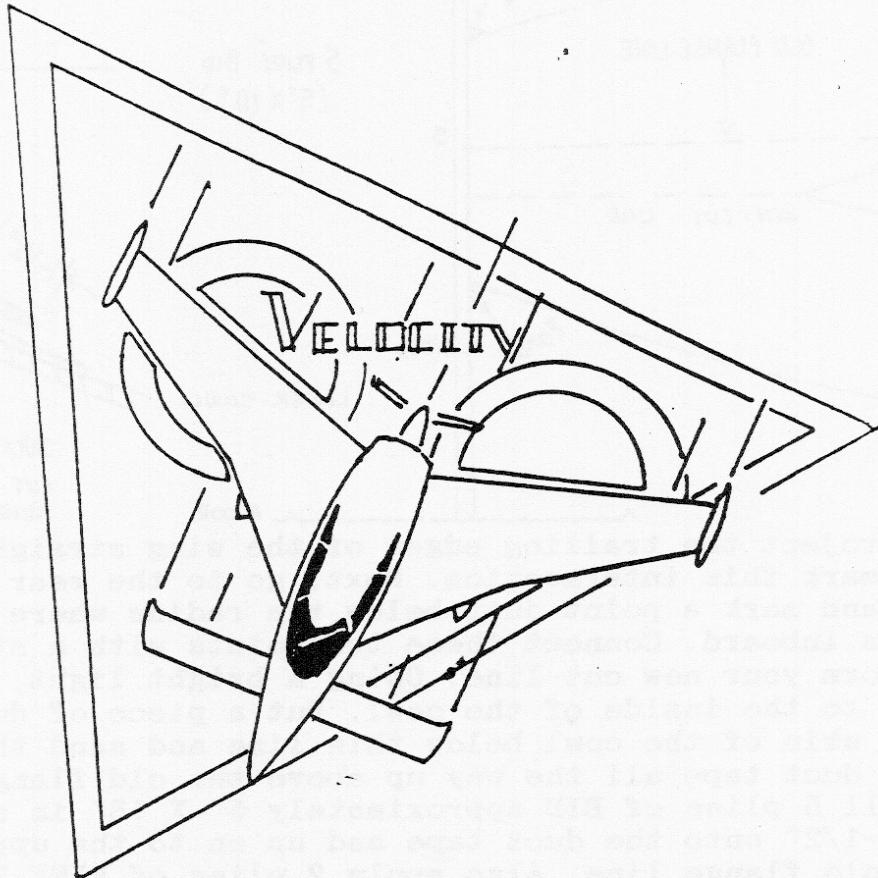


VELOCITY

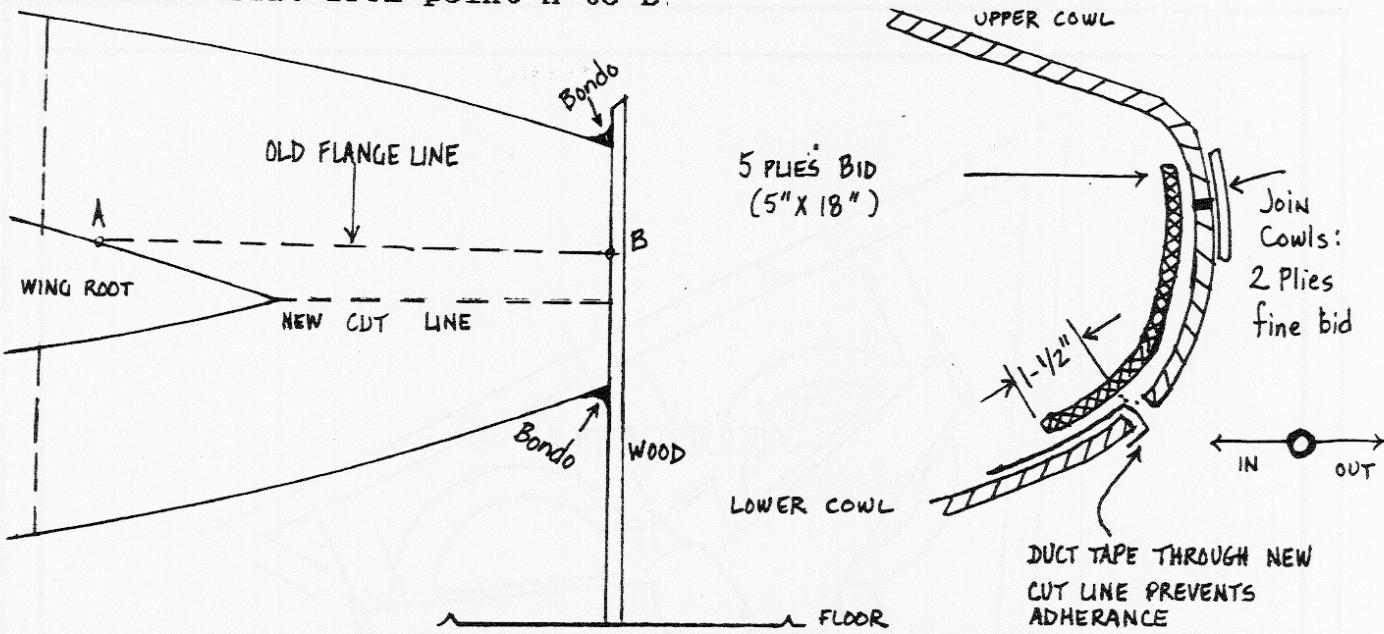


Section V

FAIRINGS

COWL TO WING FAIRINGS: WING ROOT

Install your cowling with clecos at the firewall. Clamp the remaining flanges together on each side, and check to see that both the upper and lower cowls are in their proper positions (not sagging). Get a piece of wood and support the cowls at the rear center so that they won't shift or sag when the clamps and flanges are removed. Remove any remaining flanges and grind the rearsides flat from point A to B.

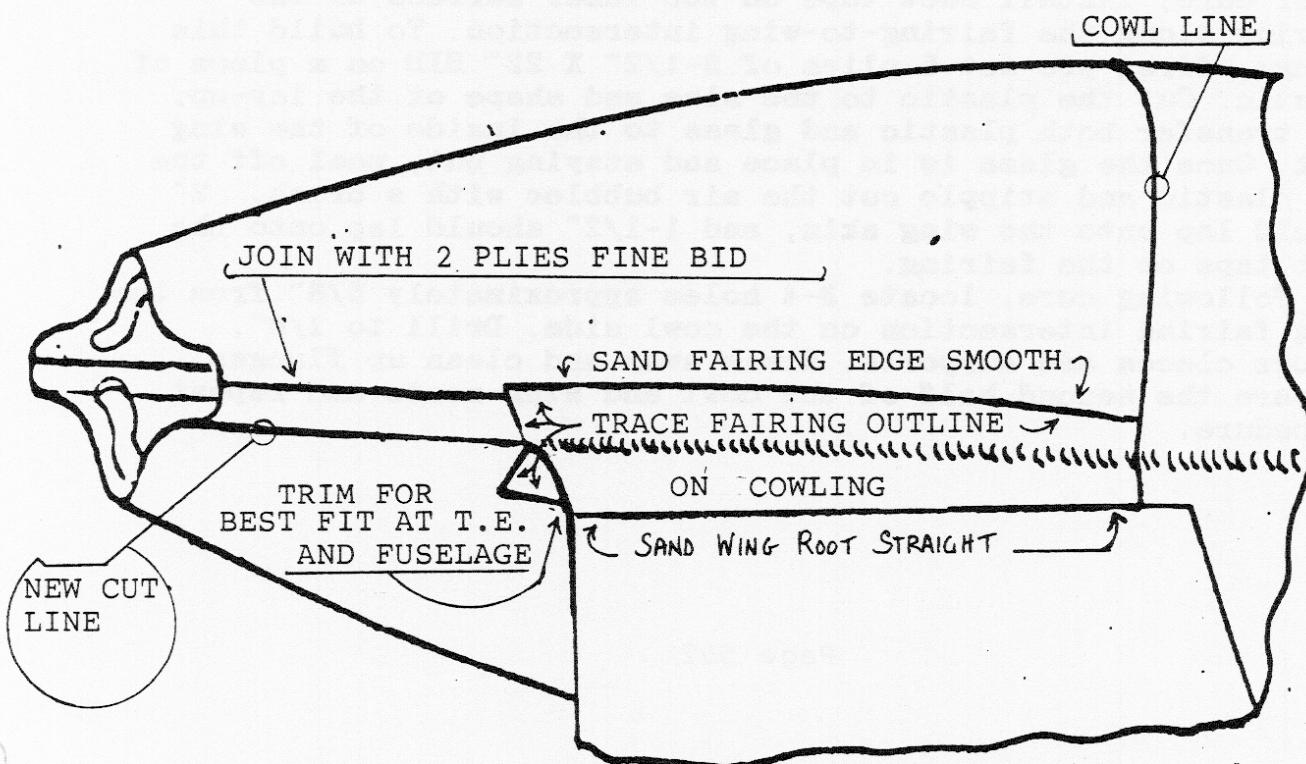
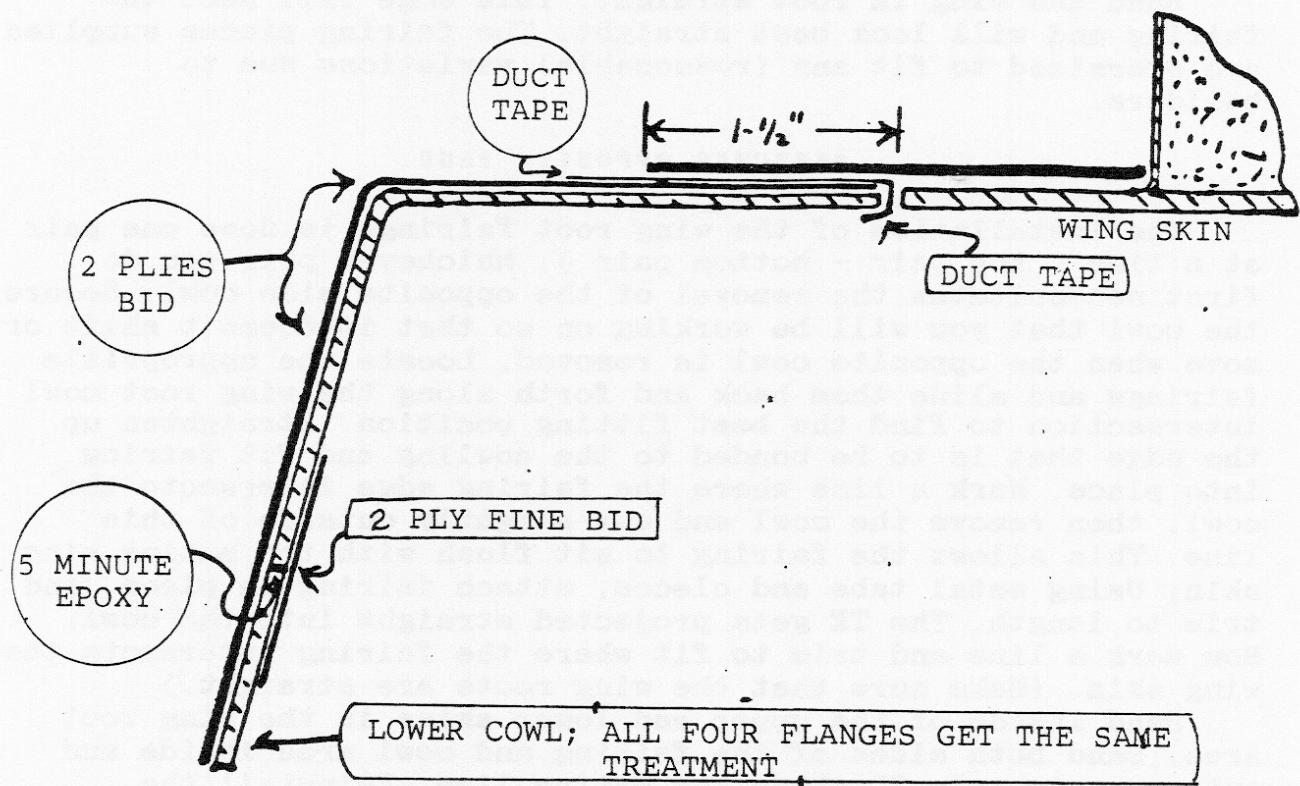


Now project the trailing edges of the wing straight into the cowl and mark this intersection. Next, go to the rear edge of the cowl and mark a point just below the radius where the lower cowl turns inboard. Connect these two points with a straight line to form your new cut-line. Using a bright light, transfer this line to the inside of the cowl. Put a piece of duct tape on the inner skin of the cowl below this line and sand the area above the duct tape all the way up above the old flange line.

Install 5 plies of BID approximately 5" X 18" in size lapping 1-1/2" onto the duct tape and up on to the upper cowl over the old flange line. Also apply 2 plies of FINE BID over the old flange line on the exterior of the cowl. Let cure. Locate 3 screw holes approximately 6" apart and 5/8" below the cut-line. Drill the holes out of 1/8" and cut the new line down to the grey tape as you did with the cowl-to-fuselage flange. Remove the clecos at the firewall and break the upper cowl away from the lower cowl. Trim up the flange and reinstall the cowl with clecos. Put a couple of clecos in the new cut-line area to support the rear of the cowl.

WING ROOT FAIRINGS

The wings must be installed and rigged for flight, i.e. shimmed to the proper incidence with the tools provided. Fuselage, canard, and wings are level.



FAIRINGS

Sand the wing TE root straight. This edge will meet the fairing and will look best straight. The fairing pieces supplied are oversized to fit any (reasonable) variations due to builders.

SKETCHES OPPOSITE PAGE

The installation of the wing root fairings is done one pair at a time (top pair - bottom pair). Whichever pair you do first necessitates the removal of the opposite side cowl. Secure the cowl that you will be working on so that it doesn't shift or move when the opposite cowl is removed. Locate the appropriate fairings and slide them back and forth along the wing root-cowl intersection to find the best fitting position. Straighten up the edge that is to be bonded to the cowling and fit fairing into place. Mark a line where the fairing edge intersects the cowl, then remove the cowl and cut slightly outside of this line. This allows the fairing to sit flush with the mating wing skin. Using metal tabs and clecos, attach fairing in place, and trim to length. The TE gets projected straight into the cowl. Now mark a line and trim to fit where the fairing intersects the wing skin. (Make sure that the wing roots are straight.)

Sand inside of the upper and lower skins in the wing root area. Sand both sides of the fairing and cowl area inside and out approximately 2" above the mating line. Reinstall the fairings with 5-minute epoxy. After cure, sand down any excess 5-minute and apply 2 layers of BID both inside and outside over the seam. The inside lay-up extends from about 1" above the seam out to the edge of the fairing, thus making a reinforcement. After cure, install duct tape on the inner surface of the fairing along the fairing-to-wing intersection. To build this flange, first pre-wet 5 plies of 3-1/2" X 22" BID on a piece of plastic. Cut the plastic to the size and shape of the lay-up, and transfer both plastic and glass to the inside of the wing root. Once the glass is in place and staying put, peel off the plastic and stipple out the air bubbles with a brush. 2" should lap onto the wing skin, and 1-1/2" should lap onto the duct tape on the fairing.

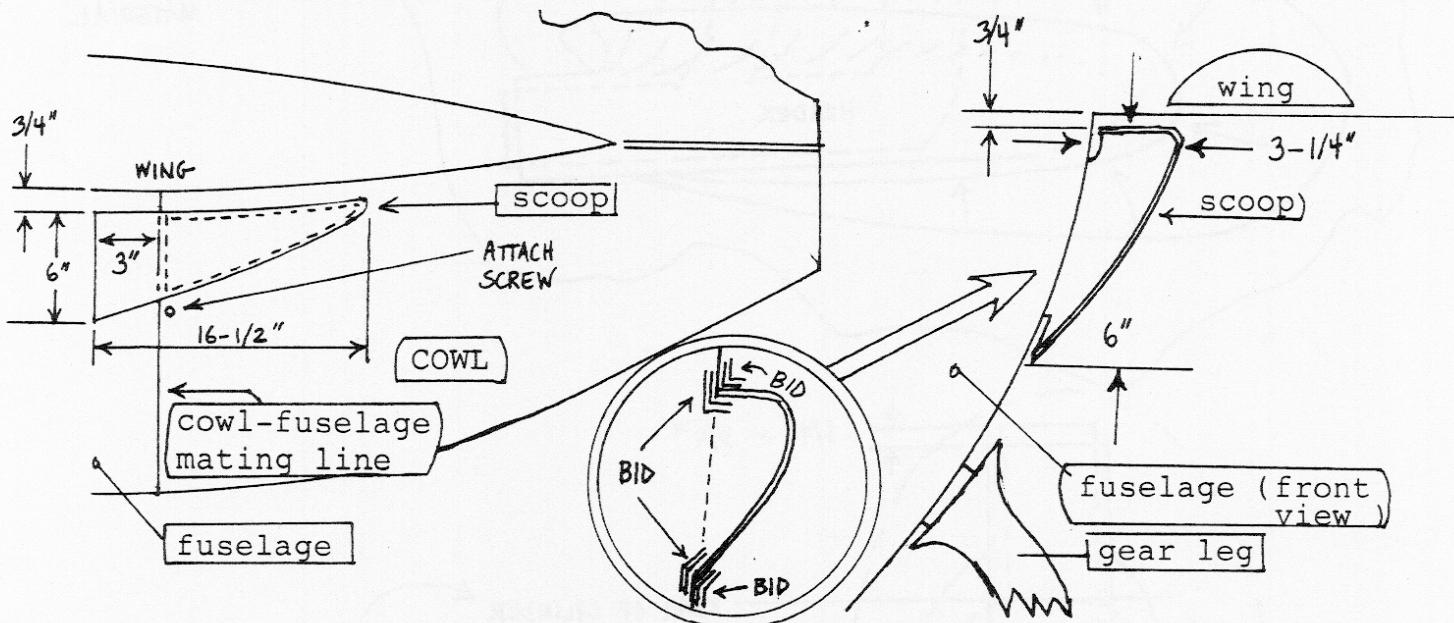
Following cure, locate 3-4 holes approximately 5/8" from the wing fairing intersection on the cowl side. Drill to 1/8". Remove clecos and supports. Break away and clean up flanges. Prepare the second half of the cowl and wing roots and repeat procedure.

FAIRINGS

INSTALLATION OF COOLING DUCTS

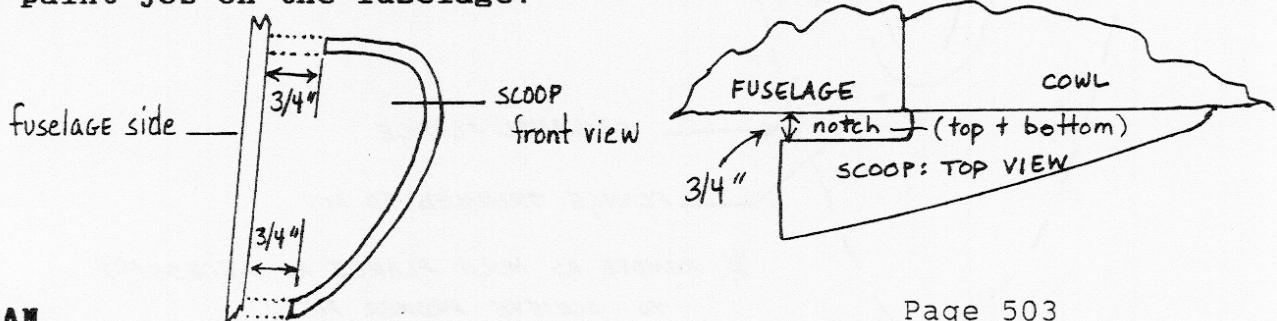
These cooling ducts go on the lower cowling just below the intersection of the wing and the fuselage. The ducts are molded just a bit oversize, so careful trimming of their intake area will increase aircraft performance, but decrease effective cooling. If you do any experimentation, do it carefully and monitor your CHT on your engine.

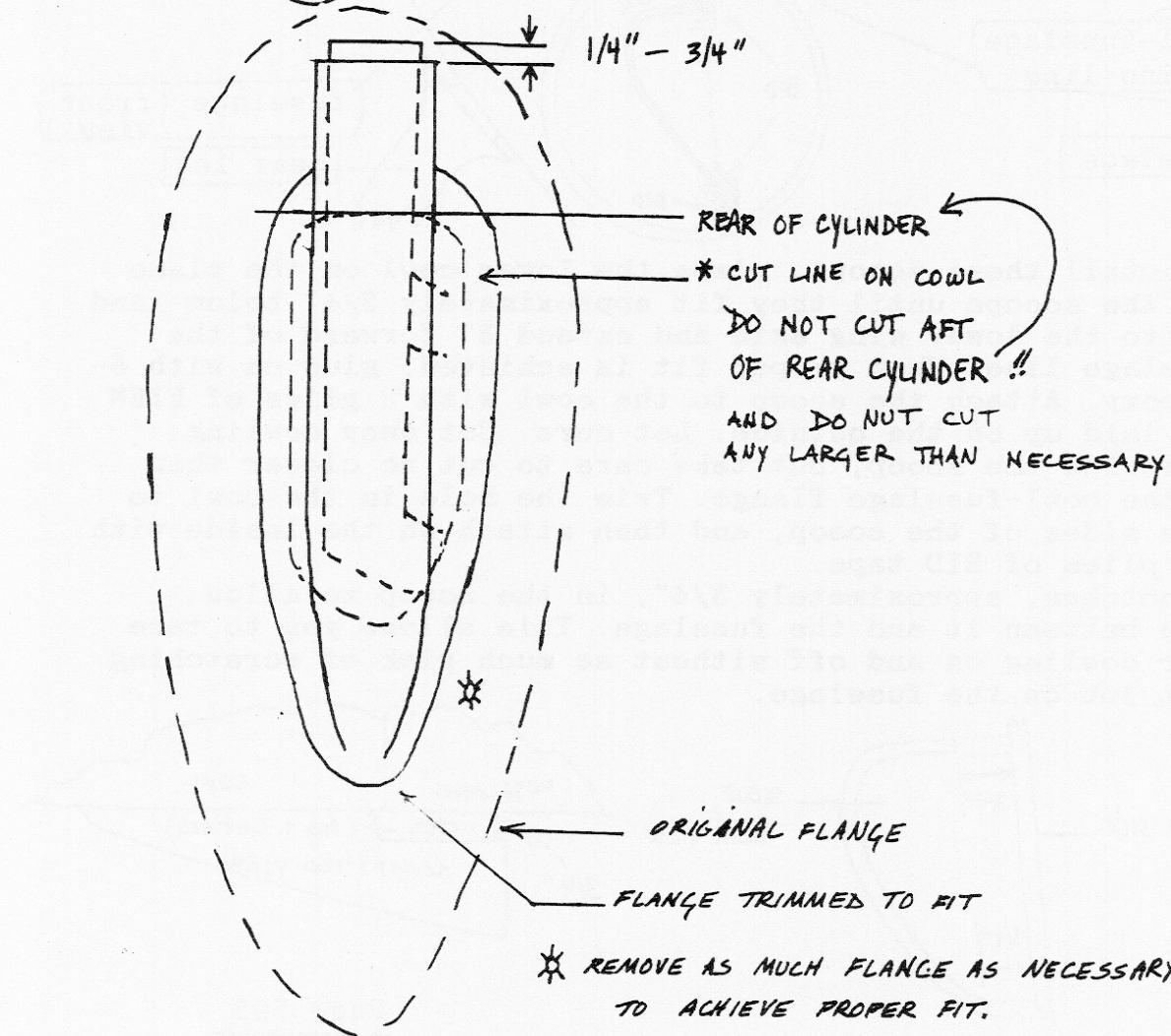
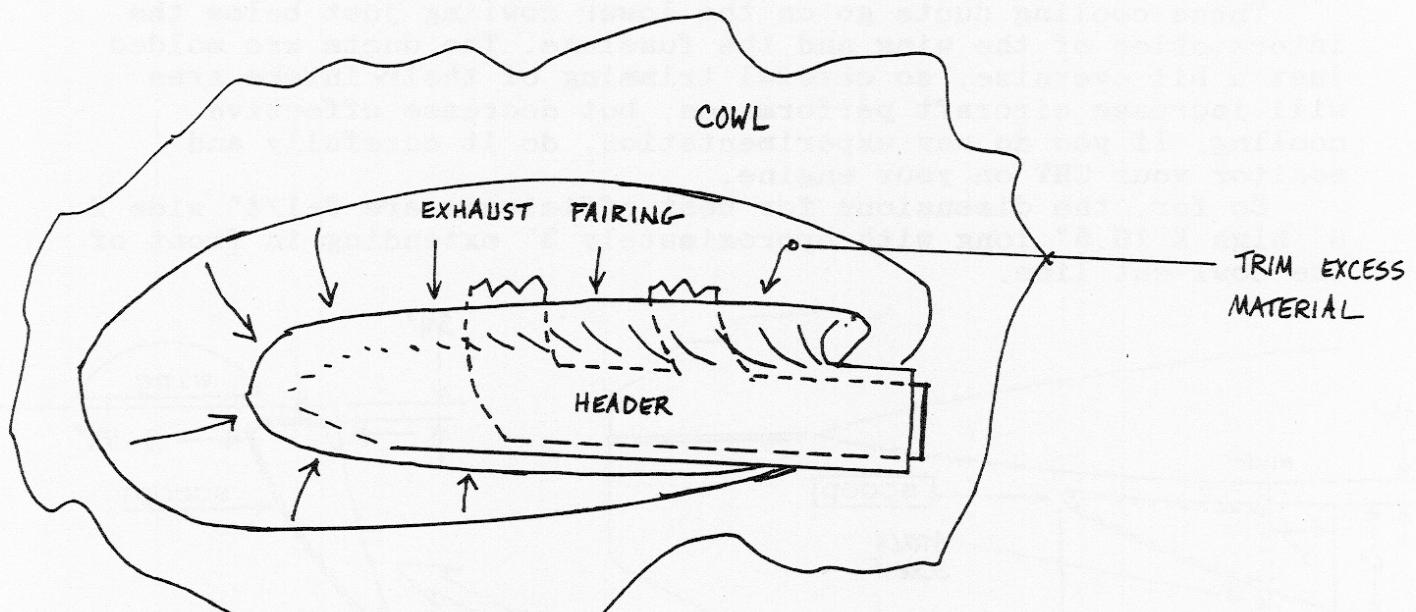
So far, the dimensions for best efficiency are 3-1/4" wide X 6" high X 16.5" long with approximately 3" extending in front of the cowl cut line.



To install these scoops, place the lower cowl on the plane and trim the scoops until they fit approximately 3/4" below and parallel to the lower wing skin and extend 3" forward of the cowl-fuselage line. When proper fit is achieved, glue on with 5-minute epoxy. Attach the scoop to the cowl with 2 plies of FIEN BID tape laid up on the outside. Let cure. Cut away cowling section inside the scoop, but take care to cut no closer than 1/2" to the cowl-fuselage flange. Trim the hole in the cowl to match the sides of the scoop, and then attach on the inside with two more plies of BID tape.

Cut notches, approximately 3/4", in the scoop to allow clearance between it and the fuselage. This allows you to take the lower cowling on and off without as much risk of scratching the paint job on the fuselage.





To install the exhaust fairings, you must have your wings, cowling, and engine mounted in proper position. The exhaust fairings are made of Hi-Temp Resin which is able to resist distortion and deterioration due to the concentration of heat around the exhaust system. The fairings are designed to cosmetically clean up the appearance of the exhaust pipes as they exit the cowling, and also to route the hot air out and away from the engine.

There is a considerable gap between the pipe and the fairing, as we have found that the engine runs hotter as you close the gap. The object of this installation is to conceal the plumbing, exposing only the tips of the headers.

The exhaust pipes must be in place in order to begin the installation of the fairings. We advise that you do one side at a time, rather than working on both sides simultaneously. Hold up your lower cowl and mark the cutout area where the pipes will extend through the cowl. Try to keep this cutout as narrow as possible, and do not go any further aft than is necessary. The baffling comes just to the rear of the pipes, directly below the rear face of the rear cylinders. The cowl must remain intact at this point.

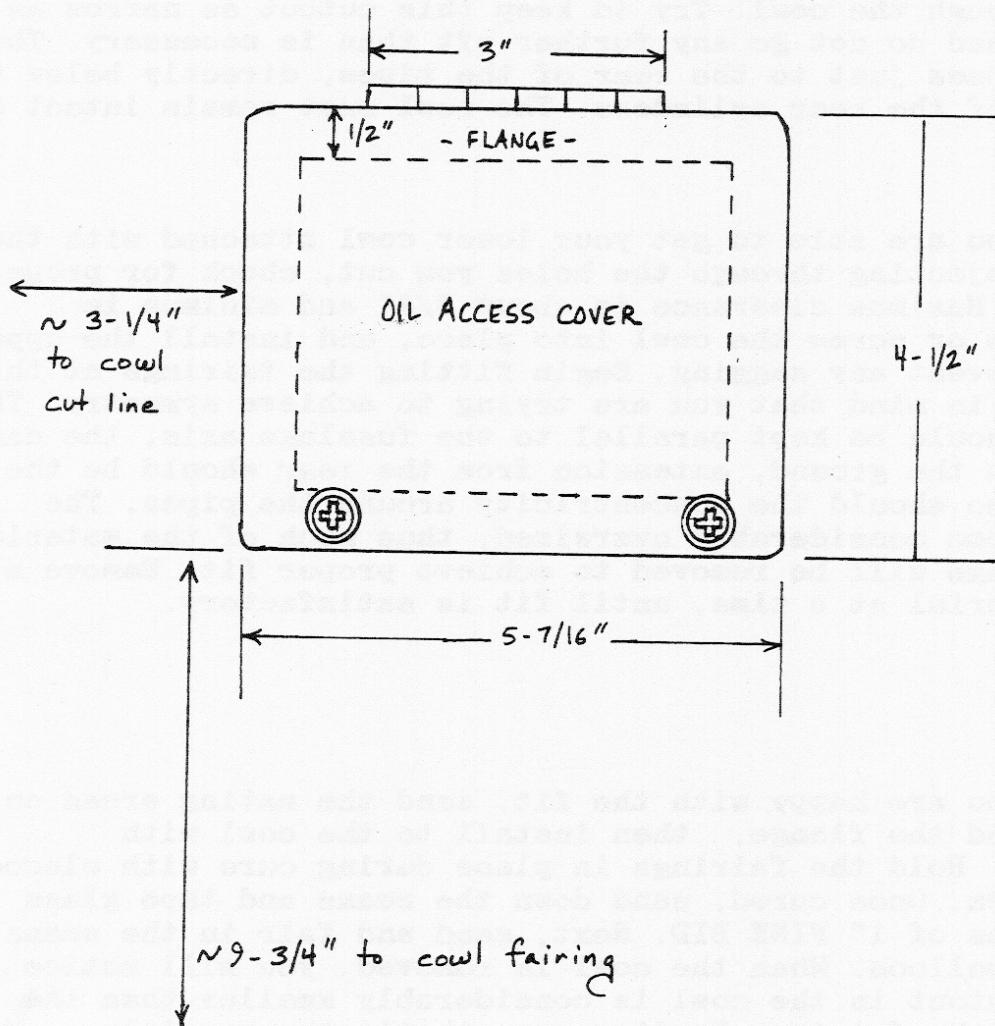
Once you are able to get your lower cowl attached with the headers projecting through the holes you cut, check for proper clearance. Maximum clearance is about 3/4" and minimum is 1/2". Cleco or screw the cowl into place, and install the upper cowl to prevent any sagging. Begin fitting the fairings at this time. Keep in mind that you are trying to achieve symmetry. The fairings should be kept parallel to the fuselage axis, the same height from the ground, extension from the rear should be the same, and so should the concentricity around the pipes. The fairings come considerably oversized, thus much of the material in the flange will be removed to achieve proper fit. Remove a little material at a time, until fit is satisfactory.

When you are happy with the fit, sand the mating areas on the cowl and the flange, then install to the cowl with microglass. Hold the fairings in place during cure with clecoes or sheet metal screws. Once cured, sand down the seams and tape glass with 2 plies of 1" FINE BID. Next, sand and fair in the seams with microballoon. When the cowl is removed, you will notice that the cutout in the cowl is considerably smaller than the opening in the fairing. Don't worry, that's the way it's supposed to be.

OIL ACCESS DOOR

The oil access door is a small hatch that sits just above the engine dipstick. This allows you to check and add oil without removing the cowl. The dimensions of the door are approximately 5-7/16" wide by 4-1/2" high. Use a 3" section of the piano hinge on the top of the door and secure with 2 screws. The location is optional, but remember that the hinge needs to be on a side that is flat, it will not work on a curved surface.

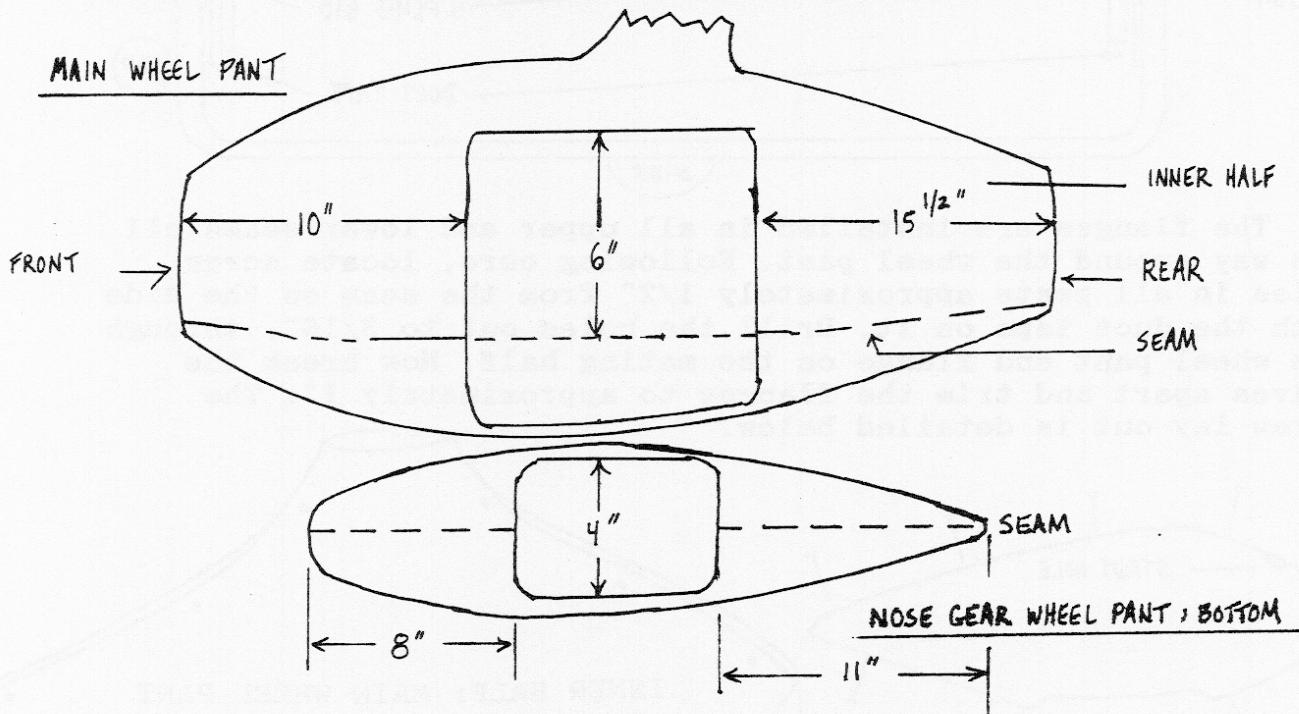
The door and flange are constructed just like the nose access cover or speed brake, except that there is no foam core to tape glass. The flange is made with 5 plies of FINE BID, and is approximately 1/2" wide. The hinge is installed with 1/8" flush-head pop rivets and microglass. The door is held closed with 10-32 panhead screws and nutplates just like on the wheelpants.



MATING OF WHEEL PANTS

The wheel pants come in the form of pre-molded halves. Once trimmed and straightened, the edges of the halves become the mating lines for the wheel pants when completed and installed. Unfortunately, the wheel pants take quite a while to complete, but there is a bright side to this. They can be done at any time, and make excellent filler work while you are waiting for other parts to cure.

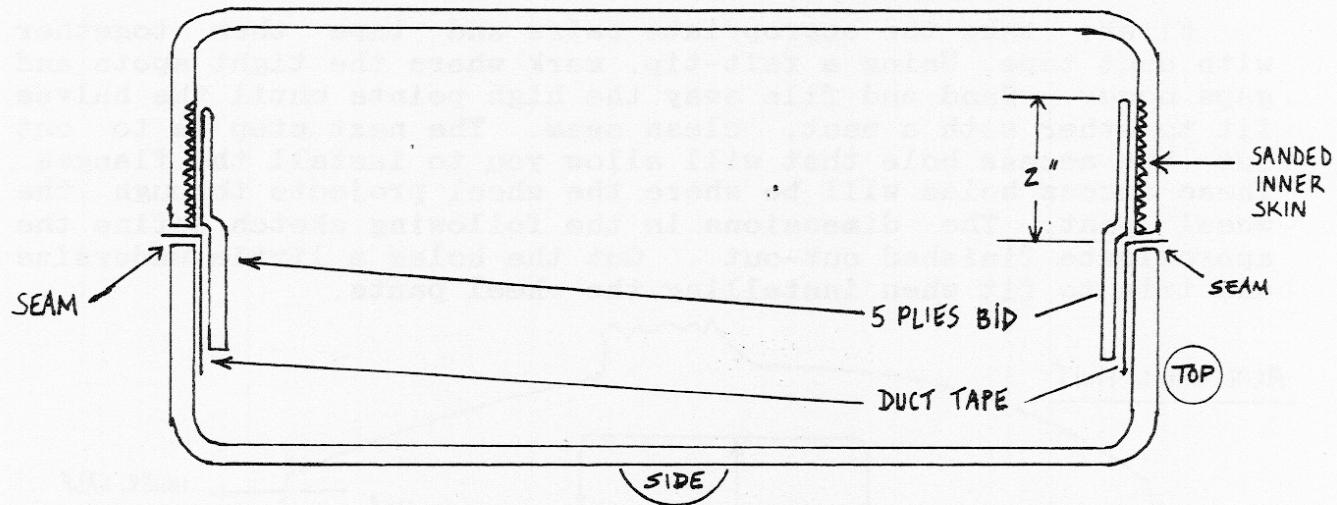
First, take the appropriate pairs and tape them together with duct tape. Using a felt-tip, mark where the tight spots and gaps occur. Sand and file away the high points until the halves fit together with a neat, clean seam. The next step is to cut out the access hole that will allow you to install the flanges. These access holes will be where the wheel projects through the wheel pant. The dimensions in the following sketch define the approximate finished cut-out. Cut the holes a little undersize and trim to fit when installing the wheel pants.



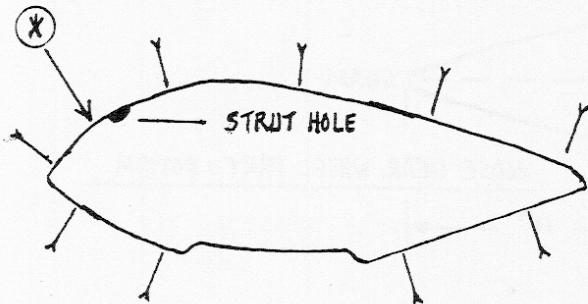
On the nose wheel pant, stick grey release tape on the inside of one half and sand back about 2" on the mating half. On the main wheel pants, put duct tape on the inner half and sand the outer half back 2". Tape the halves together with duct tape, being careful to keep the seams parallel and flat to install flanges. The flanges are 5 plies of BID approximately 3" wide and as long as necessary for each layup. These layups are done on plastic or visqueen. Once the glass is pre-wet, cut the

MATING OF WHEEL PANTS

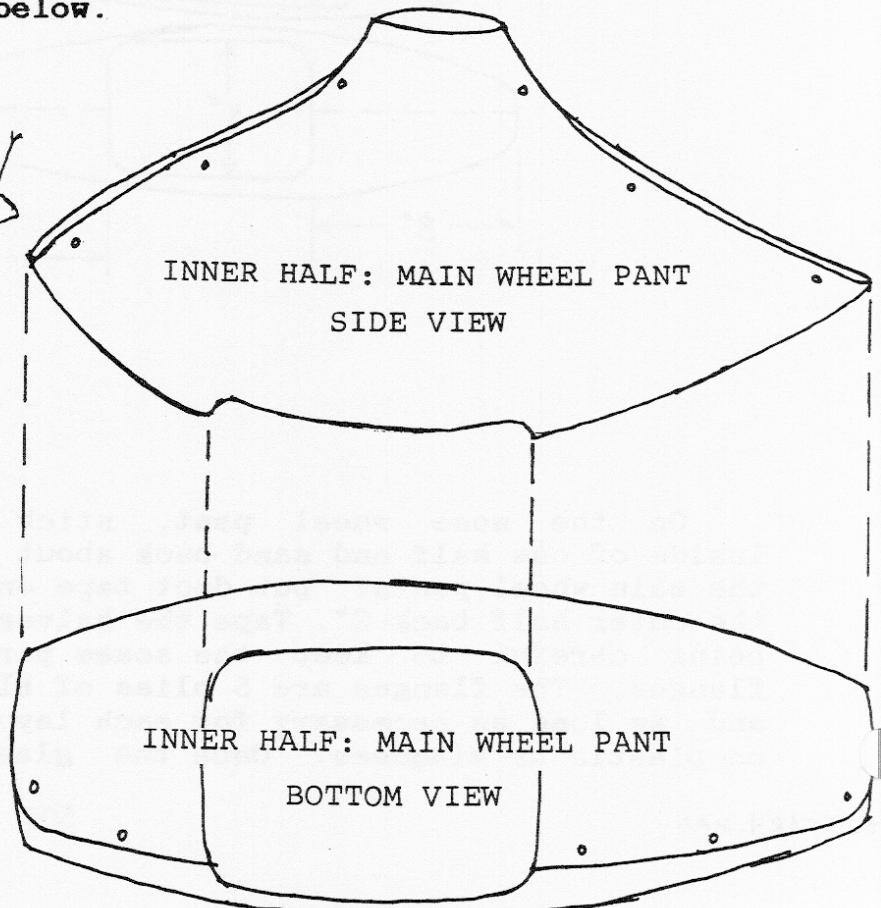
plastic to the shape and size of the layup, and transfer the whole sandwich to the work area. When in place, remove the plastic and stipple out the air bubbles with a brush.

NOSE WHEEL PANT: REAR VIEW

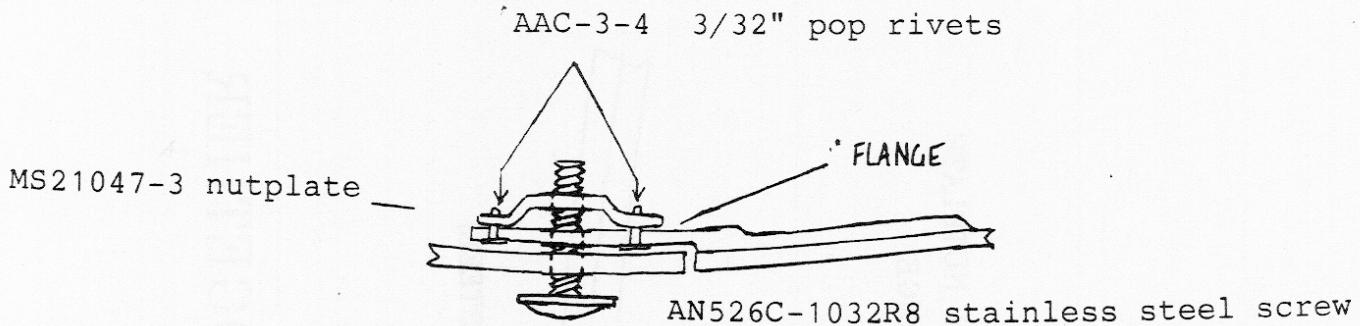
The flanges are installed in all upper and lower seams all the way around the wheel pant. Following cure, locate screw holes in all pants approximately $1/2"$ from the seam on the side with the duct tape on it. Drill the holes out to $3/16"$, through the wheel pant and flange on the mating half. Now break the halves apart and trim the flanges to approximately $1"$. The screw lay-out is detailed below.



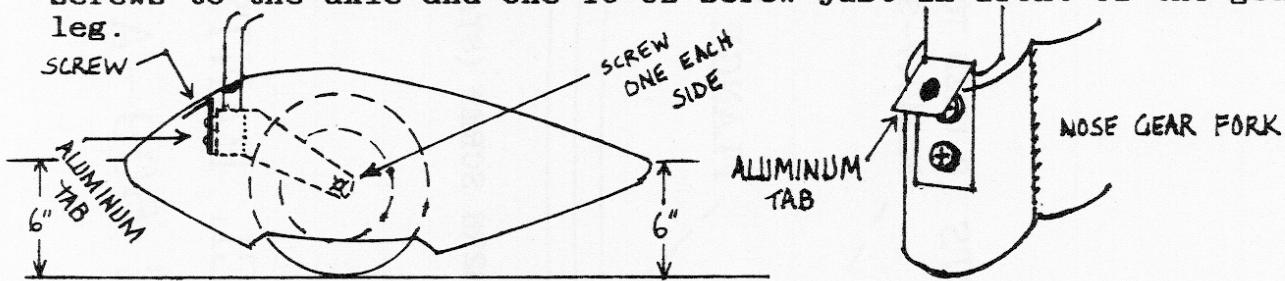
*DO NOT DRILL OUT THIS HOLE UNTIL LATER, DURING ACTUAL INSTALLATION OF THE WHEEL PANT.



With reference to the nose wheel pant, do not drill the hole just forward of the strut. This will be done later during actual installation of the wheel pant. Locate your AN526C-1032R8 S.S. panhead screws, MS21047-3 nutplates, and AAC-3-4 3/32" pop rivets. Install the nutplates to the inside of all the holes drilled in the flanges. Trial fit the halves together and see how they fit.

INSTALLATION OF NOSE GEAR WHEEL PANT

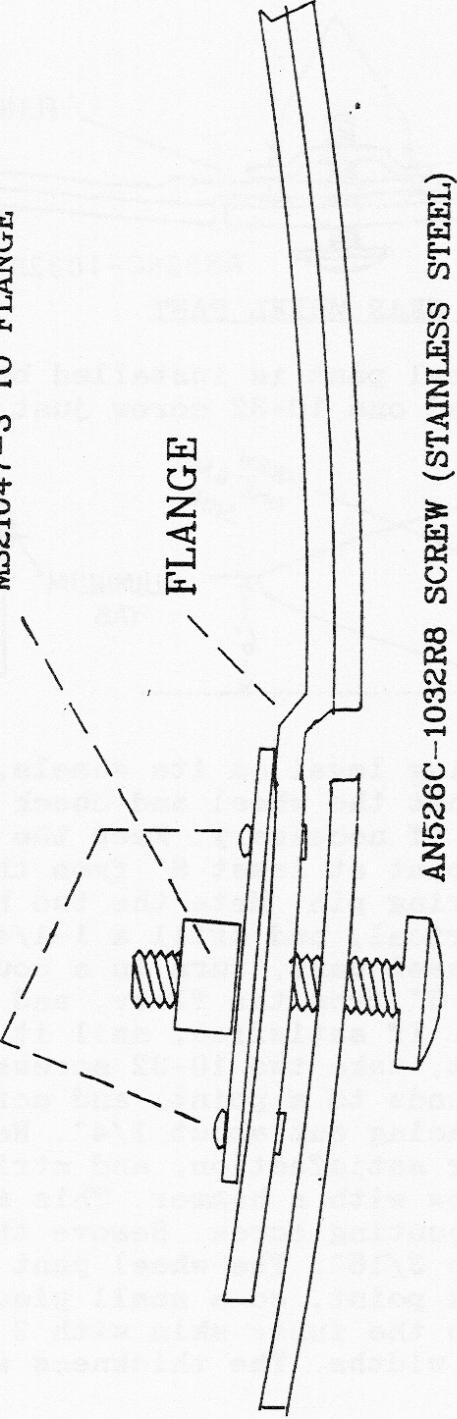
The nose gear wheel pant is installed by attaching (2)10-32 screws to the axle and one 10-32 screw just in front of the gear leg.



With the AC sitting level on its wheels, hold half of the nose wheel pant against the wheel and check your cutout for clearance, enlarging if necessary. Keep the forward and aft points of the wheel pant at least 6" from the ground, and mark the position of the king pin. Mate the two halves, making the wheel cutouts symmetrical, and drill a 1-1/4" hole for the king pin. Reinstall the wheel pant, turn in a couple of screws, shim forward and aft ends 6" from the floor, and step back and take a look at the assembly. If satisfied, nail it on (just kidding). Remove the wheel pant, take two 10-32 screws, cut off the heads and grind the other ends to a point, and screw them into the axles, pointed end facing out about 1/4". Reinstall the wheel pant, shim it to your satisfaction, and strike the wheel pant over the pointed screw with a hammer. This marks the hole to drill for the axle mounting screw. Remove the wheel pant and drill out the hole to 3/16". The wheel pant is slightly wider than the fork at this point, so a small piece of plywood will have to be glassed to the inner skin with 2 plies of BID to make up the difference in widths. The thickness will vary between 1/4" to 3/8".

AAC-3-4

3/32 POP RIVETS 2 USED TO ATTACH NUTPLATE
MS21047-3 TO FLANGE



MATING NOSE WHEEL PANTS TOGETHER

PAGE 509-A

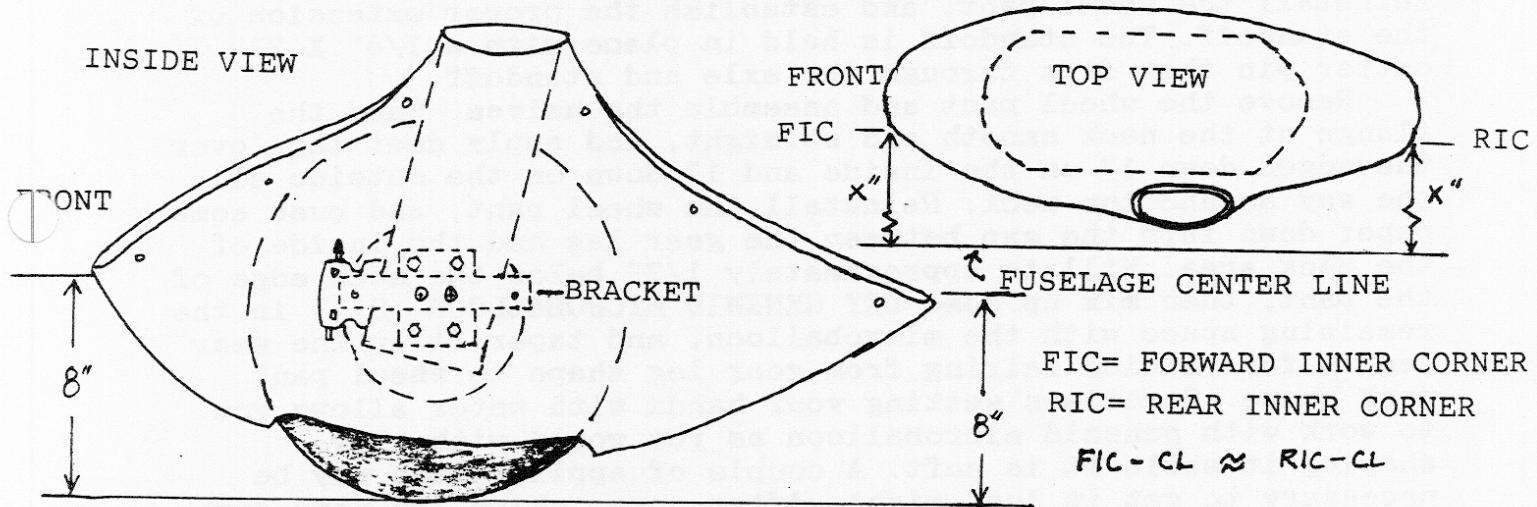
SECTION 5MATING OF WHEEL PANTS

The forward mount point is a piece of $1/8" \times 1" \times 4"$ aluminum bent over and fastened with (2) 10-32 screws drilled and tapped into the front of the nosewheel fork. When this is in place, drill the hole for the last mating screw down through the wheel pant, flange, and tab. Install a nutplate on the back of the tab.

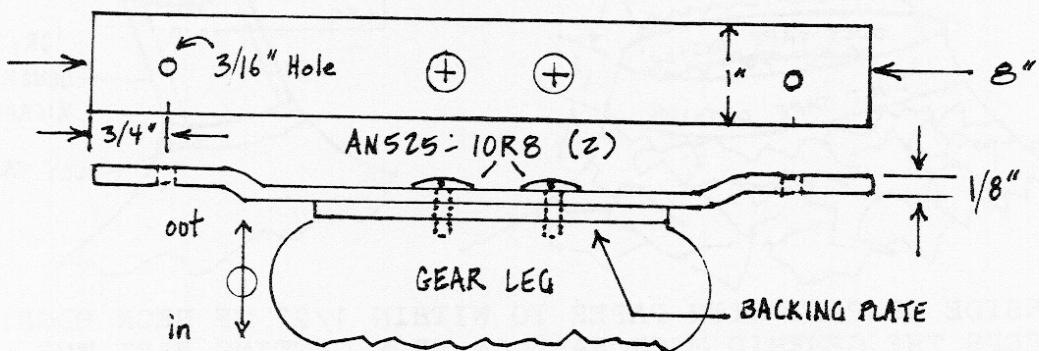
INSTALLATION OF MAIN WHEEL PANTS

The main wheel pants are held in position at three points, the end of the axle, a mounting plate inside the gear, and at the gear leg itself. The first step in the installation procedure is to fit the inner half of the main wheel pant to the tire and gear leg. The front and rear tips of the pant should be at least 8" from the floor. Trim around the wheel so that you have $1/2"$ of clearance between the pant and the tire.

Position the pant so that it is parallel to the wheel vertically. Next, establish a fuselage centerline, and measure from the front inner corner and rear inner corner to the center line. Adjust so that the two measurements are about the same.



Fabricate a small bracket out of $1/8" \times 1" \times 8"$ flat aluminum bar. The bracket will screw into place on the inside of the Main Axle Backing Plate. Fabrication and shaping is left up to the builder, but the sketch below shows how we did it at the factory.



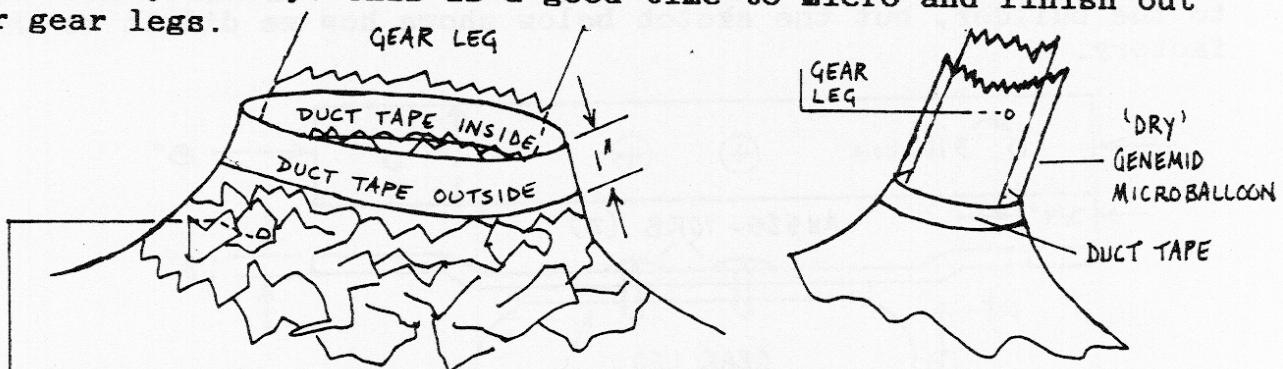
MATING OF WHEEL PANTS

Once the bracket is in place, fit the inner wheel pant flush with the bracket and drill a $3/16"$ hole approximately $3/4"$ from each end in the center of the bracket. Install a 10-32 nutplate to each end with $3/32"$ pop rivets, and secure the inner pant to the gear with (2)AN526C-1032R8 panhead screws. Tape or bondo the top of the pant to the gear leg.

Now fit the outer half of the wheel pant to the gear. Some material will have to be removed from the outer half to clear the tire. Once everything is fitted together and clearances have been established, take a step back and give the assembly the once over. Remove the wheel pant from the plane, and locate your axle standoff. Put your pointed bolt in and slide the standoff into the hole in the axle.

Put the wheel pant back on the gear, and mark the axle attach hole with a tap of your hammer. Drill the hole out to $3/16"$ and reinforce on the inside of the pant with a small patch of BID, about 6 plies worth. After cure, redrill the hole, reinstall the wheel pant, and establish the proper extension of the standoff. The standoff is held in place with a $1/8" \times 2"$ cotter pin that fits through the axle and standoff.

Remove the wheel pant and assemble the halves. Sand the flange at the neck smooth and straight, and apply duct tape over the edges down 1" on the inside and 1" down on the outside all the way around the neck. Reinstall the wheel pant, and push some paper down into the gap between the gear leg and the inside of the neck area. Fill to approximately $1/2"$ below the neck edge of the pant, then mix up some DRY GENEMID MICROBALLOON. Fill in the remaining space with the microballoon, and taper it up the gear leg to form a nice fairing from gear leg shape to wheel pant neck shape. Sometimes wetting your hands with water allows you to work with genemid microballoon as you would with clay, shaping it while it is soft. A couple of applications may be necessary to get it just right. After cure, shape and sand down to the duct tape on the pant neck to expose the seam. Remove the wheel pant. You should now have an excellent mating of wheel pant to gear leg that is both cosmetically appealing and structurally sturdy. This is a good time to micro and finish out your gear legs.



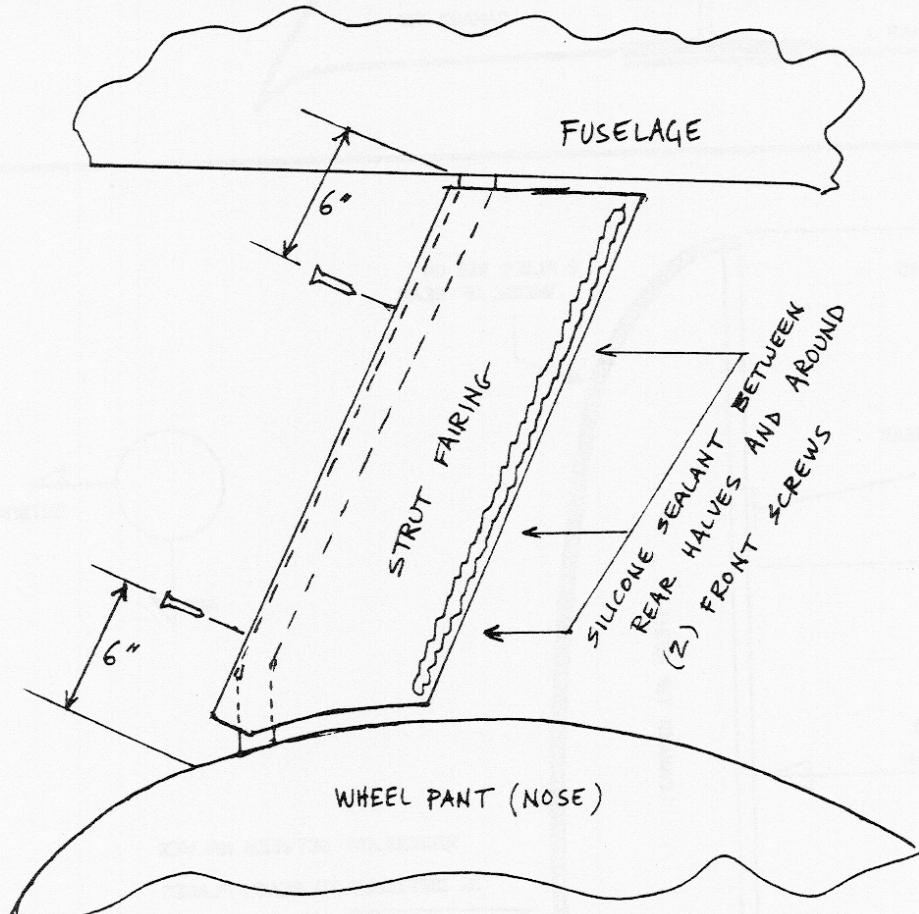
FILL INSIDE OF PANT WITH PAPER TO WITHIN $1/2"$ OF NECK EDGE.
THIS KEEPS THE GENEMID MICROBALLOON FROM GETTING PAST THE
RELEASE TAPE.

INSTALLATION OF NOSE STRUT COVER

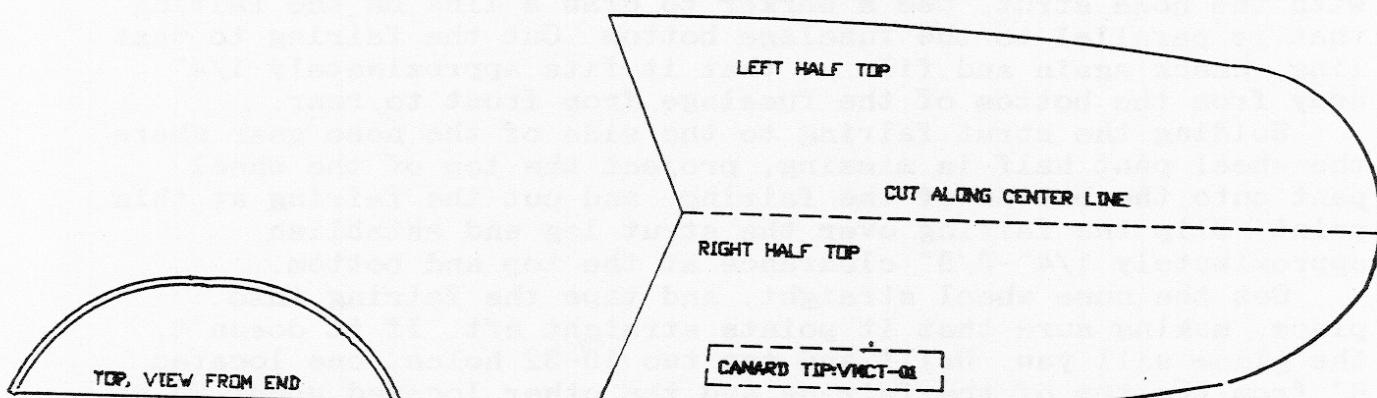
Remove one side of the wheel pant, and leave the other side in place. Hold the nose gear fairing, angled end up, parallel with the nose strut. Use a marker to draw a line on the fairing that is parallel to the fuselage bottom. Cut the fairing to that line, check again and file so that it fits approximately 1/4" away from the bottom of the fuselage from front to rear.

Holding the strut fairing to the side of the nose gear where the wheel pant half is missing, project the top of the wheel pant onto the bottom of the fairing, and cut the fairing at this point. Slip the fairing over the strut leg and establish approximately 1/4"-3/8" clearance at the top and bottom.

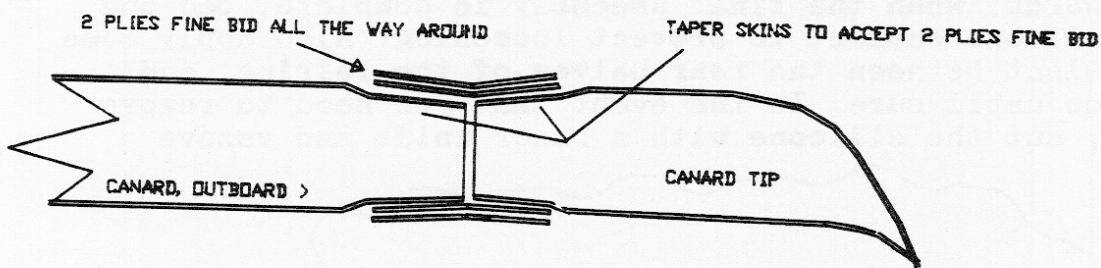
Get the nose wheel straight, and tape the fairing into place, making sure that it points straight aft. If it doesn't, the plane will yaw. Drill and tap two 10-32 holes, one located 6" from the top of the fairing and the other located about 6" up from the bottom, into the strut leg leading edge. Screw the fairing into place and rotate the nose wheel 180 degrees. Remove material on the lower front corner of the fairing so that it will clear the pant by 1/4" when the wheel assembly is turned around backwards. When the final assembly is complete, bed the screws in silicone sealant to prevent loosening. Also apply some silicone sealant between the rear halves of the fairing, and tape in place until cure. In the event that you need to remove the fairing, cut the silicone with a razor knife and remove screws.



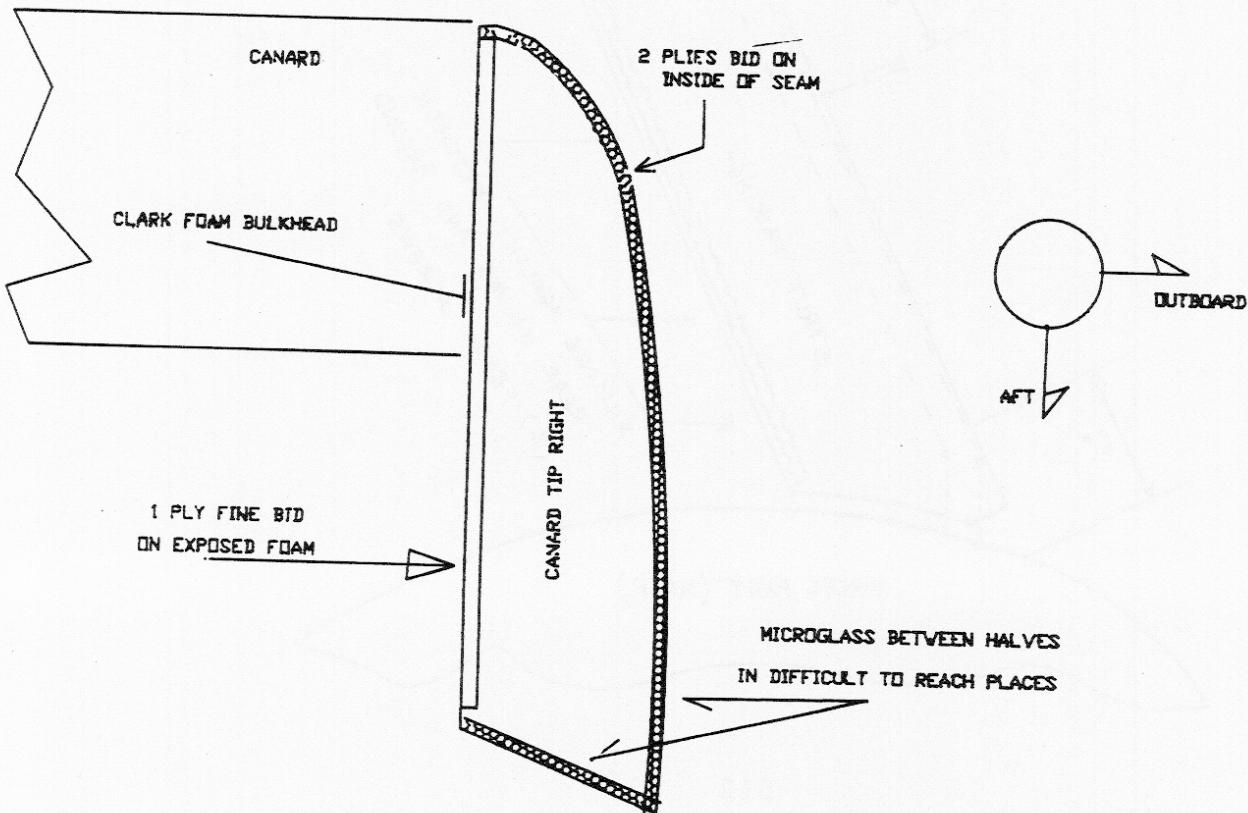
VIEW FROM TOP



SKETCH (B)



SKETCH (A)



The canard tips for the Velocity come pre-molded in two halves, upper and lower. The upper right and left tips are on one piece, and the lower right and left tips on the other. The first step is to cut these pieces in half with a saw, then fit the upper and lower halves together. Trial fit the tips to your canard to make sure that they have the proper contour. The next step is to join the upper and lower halves together with two plies of Bid on the inside seams of the leading and outboard edges. Microglass between the halves where you cannot get with the cloth (the rear and sides). At this point, it is advisable to fill the cavities with Pourfoam. If you don't have access to a supply of pourfoam, fabricate an inboard bulkhead out of Clark Foam and microglass it into place. (SEE SKETCH A,OPPOSITE PAGE)

Following cure, trial fit the tip to the canard with the elevator and counterweight in place. Be sure that the elevators are parallel (in same position). Leave approximately 1/8" clearance between the elevator, counterweight, and canard tip to insure against any interference. Taper the skin of the canard and the canard tip to accept 2 plies of fine bid for installation. (See sketch B, opposite page).

Micro the canard tips into place, taking care to get both of them even, so that when the elevators are in neutral position, they fair in evenly with the tips. Once the micro cures, glass the tips to the canard with 2 plies of BID all the way around. Cover the exposed foam in the counterweight well and at the end of the elevators with a single ply of FINE BID. At this time, you should also cover the ends of the elevators themselves with a single layer of FINE BID. Once cured, sand smooth and fair in with micro. Check for operational clearances while doing so.