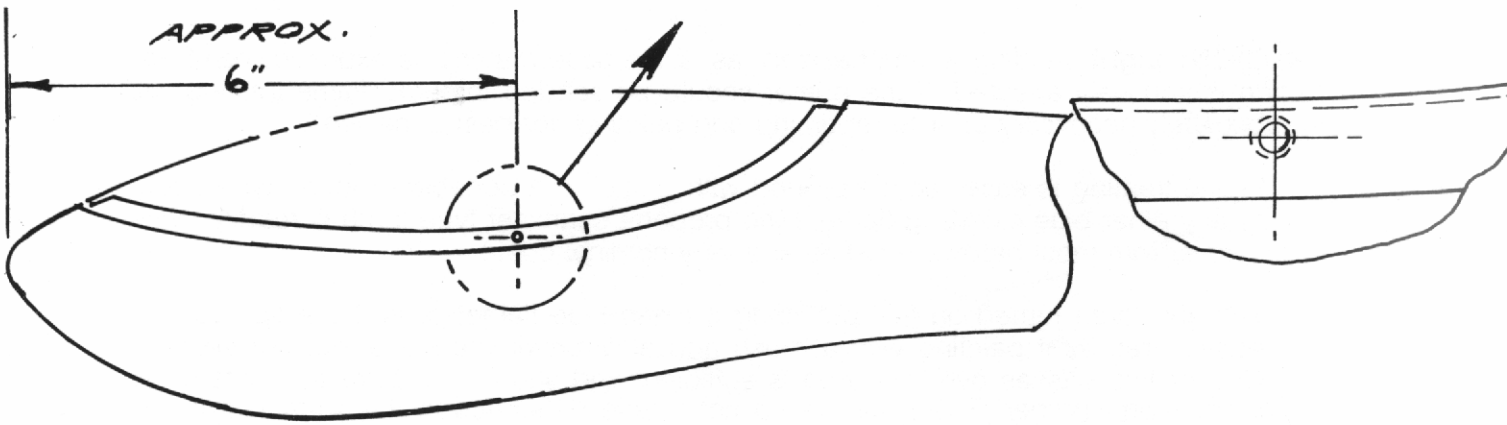
Spray surfaces with a fog coat and let stand until tacky, then proceed with heavier gloss coat. This is particularly important is urethane paints are used as it will run and sag if a heavy coat is applied without the tack coat. (Most spray paint directions recommend this procedure.)

Allow plenty of drying time before handling. Refer to directions/instructions of paint manufacturer.

Check holes in main section and dorsal for clearance for rods and wires. Work out undesirable material gently and gradually, taking care not to make the holes over size. This is particularly important in the dorsal section as these holes are not metal sleeved and can be oversized easily. A snug fit only is recommended for easy assembly/disassembly in later use.

CANOPY

Place the canopy in position and mark desired location for mounting holes. Illustrated are recommended locations:

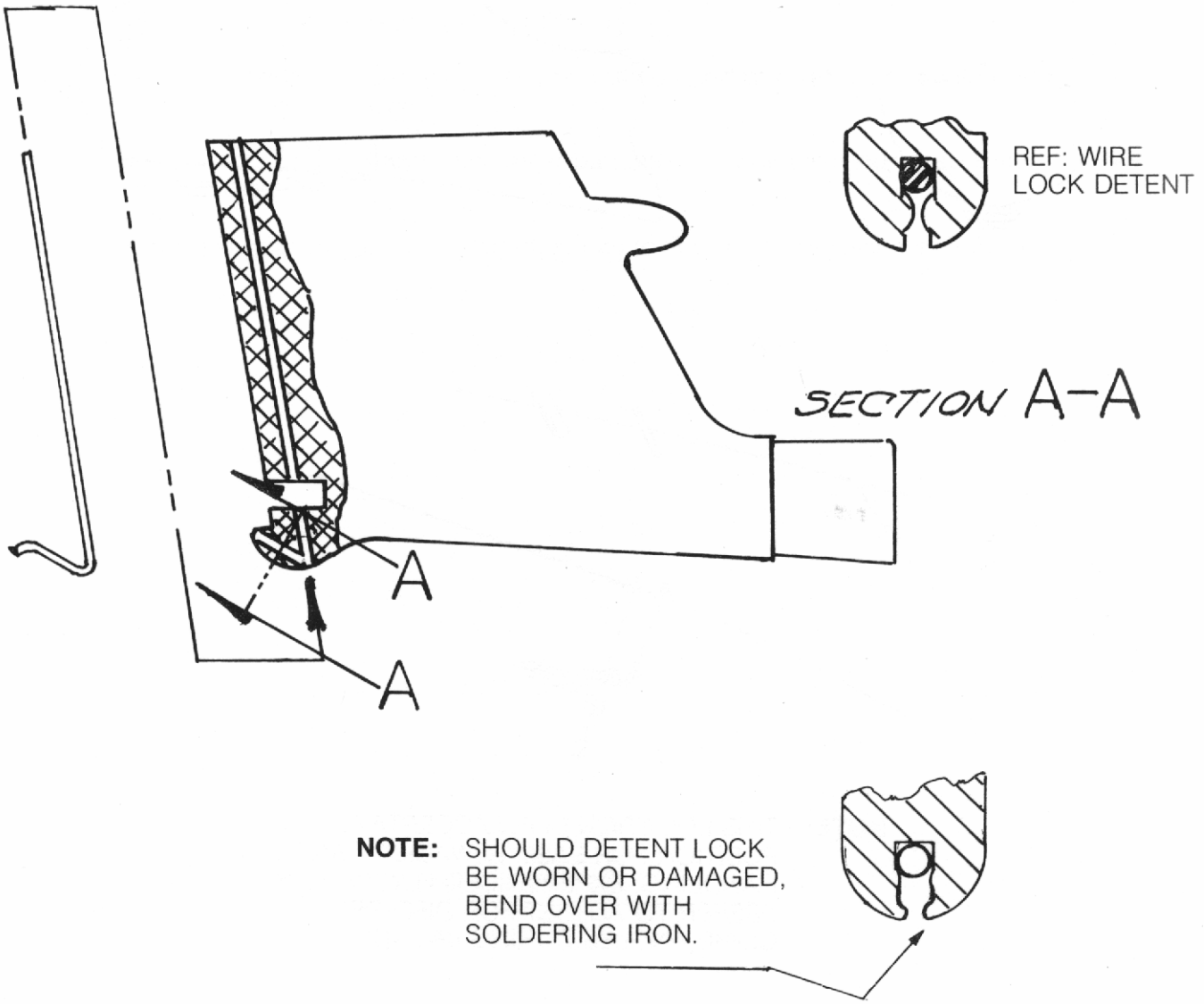


Make a 1/16" hole in canopy as marked, either with a drill or heated probe of wire, or punch, etc. This material is butyrate and is easily worked without power equipment. Make the hole location in the upper third part of the nose/canopy flange to provide maximum edge distance on canopy material.

Replace canopy and transfer hole locations to nose cone. Punch with ice pick or drill an **undersize** hole (about 1/32") through nose cone. This material is self threading with the screws provided and is quite workable also by hand. If oversize holes are created, simply increase screw size to accommodate. All holes in poly material should be considerably undersize as it easily self threads.

DORSAL AREA

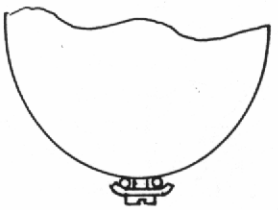
This piece is ABS plastic and provides the foundation for control surfaces installation and operation. The rudder hinge and control horn (made of polycarbonate, or lexan) mates to the dorsal by installing the rudder hinge pin (.045 shaped music wire). The cross section, below amplified, shows the importance of this area being free of excess material and also not removing the locking material provided in the molded part. (Two views.)

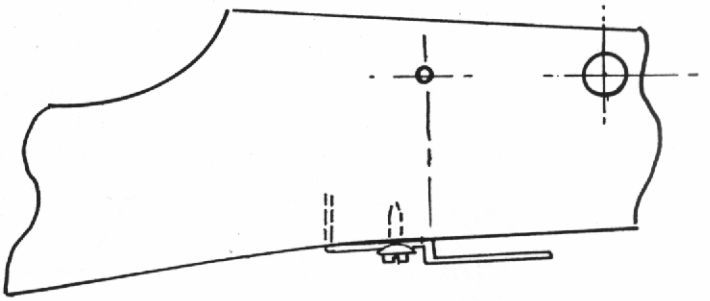


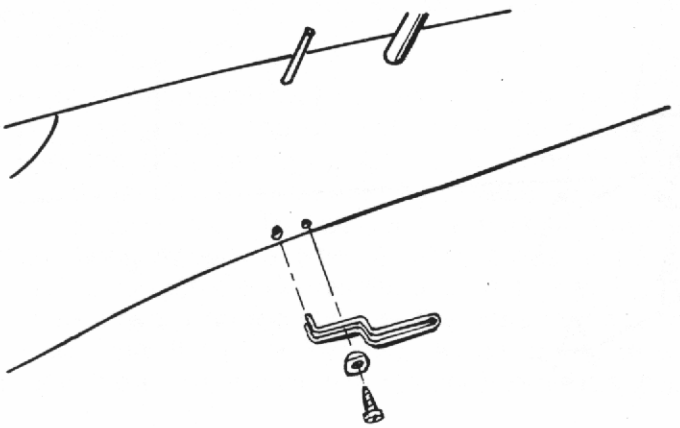
TOW HOOK INSTALLATION

Locate the tow hook installation point as noted in illustration below.

Drill two holes, the front should be about .090 in diameter (3/32″) and a smaller one for the self-tapping screw, of about 1/32″ or smaller. This screw should be quite snug as severe pressures will be applied when winch towed.



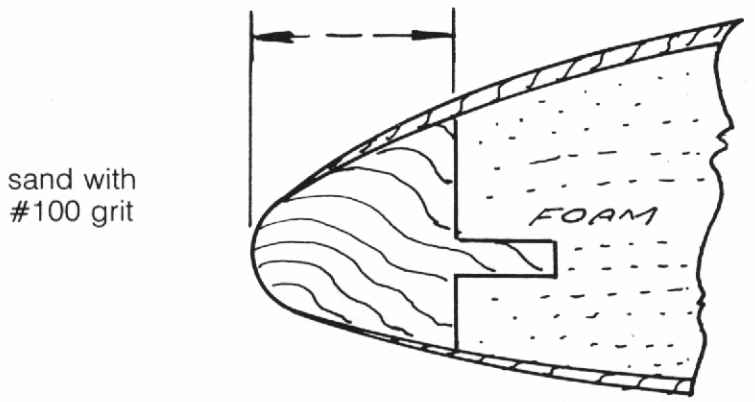




NOTE: THIS LOCATION IS AN ACCEPTABLE POSITION FOR EASY TOWABILITY AND HANDLING. EXPERIENCED FLYERS MAY PREFER TO ADJUST FOR DIFFERENT CLIMB ANGLES DURING LAUNCH.

WINGS

Lightly sand routed edges with #220 to #400 sandpaper. Do not oversand leading edge and tip area as the skin is quite thin and if sanded through, will expose foam. (See Cross section.)



Install tips with epoxy glue. After drying, rough sand to shape desired and finish sand smooth with fine paper.

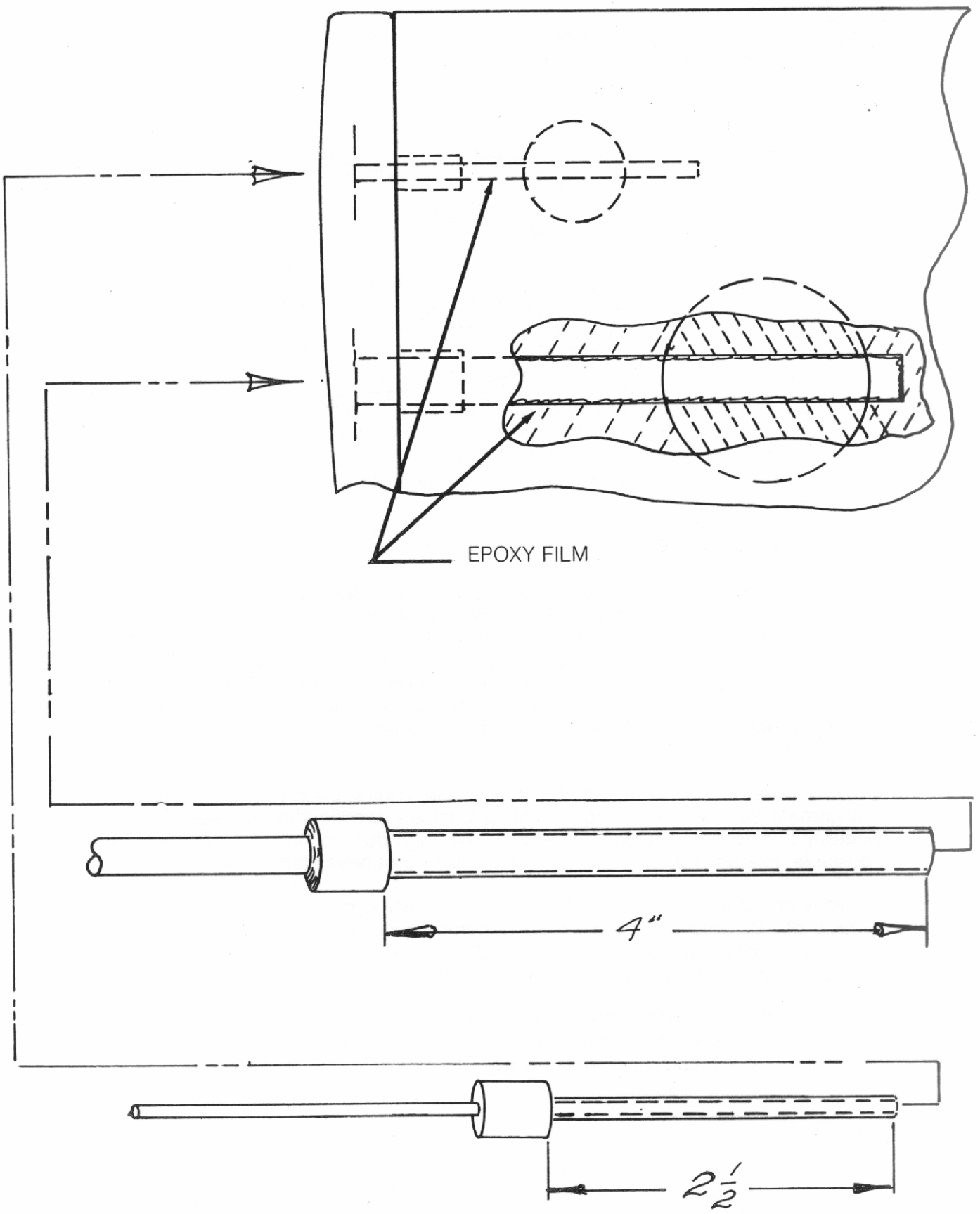
Wing Root Sleeve Installation

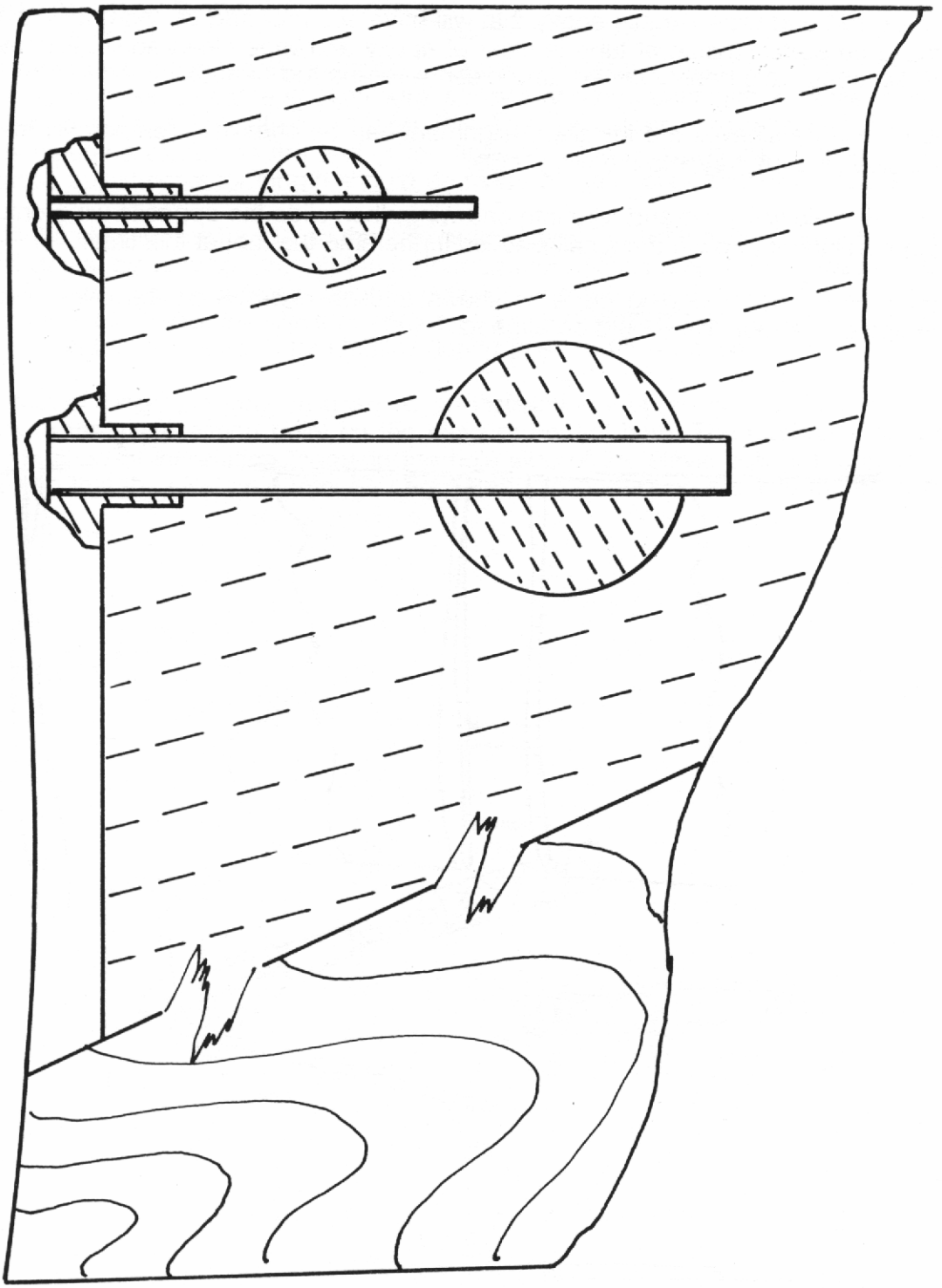
Root Rib Area: Locate wing sleeves. (P/N's 9904-9—11/32 dia. x 4" brass tubes and 9904-10—1/8 x 2 1/2 brass tube.) Set aside. Locate main wing rod P/N 9906-2—5/16 dia. x 9" alum. and wire—.093 x 6". Roll on a buildup of masking tape of approximately 1/16" at a point 4" from end—on main rod, and at a point 2 1/2" from the end of the .093 wire, as shown in illustration. There will be used temporarily as insertion tools for the brass tubes, and should be heavily coated with auto wax to prevent epoxy from adhering to them. Deburr insertion end of all brass sleeves for ease of installation.

Important Note: Prior to permanently installing the small support sleeves, we recommend the alignment be checked. Wing root fit to fuselage is critical in this area and may be noticeably affected if misalignment occurs. Although our tooling is as closely controlled as possible, tolerance accummulation can cause slight mismatch.

Mix epoxy and coat inside wing root holes as shown with small wire allowing complete coverage of I.D. Note that epoxies are generally quite fast setting so it is important to process and install one sleeve at a time. Slide brass tube over rod/wire to tape mark and insert tube to flush with root tib, as shown in illustration.

The rod will plug the tube opening being inserted and prevent scraping epoxy into inside of sleeve. When fully inserted withdraw rod/wire and wipe clean as the clearance is minimal and dried epoxy will interfere with fitting later when used for assembly.


EPOXY FILM
4"
2 1/2

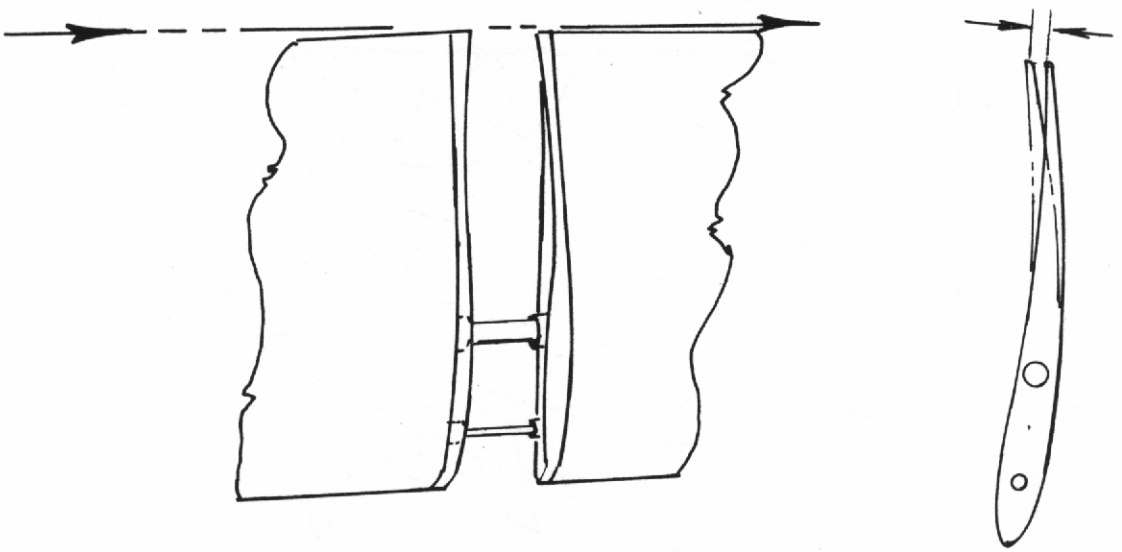


Remove rod and wipe excess epoxy that will have accumulated on the end. Insert once more to be certain inside of tube is clear of epoxy and wipe clean again. Remove tape after all tubes have been inserted, and clean wire and rod of epoxy.

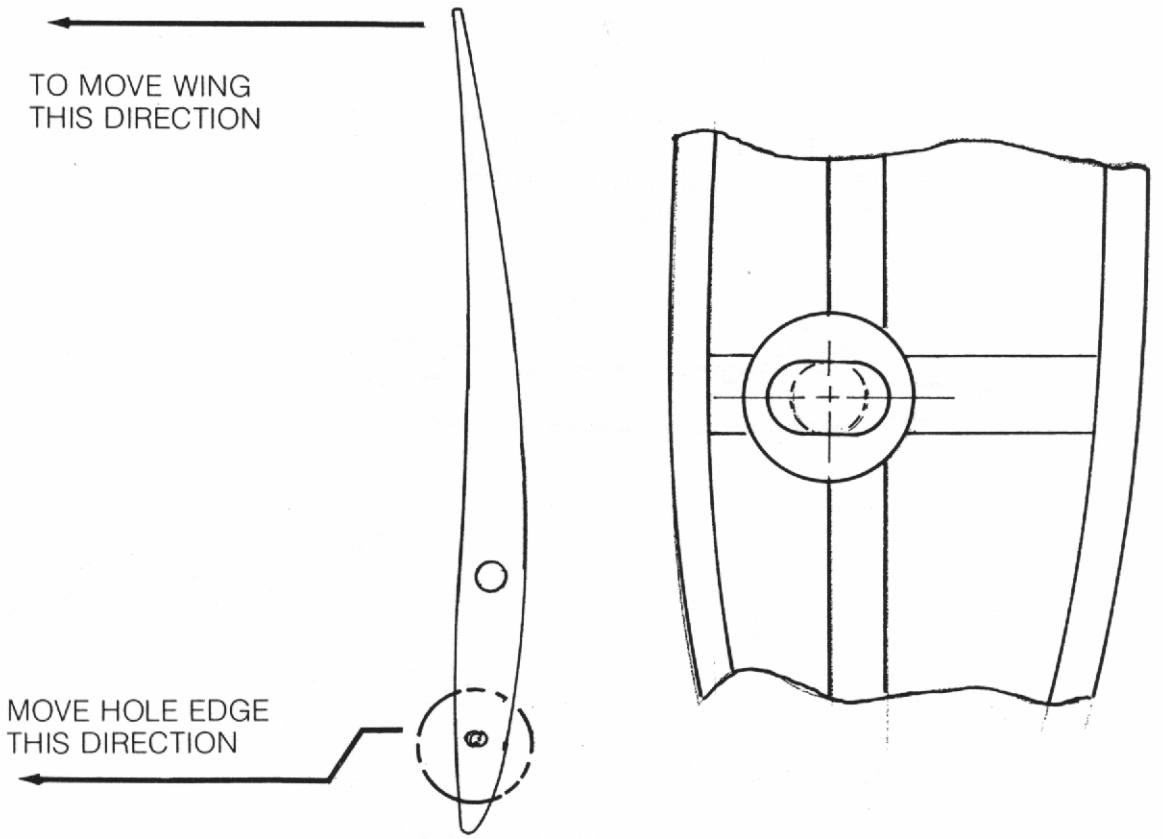
Once the large sleeves are installed, alignment can be checked. Temporarily install the small sleeves **half way** into the wing roots.

Insert the main wing rod and wire into one wing, then slide the opposite wing onto them, being careful not to push the small sleeves further into the root at this time.

Lay the wing on the leading edge as shown and observe the trailing edge alignment. Both tips of the root ribs should be aligned.



If adjustment is considered necessary, note the direction of misalignment of that wing chosen as the one to be corrected (which should be the one where the trailing edge moves toward the bottom of the wing) and enlarge the hole as shown IN THE DIRECTION the wing is to move as shown.



Proceed with the installation of the nonadjusted sleeve similarly to the preceding. For an adjusted position sleeve, immediately after installing place both wings with rod and wire installed on a flat surface to position the adjusted sleeve while the epoxy hardens. Again, be certain the wire inserted during this time has ample wax on its surface to prevent its being epoxied in place.

RUDDER AND ELEVATORS

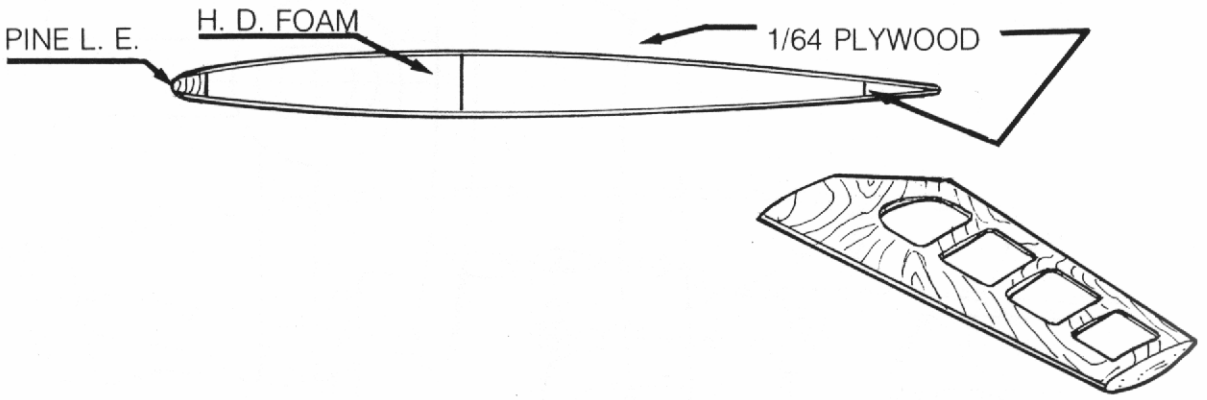
Lightly sand routed edges, same as wing operations.

Install tips with epoxy glue—rough sand to shape and finish sand with #320 or finer paper.

Check installation holes in elevators—clear as required with the appropriate installation wires. (See parts sheet.)

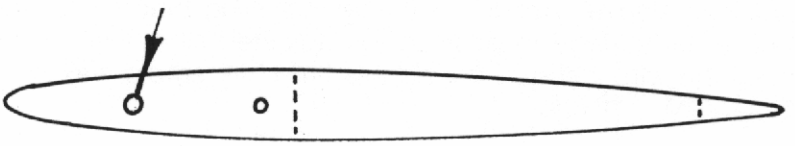
After final sanding, set aside for covering.

Notes: **All** plywood surfaces of tail parts are 1/64" thickness. Thus, care must be taken during all sanding, particularly adjacent to plastic parts—structural integrity may be affected if wood is removed from plastic surfaces. Plywood covering overlaps ABS plastic root rib.



Elevator Hinge Sleeve Installation

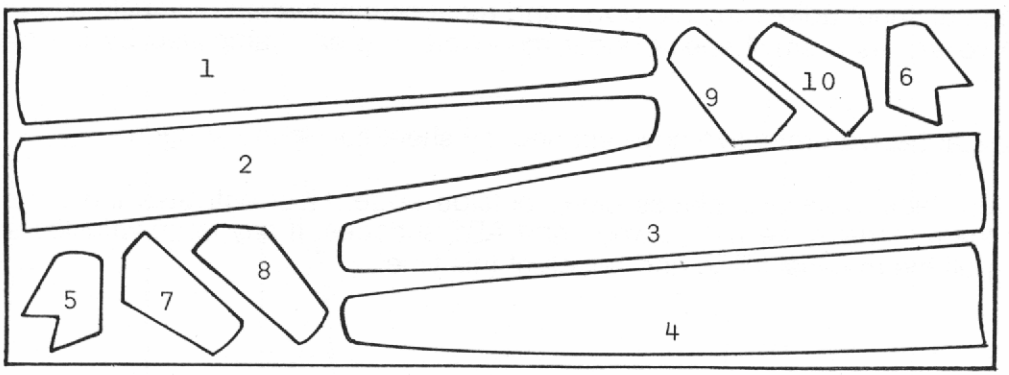
1. Locate the elevator hinge sleeves (P/N 9903-6 1/8 x 2" brass tubes).
2. Check hole clearance for obstructions and note the larger (front) hole which accepts the sleeve.



3. Epoxy in place identically to the wing sleeve procedure. Be certain the sleeves are inserted fully flush.
4. The smaller hole is the actuator hole and is properly sized. It requires no attention.

COVERING

Illustrated is one method of layout for using one single sheet of standard synthetic covering. There are several combinations that will be satisfactory. However, if one color, one sheet covering is desired, care is essential to prevent shortage of material.



1—RIGHT WING—BOTTOM
2—RIGHT WING—TOP
3—LEFT WING—BOTTOM
4—LEFT WING—TOP
5—LEFT SIDE—RUDDER
6—RIGHT SIDE—RUDDER
7—RIGHT STABILIZER—TOP
8—RIGHT STABILIZER—BOTTOM
9—LEFT STABILIZER—TOP
10—LEFT STABILIZER—BOTTOM

NOTE: Instructions for use of materials other than super monokote are provided with the material as purchased. The following is our recommended procedure and technique as applicable to super monokote specifically, and reference to covering throughout the text will refer to monokote and "brand" utensils. Although similarity exists, certain covering materials may possibly be damaged or provide undesirable finish if applied as noted.

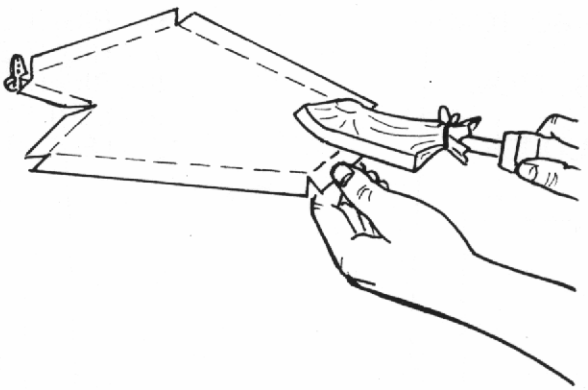
Lay finished sanded and cleaned parts on sheet and transfer shapes with felt pen or other suitable manner, mark and cut oversize at least 3/8" for handling during application. Do not remove backing material covering adhesive at this time. Note the panels must be turned over for transfer for opposite surfaces.

The tail surfaces being predominately flat should be covered first, as they may provide some experience and training in the procedure with the least possible loss potential.

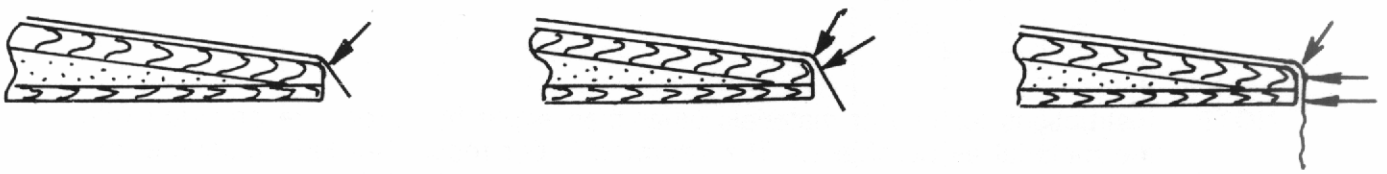
Lay the cut sheet adhesive side down and recheck that foreign materials and protusions are removed, as a small speck under monokote is greatly amplified by the glossy surface.

Remove adhesive protective covering and lay sheet flat on the surface.

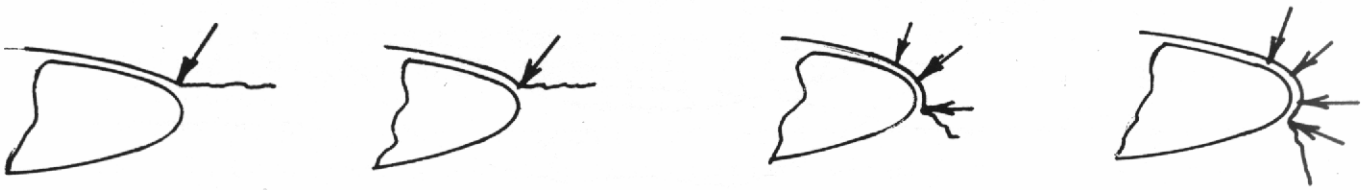
With iron, tack in several places along outside edge. Heat activates the adhesive and sticks the material quite well to wood and ABS surfaces. If any large wrinkles are noted, lightly pull the material loose and retack at this time.



Run iron along all edges as shown in several progressive steps:



On curved tip area, progressively smooth material onto tip surface until the curve is covered. (See illustration.)



Do not iron monokote all over flat wood surfaces or wood grain will show through regardless how smoothly sanded.

Trim excess material after bonding past center of curved section, and past flat edges—as shown.

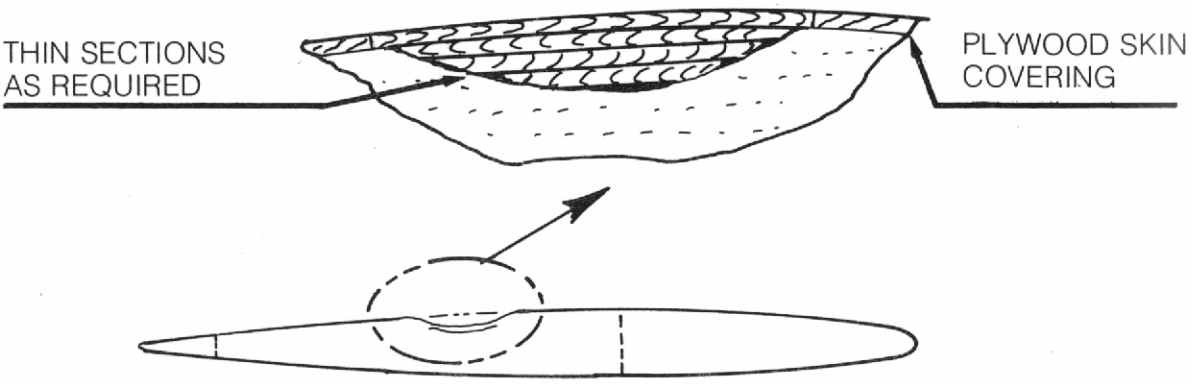
Turn part and repeat preceding. The adhesive on monokote will adhere very well to the first applied. Seal to overlap on edges as shown, and at least 1/8" on curved surfaces.

Note: Do not hold iron stationary against surface. Excessive heat (175°F.+) will soften foam core and make it expand and/or melt.

Holding part with one hand, apply heat with heat gun, starting at root, working progressively toward tip. Use wiping motion with heat gun outlet 1 to 2" away from material. Do not hold heat in one location for extended time—monokote will melt. Keep gun moving —excessive heat buildup will soften foam and result in distortion. Should this occur and is not severe, the part is usable as is, with slight deformity in appearance. If severe enough to warrant repair, remove covering at this time and repair in the following manner:

Observe the extent of damage—(usually flattening of plywood curvature) and slice plywood free from foam—with exacto knife or razor blade. If foam has expanded only, remove excess with knife to regain proper surface and re-epoxy plywood skin to foam. If the foam has passed the expansion phase, it will have flattened the surface. Cut skin free and repair with buildup.

Insert progressive thicknesses of soft, thin pieces of pine, balsa, or similar material, to build up shape to original curved section. Epoxy in place.

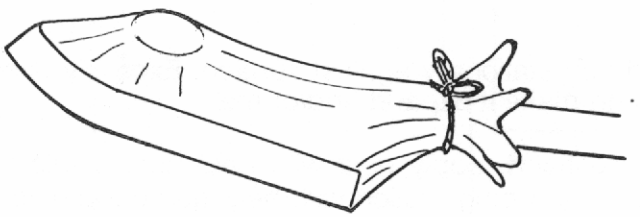


Trim and sand any materials that may have accumulated on the surface.

Repeat covering process.

Note: Covered surfaces will build up pressure in routed rib bays while shrinking with heat gun causing ballooning. Once the covering material has shrunk enough to remove major wrinkles over rib sections, punch a pin hole in each bay on one side only. This will relieve pressure build up tendency. Then proceed with shrinking process.

If desired, tail surfaces can be shrunk down without using heat gun, by covering iron with a soft cotton cloth as shown. Turn heat to high position when covered. Then iron over entire surface, keeping the iron moving, but allow sufficient time to heat and shrink the material. Careful observation of the process will readily reveal the ironing speed.

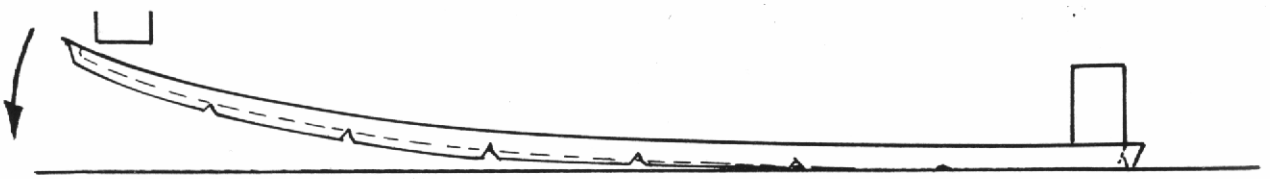


COVERING WINGS

Since the wings obviously present a unique surface for covering with a combination of taper, compound curves, and under camber, careful attention is required to provide a satisfactory covering.

Lay the previously cut sheet of covering material over the top surface of wing and check for proper fit and overlap of about 3/8" minimum.

Position the wing on a flat surface and place a weight (free of sharp edges) on the root area (recommend 7-10 lbs.). Next, place a weight (5 lbs. minimum) on the tip primarily toward the leading edge. The wing will flatten spanwise to about 90%. Do not attempt to completely flatten tip end as this is not necessary and damage is possible.



Recheck all surfaces and assure smoothness and freedom from particles and protusions.

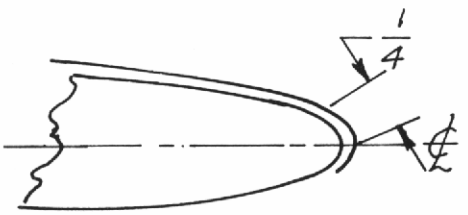
Lay the covering material on the wing, adhesive side down with protective covering removed. Gently stretch evenly over entire surface, carefully estimating position of ends which cannot, at this time, extend to root end tip because of the weights placed there.

Place hand flat on root area over covering material and remove weight, allowing material to flatten against wing. Replace weight over material, once assured position is correct. Next, repeat this procedure at the tip end of the wing.

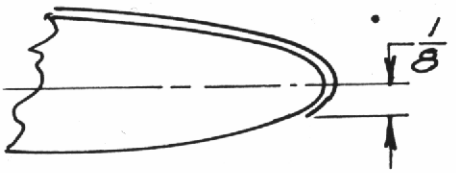
Using hand iron, tack edges alternating from side to side progressively from one end toward the other, first at about 6″ increments. Repeat at more frequent intervals until tacking is about 2″ apart on both leading and trailing edges.

Holding tip in position with hand, remove weight and tack over tip area. Release tip and remove weight on root end and tack similarly. The wing will now assume its original curvature. Some wrinkles will appear at this time. However, they can easily be removed with the normal shrinking process as previously outlined.

Using the hand iron, repeat the edge sealing process, progressively working the sealed area around the leading and trailing edges. Do not seal covering to wood beyond 1/4″ from center line.



Trim excess material about 1/8" past center as shown and seal along entire leading edge.



Seal trailing edges similarly to control surfaces previously done.

After sealing completely along edges, work the material over the tips in a progressive rolling motion over the compound curve of the tip, gently pulling the edge of the material while ironing over the curve. Patience and care will result in a wrinkle-free, well sealed surface. Tiny wrinkles that persist can be ironed down and will be virtually undetectable in this area.

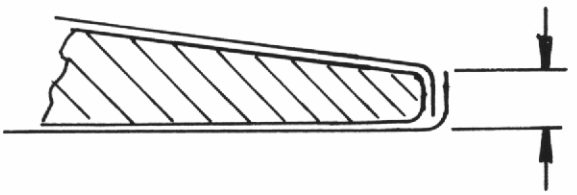
Seal completely along root rib with iron. The material adheres readily to the ABS rib. Trim excess in preparation for underside covering. Final heat shrinking will be done later. Do not be concerned with overall appearance at this time.

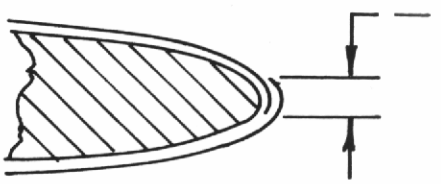
Turn wing and lay previously cut sheet of covering material on wing underside to check fit.

Recheck cleanliness of wood surfaces.

Remove protective covering and lay sheet directly on free shape wing. No flattening is required to cover the underside.

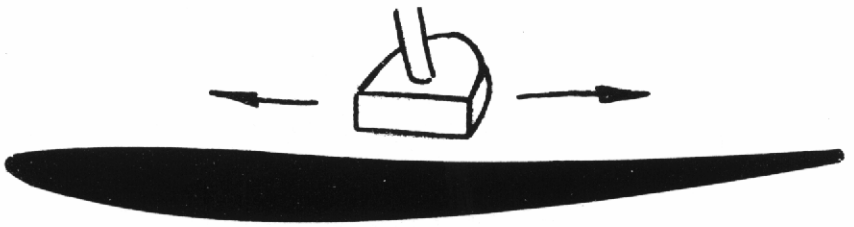
Repeat tacking process, seal edges and trim. Material should be trimmed to allow an overlap (as shown). Monokote adheres very well to itself.





Once both sides are covered and edges sealed, proceed with the heat gun process. Caution is urged to prevent damage to covering material and wing inner core; keep heat gun moving in a painting motion at all times. Careful observation provides ample visual notice of material shrinkage. Once the material is noted to begin shrinking, move heat application away and the shrinking will continue for a short period.

The final step in covering is the undercambered surfaces on the bottom sides of the wings. This should be done by wiping the covered iron across the ribs as shown. (**Note:** When covered with cloth, the iron will require a higher setting than when bare, to properly activate the adhesive material.)



RADIO AND ACCESSORY INSTALLATION

Several radio control manufacturers equipment are ideal for the HOBIE HAWK. We do not specify a choice of brands, although we have installed and tested the majority of those available with very good results, both from installation and operational views.

Since the model has only two moving surfaces, a two-channel unit is ample. However, some manufacturers offer three-channel capability, usage of which relates to the builder/user for variable possibilities.

The following pages depict layout templates of several radio-servo combinations available. Generally, only the servo part of the installation will be visible and access holes for them allow entry into the nose section for locating the receiver, battery, etc.

Important—read the balance section **prior** to cutting any holes.

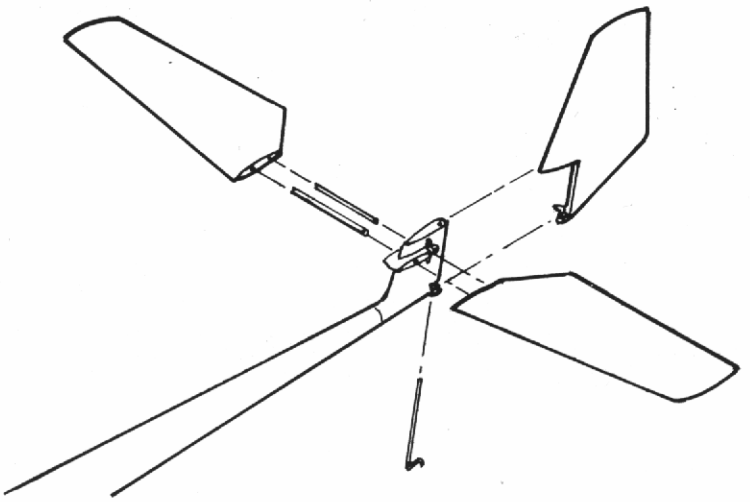
We recommend the use of the square "500" battery pack or oval type, as the larger and wider units prove to be so large as to require additional access/clearance holes to fit in the nose cone section.

Once your choice of radio equipment is available and checked out operationally, proceed with installation procedures:

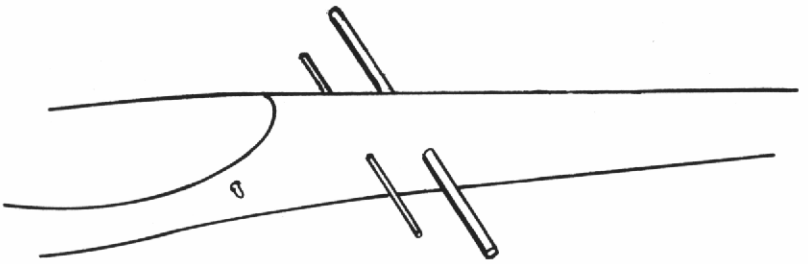
TEMPORARILY locate your receiver, servos, battery, off-on switch, canopy, (and tow hook and screw if applicable) with masking tape for balancing.

Attach the control tubes with tape to the outside of the fuselage.

Install tail surfaces **complete** with wires.

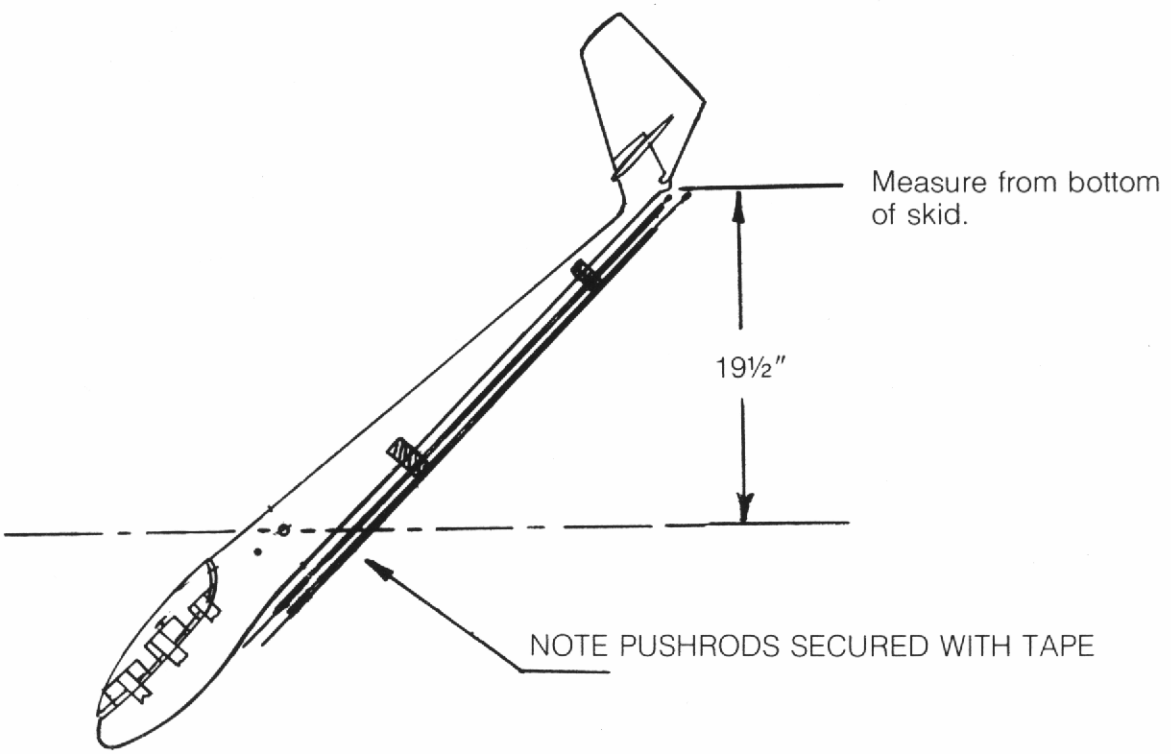


Install main wing rod and front wing wire.



The model is now prepared for balancing.

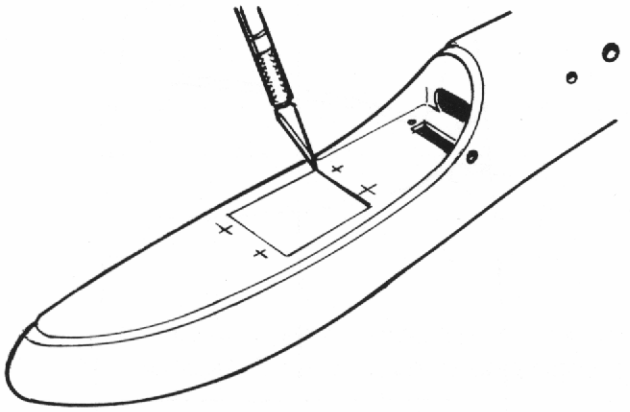
Support the complete fuselage by resting the main wing rod on a table edge and balance by moving radio gear fore or aft to the suggested balance point shown. (See illustration.)

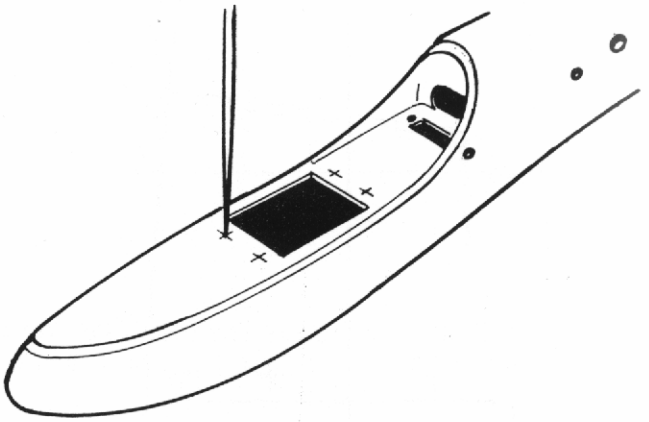


Once the equipment has been located for balancing, mark its position and select (if applicable) the proper template for servo-cutout and mounting hole location.

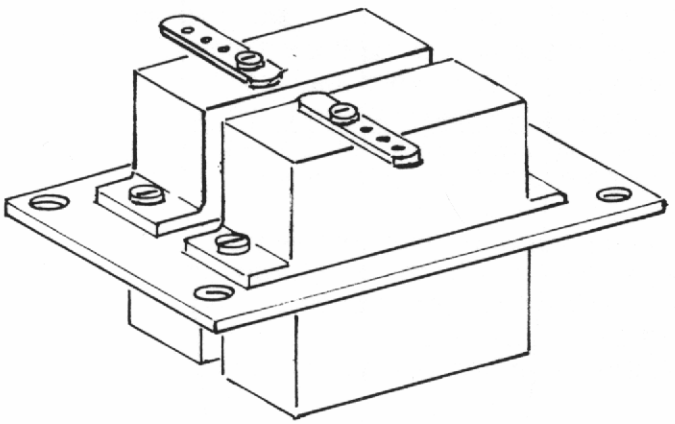
Note: Do not use template as drawn with respect to fuselage outline surrounding the area of cutout. Fuselage outline is shown for reference only. Compare/ check equipment with pattern.

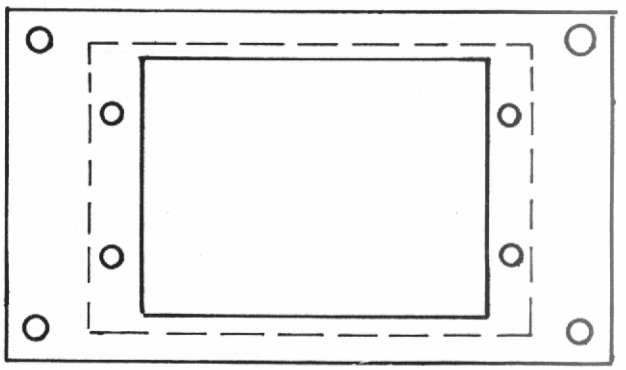
Place template over marked location of servos and transfer hole locations and cutout lines directly to fuselage. The servo cutout can be made easily with an exacto knife or razor blade. It is recommended to cut slightly undersize, then trim to final size. The screw mounting holes are easily made with an ice pick, punch, or undersize drill. Make all holes that are to receive screws **undersize** and the poly fuselage material will self thread when the screw is inserted.



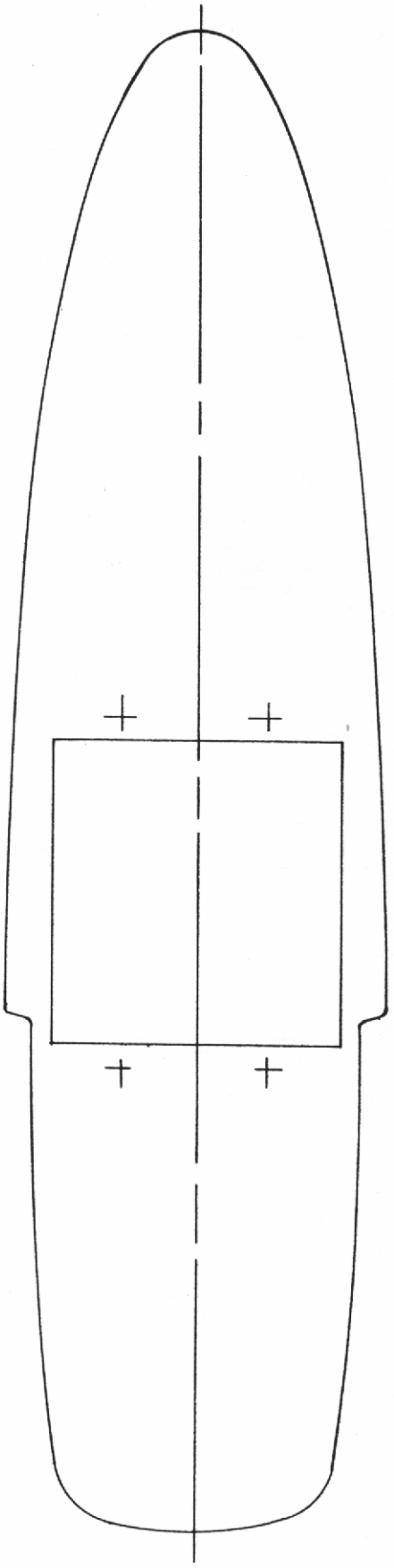


NOTE: If the servo hole is inadvertantly made oversize, a plate or tray can be made as shown to provide suitable mounting. (Use thin plywood, aluminum or plastic sheet.)

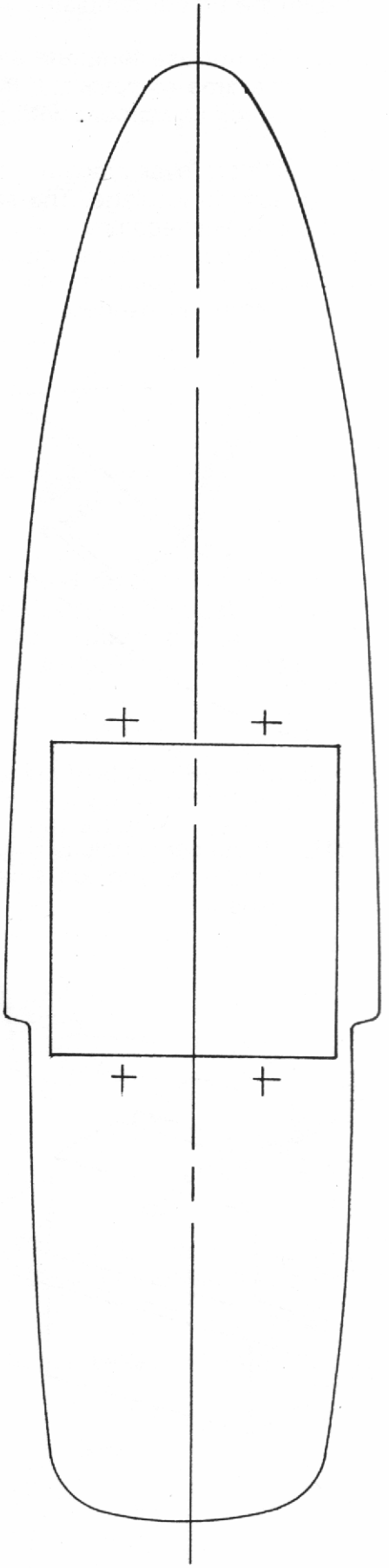




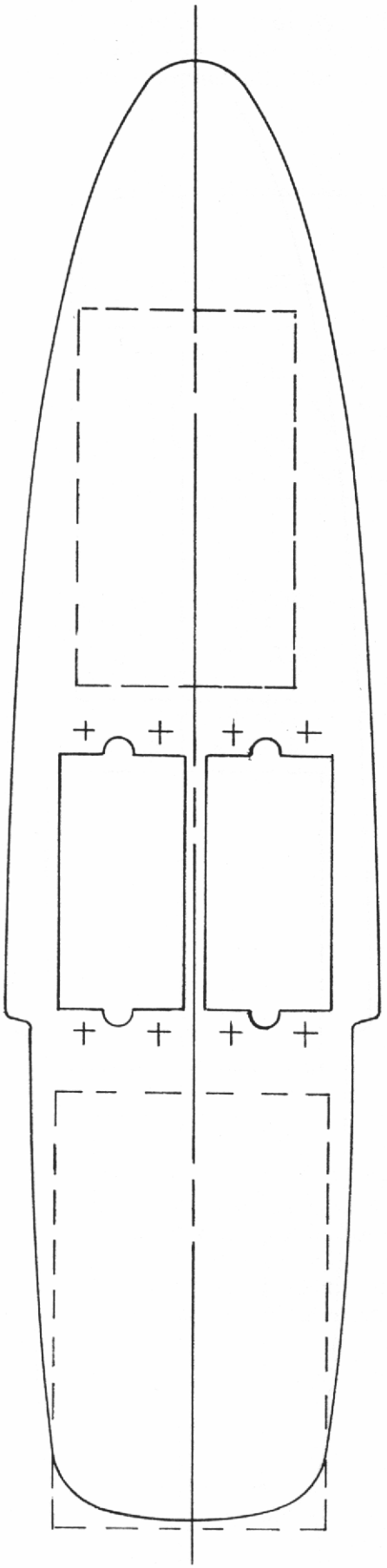
D & R TRAY FOR BANTAM



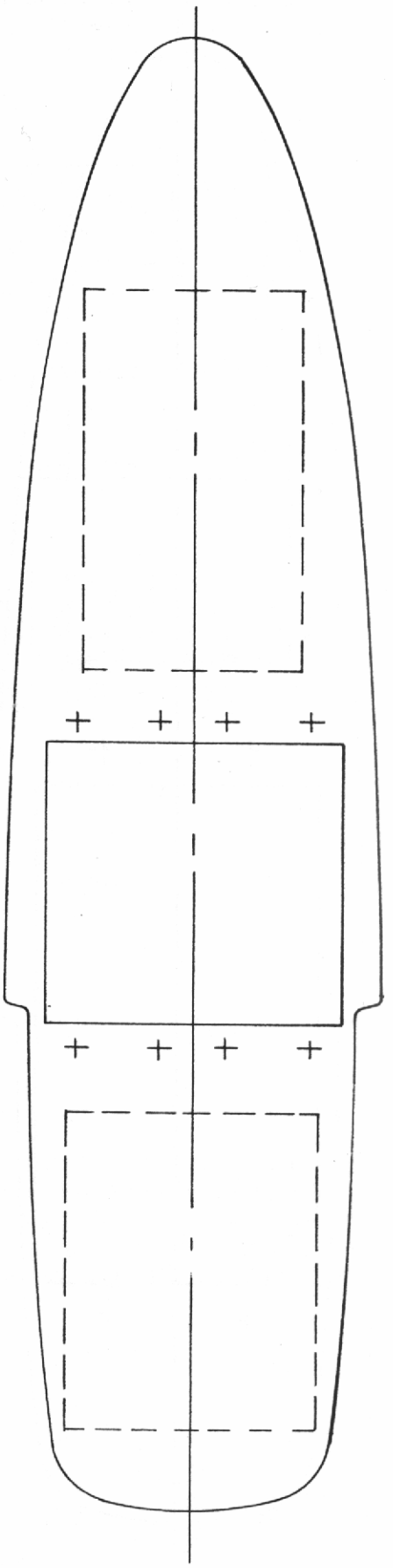
ORBIT PS-6 TRAY MOUNT



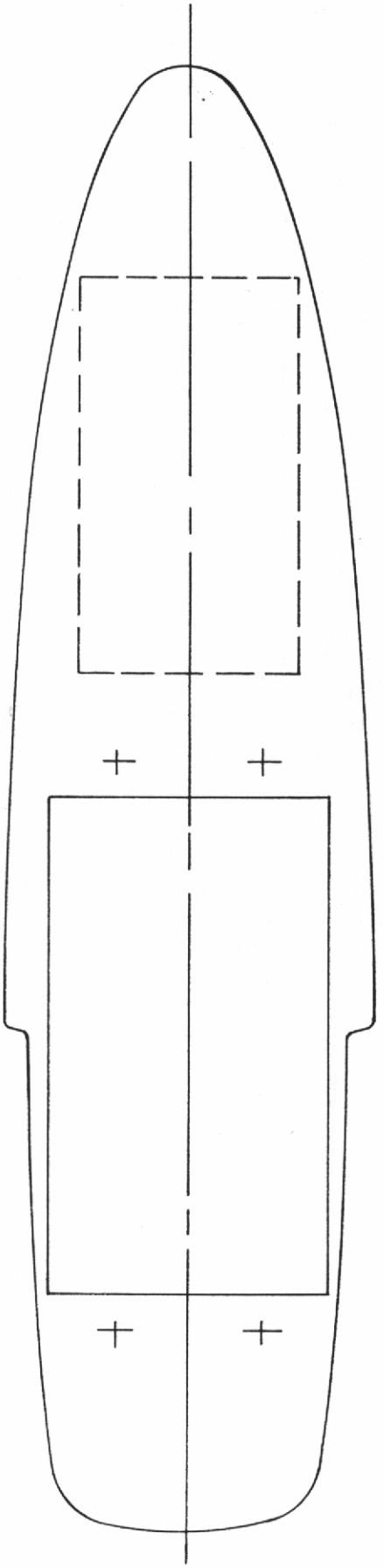
ORBIT HAWK PS-6
INDIVIDUAL SERVO



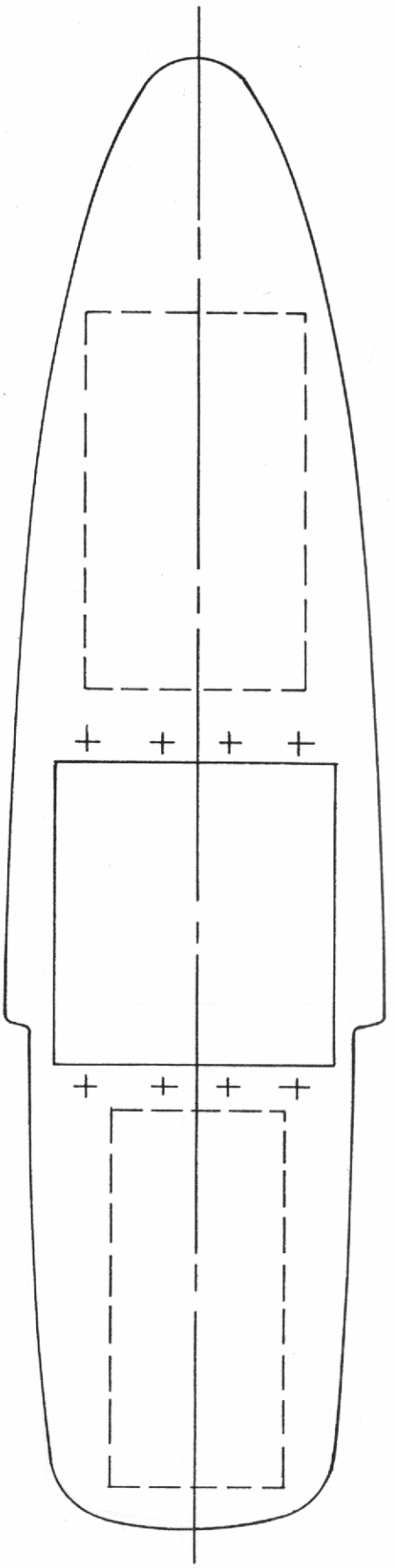
WORLD ENGINES S-5



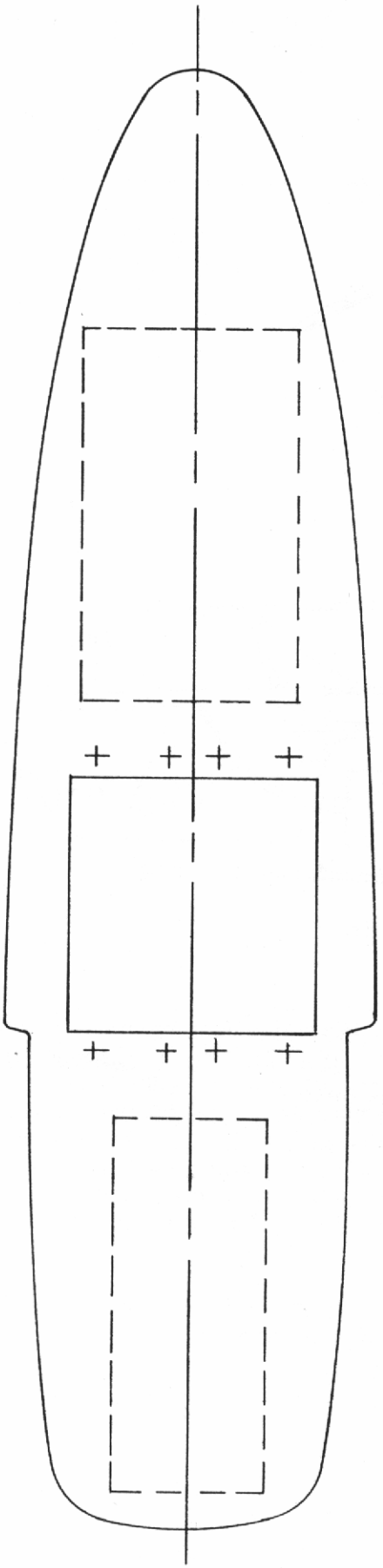
KRAFT BRICK



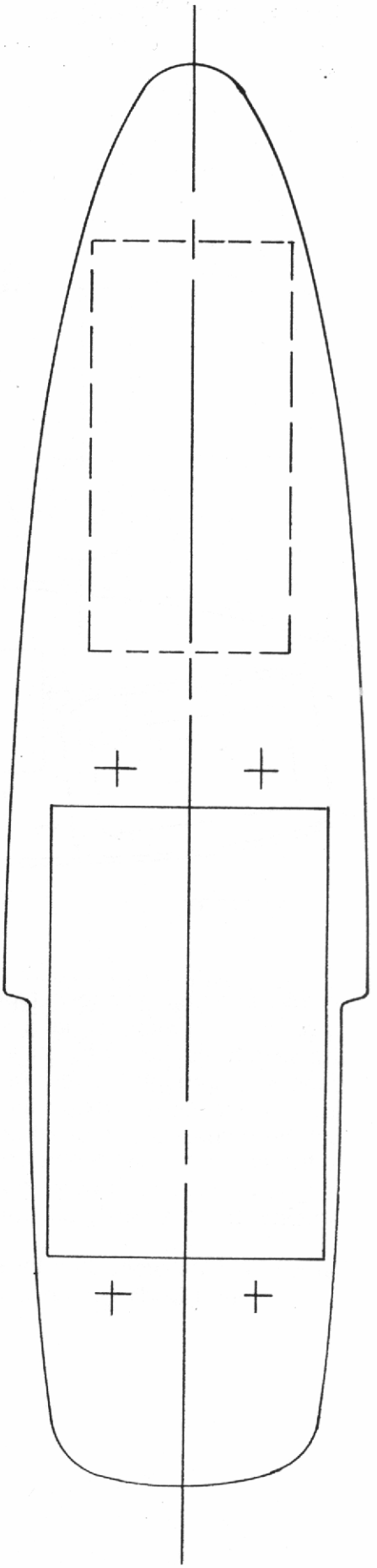
KRAFT KPS-10



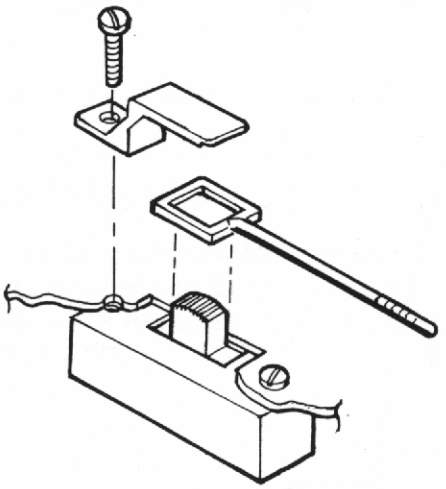
RS-LDR-2
KRAFT KPS-12
WORLD ENGINES-SMALL

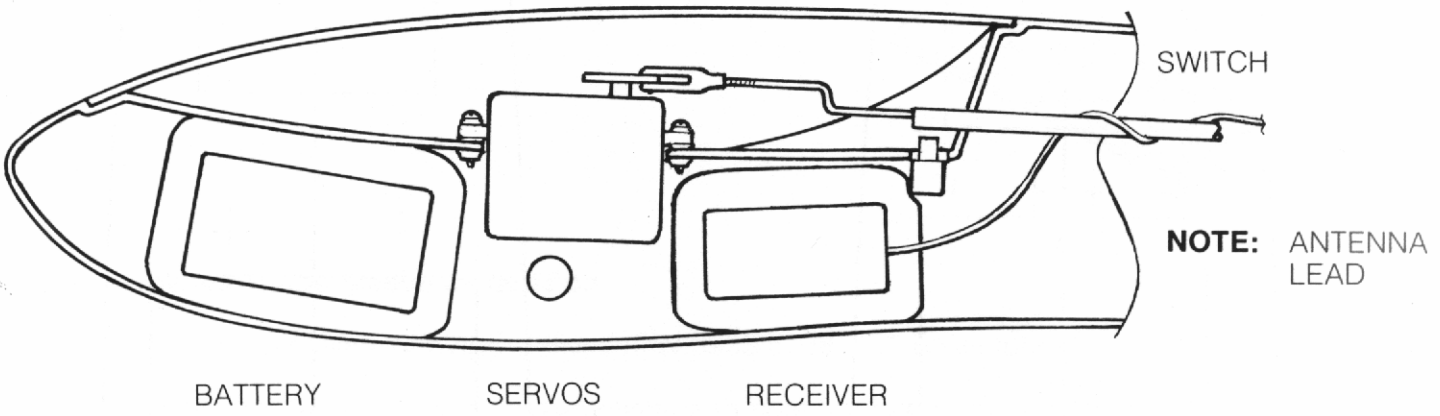


EK BRICK



Locate switch and cut access holes **only** for the toggle and screw holes.





Install radio gear as shown typically, and mount switch and servos last. We have provided in each kit a switch actuator set identified as P/N 9907. (See illustration.) Depending on the switch location, drill an access hole for the switch actuator arm either through the canopy or through the rear of the cockpit area where the sleeve type bushings are useable. If access is through the canopy, it is recommended that the sleeves be omitted, cut the actuating arm off at about ⅜ to ½" outside the canopy and create a slight knob at the end with a soldering iron or flame from a match, until a slight collection of material is noted. Then extinguish and cool. The canopy can then be removed with no difficulty and switching is easily accommodated externally.

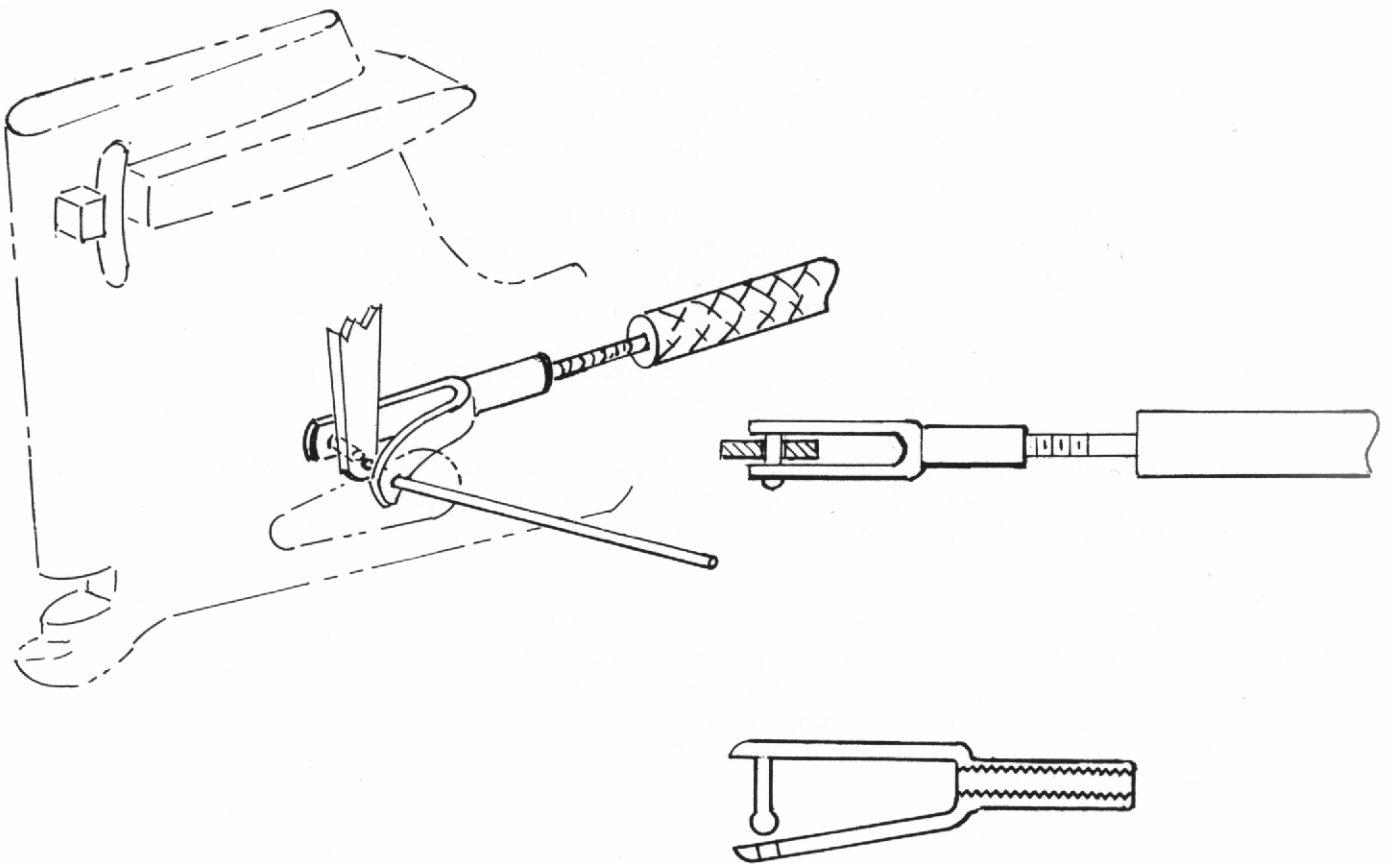
Note: A safe procedure for switch on-off position is with the "off" position in, and "on" out. Handling then will not accidentially turn on your receiver.

CONTROL PUSH RODS

With radio gear permanently installed, examine the control push rods—P/N 9901-11 is 26″ long and contains one straight wire w/clevis and one bent wire w/clevis. This is the **rudder** control rod. The other, 28″ long, P/N 9901-12 contains one wire w/clevis and one clevis mounted closely to the end of the fiberglass tube. This is the elevator push rod. All gross adjustments for length should be made at the cockpit end of the tubes.

Install the elevator push rod with the "clevis only" end toward the tail. Observe its location in the dorsal by viewing through the rudder control access hole. If the elevator bellcrack is not in view, tip the fuselage slightly nose up and tap the fuselage. The bellcrack will drop into view. Install the elevator actuator wire, P/N 9903-7 (.064 dia. x 3″ long) in the top portion (curved cut-out) for stability during push rod installation.

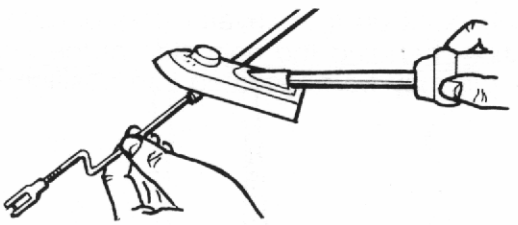
The rudder hinge pin may be used as an installation tool (or ice pick, awl, etc.) of the clevis to the lower attach point on the elevator control horn. The illustration shows one easy method of installation, bending the hole side of the clevis outward, spreading the clevis so that the clevis pin may be negotiated into position to slip into the control horn.



Once this is accomplished, pressure on the holeside will close the assembly. Be certain the clevis is snapped closed.

Install the 9901-11 rudder push rod with the bent rod toward the tail. (Remove the clevis for space at this time.) Slide the rod through the oval hole in the dorsal as shown and install clevis. (The clevises are self-threading nylon and screw on and off right hand threads.)

Gross adjustments to match servo locations can be made at this time by heating the end of the tubes with monokote iron or other method (a match moved across the end several times will suffice) until the "hot glue" inside softens—push or pull the rod inserted the required amount to match the neutral servo location with a neutral control surface location. Final adjustments can be made on the threaded clevises on both ends.



When installed, the servo hookup is attached so that when it pulls, the control relates to down flight, and pulling the rudder control rod similarly relates to a right turn. This way, pull-down, pull-right, allows for clevis adjustment in the proper direction when looking from the nose to aft as reverse adjustment errors are easily made.

Once the radio and push rod installation is complete, turn the system on and check control surface movements. Stick back—elevator trailing edge up. Stick forward—elevator trailing edge down; stick right—rudder trailing edge moves to right, etc., when standing behind the airplane with it pointed away from you.

Assure that all controls move smoothly and freely. If any binding or jerkiness is noted, check completely from servos to control surfaces.

Check neutral positions with trim buttons in their center positions. Make trim adjustments prior to flight testing as radio trim may be inadequate for proper flight if controls are not reasonably close. Weight and balance, wind and lift conditions will dictate further adjustments.

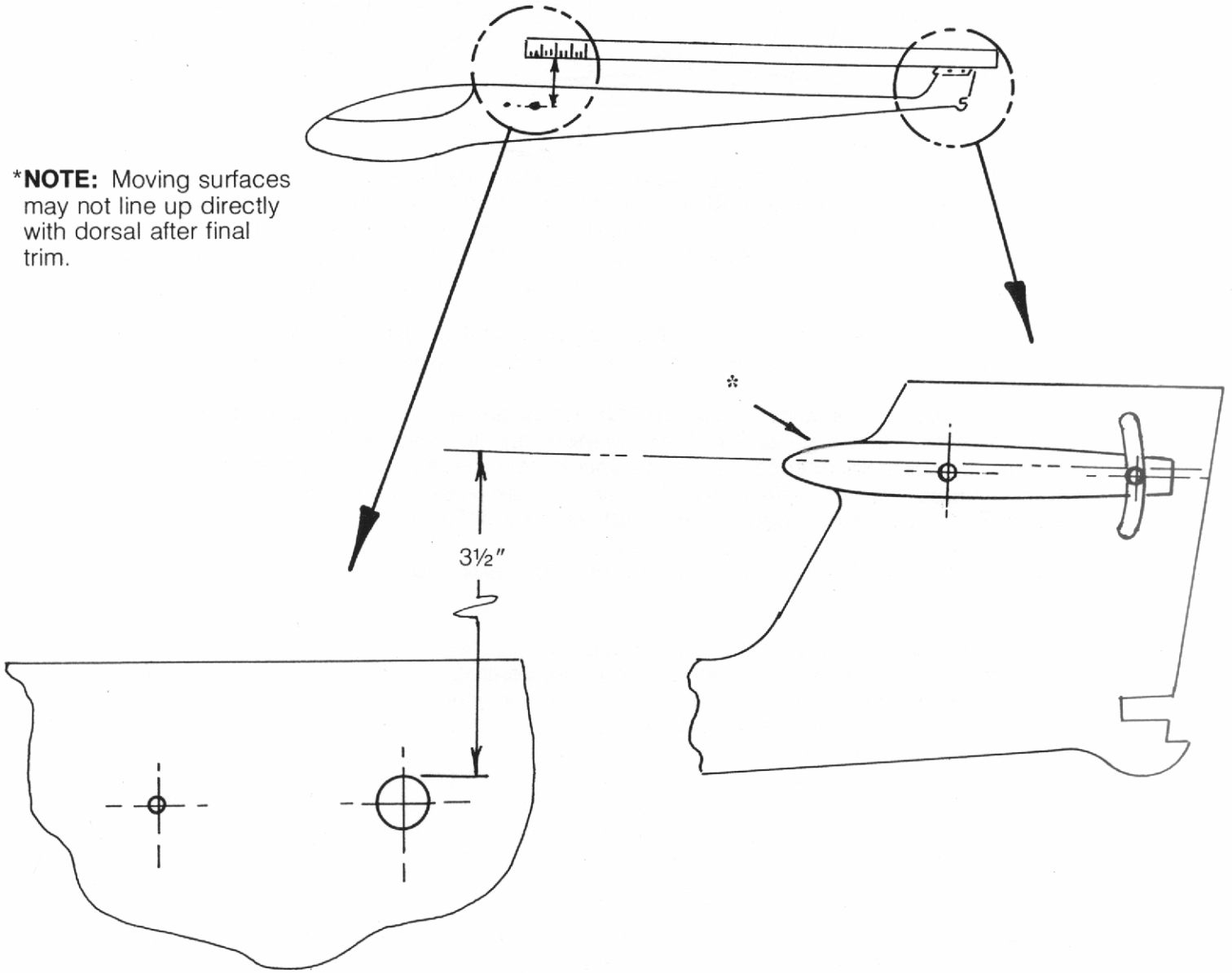
The preliminary trim adjusting should be made by either lengthening or shortening the control rods. (Clevises are right hand threads, thus twisting clevis clockwise will shorten the overall length, and counter-clockwise will lengthen them.) The rudder push rod may be adjusted from the servo connection point.

The final pre-flight check of balance, trim, etc., is the suggested control surface trim angle.

After all gear is installed, the model is balanced and completely assembled, all controls as "neutral" as possible visually, check the elevator angle per the illustration below.

Turn on receiver and transmitter to seek neutral. Lay a straight edge across the tail wires and check the dimension shown below.

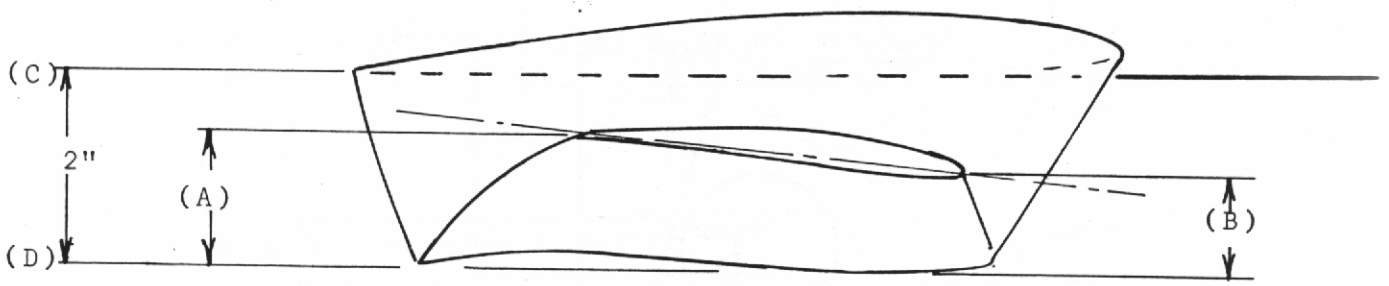
*__NOTE:__ Moving surfaces may not line up directly with dorsal after final trim.



CONTROL SURFACE MOVEMENT: Rudder = ½" to ⅝" L.E. travel each direction
Elevator = 3/16" to ¼" L.E. travel each direction

Check wings at this time for "wash-out" or twist at tips.

UNDERSIDE OF ROOT SUPPORTED FLAT AND PARALLEL TO MID-SPAN CONTACT ON FLAT SURFACE.



Correct any difference between (C) and (D) to parallel by holding in twist. Note monokote wrinkles resulting from twist and remove wrinkles with heat gun or iron. Shape will be retained and controlled with this method. Tip wash-out (A) to (B) should be $^{3}/_{16}$" to ¼". Adjust similar to above. Measure from flat surface to trailing edge (A) dim. and leading edge (b).

Lay wings on flat surface with root braced up so that measurements can be made of the tip area. The leading edge should be approximately $^{3}/_{16}$ to ¼" lower at this point.

Should adjustment of wing "wash-out" be necessary, weight the root section on a flat surface, apply heat from covered iron or heat gun to covering material while holding twisting pressure in direction desired. Check per illustration and correct as required. Temperatures, etc. may affect this condition, so from time-to-time, a visual check may be made. The acceptable range of "wash-out" is $^{3}/_{16}$ to ¼".

This should be the last pre-flight check, but before proceeding, check once more:

1. Balance
2. Servos hooked up and snap-links locked
3. Rudder throw free but not overtravelling (overcontrol)
4. Elevator throw free
5. Wing wash-out consistent wing to wing
6. All wires, rods secure

FINAL PRE-FLIGHT CHECK LIST

1. Check balance.
2. Check to see that control surfaces move correct direction with stick; also, proper amount of travel.
3. Check center trim buttons; rudder should be straight. Stabilizer should be set to angle of incidence with wing as specified.
4. Be sure you have correct wash-out in wing tips.
5. Be sure all control surfaces move freely without bind **and return to exact center** when stick is in neutral position.
6. Be sure both receiver and transmitter batteries are well charged as specified by their manufacturer.
7. Give radio gear range (distance) check as to R.C. manufacturer's instructions.

TEST GLIDING

1. Select a large area (100 yards minimum) without obstructions and with a soft landing surface (grass lawn, deep grass, or soft weeds).

2. Go through check list.

3. If anyone else is flying in the area, check for frequency clearance. Turn on the receiver (leaving transmitter off) to see if you are picking up any definite signals. A small amount of chatter is not uncommon when your transmitter is off and the receiver on.

4. Hold the plane just under the leading edge of wing. Face directly into the wind. With a few smooth steps forward, throw the plane with smooth motion. Be sure the wings are level and the nose is pointed down slightly. Do not throw the plane up or too hard. Be prepared to operate control stick immediately.

5. With the plane flying away from you, turning right or left will not present too much of a problem. Use a moderate amount of control, letting the stick return to neutral as soon as you see some response to turn; if not enough turn, then repeat the procedure. Too hard a turn or holding turn too long may cause a steep bank with possibilities of tip stall and a crash.

6. Operating elevators is not as natural a motion. Firmly set in your mind that you push the stick forward to push the nose down, and pull back on the stick to bring the nose up.

7. The flying attitude of the plane should be with the nose pointed down 2-3 degrees. Pulling back and pointing the nose up will cause the plane to lift up momentarily, then lose air speed and stall (not flying anymore). Then the nose will drop until the plane gains flying speed. At this time, with its excess speed from the dive, it will lift up until it goes into another stall. To pull out of a stall, you can do **nothing until the plane has gained flying speed.** A little up after it has dived enough to gain flying speed will work, but is dangerous. Generally, it is best to let it go through its dive, then be prepared to push forward on the stick as the nose starts up. Push forward on the stick only enough to make the plane fly level. As air speed decreases, decrease the amount of down until the plane will fly with the stick in neutral position.

8. Trimming: If the plane flies with glide too fast and steep, trim button will need to be pulled slightly back. If it flies with the nose high and wants to stall, the trim button should be pushed forward to give more down.

9. If there is not enough movement on the trim button to provide level glide, the push rod clevis may need to be readjusted. In test gliding, the plane should be trimmed out for smooth glide. If the trim buttons are at either extreme position, readjust the clevises on push rods as required to allow trim button to be centered when the plane is in perfect trim.

REMEMBER

1. Do not let the nose balloon up. Any time it starts to rise, give a tap forward on the stick to push the nose back to level and **let off.**

2. When the plane is flying away from you, moving the stick to the right will make the plane go to the right. When it is coming at you, the plane will go to **your left** as you push the **stick to the right.**

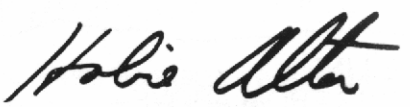
3. Try to always fly the plane up wind of yourself and make turns **into** the wind as much as possible.

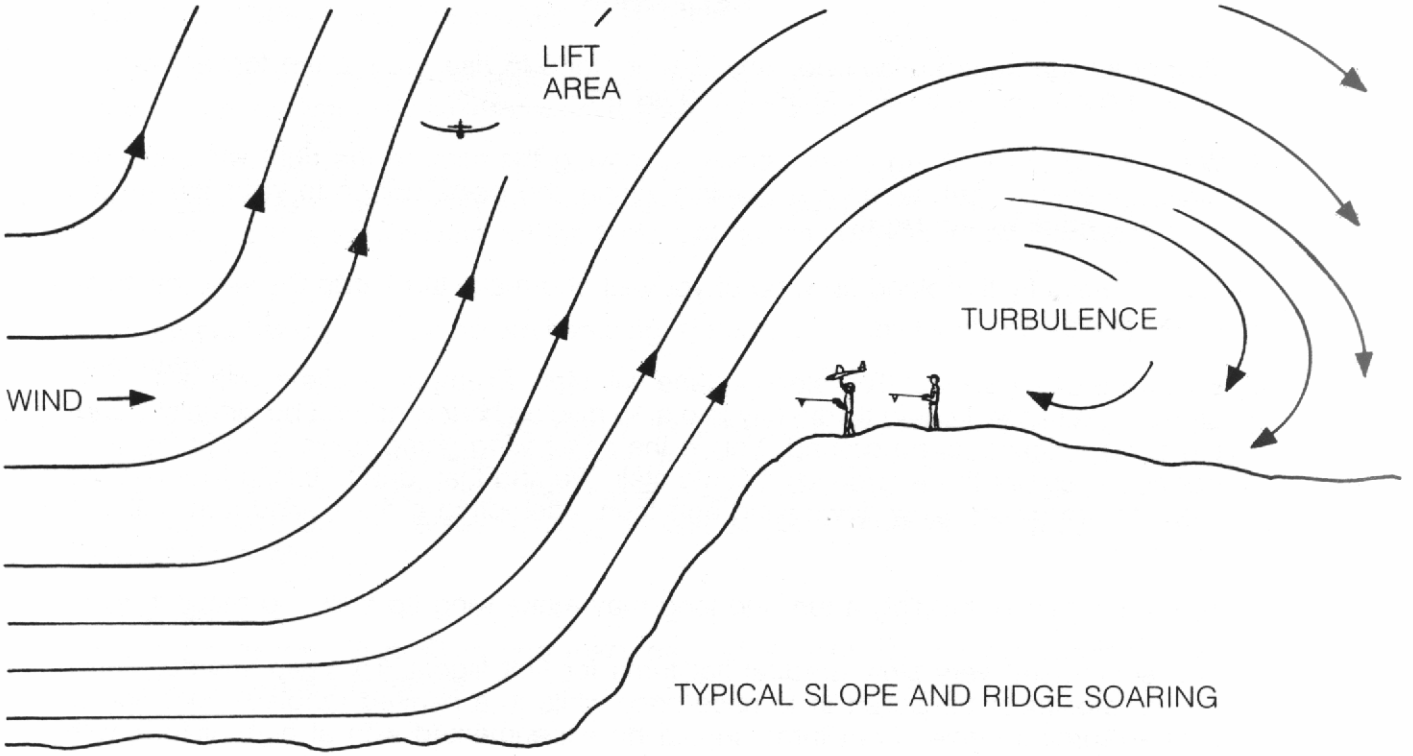
4. Be aware of air speed. Too slow—plane will stall. Example: a plane with a 12 mile an hour stall speed could fly directly into a 15 mile an hour wind and be virtually standing still in relation to the ground. Yet, in the same wind going down wind at 25 miles per hour (relative to the ground) it could stall. We find that, due to this, a flyer has the tendency to go too slow down wind and then, attempting a down wind turn, will stall the plane.

5. Too much turn or holding a turn too long may make wing tip stall and result in spin.

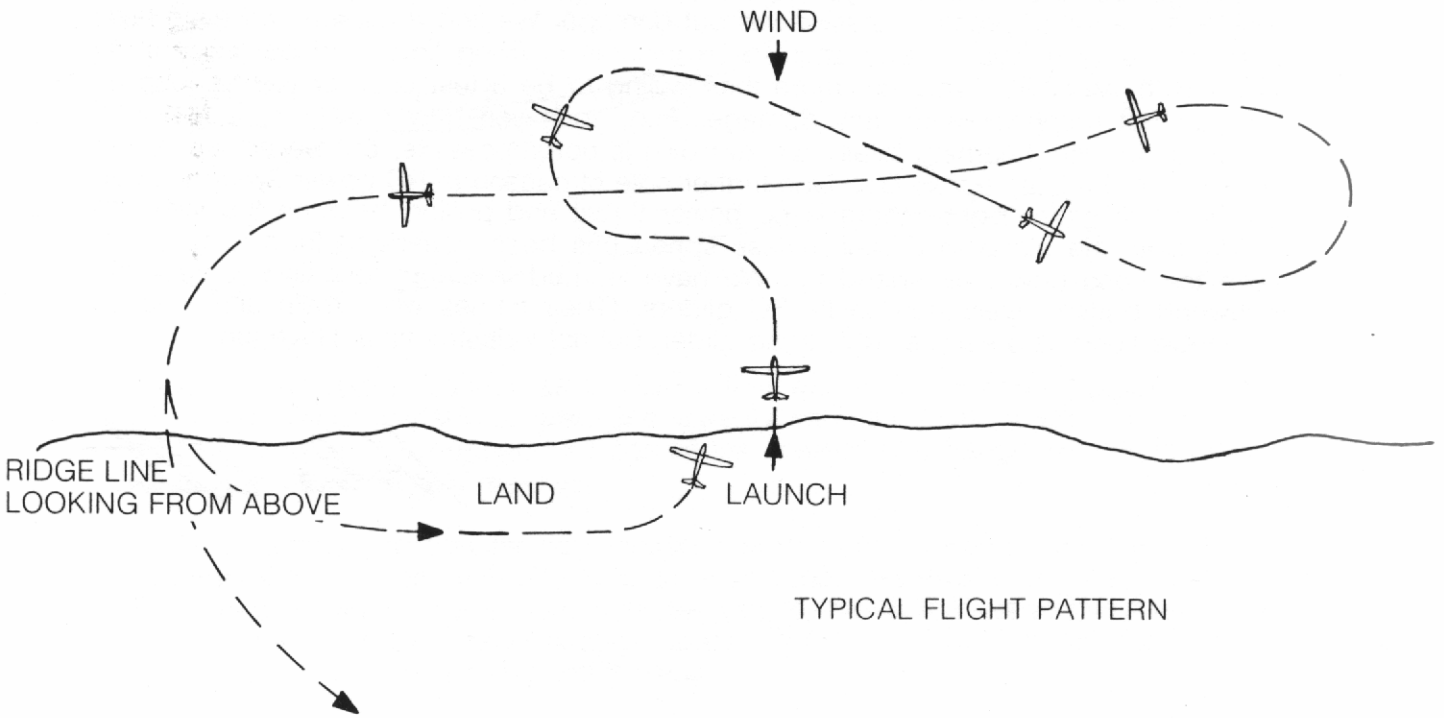
6. We recommend very slow gradual flat turns for first flights. To make sharper turns, up elevator must be pulled in to raise nose while in a banked (angled) condition to shorten turning circle. Tight turns should be experimented with at high altitude with lots of room for recovery.

We highly recommend that you have an experienced RC flyer help you with your first flights. He can get the plane in the air for you, make sure it is trimmed correctly, then let you get some stick time. If you foul up, he can take over and get it back in flying position for another practice session without damage. We find a person can have fairly good control of a Hobie Hawk after 15-30 minutes of flying time, and be ready to fly on his own. Most RC flyers are more than willing to be a test pilot for you as long as they are not responsible for any damage. And, soon you may qualify as a test pilot for someone else. Learning totally on your own is not impossible, but we advise you to stock up on 5 minute epoxy first. One further note of caution to RC power flyers attempting their first glider flight—there is no power thrust and pulling back on the stick will rapidly slow the plane to a stall, unless speed has been generated from a dive, etc. Keep the nose down, air speed up. We have learned this from teaching some world renowned pattern flyers how to fly RC gliders. (Their names will remain anonymous.) The Hobie Hawk is a surprisingly strong glider, but not indestructible. Have fun!



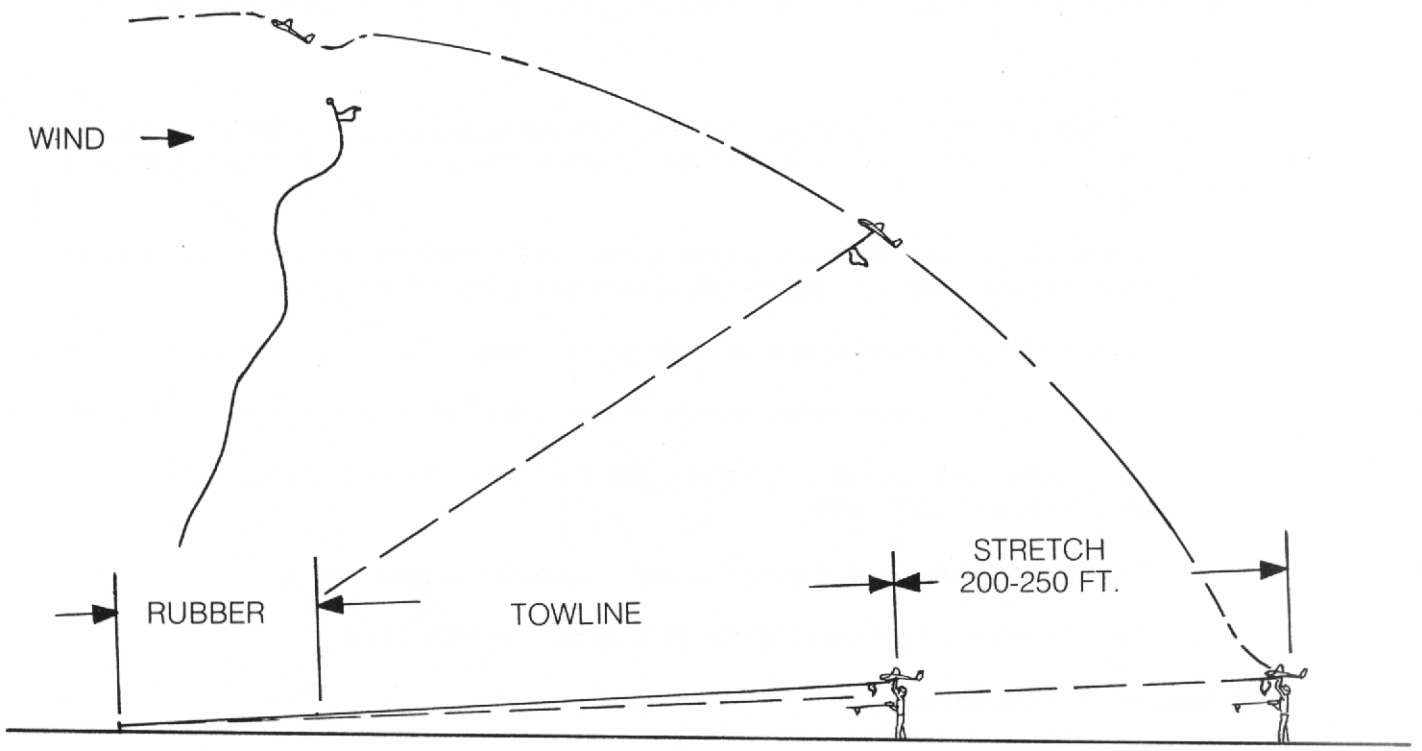


TYPICAL SLOPE AND RIDGE SOARING

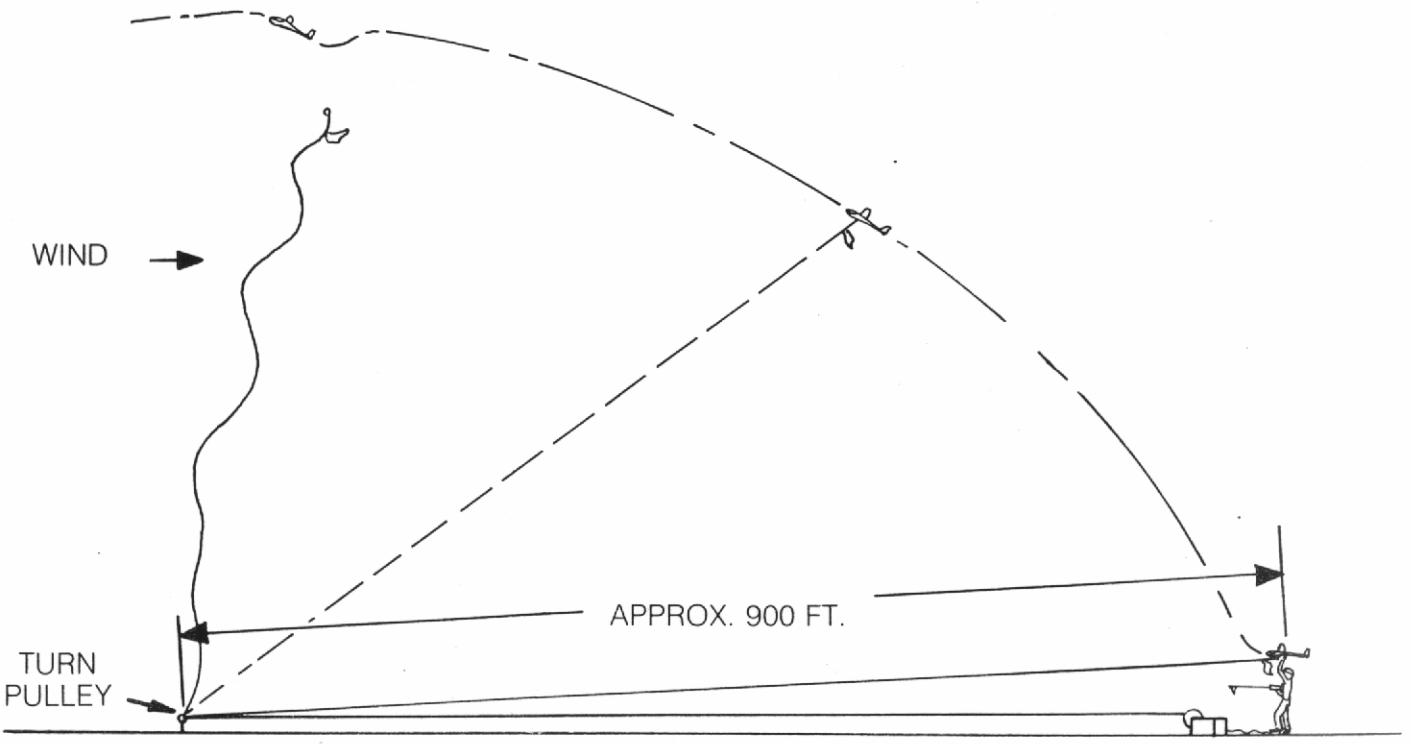


TYPICAL FLIGHT PATTERN

Hi-start and winch launch basically create a "kiting" condition which starts instantly when the model is released and accelerates at least for a short time. Caution is advised to be quick on rudder response to prevent complete rotation of model during first few seconds after release.



TYPICAL HI-START



TYPICAL WINCH TOW

WINCH

REPAIRS

Structural damage and repair methods may vary from that outlined herein due to the variety of circumstances such as type and extent of damages, repair materials available, etc. Tests conducted at our facility on typical structural damage resulting from various angles of impact and external forces have provided the following recommendations:

1. Wing

   A. Complete fracture—Remove covering from damaged area for sufficient exposure only. (Replacement of covering over repaired area same as outlined in assembly text.)

   B. Review illustration of repair shown below and determine size of bracing to be added to main section, and length of wire to trailing edge section.

   C. Remove foam material only enough to provide space for brace and wire selected.

   D. Locate brace and wire temporarily to assure proper fit prior to mixing epoxy glue.

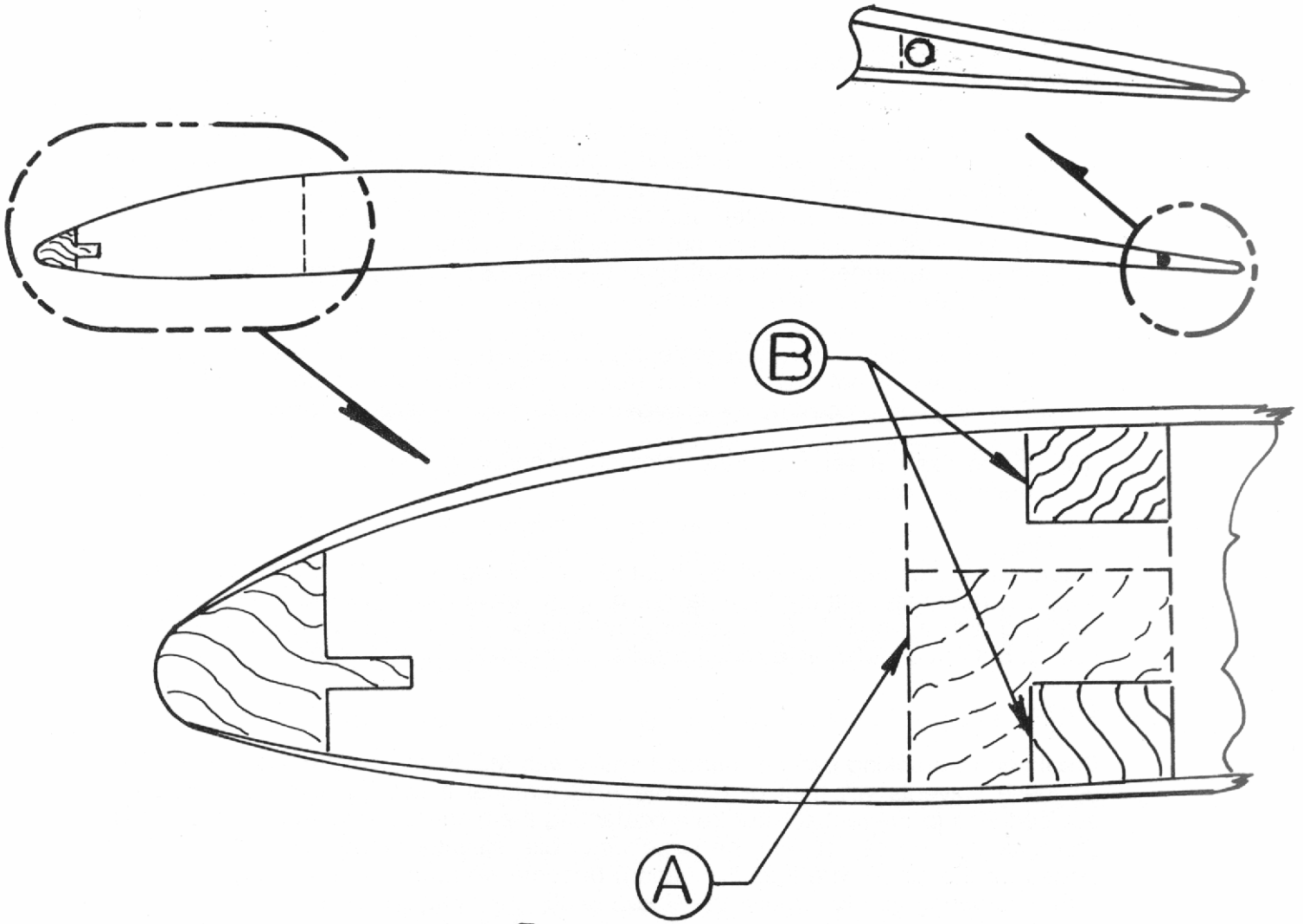
   E. Apply epoxy glue to both foam and brace material and insert snugly. Tape or hold firmly to assure alignment.

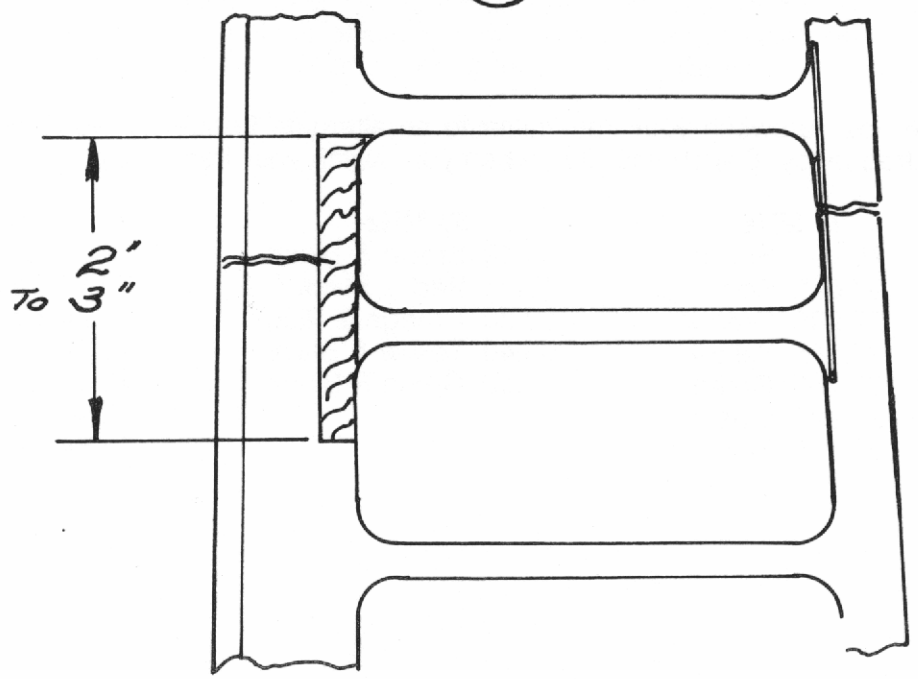
   F. Sand lightly over external surfaces and clean prior to recovering.

   G. Recover repaired area with same material as originally used.

2. Rudder and Elevators.

   1. Structural damage to foam/plywood—identical to wing procedure.


B
A


2"
To 3"

FUSELAGE

A. Nose Cone

(1) Small dents received from impact will generally reduce themselves in time without any processing. Sideward impact may produce a kind or sustained wrinkle. This may be removed with careful local application of heat which will allow the material to soften and return to its original shape. Caution is advised in temperature control—do not exceed 200°F. and do not allow heat to remain local for extended periods of time. Careful observation of the material will provide reasonable notice of effects.

(2) Oversize holes—Very few materials will adhere to the poly material and **none** will adhere if not flame treated (refer to assembly procedure in earlier text). The simplest procedure for enlarged screw holes is larger screws.

(3) In the case of servo access holes cut oversize, a doubler plate is required as illustrated previously.

B. Tail Cone

Fractures and/or tears should be treated with fiberglass cloth and/or epoxy resin patching materials. Although six layers of glass cloth make up the initial assembly, patching with a single layer of repair cloth can be expected to produce adequately strong, but not unnoticeable repair results. Sand smoothly and repaint.

C. Dorsal

Breakage or cracking can be mended easily with M.E.K. or acetone. Care is advised as these solvents will melt or dissolve ABS material if used in excess. Caution is advised also to prevent solvent from contacting the hinge bearing surface of the bellcrank located on center with the large wire hole (elevator hinge). Should the detent ridges for the hinge wire (see illustration) become worn, the tip ends may be closed with a soldering iron to remake the shape to clip the hinge in place.

If you are able to switch your transmitter to an alternate frequency, you'll need one flag for each frequency. Switch your flag when you switch your frequency.

27 MHz	**53 MHz**	**72 MHz**
26.995 Brown	53.10 Brown & Black	72.08 Brown & White
27.045 Red	53.20 Red & Black	72.16 Lt. Blue & White
27.095 Orange	53.30 Orange & Black	72.24 Red & White
27.145 Yellow	53.40 Yellow & Black	73.32 Violet & White
27.195 Green	53.50 Green & Black	72.40 Orange & White
27.225 Blue		72.96 Yellow & White
27.225 Blue		75.64 Green & White

GLOSSARY OF TERMS

AIRBORNE BATTERY PACK: The batteries used to power the receiver-decoder and servos in the aircraft.

AIRFOIL: The cross section of a wing if cut chord-wise through the wing.

AMA: The Academy of Model Aeronautics, the governing body for model aviation in the United States.

BAND: Referring to a frequency band such as 27 MHz or 72 MHz.

BELLCRANK: A nylon lever used between the servo and a control surface to convert the movement of the servo at right angles to the servo output. Bellcranks are usually available in 60 degree, 90 degree, and 120 degree modes.

C.G.: Center of gravity.

CLEVIS: A device on the end of a pushrod to attach the pushrod to a control horn at the control surface.

CONTROL HORN: A small nylon fitting mounted on the control surface to which the pushrod clevis is attached providing a mechanical connection between the push-rod and the control surface in order to move that surface.

CROSS-WIND: A wind that blows at right or oblique angles to the direction of flight.

DIHEDRAL: The upward rake of each wing panel to provide "built-in" stability.

DORSAL: The small portion of the vertical fin which fairs into the top of the fuselage.

DOWN-WIND: Flying in a direction opposite to that from which the wind is coming.

DRAG: A force exerted against the direction of flight by the resistance of the air.

ELEVATOR: The movable portion of the aircraft attached to the horizontal stabilizer which, when moved, creates a change in pitch of the aircraft.

F.A.I.: Federation Aeronatique Internationale, the governing body for sport aviation throughout the world.

F.C.C.: Federal Communications Commission, the federal agency assigned to the control and regulation of all radio transmissions.

FIN: Referring the vertical or horizontal stabilizer.

FREQUENCY: Each radio system operates on one of several F.C.C. assigned frequencies in the 27 or 72 MHz bands.

HEAD-WIND: A wind blowing in the direction opposite to the flight path of the aircraft.

HIGH ASPECT RATIO: Indicating a wing that utilizes a greater than normal span with relation to the chord, or width, of the wing.

HI-START: A method of launching sailplanes utilizing a combination of surgical tubing and monofilament line, one end of which is attached to a stake in the ground and the other to the sailplane's tow hook.

INCIDENCE: The angle formed between the wing and the stabilizer.

L.E.: Leading edge, referring to the leading edge of the wing of an aircraft.

LIFT: The upward force exerted by the wing.

LINKAGES: Normally used to indicate a connection between a pushrod and control horn or a pushrod and a servo.

PITCH: The control movement effected by the elevator, causing the aircraft to move in a nose up or nose down condition.

PROPORTIONAL: Referring to proportional control systems wherein the movement of the control surface is proportionate to the amount of the control stick on the transmitter.

PUSHROD: A device designed to transfer the action of an electromechanical servo to a given control surface.

RIDGE SOARING: Soaring on an upward movement of air, caused by the force of wind hitting a ridge and being "pushed" up.

RUDDER: The movable portion of the vertical fin which affects the yaw mode of the aircraft.

SERVO: An electro-mechanical device which converts an electrical signal into mechanical energy to move a control surface on the aircraft.

STABILIZER: Referring to the horizontal tail plane. (Normally fixed.)

STALL: A condition which occurs when air speed has been reduced to the point where the aircraft is no longer flying.

STICK: A movable portion of the transmitter which is manually deflected to transmit a command to the receiver-decoder in the aircraft.

T.E.: Trailing edge, referring to the trailing edge of the wing of an aircraft.

THERMAL: A rising column of warm air.

TIPS: Referring to the tip of a wing, elevator or rudder.

TRANSMITTER: The hand held portion of a proportional control system which transmits the command of the operator to the receiver-decoder in the aircraft.

TRIM: The proper adjustment and balance of amodel.

WASH-OUT: Where the trailing edge of the wing at the tips are twisted slightly upward.

WING LOADING: A mathematical formula arrived at by dividing the number of square feet of wing area into the total number of ounces of weight of the aircraft, e.g., 8 ounces per square foot wing loading.

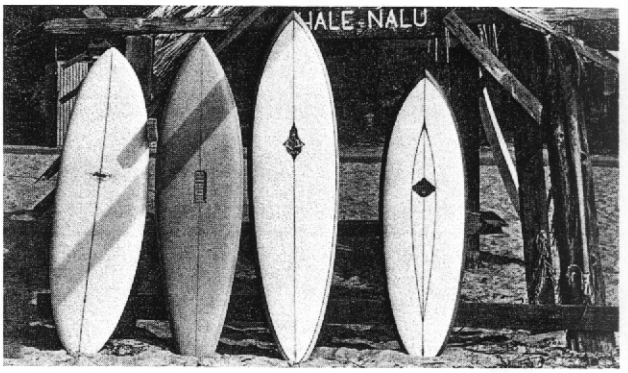
WING RIB: Formers used in wing construction that determine the airfoil shape.

WINGSPAN: The distance from one tip of the wing to the other tip of the wing as measured on a flat surface.

YAW: The movement of the aircraft caused by the rudder, a flat movement of the aft section of the fuselage to the right or left.

. . . AND ALSO
FROM THE EXCITING IMAGINATION OF
HOBIE ALTER

HOBIE 10



HOBIE SURFBOARDS

HOBIE 12

HOBIE CAT 14

HOBIE CAT 16

HOBIE MODEL COMPANY
33081 Calle Perfecto
San Juan Capistrano, Calif. 92675