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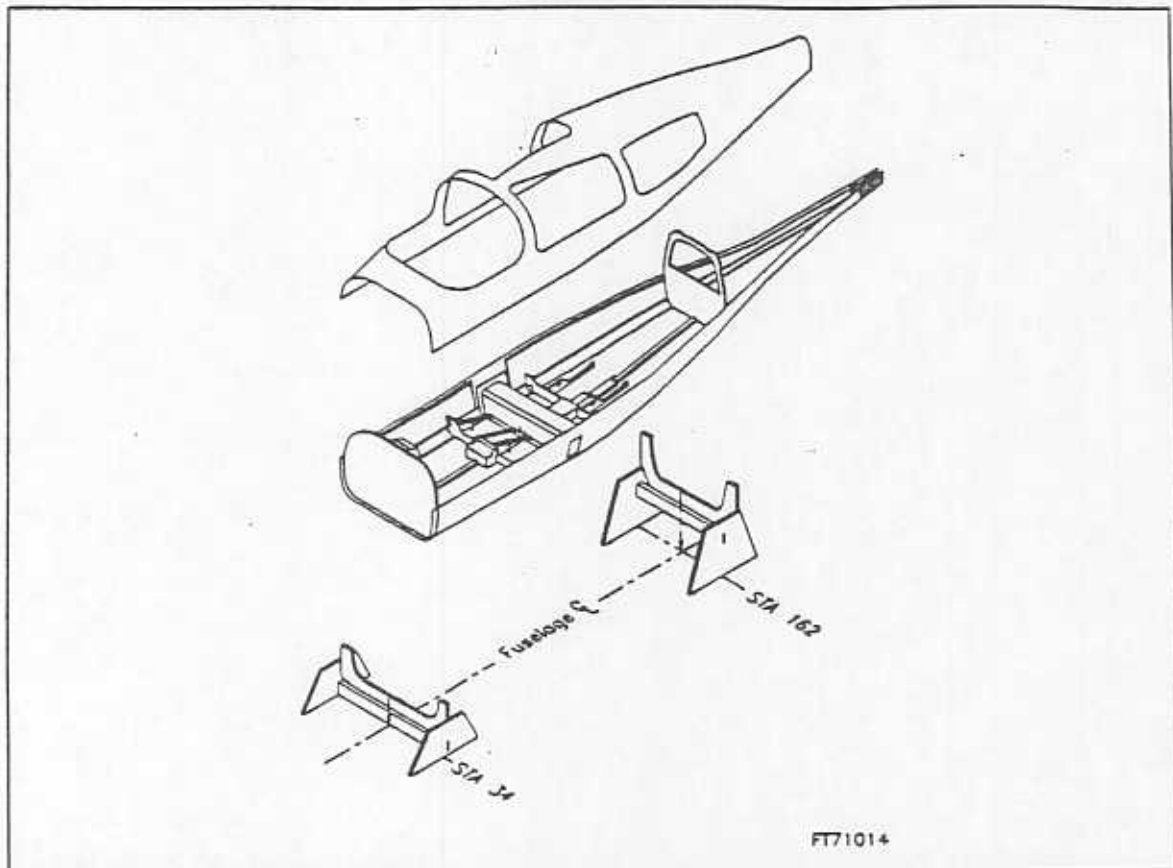
PROCEDURE 7.010**FUSELAGE ASSEMBLY
UPPER TO LOWER****Overview**

Figure 7.010-1

The objective of this procedure is to install the Upper Fuselage on the Lower Fuselage and complete associated installations. In this procedure you will; modify the Nose Gear Support (NGS), align and bond the Upper and Lower Fuselage, laminate bulkhead 162/firewall and NGS to the Upper Fuselage. Figure 7.010-1 is an overview of the upper fuselage installation.

Materials Supplied

Part Number	Qty	Description
112-11-001	1	Upper Fuselage
119-99-007-01	2 X 8 Ft.	Foam, 1/2"
119-99-001-06	1	Rib Stock, .25"
119-80-021-01	1	BID, 7781, 20'
119-80-048-01	1 Gal.	Resin, Slow

Previously Supplied

Part Number	Qty	Description
112-12-010	1	Bulkhead 162
112-12-001	1	Nose Gear Support
112-12-012	1	Firewall

TOOLS NEEDED

Glue Gun	Straight Edge
Sandpaper	Punch (small)
Rivet Puller	Bubble Level
Cleco Pliers	Clecos, 1/8" (24)

OTHER SUPPLIES NEEDED

Pop Rivets, 1/8"	Wood screws, 3" (12)
Bolt, 1/4 X 2" (4)	Nut, 1/4" (4)
Washer, 1/4" X 1" OD (4)	
Plywood, 3/4" X 48" X 30"	
Wooden strips:	
1/2" x 4" x 48" (10)	
1/2" x 4" x 96" (4)	

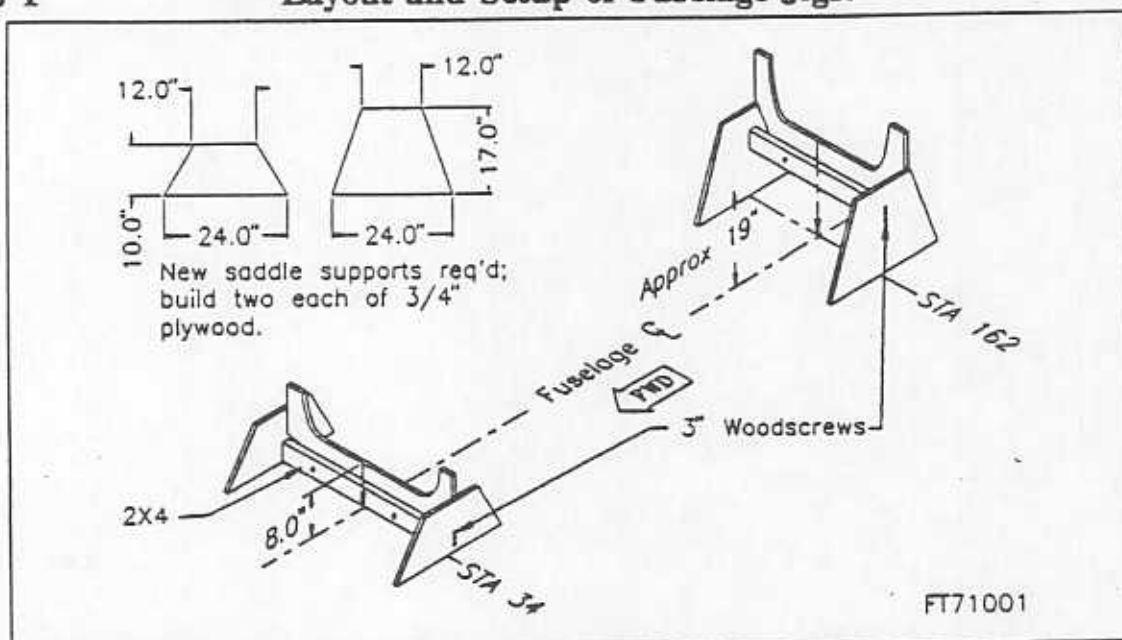
Step 1**Layout and Setup of Fuselage Jigs.**

Figure 7.010-2

Build new saddle supports as shown and locate per figure 7.010-1. Place lower fuselage into saddles locating it according to the station lines as shown and level side to side and lengthwise using waterlines. Bolt saddles to supports.

Step 2 Modify Nose Gear Support to Clear Avionics Equipment.

Remove the rudder torque tubes.

Measure, mark and cut notch in the NGS (112-12-001) as shown in Figure 7.010-3.

Cut the rib stock (119-99-001-06) into three pieces to fit A, B and C in figure 7.010-3. Sand each piece to a 0.125" radius at the edges adjacent to the NGS. Bevel the parts at points A to B, and B to C for a smooth fit. They will be laminated in place after necessary access to the firewall and rudder pulleys are completed.

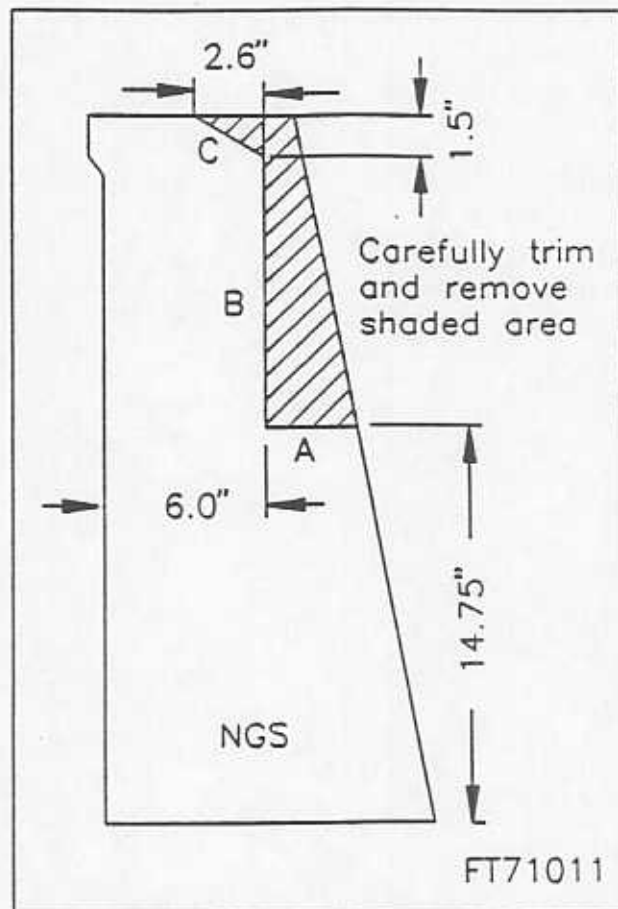


Figure 7.010-3

Step 3 Prepare and Align Fuselage Parts for Bonding.

Sand the gray primer off the joggle area of the upper fuselage using 80/100 grit paper. Do not sand into the glass.

Place the upper fuselage onto the lower fuselage and set the fore and aft alignment by aligning the firewall joggles. Hot glue wooden blocks onto the inside of the lower fuselage if needed to prevent the upper fuselage from sliding down past the joggle lip.

Trim and align the Firewall, Bulkhead 162 and the NGS to the upper fuselage.

Sand/trim the fuselage halves as shown in figure 7.010-5 until the upper joggle rests fully on the lower fuselage EOP. Be sure to check for clearance between the upper fuselage EOP and the lower fuselage foam bevel.

Drill 1/8" diameter holes in the center of the overlap of the upper/lower fuselage joggle every 6 inches along the entire length of both sides of the fuselage, inserting 1/8" Clecos in every fourth hole as shown in Figure 7.010-6.

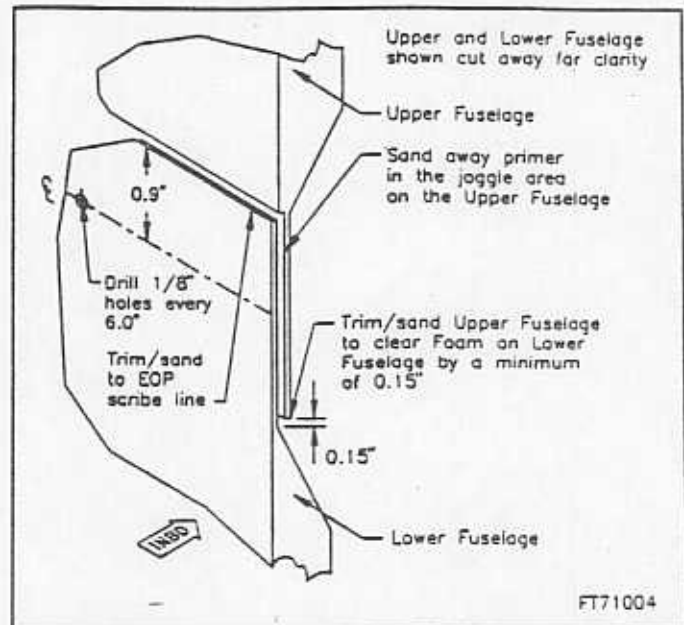


Figure 7.010-5

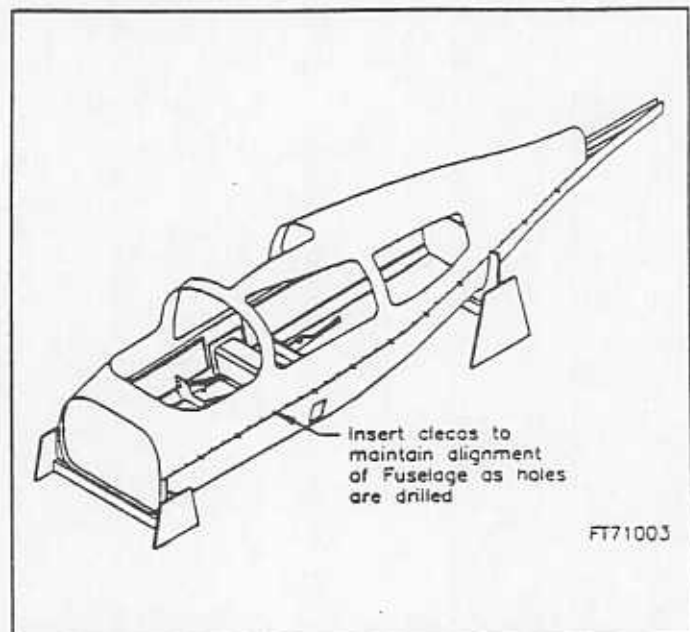


Figure 7.010-6

Step 4 Position and Secure the Upper to the Lower Fuselage

Remove the Clecos and lift the upper fuselage skin off the lower fuselage skin. Place 2" X 4"s or other suitable supports across the lower fuselage and rest the upper fuselage on the supports as shown in Figure 7.010-7.

Prepare the lower fuselage bond area by wiping with acetone, then sanding with 80/100 grit sandpaper. The bond area extends full length along the inside of both sides of the lower fuselage from the scribe line (about 0.25" down from the upper EOP) down to 0.15" above the edge of the lower fuselage foam. (See fig. 7.010-5)

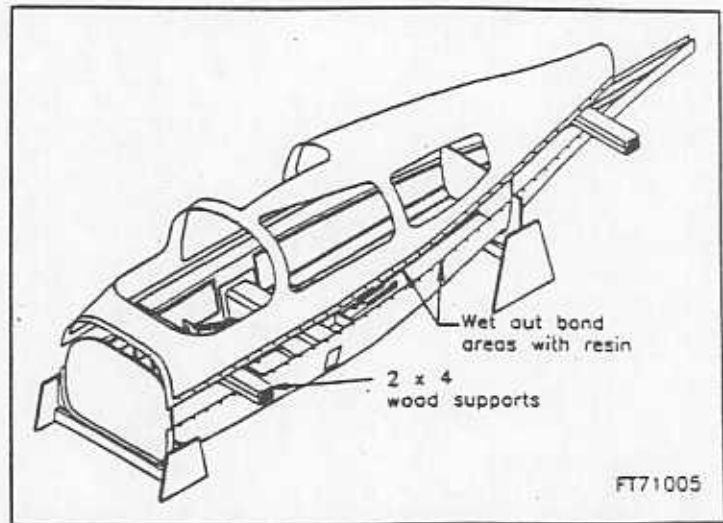


Figure 7.010-7

Step 5 Bond the Fuselage Joggle

Approximately 400 grams of slow resin is required to wet out the bonded area. First you will wet the bond area with resin, then you will fill the bond area with milled fiber, so you should prepare the milled fiber mixture prior to wetting the bond area. Wet the bond areas with the 1% catalyzed resin and set the upper fuselage on the lower fuselage. Hold the two fuselage halves together with several Clecos.

Mix 1800 grams of milled fiber paste, using 800 grams of slow resin catalyzed at 1% and 1000 grams of milled fiber. Mix very well.

Starting at the firewall and working toward the empennage, carefully pry the lower fuselage skin away from the upper skin and work milled fiber into the gap using a small putty knife. Insure that the bond area is entirely filled. After proceeding about 18 inches (three holes), anchor the two fuselage halves

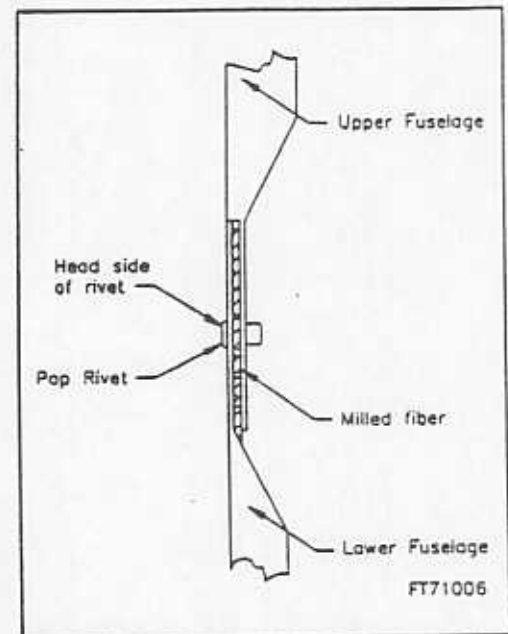


Figure 7.010-8

together with aluminum rivets in the first two holes, and proceed. After bonding, wipe off any excess milled fiber. Complete the process for both sides of the fuselage. After curing for at least 12 hours, remove the pop rivets. First, drill or punch out the center of the rivets from the head side, then drill off the head using a 1/8" drill bit. Finally, punch out the remaining rivet body. The holes will be filled during paint preparation.

Step 6 Internal Joggle Laminations

Clean the entire bond area shown in Figure 7.010-9 with acetone and sand with 80/100 grit paper. Lay up two plies of BID on a 45 degree bias covering the areas shown for the entire length of the fuselage junction, both sides. Overlap seams by approximately 1". Let the layups cure, and sand before next step.

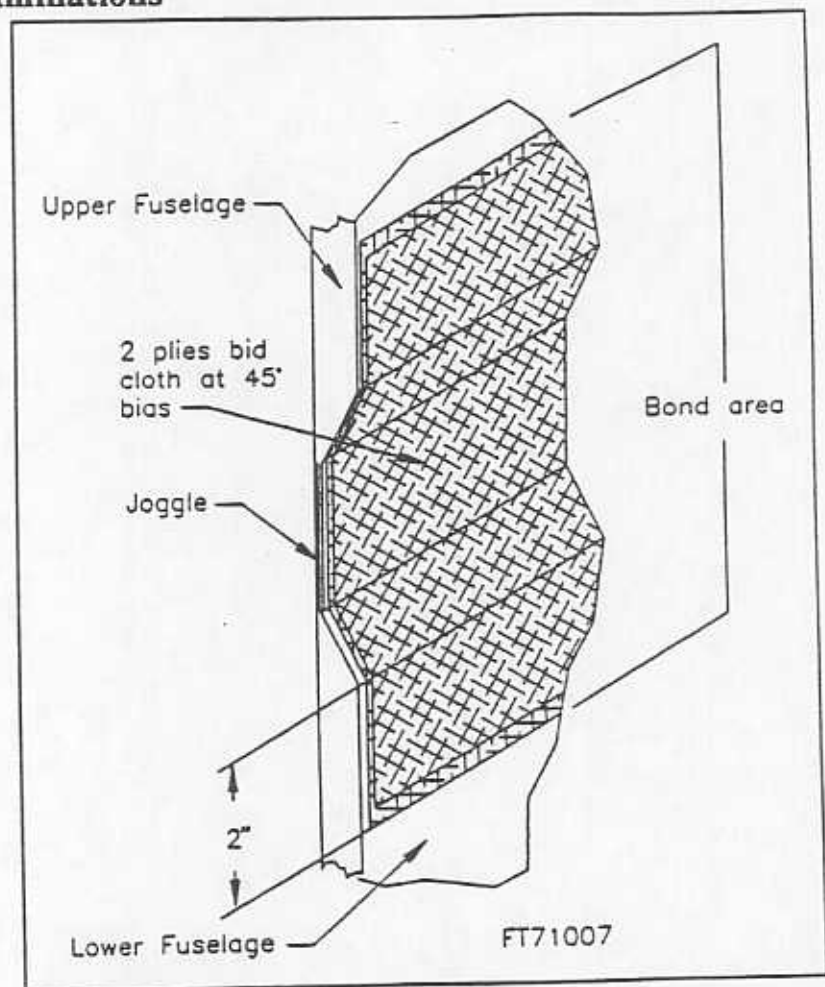


Figure 7.010-9

Step 7 Shape the Foam Core and Laminate in Place

Cut the 2'X 8' foam into strips and shape to fit flush in the joggle area as shown in Figure 7.010-10. Interrupt the foam at bulkhead 162 and continue to approximately station 190. Bevel the ends of the foam strips to match the fuselage core.

Coat the bond side of the foam with a thin slurry of Q-Cell and let cure. Then wet the joggle area with resin and place the foam in the joggle area.

Center 1/2" x 4" boards lengthwise over the foam and brace them in place with shorter 1/2" x 4" boards spaced every two feet. The pressure of the boards should hold the foam firmly in place for bonding, but should not deform the fuselage shape more than 1/2".

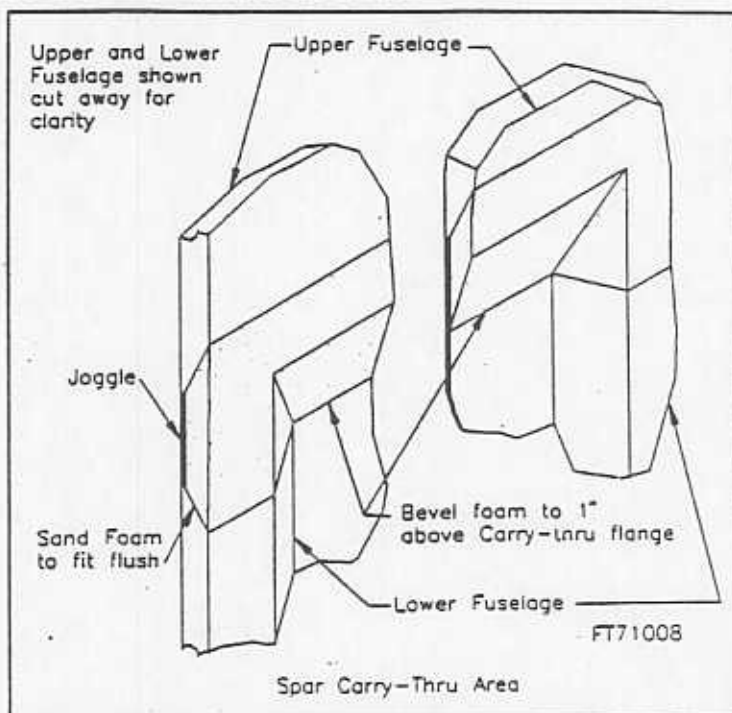


Figure 7.010-10

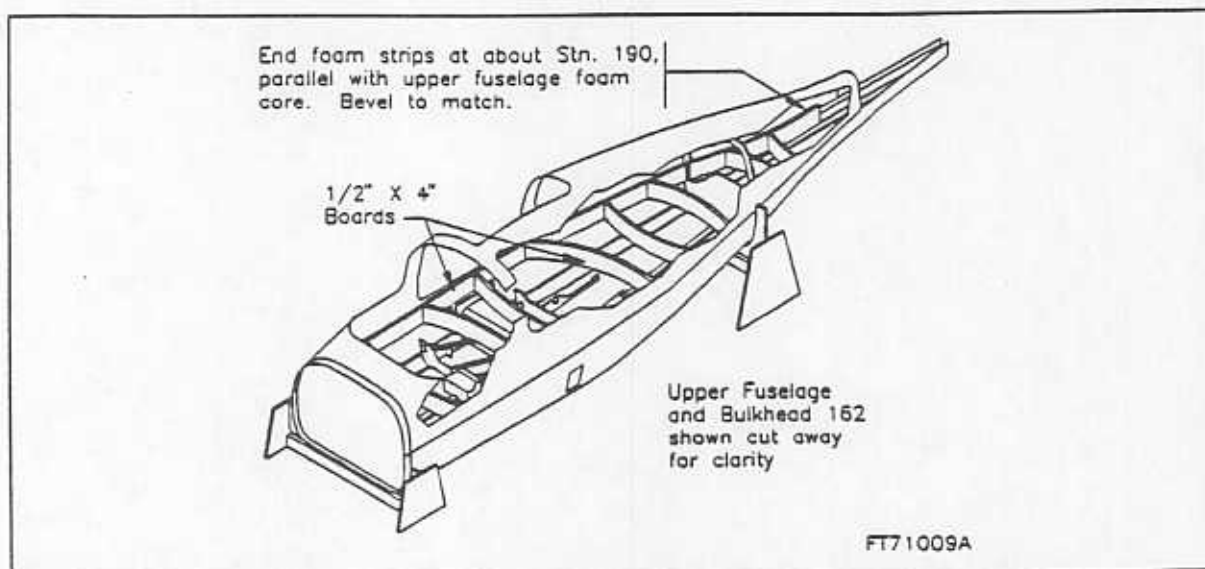


Figure 7.010-11

Step 8 Laminate BID Over the Foam Core

After complete cure, remove the boards and cover the entire exposed face of the foam bonded to the fuselage junction with a thin slurry of Q-Cell. After the Q-Cell cures, lay up two layers of BID on a 45 degree bias over the entire foam area and extending onto the fuselage skin for 1.5 inches top and bottom. See Figure 7.010-12. Overlap seams by 1".

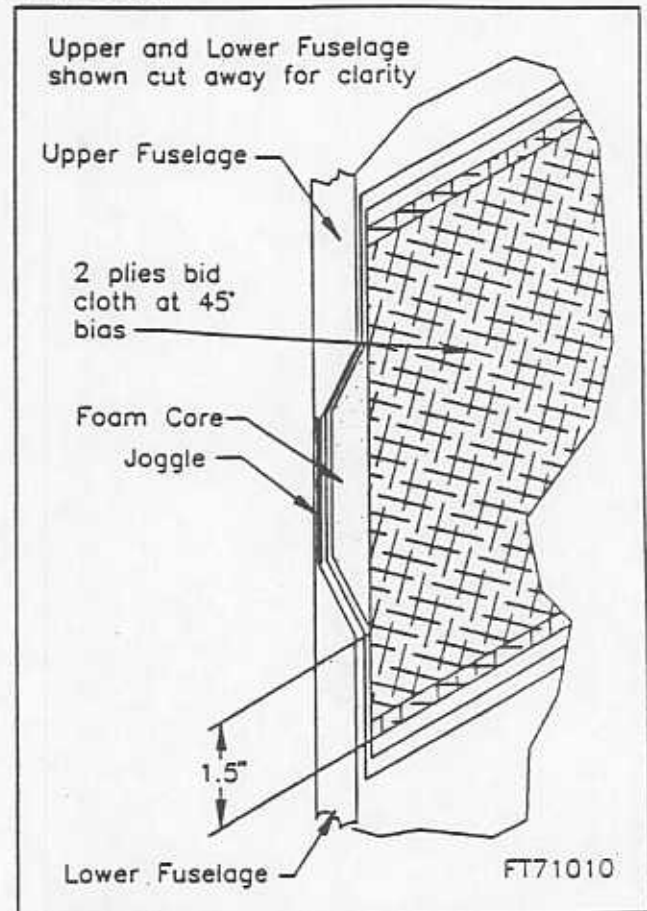


Figure 7.010-12

Step 9 Laminate Bulkhead 162, the Firewall and the NGS to the Upper Fuselage.

Fillet all sides of the NGS, Bulkhead 162 and the Firewall with Q-Cell where they contact the upper fuselage. Fill any gaps greater than 1/8" with Q-Cell.

Laminate the Bulkhead 162 and the Firewall to the upper fuselage with two plies of 45 degree bias, 3" wide BID.

Laminate the NGS to the upper fuselage as shown in figure 7.010-13.

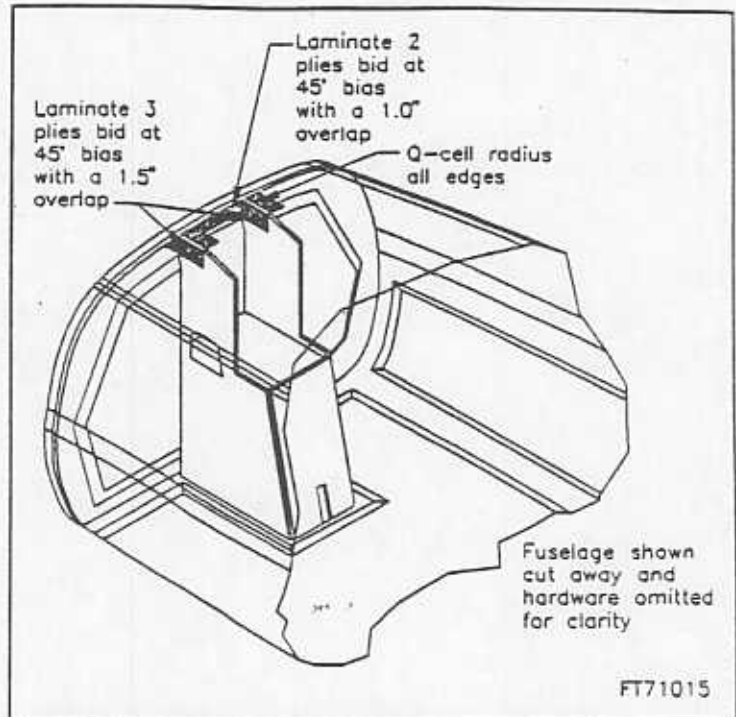


Figure 7.010-13

Enclose the NGS with the rib stock cut in step 1. Tack glue piece A in place, then B and then C. Fillet each intersection with Q Cell, and laminate in place with two layers of 45 degree bias 3" wide BID. Overlap 1.5 inches onto the NGS and the pieces A, B and C as shown in Figure 7.010-14.

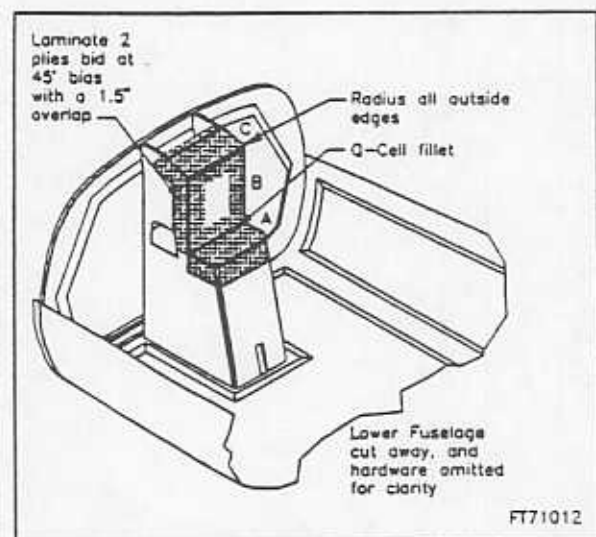


Figure 7.010-14

Procedure 7.010 complete

7.030 UPPER ENGINE MOUNT GUSSET:

DESCRIPTION:

The upper engine mount gusset will be constructed and installed in this procedure, it will be constructed the same as the lower mount and the lower mount procedure will be used.

MATERIAL NEEDED:

1 ea	119-98-243-01	CLOTH, UNI, 36" X 48"
1 ea	112-91-034	TEMPLATE, ENGINE MOUNT GUSSETS
		CLOTH, BID
		RESIN

TOOLS NEEDED:

HAND DRILL WITH BITS
HOT GLUE GUN
SABER SAW
LAY-UP TOOLS

PROCEDURE:

STEP 1. LOCATE UPPER ENGINE MOUNT HOLES:

Place engine mount in position, centered over the two lower engine mount pilot holes, drilled in procedure 5.190, Step 2.

With the engine mount held in position, mark the two upper engine mount holes, being very careful and as accurate as possible.

Drill the two upper engine mount holes, using a 1/8" bit.

STEP 2. CONSTRUCT AND INSTALL UPPER ENGINE MOUNT:

Use procedure 5.190, Step 5, Figure 5.190-5, to construct both upper engine mounts.

Use procedure 5.190, Step 6, Figure 5.190-6, -7, -8, -10, -11, to install gussets.

NOTE:

A CHANGE SHOULD BE NOTED. FIGURE 5.290-11 SHOWS TWO PLYS OF BID HOLDING THE OUTSIDE OF GUSSET TO FUSELAGE SKIN AND FIREWALL AND ONLY ONE PLY INSIDE OF GUSSET. THIS SHOULD BE FIVE (5) PLYS BOTH INSIDE AND OUTSIDE HOLDING GUSSET TO FUSELAGE SKIN AND FIREWALL. THIS ALSO APPLIES TO THE LOWER ENGINE MOUNT GUSSETS.

7.040

RUDDER PEDALS AND BRAKE MASTER CYLINDERS STANDARD AND DUAL BRAKE SYSTEM

Overview

In this procedure the rudder pedals and brake master cylinders are bolted to the rudder torque tubes, and the brake line is cut to size, connected to the master cylinders and clamped in place. The brake reservoir is installed in a later procedure.

Materials Supplied

Tools Needed

Part Number	Qty	Description
10-20	2*	Cylinder, Master
111-33-006	25	Tubing, Nylaflo, 3/16
112-24-031	2*	Pedal, rudder
264P-03	1	Fitting T
269-P-03X02	4*	Fitting, elbow 90
754-4-2-8	4	Clamp, Adel
AN3-13	2*	Bolt
AN3-17	2*	Bolt
AN310-3	4*	Nut, castellated
AN310-4	4	Nut, castellated
AN4-60	4	Bolt
AN960-10	16*	Washer
AN960-416	12	Washer
MS21919-DG6	2	Clamp, Adel
MS24665-136	6*	Pin, cotter
NAS43DD3-32	2*	Spacer
NAS43DD4-12	2*	Spacer

Box/Socket Wrenches
 Drill bit: 1/8", 3/16", 1/4"
 Utility knife
 Pull rivet squeezer
 Straightedge
 Tape Measure

* Indicates quantity will double for dual brake system.

PROCEDURE

1. Assemble brake pedals and master cylinder.

The Express rudder pedals are interchangeable and may be used as either right or left. To prepare the pedal for installation you must drill the holes for the pivot bolt and master cylinder attaching hardware. In addition you may wish to cut off the unused flange.

First, mark the hole locations on the pedal as shown in Fig 7.040-1. Secure the pedal in a vise and drill 1/8" pilot holes in the pivot bolt locations. Final drill these holes to 1/4" insuring that the holes are in line with each other.

Next drill the 3/16" hole through both sides of the master cylinder attaching flange. Make sure the hole is perpendicular with the outer face of the flange. Bolt the rudder pedals to the rudder torque tube arms utilizing the AN4-60 bolts. Use one AN960-416 washers under the head of the bolt, pass the bolt through the right rudder torque tube arm, place a washer, spacer (NAS43DD4-12) and washer on the bolt. Slide the pedal on the bolt and place 2 additional washers between the pedal and the left torque tube arm. Secure the AN-60 bolt with an AN310-4 nut and tighten to eliminate any end play. Bolt must rotate in hole. Install cotter pin.

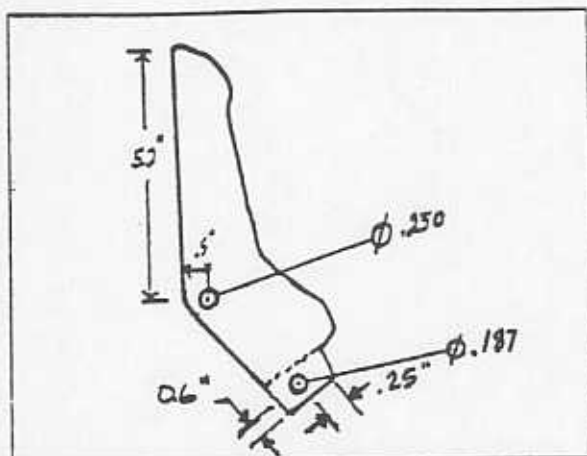


FIG 7.040-1 RUDDER PEDAL

Attach the master cylinder to the rudder pedal utilizing AN3-13 bolt for the top and AN3-17 at the bottom. In order to provide proper clearance between the pedal and the master cylinder 5 AN960-10 washers must be placed between base of master cylinder and rudder pedal. Use additional washers on the other side of the master cylinder to remove side play. Secure bolt with AN310-3 nut and torque to 25 inch pounds torque. Rotate master cylinder in rudder pedal to insure freedom of movement. Attach the upper end of the master cylinder to the rudder torque tube arm with AN3-13 bolt. Use NAS43DD3-32 spacer to adjust clearance between the torque tube arm and the master cylinder. Place washer between master cylinder and AN310-3 nut. Tighten nut to eliminate end play. Bolt must rotate freely. Install cotter pin. Repeat the above procedure for each pedal installed.

2. Install Nylaflo tubing and clamp in place.

Install the 90° elbow fittings in each master cylinder. Cut two 12 inch lengths of Nylaflo tubing, insure the ends are cut at 90°, insert the tube in each run ends of the T fitting and tighten the nut. These nuts cannot be reused once tubing has been clamped on. Nut can be removed from fittings and reinstalled. Attach the other ends of the tubing to the upper fittings of the master cylinders. If installing the dual brake option install tubing to the upper

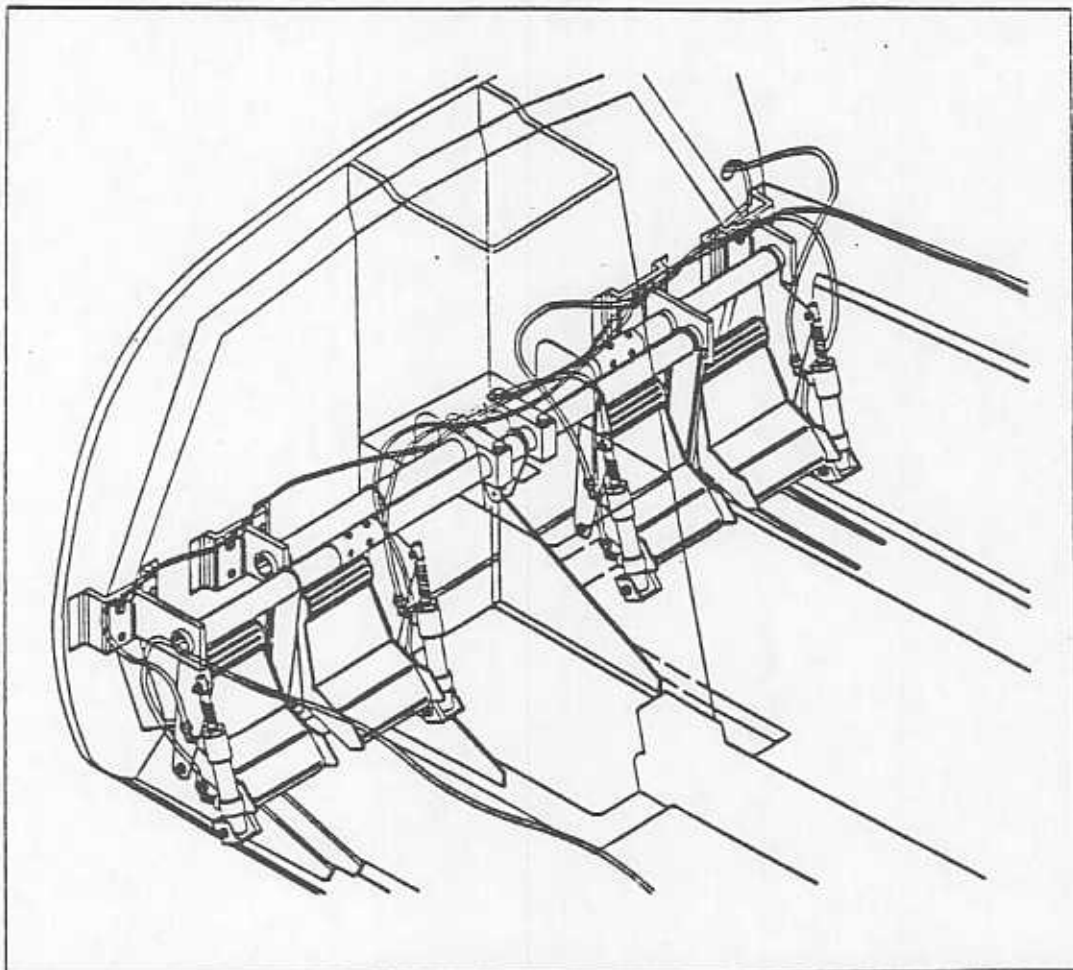


FIG 7.040-2 RUDDER PEDAL AND MASTER CYLINDER ASSEMBLY

fittings of the co-pilot master cylinders (normally right side). The third tube on the T-fitting will be installed in a later procedure when the brake reservoir is installed. Next cut two lengths of tubing long enough to reach from the lower fittings on the master cylinders on the right side to the upper fittings on the pilots master cylinders (left side). Route this tubing along the

firewall through the nose gear support structure just above the rudder torque tubes. Attach these tubes to the upper fittings of the respective master cylinder (left to left, right to right). If you are installing the standard brake system these lines will run direct to the wheel brake assembly. If installing the dual brake option it is recommended that the tubing for the right brake be

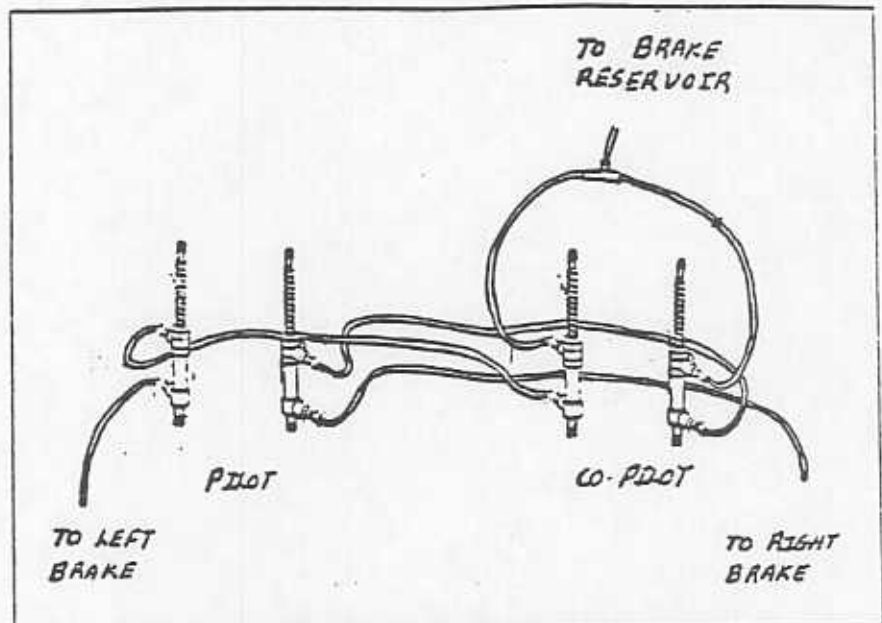


FIG 7.040-3 BRAKE LINE SCHEMATIC

connected to the master cylinder and routed back through the nose gear support along the top of the rudder torque tube, coiled and secured to right side of the fuselage until routed to the wheel cylinder. Secure the tubing with the clamps provided (See Fig 7.040-3). Move the rudder pedals through their full range of travel and make sure the tubing does not kink and no binding exists. Insure that all open ends have been properly capped to prevent contamination.

CAUTION: The design of the master cylinder causes the inlet port to be blocked off after approximately 1/8" travel of the piston. When these cylinders are connected in series (as they are in the dual brake installation) any pressure being placed on the rudder pedals by pilot (the down stream cylinder) will prevent brake application by the co-pilot. For this reason it is imperative that the routing of the tubing for the dual brake installation be as described above.

7.050 Installation of the door spring

Description:

The gas spring is a 50 lb. model. It is mounted at an angle from the door frame to a position above the aft door hinge. The mounting position above the aft hinge reduces distortions of the door compared to other possible positions. The gas spring has gold colored wire safety clips on each ball joint. Remove these clips before inserting or removing the ball studs.

Parts Required:

- 1 Gas Spring
- 2 Ball Studs
- 1 Hardpoint block
- 1 Upper mounting block, gas spring
- 1 Lower mounting block, gas spring
- 2 1/4-20 x 3/8 threaded inserts
- 2 1/4-20 x 1 1/8 Hex Head bolts
- 4 10-32 x 3/8 pan head screws

Step 0.5:

Make a hole finder from .040" thick aluminum which is 1" wide and 9" long. Fold the strip in half and put a square (.7" sides) 4 hole pattern through both halves as close as practical to the end.

Step 1:

The upper end of the gas spring points to a location 5.5 inches above the aft hinge pivot bolt. Mark a point 5.5 inches above the aft hinge pivot point. The door axis is tilted slightly forward so your 5.5 inch line will be tilted forward also. Screw a ball stud into the upper mounting block and position the block on the door with the ball about 1/2 inch left of the mark. Tilt the aft end of the block down 26 degrees while maintaining the position of the ball in relation to the mark. Outline the block on the inner door skin. Cut the inner skin on the outline and remove the foam within the outline to expose the outer skin. Prepare a small amount of milled fiber slurry and glue the hardpoint into the cut-out against the outer skin. Fill the void around the hardpoint with microballoon slurry. Bond the hardpoint to the door's inner skin by overlaying the hardpoint with two 4"x4" squares of bid. Let it cure.

Step 2:

Match drill only one of the mounting holes in the hardpoint using the upper mounting block for a guide. Use a 1/4" drill. Then enlarge the hole in the hardpoint block to 5/16". Press a 1/4-20 threaded insert into the hardpoint block.

Bolt the upper mounting block for the gas spring to the hard point in the door. Attach the lower mounting block to the rod end of the gas spring. Attach the cylinder end of the gas spring to the upper mounting block on the door.

With the door fully open swing the lower end of the gas spring over to the aft rail of the door frame. Mark the position where the lower ball stud crosses the door frame.

Get inside the fuselage with a ruler and close the door. (The gas spring is hanging by the upper mount only at this time.) Turn the upper mounting block until the plane of the beveled surface is in-line with the mark on the door frame. Tighten the upper mounting block retaining bolt. Measure the distance from the ball stud on the door to the marked position on the door frame. This distance must be 11" minimum. Move the mark on the frame to have the correct distance if necessary. The difference in the gas spring's length from extended to compressed is controlled by the distance from the upper ball stud to the hinge pivot bolt (nominally 5.5").

At the location previously marked, match drill the door frame for No. 10 screws to mount the lower mounting block. The screw holes in the lower mounting block are 1.25" apart and should be equidistant from your mark on the door frame.

Attach the lower mounting block to the door frame, attach the rod end of the gas spring to the lower mounting block and perform a trial door closing. Ensure that the gas spring does not bottom out. If the gas spring does bottom the lower mounting block can be moved farther down the door rail. Check for binding and alignment of the upper mounting block.

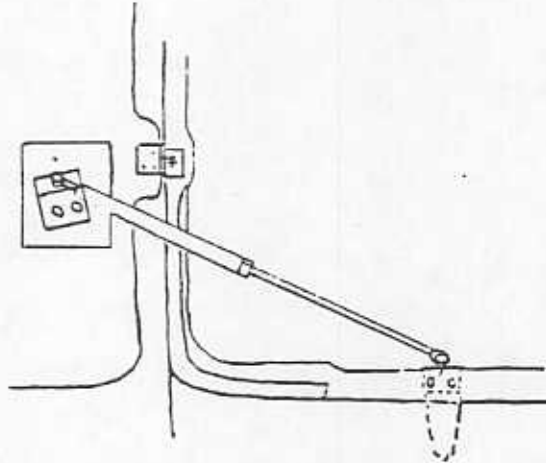
Step 3:

When the spring is correctly fitted to the door fix the position of the upper mounting block by drilling into the hard point through the remaining bolt hole and installing another threaded insert as previously done. Sand or file the upper side of the lower mounting block to better match curvature of the door frame. Shape a piece of foam to form a gusset behind the lower mounting block. Apply three layers of bid over the gusset and lower mounting block. After curing, carefully match drill through the fiber glass to expose the 10-32 threaded holes in the bottom of the lower mounting block. Secure the lower mounting block to the gusset with two 10-32 screws.

EXPRESS DESIGN
P.O. Box 609
Redmond, OR 97759
503)548-2723 FAX (503)548-2949

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPRO

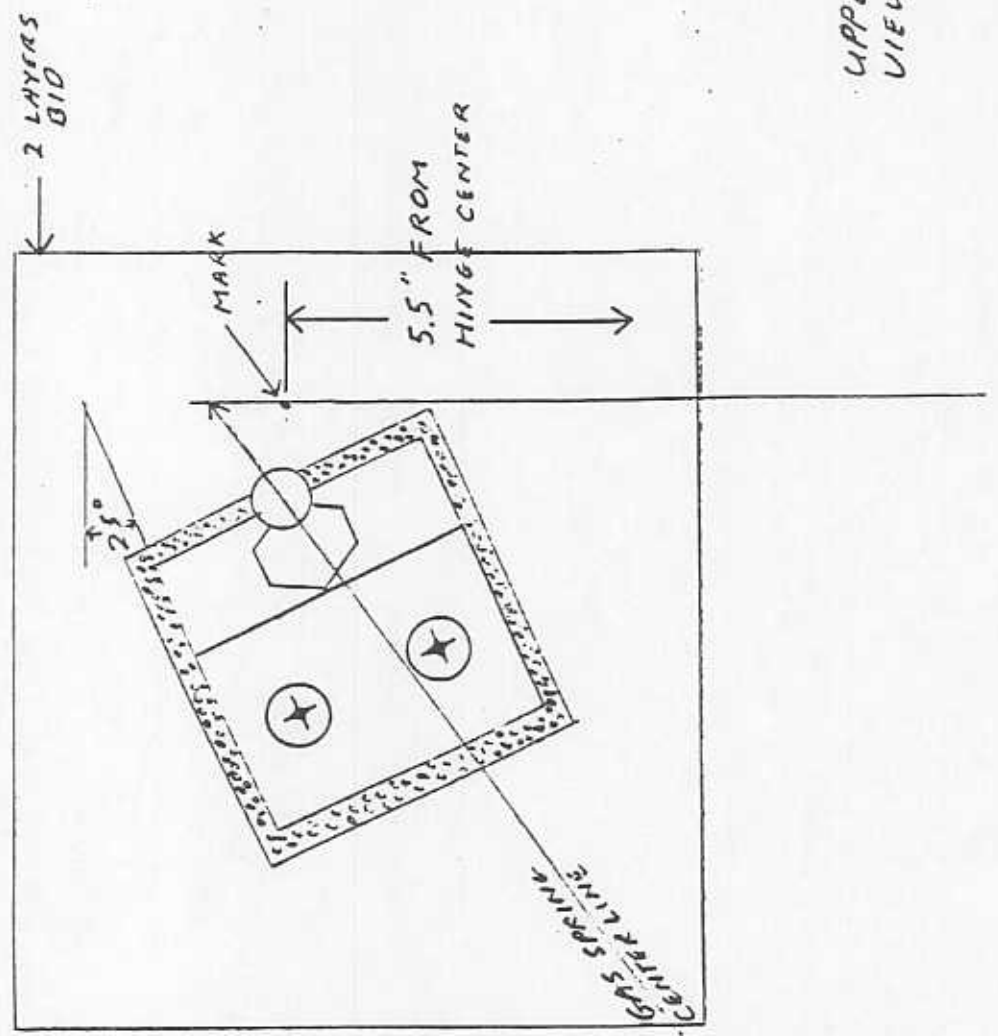
*GAS SPRING INSTALLATION
10/21/91 DP*



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UPPER HARD POINT & MOUNT
VIEW - DOOR OPEN

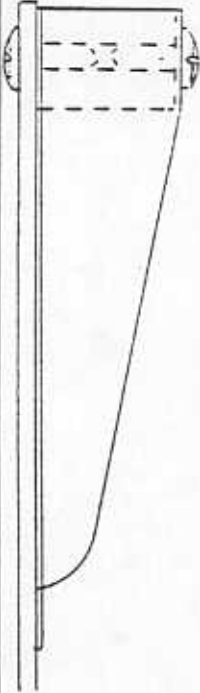
22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
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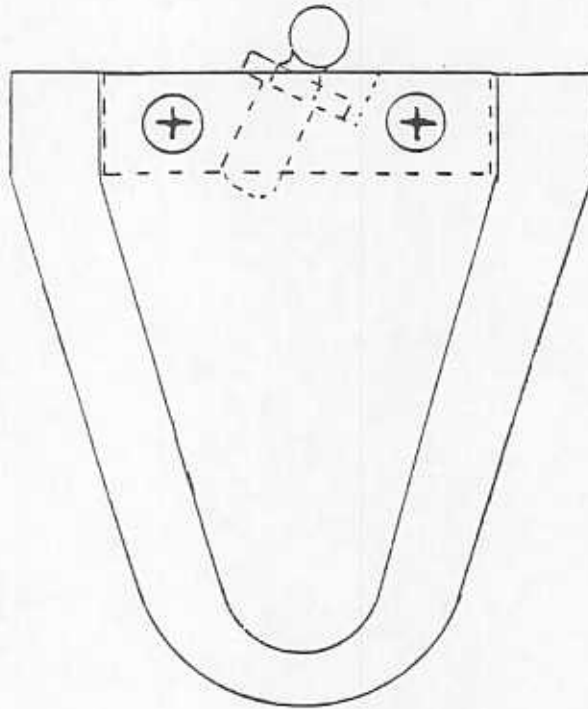
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22-142 100 SHEETS
22-144 200 SHEETS
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SIDE VIEW
(CONTOUR OF PAIR FRAME
IS NOT SHOWN)



LOWER MOUNT GUSSET,
VIEW FROM INSIDE CABIN



7.050 Installation of Door Hinges

Description:

This section details the installation of door hinges. Before the hinges are installed the door should already be fitted. Develop and even gap between the door skin and fuselage skin all around the door. The outer skins of the door and the fuselage should be flush with each other when the door is closed. To achieve this, most measurements for the installation of the hinges are referenced from the outer skins. The hinges are engineered with a small amount of adjustment capability which is intended to accommodate the addition of door seals and (very small) mistakes. The hinge blocks themselves can be sanded slightly if necessary to adjust their fit at corners. The hinge blocks and hardware were designed so that all four hinge blocks stations could use the same parts. You will almost certainly have to shim up the blocks mounted in the fuselage hinge channels to set the eye bolts the same distance below the fuselage skin as their counter parts are in the door hinge channels.

Parts Required

- 2 Drill guides
- 4 hinge block assemblies
- 4 flat head 10-32
- 2 AN3-5 bolts
- 2 AN365-1032 self locking nuts

Assemble the hinge blocks

There are two ways to assemble the hinge blocks. The first way is for blocks mounted in the fuselage hinge channels. The second way is for blocks mounted in the door hinge channels.

Insert an eye bolt with a washer into a hinge block so that the threaded portion of the eye bolt protrudes into the deep counter bore of the hinge block. Inside the deep counter bore put a spacer and self locking nut on the eye bolt. Assemble two hinge blocks in this manner. These will be the fuselage hinge blocks.

Insert an eye bolt with a spacer into a hinge block so that the threaded portion of the eye bolt protrudes into the deep counter bore of the hinge block. Inside the deep counter bore put a washer and self locking nut on the eye bolt. Assemble two hinge blocks in this manner. These will be the door hinge blocks.

The eye bolt retaining nuts should be loose enough to allow slight turning of the eye bolts with needle nose pliers.

Reinforce the door channels

Put a layer of bid inside diameter the door hinge channels.
Put two layers of bid outside the door hinge channels.

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Installation of hinge blocks into the door hinge channels

Step 1:

Position the door upside down on a work table with the hinge channels facing you. On the inside of the door, mark the center of the hinge channels 0.4" back from the outer skin edge. Line up a flexible yard stick on the two marks and press the yard stick in its center until it conforms to the outside surfaces of both hinge channels. Draw lines on the channels along the side of the yard stick. These lines are in the same plane and assure that the hinge eye bolts will be reasonably parallel.

Step 2:

Center the distance of 22 5/8" between the two door hinge channels. Draw lines perpendicular to the lines drawn in step one on each of the door hinge channels. These lines will be the eye bolt centerlines. Remove excess Q-cell inside the door hinge channel in order for the hinge blocks to fit inside the channel with the eye bolts aligned with eye bolt centerlines (lines 22 5/8" apart). Make the channel deep enough for the centers of the two threaded holes closest to the eye bolt head to line up with the line which is 0.6" back from the outer skin edge.

Step 3:

Drill a screw hole pattern that matches the screw hole pattern in the hinge blocks using a # 10 drill. The hole pattern on the hinge block is square with 0.7" sides. The corners of the square pattern are in the center of each screw hole. On the lines which are 0.4" back from the outer skin edge drill two holes are 0.7" apart - centered on the eye bolt center lines. Farther away from the edge of the door, also centered on the eye bolt center lines drill two more holes 0.7" apart and 0.7" from the first two.

Step 4:

Install the hinge blocks into the door hinge channels using four 10-32 x 1/2" pan head screws. Measure the distance from the outer skin to the eye bolt center. If the distance is greater than .040", make a note to use material from the drill guides to shim up the block with the greater distance to make them the same.

Step 5:

Without trimming any outer skin - trim excess channel material which extends past the mounted hinge block.

Installation of hinge blocks into fuselage

Step 1

Attach the drill guides to the fuselage hinge blocks with two flat head screws. Orient the drill guides so that when the hinge block is inserted into the fuselage door channels, the drill guide protrudes inside the cabin around the door frame. Using the hinge pivot bolts(AN3) and self locking nuts attach the fuselage blocks to their counter parts already installed

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in the door.

Step 2

Place the door onto the fuselage - sliding the fuselage hinge blocks into their respective channels, and with the drill guides protruding into the cabin area.

Step 3

Transfer the hinge blocks screw hole pattern to the inside of the fuselage by marking the center of each drill guide hole. Drill holes at these marks using a #6 drill. These holes may be enlarged considerably if necessary later.

Step 4

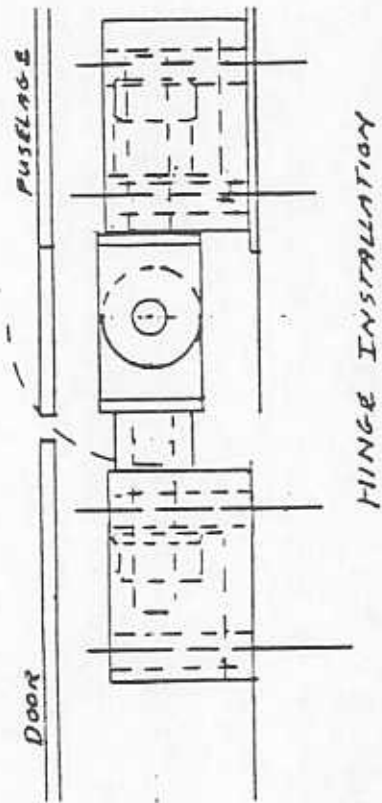
Remove the door from the fuselage, take out the hinge pivot bolts, and remove the drill guides from the fuselage hinge blocks. Save the drill guides to use as shim material. Reinsert the fuselage hinge blocks into the fuselage hinge channels and measure from the outer skin on the door to the eye bolt center line. Fabricate enough shim plates from the drill guides to bring the eye bolt centerlines in fuselage to the same distance from the outer skin as the eye bolts mounted in the door.

Step 5

Reattach the fuselage hinge blocks to the door with the pivot bolts. If the door window is installed - get inside the fuselage with 10-32 pan head screws and a Phillips screw driver. Remount the door onto the fuselage and screw down the hinge blocks. Have someone out side the fuselage watch the seams near and between the hinges. The eye bolts must be oriented so hinge pivot bolt center lines point to each other. The person outside the fuselage might turn them with needle nose pliers to get them lined up with each other. Open the door slowly and carefully - watching for interference. Interference points on the channels and hinge blocks can be sanded for clearance. Interference of the outer skins can be reduced by moving the eye bolt center lines closer to the outer skins by shimming the door and fuselage blocks equally. The door seam gap can also be widened by slotting the fuselage hinge blocks mounting holes toward the door.

Note:

If the eye bolts in the forward and aft locations are not parallel, they will have a tenency to turn about their own axis. This condition while not ideal, is acceptable if the turning amount is small, the assemblies are lubricated and you adjust the tension of the nut which retains the eye bolt for smooth operation. It is recommended that you enlarge the hinge block screw holes in the fuselage enough to correct or reduce the misalignment.



7.060 Door Latch

DESCRIPTION:

This section describes installation of the door handle and dead bolts. Before beginning this procedure the door should already be fitted to the fuselage, the hinges installed and the gas spring installed. It may be very helpful to delay door window installation until after installation of the door latch. The door seal should not be installed at this time. Read this entire section before beginning.

The door latch consists of a rotating gimbal which translates its rotary motion into reciprocating motion of a pair of dead bolts. A "T" handle is used to turn the gimbal. The "T" handle pivots into recesses when the latch is in the closed position and serves as a convenient grip with which to pull the door from the open position to the closed position. The door latch was engineered to have a theoretical maximum "pull in" of 1/4". This should allow the pilot or passenger to close the door with little thought or manipulation as to alignment. The position of the door when closed is set by the installation of the dead bolt guides and receivers. Therefore you should take great care in the positioning of these bolt guides and receivers.

Material:

Latch assembly (consisting of:

"T" handle
Gimbal
Nylon Washer
Door Plate
Door Ring
Mounting blocks
14" Push Rod
27" Push Rod
2 dead bolts
6 Nylon Barrels
4 10-32 x 3/8" inserts
1 8-32 x 11/32 ball plunger
4 AN 960-10 washers
4 10-32 x 1/2" SS flat head
2 1/8" x 5/16" roll pins
2 AN 380-2-2 cotter pins
1 1/8" x 1 1/4" roll pin
3 AN393-9 Clevis Pins

Milled fiber slurry

4 1 1/4" x 2" strips of BID

Tools Required:

1/8" drill bit
5/16" drill bit
Drill motor
Resin handling supplies and equipment
Sanding equipment
Vise or press to insert roll pins with
Phillips #2 screw driver

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Lead shot or sand bag to weight door on bench
Rotary file for Step 6
1/2 wide wood chisel

Step 0.5:

Press a AN393-9 Clevis Pin into each of the three holes in the widest gimbal flange.

Step 1:

The intended position of the door latch is 45.5" from the engine side of the fiberglass firewall (or 47" from the forward part line). Variation from this position affects the dead bolt push rod lengths and there associated thrust angles. The thrust angle of the forward push rod is greatest and the only one of concern. Keep this in mind if you decide to move the position of the handle from the recommended place.

Measure back from the fire wall and mark 45.5". Measure down from the window sill 2.7" and mark. Draw a center line through the mark which is perpendicular to the window sill. This center line should extend 4" below the mark. Make a 1/8" diameter pilot hole at the mark. This hole will later be enlarged to 1.19" to receive the step on the outer diameter of the door latch ring.

Step 2:

Remove the door from the fuselage and place it inside up on a work table. On the inside of the door draw a horizontal line (parallel to the lower window sill) through the pilot hole from the forward edge to the aft edge of the door. This will be the push rod center lines when the latch is in the closed position. From where the horizontal lines reach the fore and aft edges of the inner skin measure back 3/4". From the forward of these positions draw a line to .9" below the pilot hole. From the rearward of these positions draw a line to .9" above the pilot hole. These will be the center lines of the push rods when the latch is in the open position. The latch can be turned counter clockwise to open the latch and the push rods will sweep the area between centerlines (plus half the width of the push rod in each direction).

Step 3:

Cut a 3"x 3.6" rectangle around the door latch ring hole. The 3" sides are at the top and bottom of the rectangle. The upper 3" side is 1.7" from the center of the door ring hole. The rectangle is centered left to right on the door ring hole. Remove the core foam to expose the inside of the outer skin. Remove the inner skin and foam core material between and 3/8" outside of the push rod center lines to provide clearance for the 1/2" wide push rod. The push rod channels should extend through the fore and aft edges of the inner skin along the horizontal centerlines.

Step 4:

Cut a 1.19" hole centered on the pilot hole in the outer skin. Cut a slot .4" wide and 2.3" long along the extended centerline below the 1.19" hole in the outer skin (only). This slot is a

relief for the outside handle. You will need some kind of a finger relief near or at the bottom of this slot in order to open the latch from outside the plane.

Ruff up the largest outside diameter of the door latch ring with a course file. The ruff surface is to provide mechanical attachment for the bonding slurry. Bond the ring into the 1.19" ring hole with a small fillet of milled fiber slurry. This fillet must clear the heads of the pressed in clevis pins on the gimbal. Make sure that the opening in the ring lines up with the .4" wide vertical slot. When the slurry is at the green cure stage place the gimbal onto the ring and check for clearance between the clevis pin heads and the fillet. Let the slurry cure before proceeding with the next step.

Step 5:

Screw the two foam mounting blocks to the door latch plate with 10-32 x 1/2 stainless steel flat head screws. The blocks are oriented so that they are very nearly flush with the top and bottom of the plate. Sandwich the gimbal and nylon washer between the outer skin and door plate. Orient the gimbal so that the heads of clevis pins are next to the outer skin. Thread the "T" handle through the door plate, nylon washer and gimbal as shown in figure xx.x. Thread the outdoor portion of the "T" handle through the bonded door ring and press the entire assembly against the door. The foam mounting blocks are made slightly over size and cause excessive free play of the gimbal between the outer skin and the inside door plate. Sand the foam blocks until a minimum of gimbal free play is achieved.

Bond the foam blocks into place with a thin mixture of milled fiber slurry on the block surface where it touches the outer skin. Press the entire assembly into place and hold it in position until the milled fiber slurry sets. After the slurry holding the foam mounting blocks has cured unscrew and remove the door plate along with the handle, washer and gimbal. **Reinforce the foam mounting block installation with a slurry of micro balloons. These blocks will have to withstand the repeated tugging of your passengers and copilots.

Step 6:

Note:

The dead bolts slide through two identical barrels at both the forward and aft locations. These identical components will have different names for clarity in this text. When the barrel is used in the fuselage door frame we will refer to it as the "receiver". When the barrel is used as a guide in the door for the sliding dead bolt it will be referred to as a "dead bolt guide". Make sure now that the dead bolts slide easily through all of the barrels. Polish the dead bolts or ream the barrels with a 5/16" drill bit. Do not however, resize the barrels with a larger drill bit. The fit of the dead bolts in the barrels is intended to be very close.

Reinstall the door on the fuselage. Make sure that the door

is positioned for the correct fit. From inside the cabin mark the door frame at the forward and aft outlets of the push rod channels. Open the door.

Remove a section of the door frame within the transferred dimensions of the push rod channels to retain the dead bolt receivers. Remove enough material to make the chamfered end of the receiver flush with the inside of the door frame and the round edge of the receiver to be flush with the outer skin side of door frame.

Apply tape to the door edge which is adjacent to the dead bolt receivers when the door is closed. This is to protect the door edge from the milled fiber slurry when installing the receivers. The door will be closed at least once during their installation.

The receivers will be potted into the door frames with a milled fiber slurry. The slurry must be thick enough (like peanut butter) to hold the receiver in position without movement until it sets. Before the slurry cures, you must position the receivers with the chamfered edge flush with the inside of the door frame and the tangent of outside of the receiver flush with the outer skin side of the door frame. Additionally the bore of the receiver must be parallel to the adjacent outer skin. After a thick milled fiber slurry has been applied to the receiver insert a dead bolt with a dead bolt guide on it. Get into the cabin and close the door fully (have someone outside the cabin check that the door is closed properly and apply gentle pressure in the area of the dead bolts.) and locate the dead bolt guide between the door's skins. The dead bolt should be in the center of the push rod channel and point toward the center of the door latch ring hole. Carefully slide the dead bolts out of the receivers and wait for the slurry to cure before continuing.

Step 7:

The dead bolt guides are installed into the push rod channels with a thick milled fiber slurry. Put the dead bolts into the receivers and use them as alignment tools for the guides. Get into the cabin (or work through the door window). With the door closed (with the same care used in the installation of the receivers) - slide the guides onto the dead bolts until they are flush with the inner door skin's fore or aft edge. Anchor them in place with a thick milled fiber slurry. Get enough milled fiber slurry around the guides to hold them in place until you can remove the door and finish anchoring them. If slurry gets on the dead bolts remove them before the slurry cures and clean them in acetone. Reinsert them to retain the correct alignment until the slurry cures. Mark the extended position of the dead bolts when they are bottomed in the receivers on the door.

Remove the door and place it inside up on the work bench. Sand and fill as necessary around the door guides to provide a smooth surface to apply retaining strips of fiber glass. Retain both guides with two layers of fiber glass approximately 1 1/4" x 2". Since the resin will not adhere to the guides the guide must

be encapsulated completely with the fiber glass strips. Place one strip of fiber glass over the guide along the axis of the guide bore. Place the second piece perpendicular to the first. The door seal will press against door in the area above the guide so try to keep the bridge of glass across the channel smooth. When the fiberglass is in the later stage of green cure use a 5/16" drill to cut through the fiber glass at both ends of the guides.

Step 8:

After both the guides and receivers are installed, the push rods can be cut to length. Place the door inside up on the work bench. Align the bolts with the marks made earlier so that they are in their extended position. Attach the push rods to the gimbal by using the existing holes at one end of each push rod and the pressed in clevis pins on the gimbal. Press the gimbal into the ring hole and rotate it to the position which gives the shortest push rod length to the aft dead bolt. Hold the free ends of the push rods near the dead bolts and mark the location of the dead bolt roll pin holes on push rods. The dead bolts should not bottom during normal operation so measure 1/6" from the marks on the push rods toward the gimbal and drill a 1/8" hole here for the clevis pins. Cut the excess push rod length off .2" past the 1/8" hole. Attach the dead bolts to the push rods using 1/8" x 5/16" roll pins. You may have to sand the push rod to obtain a close fit with the clevis fork machined in the dead bolt. Lubricate this joint with motor oil. Lubricate the dead bolt shaft with petroleum jelly. Petroleum jelly is specified because it is cosmetically cleaner and will not attack the plastic guide and receiver. Install the dead bolts with push rods into the door.

Step 9:

Place the gimbal on to the door ring and place the push rods on the pressed in clevis pins (don't use cotter pins at this time). Rotate the gimbal and check for proper travel lengths of the dead bolts. Determine and devise travel stops for the mechanisms. You need a positive stop in both directions. In some cases the push rods will bottom on the gimbal at the correct position. Otherwise, you might bond a small block of G10, 40# foam or other material at the extremes of the push rod sweep near the gimbal. Sand the push rods where they touch the gimbal as required to increase the dead bolt retraction distance.

Step 10:

After you have adjusted the travel of the push rods, thread the "T" handle through the door plate, nylon washer and gimbal. Temporally retain the "T" handle in the gimbal with a piece of 1/8" welding rod, cotter pin or drill bit. Screw the ball plunger into the threaded 8-32 hole in the gimbal until its ball engages the detent in the "T" handle. Screw the door plate down and observe the portion of the "T" handle on the outside of the door. Most installations will require that this part of the handle be bent to match the contour of the door. After you are satisfied with the fit of the handle continue with the next step.

Step 11:

Retain the "T" handle in the gimbal with the 1/8" x 1 1/4" roll pin. Lubricate with petroleum jelly the areas where the gimbal goes touches the door ring, door plate, and push rods. Place the gimbal onto the door ring and hold the door plate out of the way while you attach the push rods to the gimbal. The push rods are retained with a washer and cotter pin. Retain the door plate with four 10-32 x 1/2" flat head screws.

Builders have several options at this point. You are free to style you own solutions to covering the push rod channels and the size and configuration of a finger relief to open the handle from the outside. The area under the outside handle should be waterproofed You may want to incorporate a key lock. A lock that limits the sweep of either the forward or aft push rod should be adequate.

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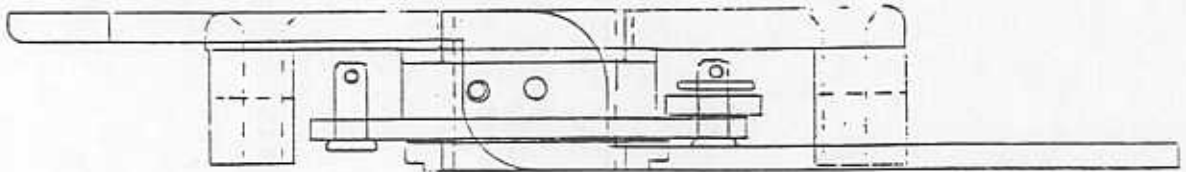


DOOR HANDLE ASSEMBLY

.001 THEORETICAL BETWEEN
SKIN BUSHING AND GIMBAL.

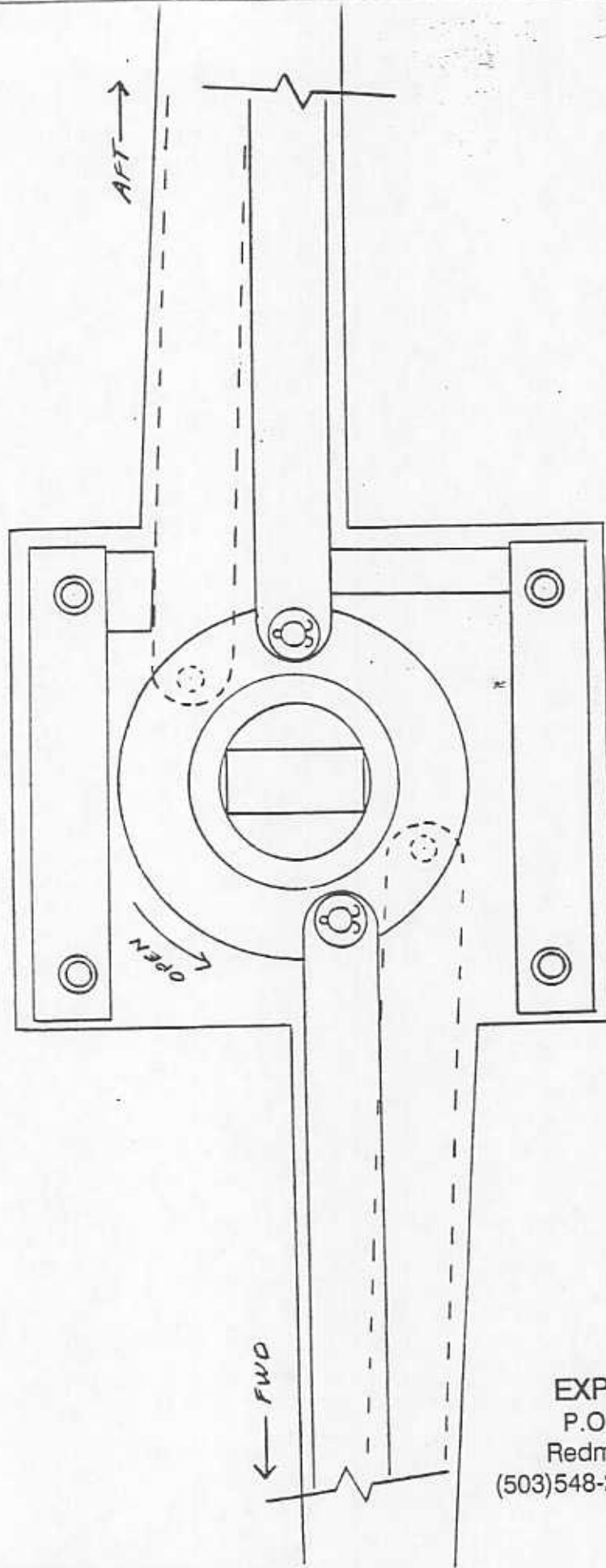
UPON INSTALLATION SAND
FOAM BLOCKS TO ACHIEVE
PROPER ASSEMBLY
CLEARANCE.

CLEVIS PINS ARE 90 DEG
FROM PROPER LOCATION FOR
CLARITY.



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GIMBAL & PUSH ROD VIEW
FROM INSIDE CABIN

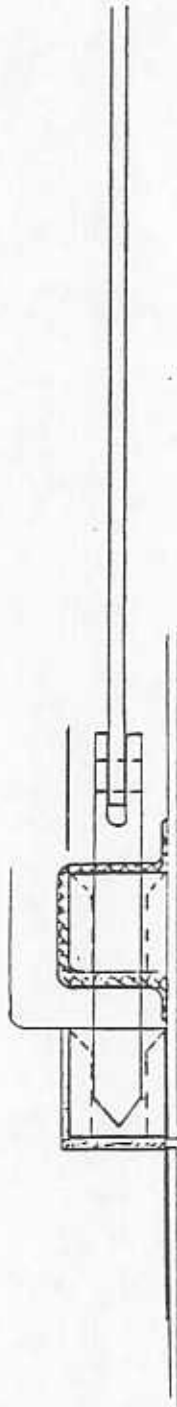
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7.060-8

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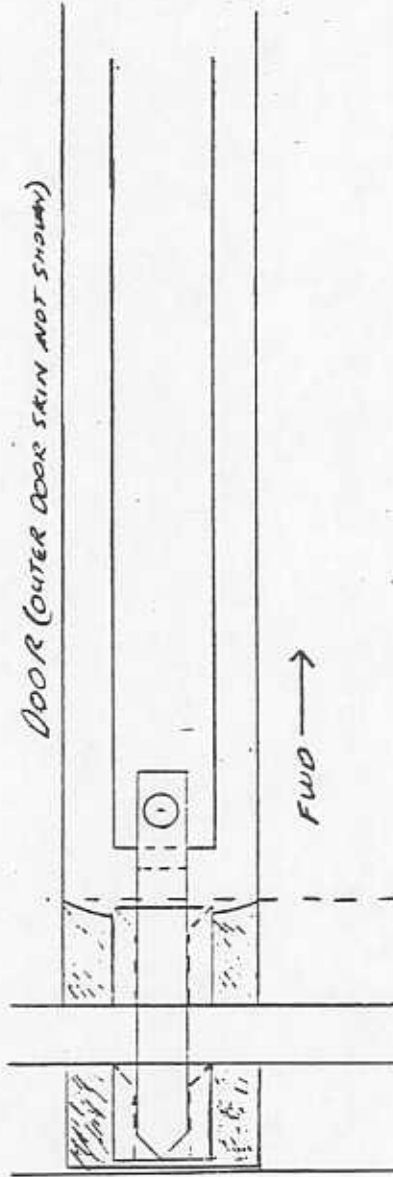


TOP VIEW



VIEW OF
AFT DEAD BOLT

VIEW FROM OUTSIDE
FUSelage



DOOR (OUTER DOOR SKIN NOT SHOWN)

FWD →

7.070**SEAT BELT FOUNDATION INSTALLATION****OVERVIEW**

The objective of this procedure is to install the hardpoints and hardware for the Lap Belts and Shoulder Harnesses for the fore and aft seats. Hardpoints will be constructed, location points marked and the fuselage skin and carry through structure prepared for the installation. Hardpoints will be installed and laminated in place.

Materials Supplied

<u>Part Number</u>	<u>Qty</u>	<u>Description</u>	<u>Tools Needed</u>
112-61-016	2	Bracket, Lap Belt Back	Drill Motor
112-61-015	1	Bracket, Lap Belt Front	Drill Bits 3/32,5/16,1/2,3/4
150FS -029	1	Plate, Backing	Measuring tape
AN4-6A	4	Bolt	Knife
AN4-13A	2	Bolt	Glue Gun
AN5-6A	6	Bolt	Straight Edge
AN960-416	4	Washer	Spade Bits 1/2,3/4
AN364-428	4	Nut, Self Locking, 1/4 28NF-3	
AN364-524	6	Nut, Self Locking, 5/16 24NF-3	
K1000-4	2	Nut, Anchor	
AN426AD3-4	4	Rivit, Countersunk, 3/32 x 1/4	
BSP4-3	2	Pop Rivet	
112-14-045	1	G-10, 8"x 6"	

Procedure**1. Hardpoint Construction**

The G-10 hardpoints are made by sawing the 6" X 8" block (PN 112 14 000) into eight 2" x 3" blocks. Utilize these blocks to construct six (6) single hole blocks, part number 112-14-040 (Fig 7.070-1) and two double hole blocks (Fig 7.070-2). In some cases the factory has shipped 8 (1.5" X 5") blocks in place of the 6" X 8" block. These should be used in place of the 2" X 3" blocks.

To construct the single hole block drill a 1/8" pilot hole in the center of the block. Next drill the counter sunk hole .75" deep utilizing a 3/4" spade bit. Drill the pilot hole out with a 5/16" bit. Taper four blocks at forty five degrees on all four sides. Be sure that the 3/4" hole is on the base (large) side of the tapered block.

These blocks will be used for the shoulder harness hardpoints which are bonded clear of fuselage foam and provides for a smooth transition for the BID cloth lamination to the fuselage skin. Using a stiff Milled-Fiber mix (heavy mashed potatoes), secure an AN5-6A bolt into the hole. The head of the bolt must be counter sunk into the 3/4" hole. Clean any Milled-Fiber from the threaded end of the bolt.

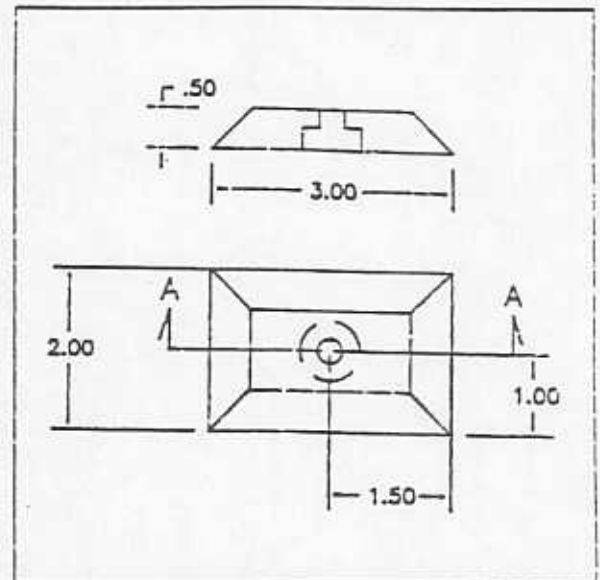


FIG 7.070-1 SINGLE HOLE BLOCK

The double hole block, part number 112-14-039, is made by drilling two 1/8" pilot holes in each block. Then counter bore each hole on one side with a 1/2" spade drill to a depth of .75". Drill the pilot hole out with 1/4" bit. Attach two AN4-6A bolts to each block using the Milled-Fiber method.

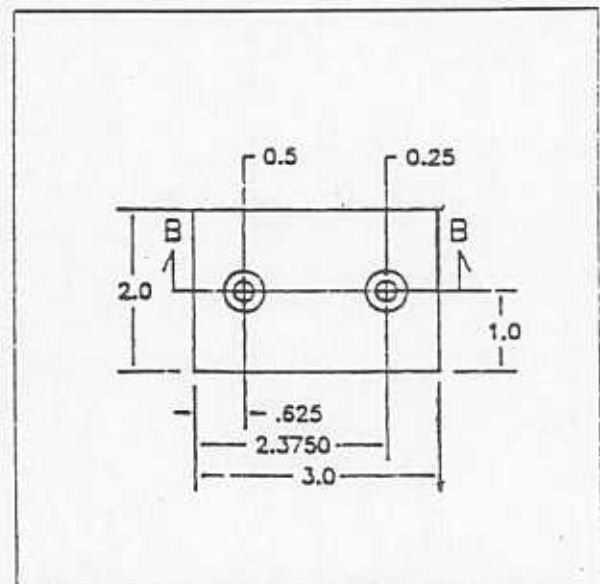


FIG 7.070-2 DOUBLE HOLE BLOCK

2. Locating Shoulder Harness Hardpoint Positions.

The front seat shoulder harness hardpoints are located by extending the lines of the rear window forward vertical edge and the upper horizontal edge. Place the lower forward corner of the single hole hardpoint two (2) inches above the extended lines intersection. Make sure long axes of the hardpoint is horizontal with the fuselage and draw a line around the hardpoint (Fig 7.070-3).

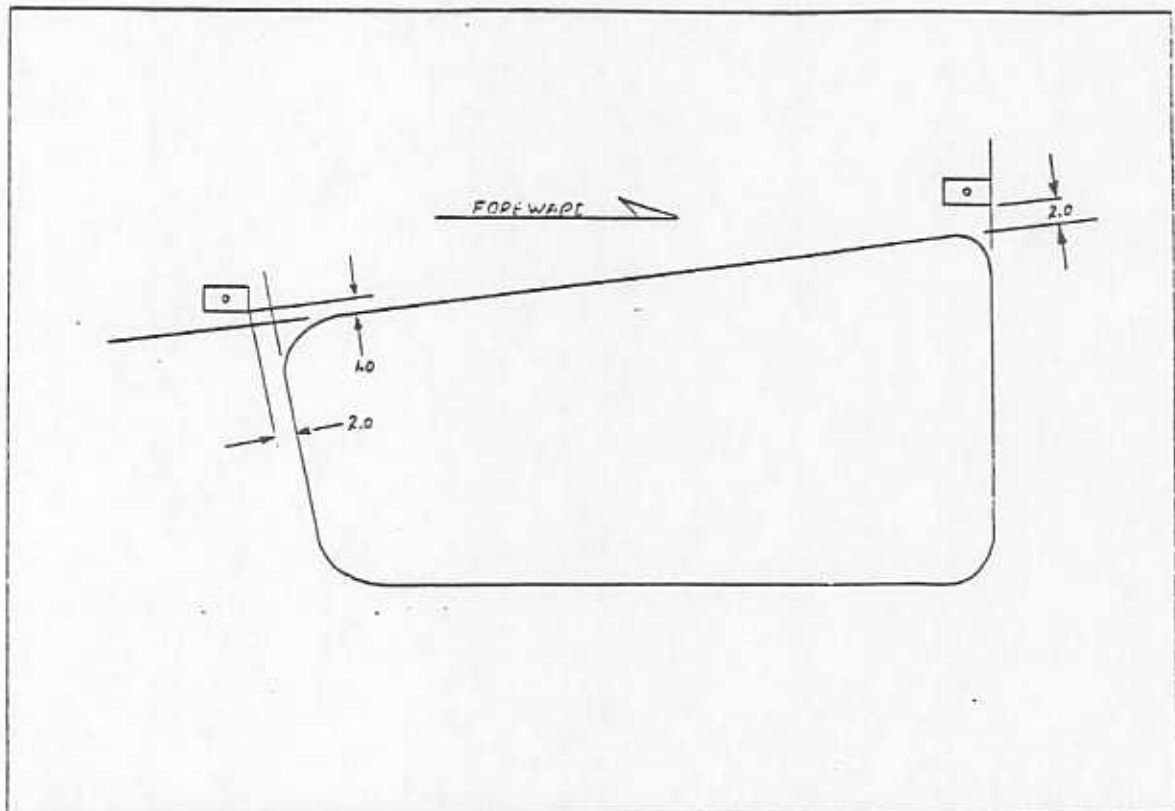


FIG 7.070-3 SHOULDER HARNESS HARDPOINT LOCATIONS.

The rear seat shoulder harness hard points are located in the same manner except using the aft vertical line of the window. Place the forward corner of the single hole hardpoint one (1) inch above and two (2) inches aft of the extended line intersection (Fig 7.070-3).

3. Locate Rear Seat Lap Belt Hardpoint Positions.

The rear seat lap belts can be anchored in six positions depending of the positioning of the left rear seat.

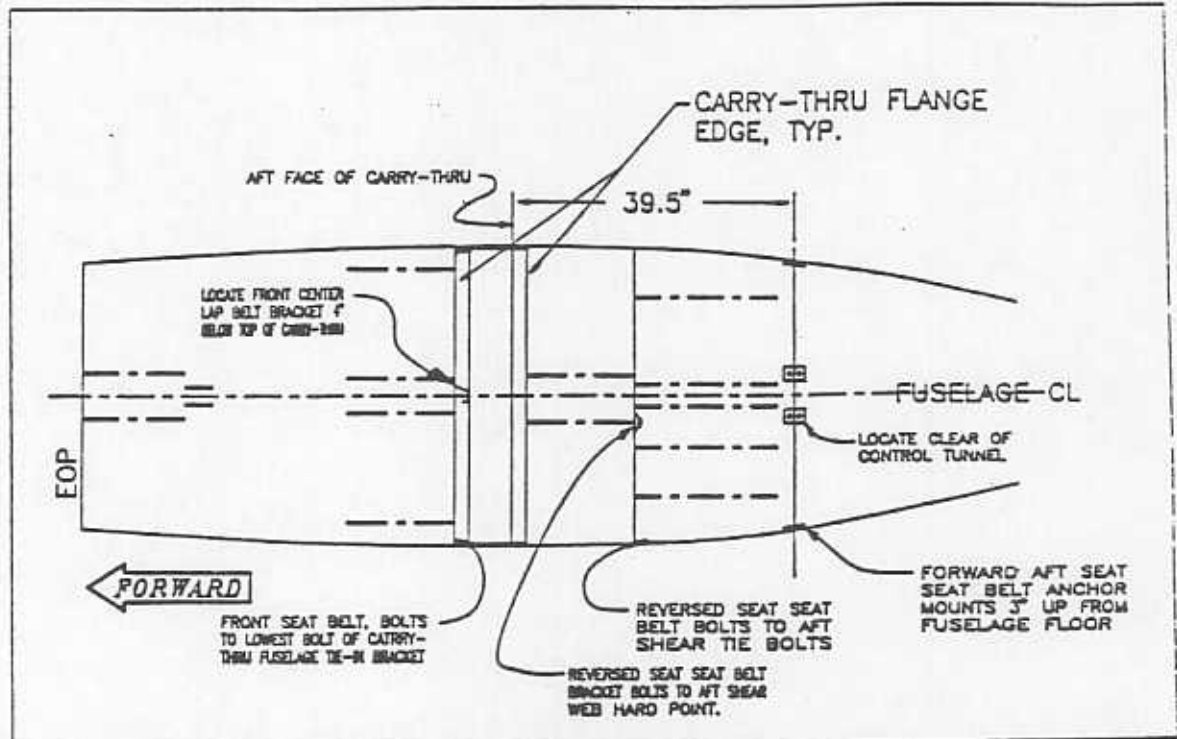


FIG 7.070-4 LAP BELT ANCHOR LOCATIONS

The right rear seat lap belt hardpoint positions are located by measure 39.5" aft of the aft face of the carrythrough. Draw a line perpendicular to this line. The outboard hardpoint is located on the side of the fuselage 3" up from the level floor surface centered on this line. Center a single hole hardpoint on the locating mark and trace a line around it. The inboard hardpoints are centered on the perpendicular line just clear of the tunnel (Figure 7.070-4). Center the two hole hardpoints on each of these locations and trace a line around them.

If you chose to make the left rear seat rear facing aft, the outboard seat belt bracket is attached to the aft face of the aft shear tie bolt (Fig 7.070-4). The inboard bracket is bolted to a hardpoint located between the inboard seat bracket and the control tunnel (Fig 7.070-4).

4. Installation of G-10 Hardpoints.

Using a knife cut the inner skin of the fuselage approximately 1/8" outside the line traced around the hardpoint blocks. Remove the inner skin and under cut the foam 3/16". Use caution not to cut the outer skin. Place a thin layer of milled fiber on the outer skin to fill voids caused by the curvature of the outer skin. Place the G-10 block in the cutout area, center and force milled fiber around the edges. Laminate 4 layers of BID over the hardpoint (Fig 7.070-6).

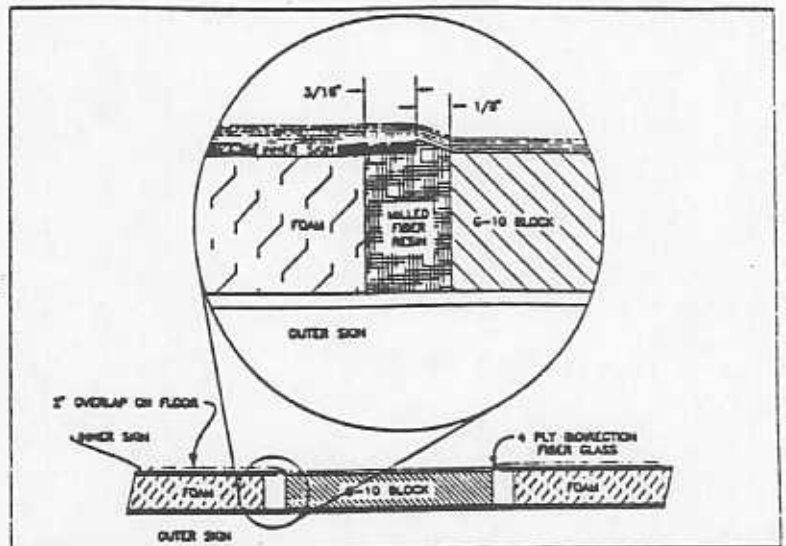


FIG 7.070-5 G-10 HARDPOINT INSTALLATION

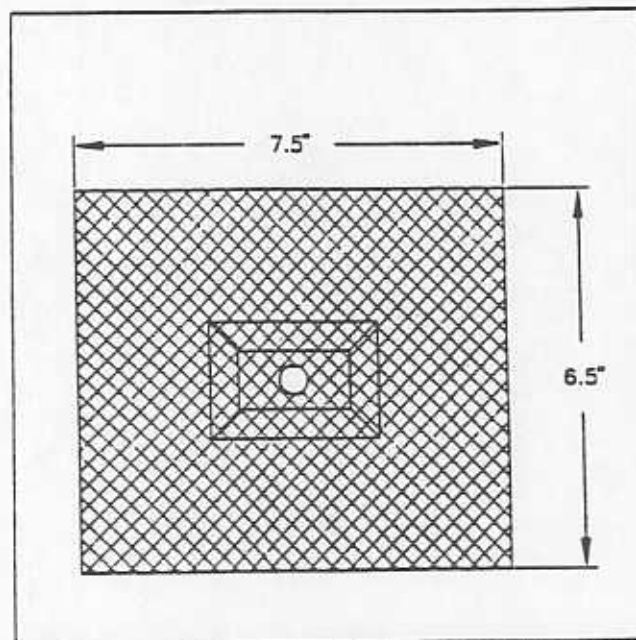


FIG 7.070-6 G-10 HARDPOINT BID LAMINATION (4 LAYERS)

5. Installation of Front Seat Lap Belts.

Front seat lap belts are attached in three positions. The outboard attach points are located at the lower bolts of the carrythrough fuselage tie-in brackets. These attach points will be installed in a later procedure. The center attach point for both front seats is located on the forward side of the carrythrough (Fig 7.070-7).

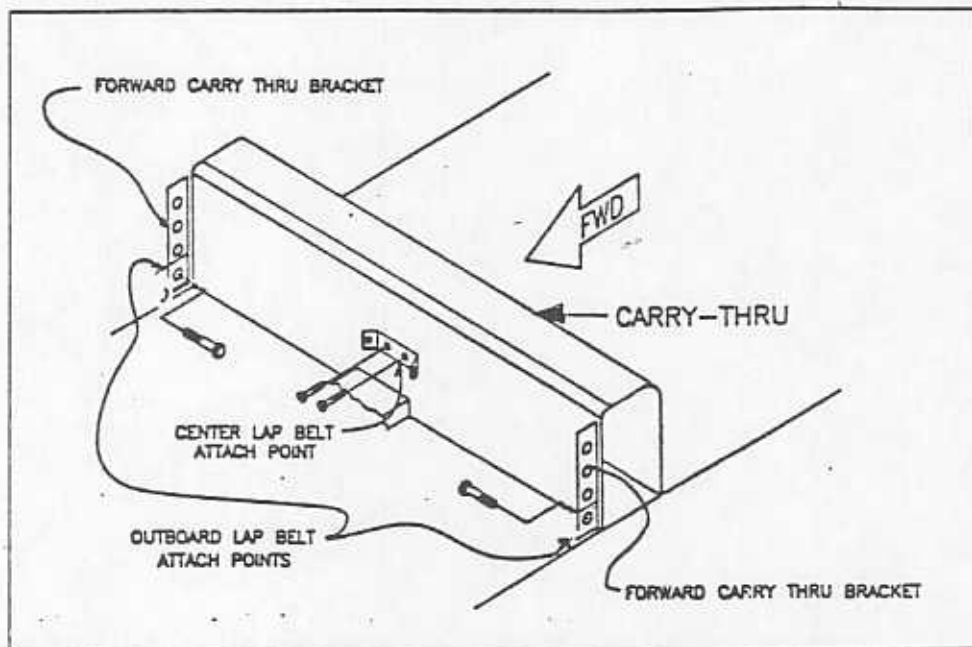


FIG 7.070-7 FRONT LAP BELT ANCHOR LOCATIONS

Draw a vertical line on the forward face of the carrythrough at the aircraft center line. Make a mark on this line 4.4" down from the top of the carrythrough. Measure an additional .75" down and make a second mark. Drill 1/4" holes through the carrythrough at these locations. Drill two 1/4" holes in the backing plate (PN 150FS-029) as shown in Fig 7.070-8. Install two K1000-6 anchor nuts. Place the backing plate on the inside of the carrythrough and install the forward lap belt bracket (PN 112-61-015) utilizing 2 AN4-13A bolts. Attach the backing plate to the carrythrough using 4 BSP 4-3 Pop rivets.

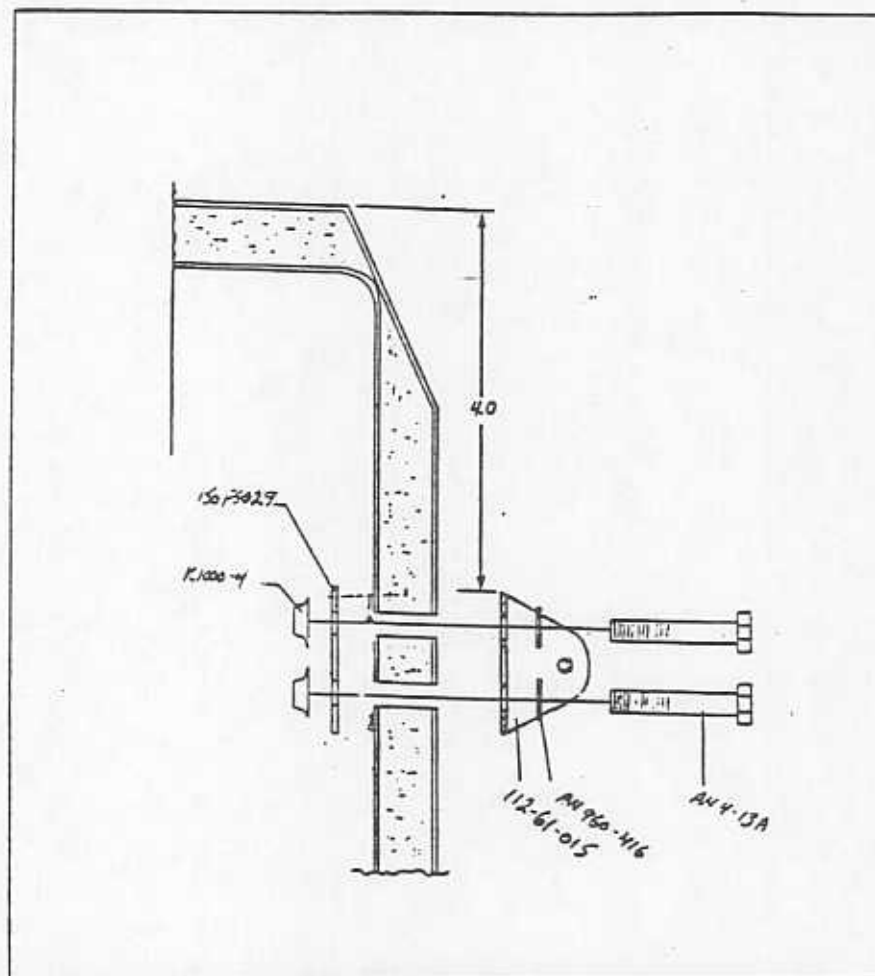


FIG 7.070-8 FRONT LAP BELT ANCHOR INSTALLATION

7.080 INSTRUMENT PANEL INSTALLATION (GENERIC)

DESCRIPTION:

The standard instrument panel will be installed in this procedure. The location of instruments will be the builders choice, and will not be shown. The instrument panel can be shock mounted if desired, but this procedure shows a ridged mount.

The measurements shown in this procedure are approximate, each builder will need to customize to his or her physical size.

MATERIAL NEEDED:

1ea.	112-61-023	PANEL, FLAT INSTRUMENT
1ea.	112-61-023-T1	TEMPLATE, FLAT INST. PANEL
8ea.	AN426AD3-4	RIVET, CTR. SNK., 3/16" X 1/4"
4ea.	AN507-832-R10	SCREW
4ea.	F5000-8	NUT, ANCHOR, 8-32
10ft.	1/2" X 1/2" X 1/16"	ANGLE ALUM.(BUILDER SUPPLIED)
12ft.	3/4" X 3/4" X 1/8"	ANGLE ALUM.(BUILDER SUPPLIED)
100ea.	AN426AD4-5	RIVET, CTR. SNK., 1/8" X 5/16"
8ea.	AN3-5AP	BOLT
8ea.	AN364-1032	NUT, LOCKING
16ea.	AN960-10	WASHER

TOOLS NEEDED:

BAND SAW
HAND DRILL WITH BITS

PROCEDURE:

STEP 1. CUT OUT INSTRUMENT PANEL:

Using template (1112-61-023-T1), mark and cut out instrument panel out.

STEP 2. LOCATE INSTRUMENT PANEL ON FUSELAGE:

Measure aft approximately 20" from firewall, (this measurement depends on the builders size), and make a vertical line on both sides of fuselage. (vertical in this case indicates the desired angle builder wants panel to be at). The angle of the panel is the builders option, but with too much lower aft angle the glareshild may not shield out all the light. See figure 7.080-1.

STEP 3. MAKE INSTRUMENT PANEL BRACKETS:

Place clear tape on the edge of two 3/4" X 6" pieces of wood.

Using the pre-taped blocks of wood, clamp to the aft side of the vertical lines, as per figure 7.080-2.

Laminate four (4) plies 45 deg. BID extending 1.0" onto the fuselage side and extend onto the edge of the wood blocks.

After cured remove blocks and trim laminates to 3/4" X 6".

Measure down 7.3" from the top of the instrument panel, and place a mark on each end, draw a horizontal line (using masking tape on panel first and marking on tape will protect panel).

Measure in from the side 0.3" and place mark on line.

Measure down 4.0" from that mark and make a new mark, also measure in 0.3" from edge and place mark. These are the locations of the two mounting screw holes. See Figure 7.080-3

Drill the four holes using a #19 drill bit, and countersink for a #8 screw.

Clamp panel in position and drill through brackets using a #19 drill bit, as per figure 7.080-4.

Remove panel and rivet (AN426AD3-4) anchor nuts (F5000-8) over the holes in brackets.

STEP 4. CUTOUTS FOR INSTRUMENTS AND RADIO STACK:

As mentioned in the description, the instrument locations are the choice of the builder, and now would be the easiest time to cutout the holes. The radio stack is 6-5/16" wide.

and should be as tall as possible, but leave room for the engine controls at the bottom. See figure 7.080-5.

STEP 5. FRAMING THE PANEL:

The panel will need to be framed for additional strength.

Using 1/2" and 3/4" angle aluminum cut and rivet angle aluminum to panel, as per figure 7.080-5.

STEP 6. FINAL BRACKETS:

Using 3/4" angle aluminum, make four brackets and bolt to the nose gear support as per figure 7.080-6.

PROCEDURE COMPLETE: DATE: _____

7.090 GLARESHIELD INSTALLATION:

DESCRIPTION:

The purpose of the glareshield is to shield light off of the instruments, and also to keep any reflections off of the windscreen from the instruments. The glareshield will be constructed and installed in this procedure. The construction of the glareshield will be done before the windscreen is installed, and is fabricated from 1/4" foam, and installed over the instrument panel, while the panel is in place.

MATERIAL NEEDED:

1ea.	119-99-006-02	FOAM, 4.5 LB. 1/4" X 24" X48"
		RESIN
		Q-CELL
		BIDIRECTIONAL CLOTH
		VELCRO (BUILDER SUPPLIED)

TOOLS NEEDED:

LAY-UP TOOLS
CLEAR TAPE

PROCEDURE:

STEP 1. CUTTING FOAM:

Use a piece of heavy paper or light cardboard and make a pattern over instrument panel and under windscreen cutout. The overhang aft of the instrument panel should be at least 4". The forward end should go under instrument panel about 2.5".

Using pattern cut 1/4" foam. cut a little oversize and trim to size while in place.

STEP 2. LAMINATE TOP:

Tape foam in place, taping the forward part under windscreen cutout, and taping the sides down onto the instrument panel.

While taped in place, coat the upper portion of glareshield with a survey of Q-cell/resin mix. coat wherever you can reach.

After cured laminate one (1) layer of BID over all areas that can be reached. Let cure for at least 24 hours.

Remove glareshield from instrument panel, and complete the lamination of the top, the area that you were not able to reach.

STEP 3. LAMINATE BOTTOM:

Turn glareshield over and coat with a survey of Q-cell/resin mix, let cure. Laminate one (1) layer of BID on the lower side, making sure that you hold the proper shape.

STEP 4. LAMINATE LOWER BRACKETS:

After all laminates are cured, trim for a good fit. Place clear tape over forward edge of glareshield at locations shown in figure 7.090-1.

Place glareshield in position and tape to under side of fuselage.

Laminate three (3) plies of BID 1.0" over glareshield and 1.0" onto upper fuselage skin.

After cured remove glareshield and trim brackets. This will make a good shelf to hold the forward edge of glareshield.

STEP 5. AFT HOLD DOWN:

A Velcro strip and be glued to the upper edge of the instrument panel and under side of glareshield. If you have a tight fit the Velcro is not necessary.

PROCEDURE COMPLETE: DATE: _____

7.100 WINDOW INSTALLATION:

DESCRIPTION:

In this procedure you will prepare the fuselage, and install all windows and windscreen. The windows are installed from the inside and bonded in with a mixture of cabosil/resin.

It is advisable to have the instrument panel and glare shield fitted before the windscreen is installed, and also have the door installed with hinges and latch before installing the side door window.

MATERIAL NEEDED:

		RESIN
		CABOSIL
lea.	112-61-021-01	WINDOW, REAR, LEFT
lea.	112-61-021-02	WINDOW, REAR, RIGHT
lea.	112-61-020-02	WINDOW, MIDDLE, RIGHT
lea.	112-61-020-01	WINDOW, MIDDLE, LEFT
lea.	112-61-022	WINDSCREEN

TOOLS NEEDED:

BAND SAW
 LAY-UP TOOLS
 SAND PAPER
 TAPE, MASKING
 TAPE, TRIM TAPE, 1/8", 1/2", (FOUND IN MOST AUTO PAINT STORES)
 LATEX PROTECTIVE COATING ("SPRAYLAT" IS A REG. TRADE MARK)
 MARKING PENS, MULTIPLE COLORS

PROCEDURE:

STEP 1. WINDOW PROTECTION:

Hold each window up to its appropriate cutout, and lightly mark the cutout on the window. This will give you a tape line.

Using masking tape, tape 1/4" inside of marks (smaller window).

Spray or brush on a very heavy coat of latex protective coating. Do so for each window and the windscreen.

Remove tape. Don't leave masking tape on the window surface too long, it can dry out and can be difficult to remove.

STEP 2. SHAPE OUTSIDE FUSELAGE WINDOW OPENINGS:

Sand and shape the window fuselage openings in the outer skin (maximum 1/8" material removal) so that the edges are straight and even and the corners are smooth. This will determine the final visual edge of the window.

STEP 3. SHAPE INSIDE FUSELAGE WINDOW OPENINGS:

Remove the inside skin and foam 1.25" around the perimeter of the inside of the window opening. See Figure 7.100-1.

NOTE: SOME FUSELAGE UPPERS, DON'T HAVE FOAM AROUND THE BACK WINDOW.

WARNING: DO NOT REMOVE ANY UNI AROUND THE EDGE OF ANY WINDOW. THE FOAM CAN BE REMOVED AND THE WINDOW CAN BE INSTALLED IN THAT SIDE FIRST. THE WINDOW MAY NEED TO BE BEVELED IN SOME AREAS FOR A GOOD FIT.

STEP 4. MARK AND TRIM GLASS TO FIT OPENING:

Make a new line 1.0" parallel to previous line made in step 1.

Trim to outer line (larger window) using band saw. Care must be made to protect window against scritchng.

Support the window in the position in which it will be installed and mark the outline of the window opening on the glass. Do this as accurately as possible.

NOTE: THE INNER 1/8" TAPE WILL BE THE FINAL EDGE OF WINDOW AND PAINT, SO DO AS GOOD A COSMETIC JOB AS POSSIBLE.

Remove glass and using the 1/8" wide trim tape, tape two rows of tape, around the perimeter of the window, 0.1" inside of line (smaller window).

Using soft object (finger nail) press tape tight to glass.

Now using the 1/2" wide trim tape, tape the area between the inner 1/8" wide tape and the latex coating, also press to glass. See Figure 7.100-2. A piece of bubble wrap can be used for further protection, tape to inside area. Make sure all glass area on the inside is covered.

Tape and cover both inside and outside of glass.

Sand the outside edge of the glass right to the tape, with #80 grit sandpaper, being careful not to damage the tape.

Make a trial fit and taper the outside edge if necessary. See Figure 7.100-2.

STEP 5. BEVEL WINDOW OUTSIDE EDGES:

Use a fine fiber tipped pen to mark a line 3/8" outside the fuselage window opening of the outer skin. The mark will be on the exterior of the fuselage skin, as shown in Figure 7.100-3.

Rough sand with 40 to 60 grit paper from the window opening down to the mark. Do not sand the opening to a knife edge. Leave at least 0.05" at the small end. This entire bevel will be carefully fine sanded after the window is installed. Use a sanding block on the straight areas.

STEP 6. INSTALL THE RIGHT REAR WINDOW:

Make a trial fit of window, place window in place, and with small blocks of wood, block up the bottom of window for proper height, hot glue blocks in place. All areas of window edges should be in contact with the outside skin with little pressure on the inside of glass.

Using a piece of packaging foam and a plank hold window in place with just enough pressure to hold window, it shouldn't take much. See Figure 7.100-4.

After satisfied of fit and of holding process, mix cabosil/resin to a petroleum jelly consistency, and apply to the fuselage bonding surface and place the window in place.

Place the foam and plank to apply pressure to window. Smooth the excess cabosil that extruded from the joint, make sure there's no cabosil over the tape, and that the edge is as smooth as possible. The inside edge, just make a smooth fillet around the perimeter. Let cure for at least 24 hours at 60 degrees or higher.

Repeat this process for right rear window.

STEP 7. INSTALL DOOR WINDOW:

The door window should be installed after the hinges and latches have been installed. Steps 2, and 3 should have been done by this time.

Repeat steps 4 through 6 for the door window, door should be closed and latched when bonding. Use the holding support as per Figure 7.100-5.

STEP 8. INSTALL RIGHT HAND WINDOW (PILOTS WINDOW):

Repeat steps 4 through 6, and Figure 7.100-5.

STEP 9. INSTALL WINDSCREEN:

The instrument panel and glare shield should have been fitted by this time, if not do so before installing the windscreen.

Repeat steps 4 through 6, using the hold-down supports as per Figure 7.100-6.

STEP 10. INSIDE FINISHING FOR ALL WINDOWS:

Fill the area between outside fuselage skin and inside skin, with Q-cell/resin mix. Use the inside edge as a guide. This should be as smooth as possible. Make sure not to get any Q-cell over tape.

After cured, sand and apply two (2) plies of 45 deg. BID extending to the tape, but not over it, to 1" over inside skin, as per Figure 7.100-7. Do this step as neatly as possible, it will be the reveal of the window.

After laminates have cured, remove the outside 1/8" layer of tape, sand smooth, and prepare for paint or upholstery.

STEP 11. OUTSIDE FINISHING FOR ALL WINDOWS:

Remove the outside 1/8" layer of tape. Use #100 grit sandpaper to finish the bevel and fillet on the exterior of each window. This finish sanding should blend the fuselage smoothly into the window at the masked paint line. See Figure 7.100-7.

PROCEDURE COMPLETE: | DATE: _____

7.110 WING TIP INSTALLATION:

DESCRIPTION:

In this procedure you will assemble the wing tip halves, and attach to the wing, using anchor nuts. You will also install the strobe/navigation system (optional). The strobe/navigation system is available in two configurations. The first is comprised of two (2) power supplies, two (2) light assemblies, and two (2) installation kits. While one power supply serves as "master" the other will slave off the first. The second package is comprised of one (1) power supply, two (2) light assemblies, and one (1) installation kit. Both packages, equipped with forward and tail position lights, comply with FAR part 91.33(c)(2) and (c)(3) requirements.

MATERIAL NEEDED:

1ea.	111-11-017-01	SKIN, WING TIP, UPPER, LEFT
1ea.	111-11-017-02	SKIN, WING TIP, UPPER, RIGHT
1ea.	111-11-018-01	SKIN, WING TIP, LOWER, LEFT
1ea.	111-11-018-02	SKIN, WING TIP, LOWER, RIGHT
36ea.	AN507C832R10	SCREW, MACHINE
36ea.	F5000-8	NUT, ANCHOR, FLOATING
72ea.	AN426AD3-4	RIVET, CTR. SNK.
2ea.	111-42-004	*WHELEN POWER SUPPLY
1ea.	111-42-003	*WHELEN POWER SUPPLY
1ea.	111-42-002	STROBE/GREEN LIGHT ASSEMBLY
1ea.	111-42-001	STROBE/GREEN LIGHT ASSEMBLY
5" X 7"	119-99-006	40# FOAM
4ea.	AN3-7AP	BOLT
4ea.	AN960-10	WASHER
4ea.	F5000-3	NUT, ANCHOR
		RESIN
		MILLED FIBER

* POWER SUPPLY OPTION, BUILDERS CHOICE

TOOLS NEEDED:

LAY-UP TOOLS
SANDPAPER
HAND DRILL WITH BITS
MASKING TAPE
CLECOS

PROCEDURE:**STEP 1. WING TIP ASSEMBLY:**

Prep sand the wing tip halves. Do not sand to EOP.

Tape the halves together and fit them over the outboard end of the wing. Check the fit.

Sand the wing tip halves as necessary to achieve the proper fit in the wing end joggle. You may need to sand the wing joggle, especially at the trailing edge. The leading edge seam will get two layers of BID, so leave enough room for them.

Put clear tape, or Saran Wrap on the trailing edge of the wing joggle. This will prevent the wing tip from bonding to the wing.

When you are satisfied with the fit, apply a mixture of milled fiber/resin along the inside aft edge, and forward (approximately 9") of the wing tip halves, as per Figure 7.110-1. Use a small amount of milled fiber on the joggle, the wing will need to fit into this area.

After cured, remove tip from wing. Be sure the halves are securely taped together.

Laminate two (2) layers of 45 deg. BID, 2" wide, along the seam where the halves come together. Start where the milled fiber stopped, and go forward to the forward EOP.

After cured, refit wing tip to wing.

Repeat this step for the other wing.

STEP 2. WING TIP INSTALLATION:

Mark screw holes as per Figure 7.110-1.

Replace wing tip on wing, and drill 1/8" holes in the fore and aft upper and lower holes, placing clecos in as you drill.

Remove one cleco and redrill hole using a #19 drill bit, remove wing tip and rivet anchor nut to wing, as per Figure 7.110-2.

Replace wing tip, clecos and put screw in new anchor nut.

Repeat this process for the remaining three holes. This will hold the wing tip in it's proper place while completing the drilling.

After all four holes have their anchor nuts, while the screws are in place, drill the remaining holes using the #19 drill bit.

Remove wing tip and rivet the remaining anchor nuts.

After all anchor nuts are installed, countersink the holes in the wing tips.

Attach the wing tip to the wing with the screws, and check the fit.

Repeat step 2. for the other wing.

STEP 3. STROBE/NAVIGATION SYSTEM INSTALLATION (2 POWER SUPPLIES):

The A600 light assembly should be mounted on the most outward radius of each wing tip, running parallel with the centerline of the aircraft. When positioned properly, both tail position lights will be white, the right side forward position light green, and the left side forward position light red. See Figure 7.110-2.

The dual strobe power supplies will be installed inside the wing tips on both wings. A mounting base will need to be constructed using 1/4" 40# foam.

Cut and shape a piece of 40# foam to fit in the wing tip as per Figure 7.110-3.

Laminate two (2) plies of BID over each side of foam, let cure (do not laminate to wing tip at this time).

Set the power supply in the center of the 40# foam, and mark the hole locations. Drill holes with a 3/16" drill bit.

Mount power supply using the AN3-7A bolts into the K5000-3 anchor nuts.

While the power supply is mounted, place milled fiber/resin mix around each anchor nut, then while still uncured, laminate one (1) ply of BID over each nut, cut hole for bolt to penetrate. Make sure not to get any resin in the threads of the bolts.

Remove power supply, laminate bracket as indicated by Figure 7.110-4, with two (2) plies of 45 deg. BID, extending 1.5" into the wing tip skin, and 1.5" onto the bracket.

Repeat for other wing tip.

STEP 4. STROBE/NAVIGATION SYSTEM INSTALLATION (1 POWER SUPPLY):

The single power supply may be installed in various locations throughout the aircraft structure. Locations including the front firewall, the hat rack aft of bulkhead 162, and under a seat are all good possibilities. Depending on where you install your power source, you may not need to construct the mount described in Step 3.

PROCEDURE COMPLETE: | DATE: _____

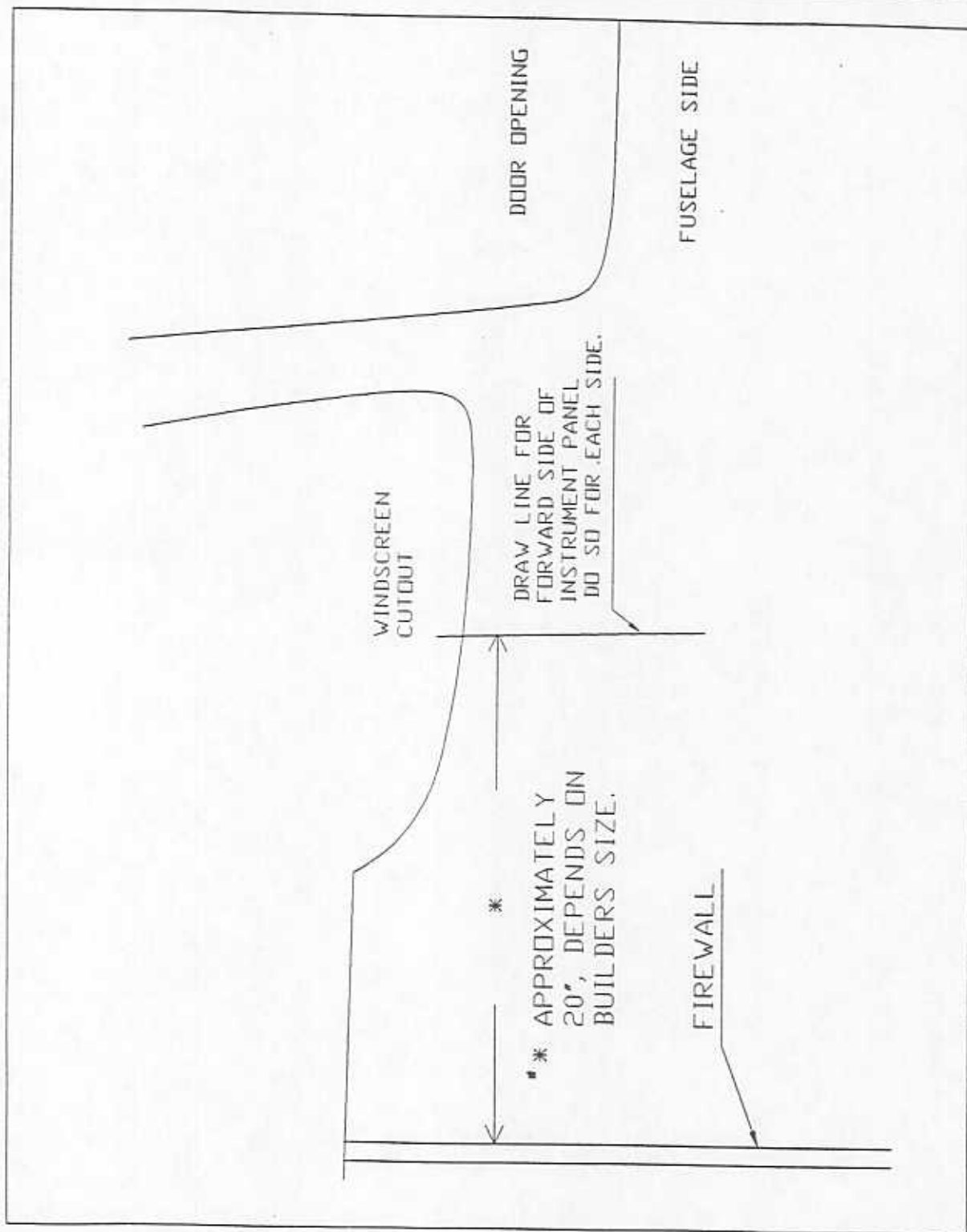


FIGURE 7.080-1

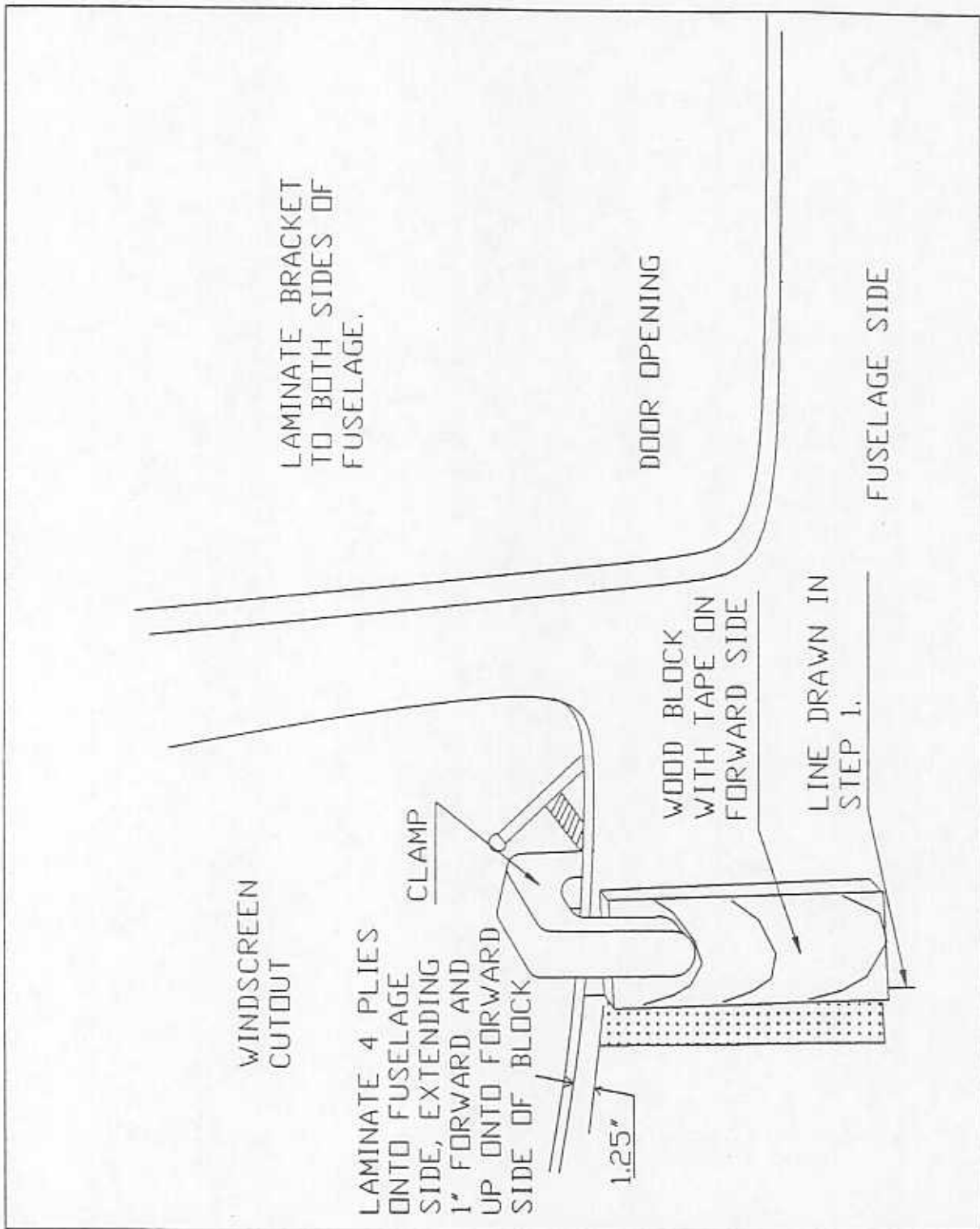


FIGURE 7.080-2

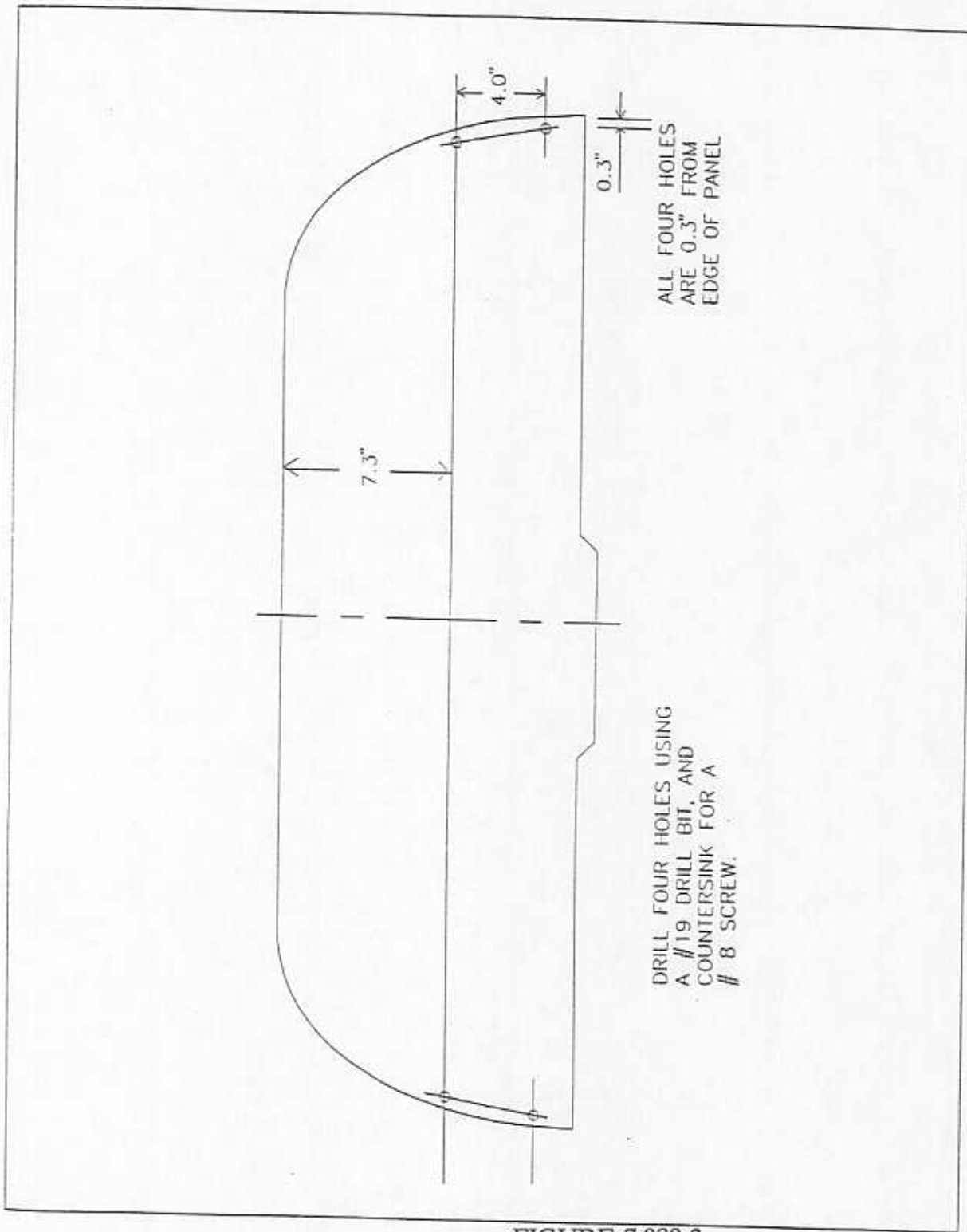


FIGURE 7.080-3

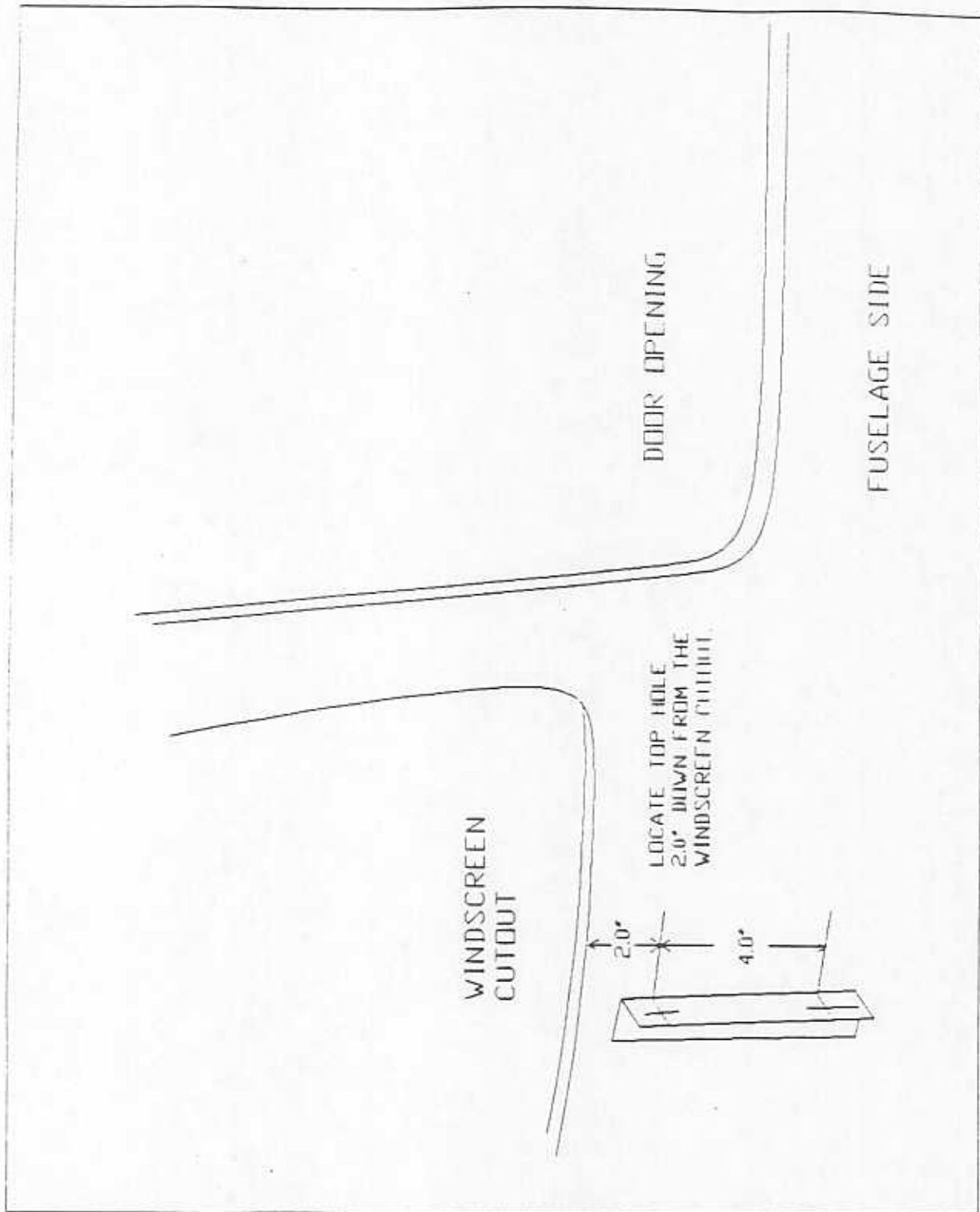


FIGURE 7.080-4

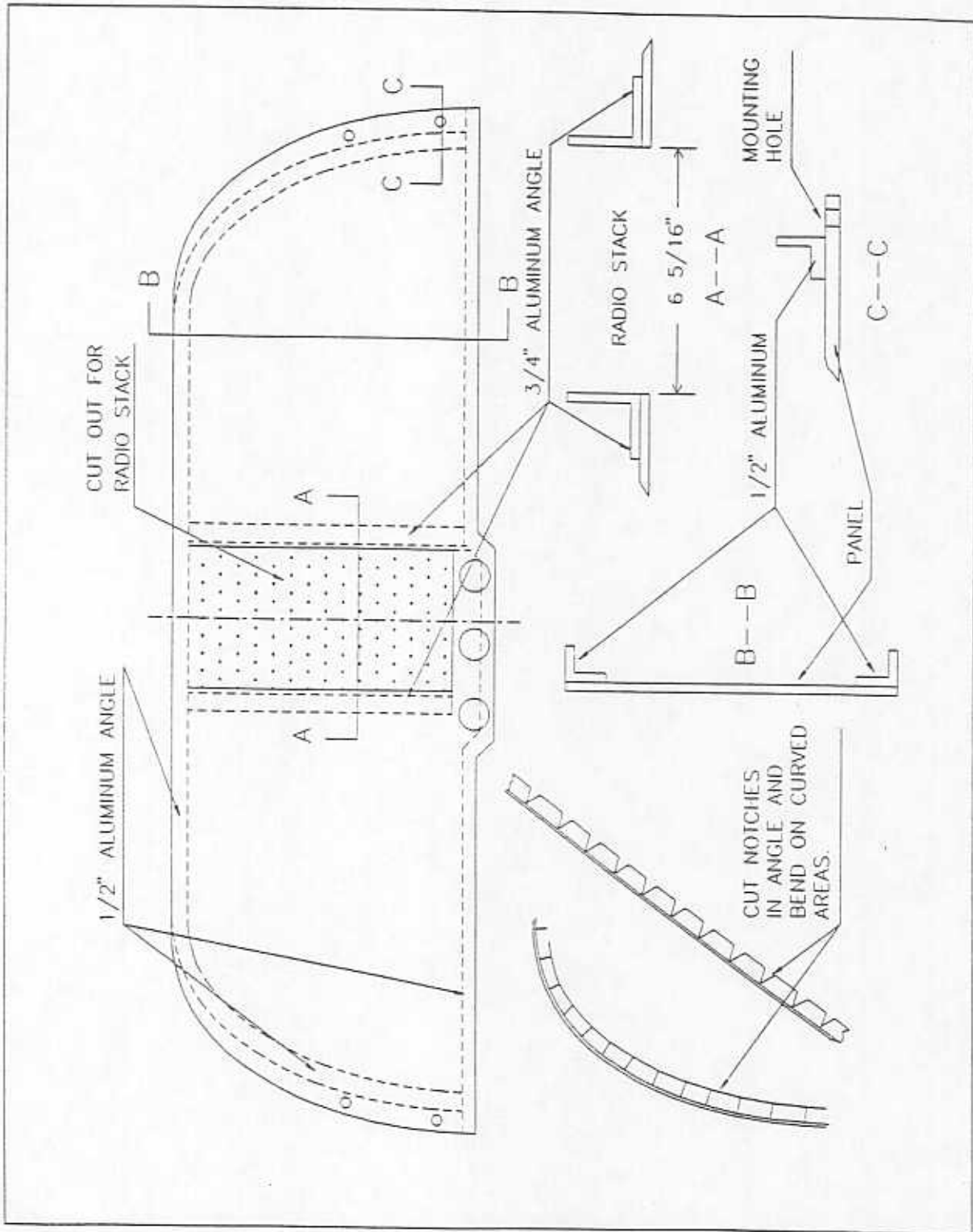


FIGURE 7.080-5

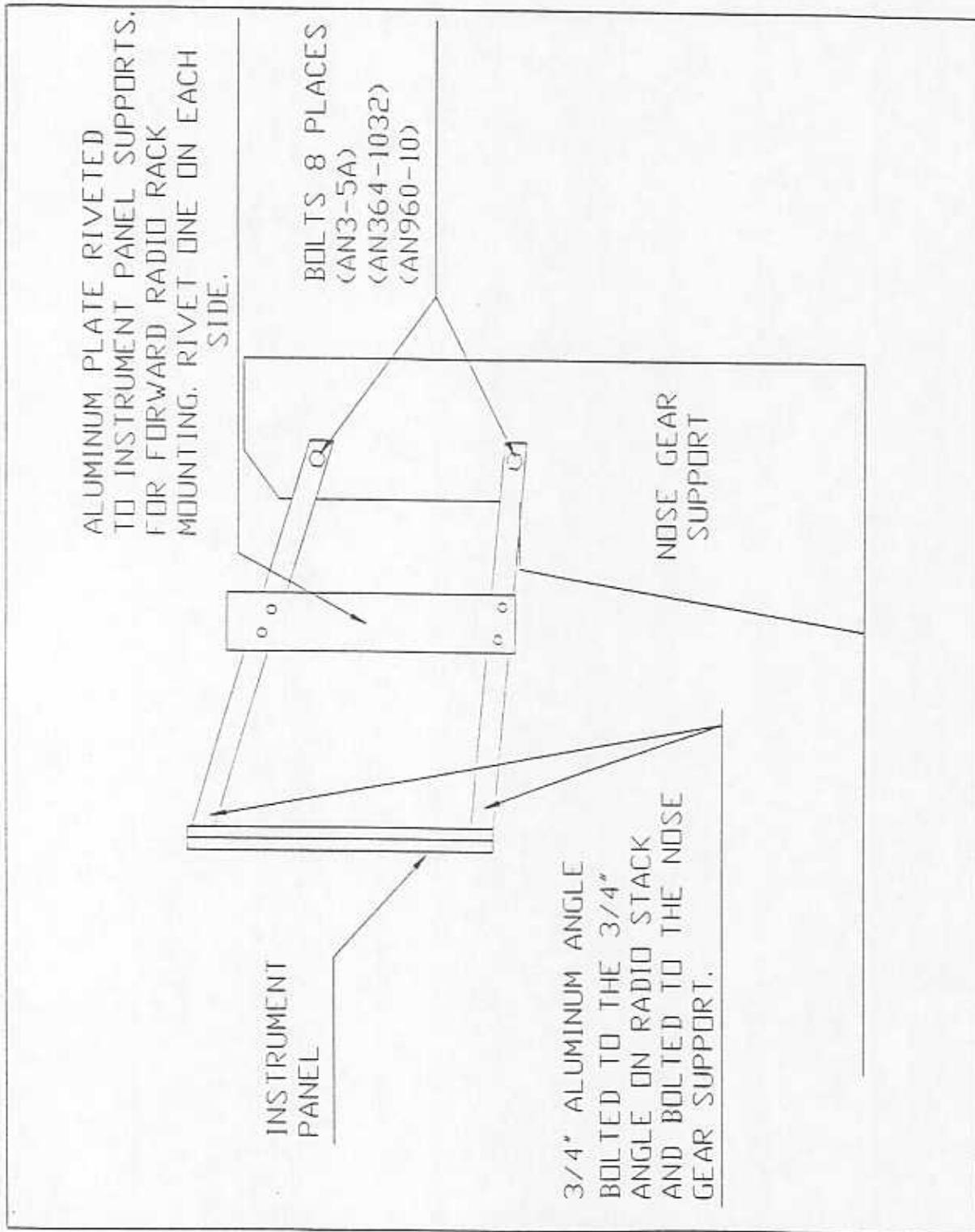


FIGURE 7.080-6

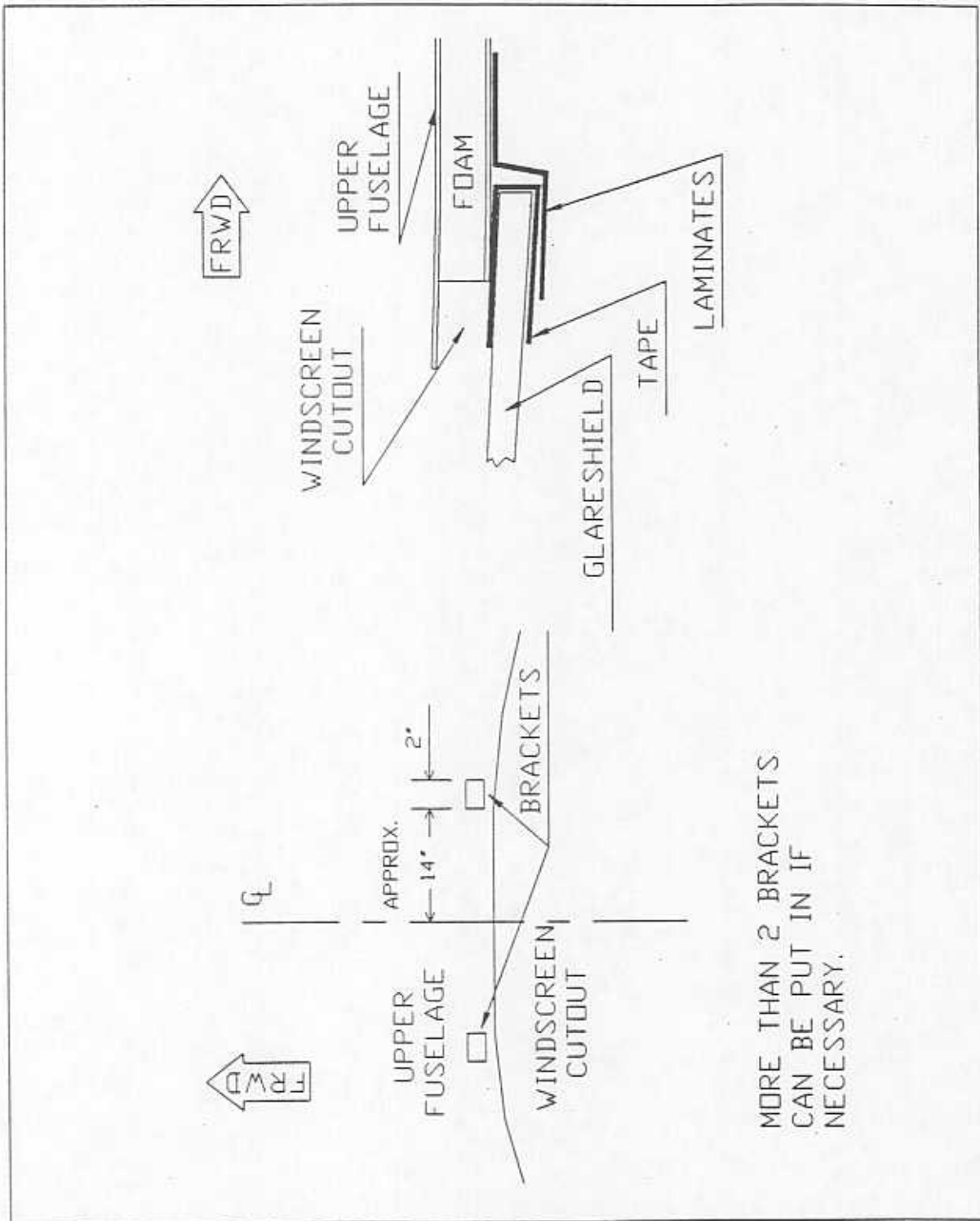


FIGURE 7.090-1

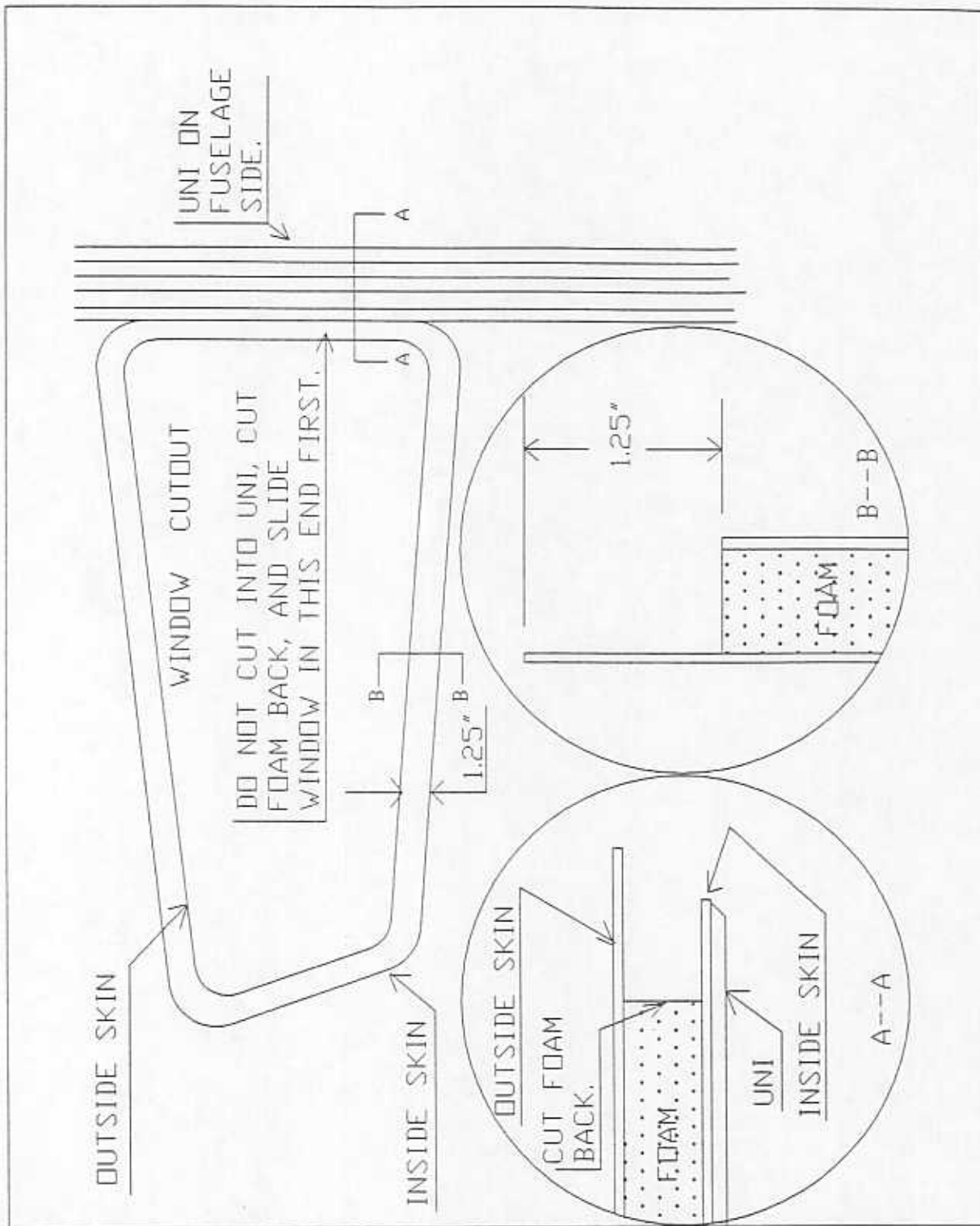


FIGURE 7.100-1

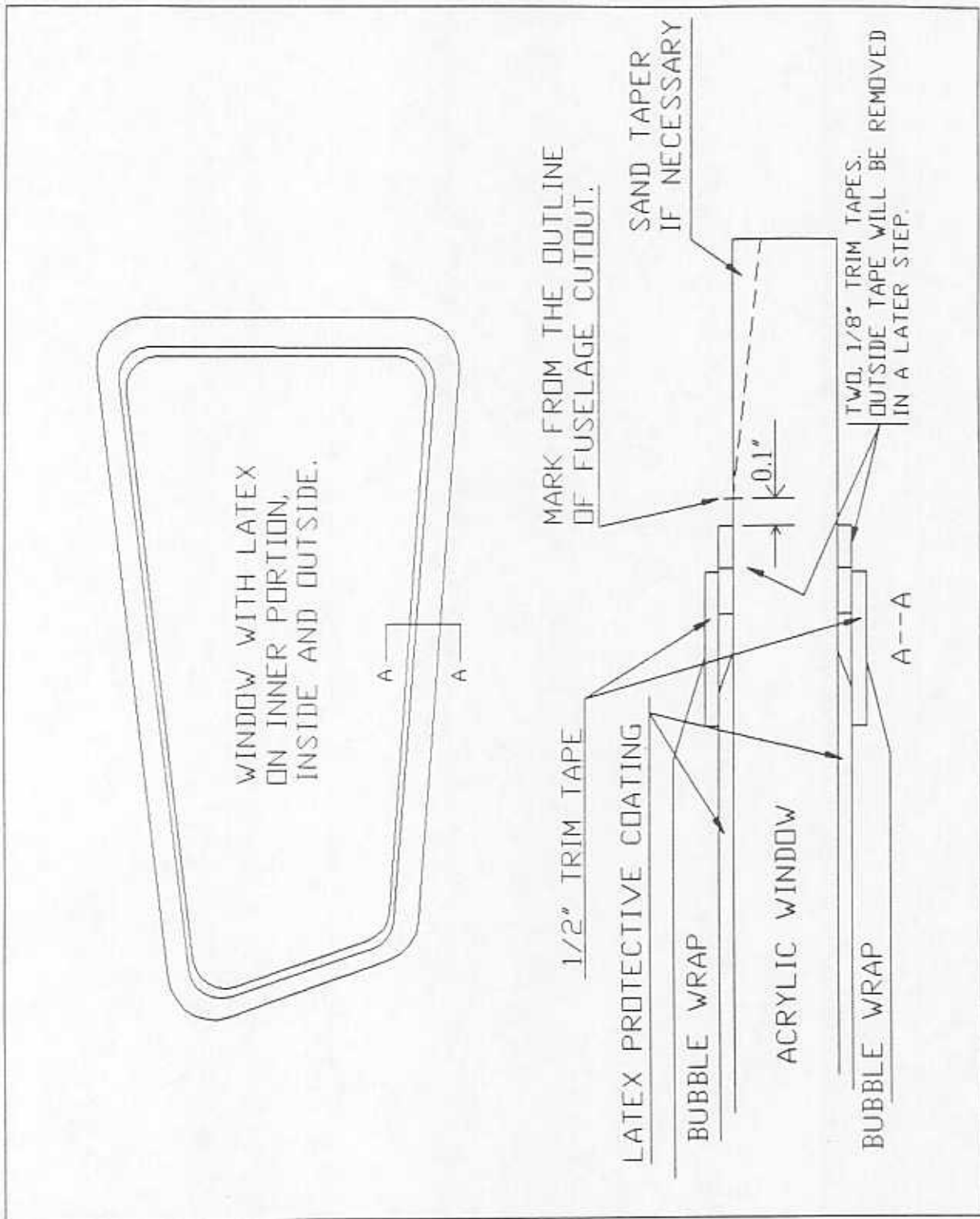


FIGURE 7.100-2

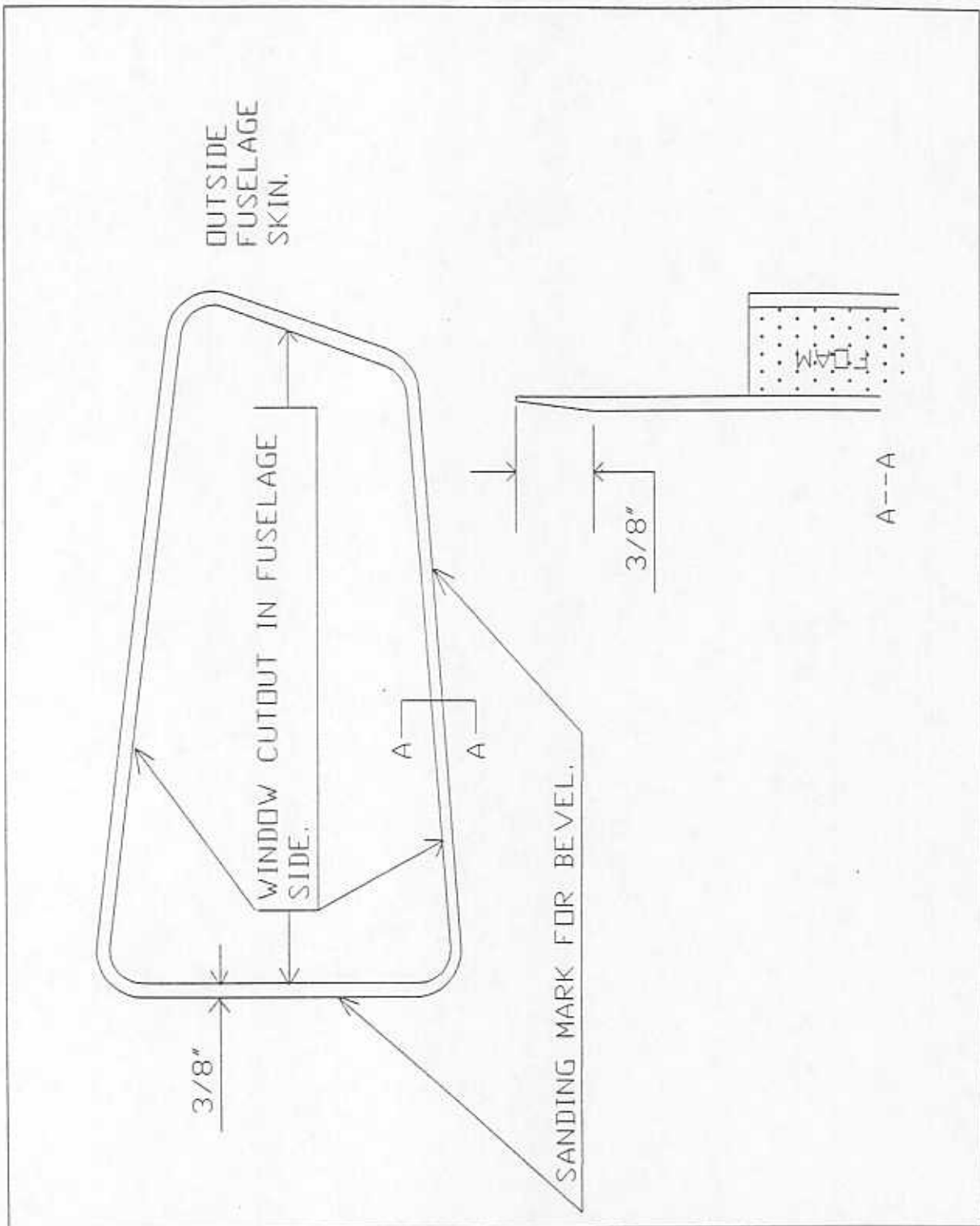


FIGURE 7.100-3

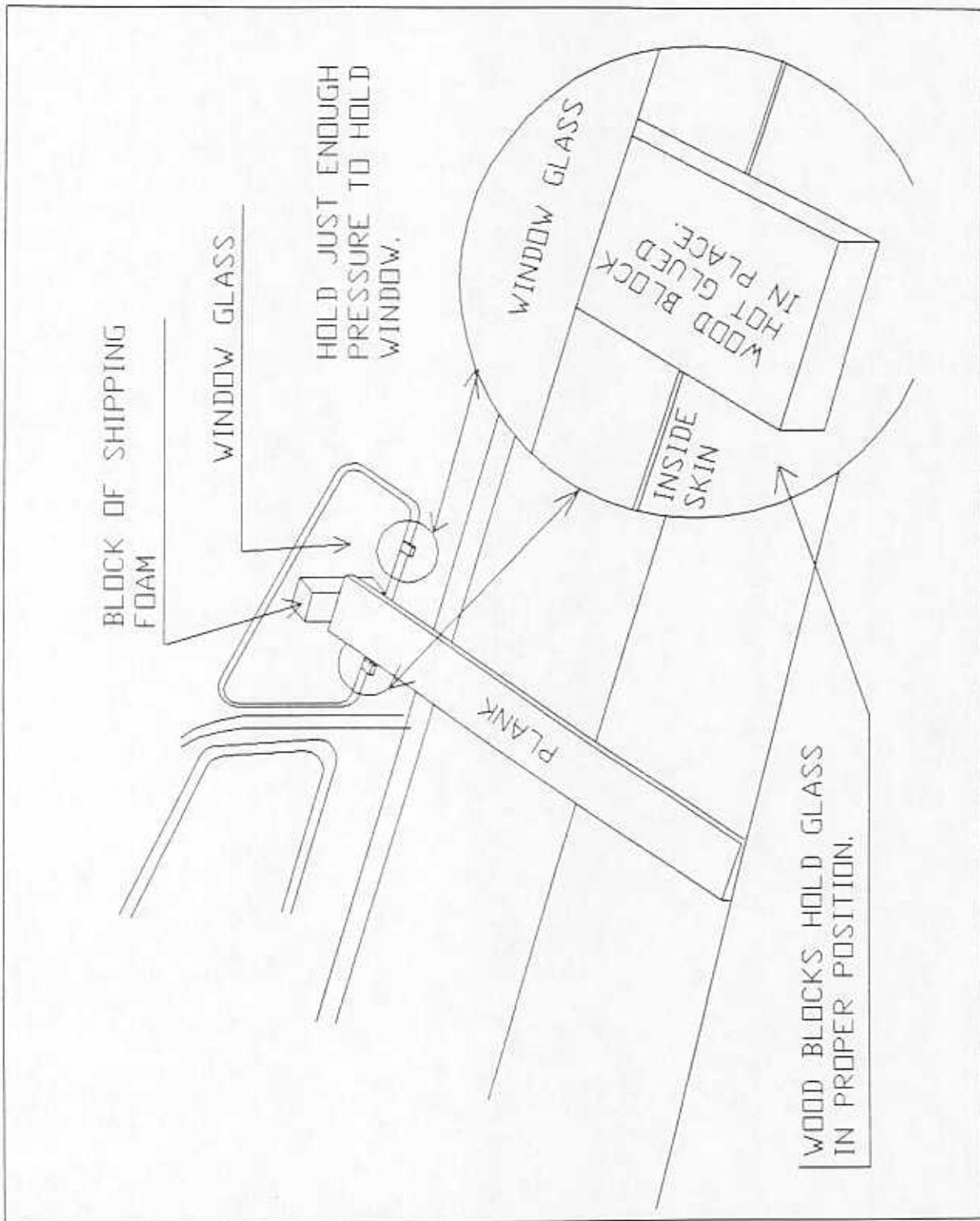


FIGURE 7.100-4

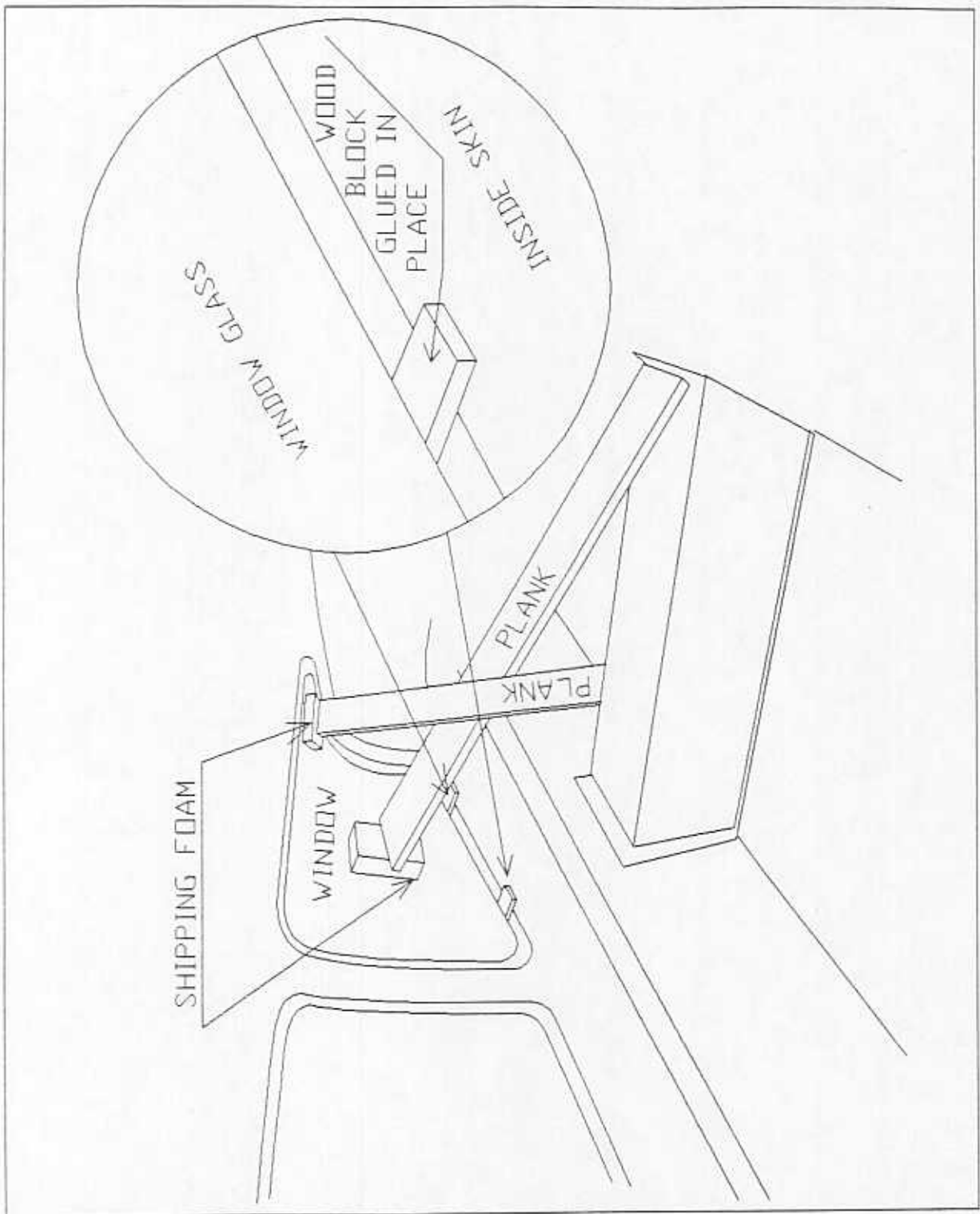


FIGURE 7.100-5

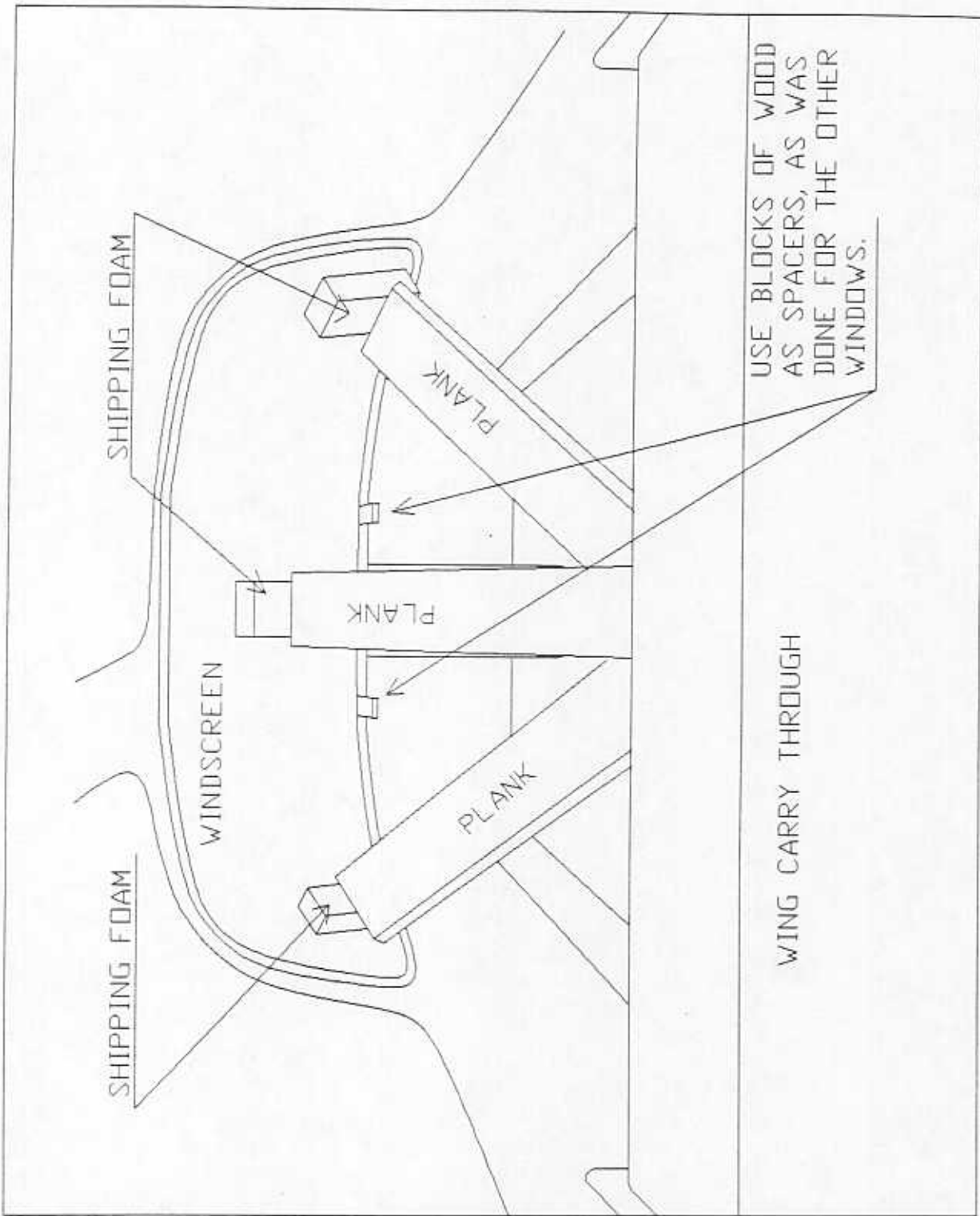


FIGURE 7.100-6

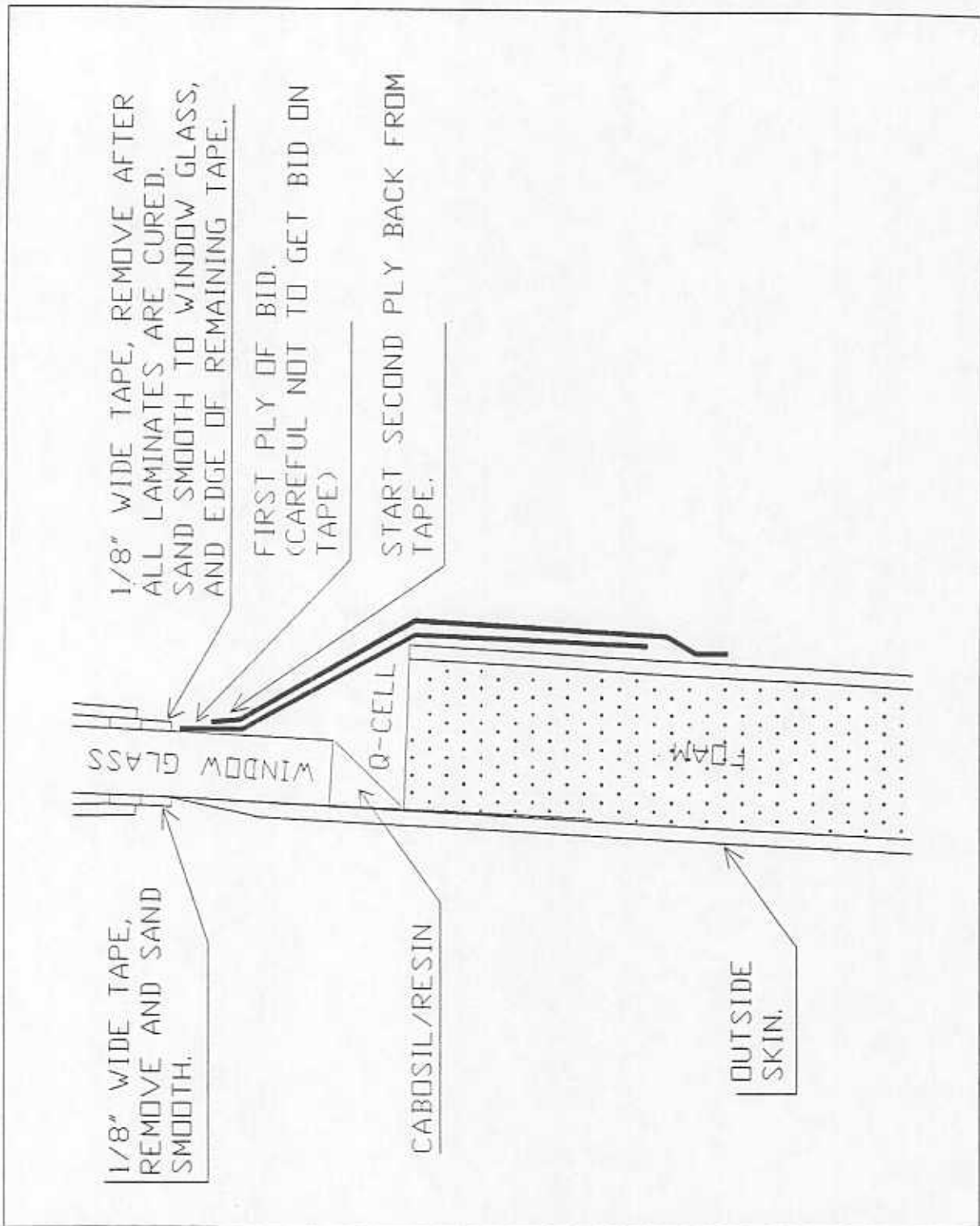


FIGURE 7.100-7

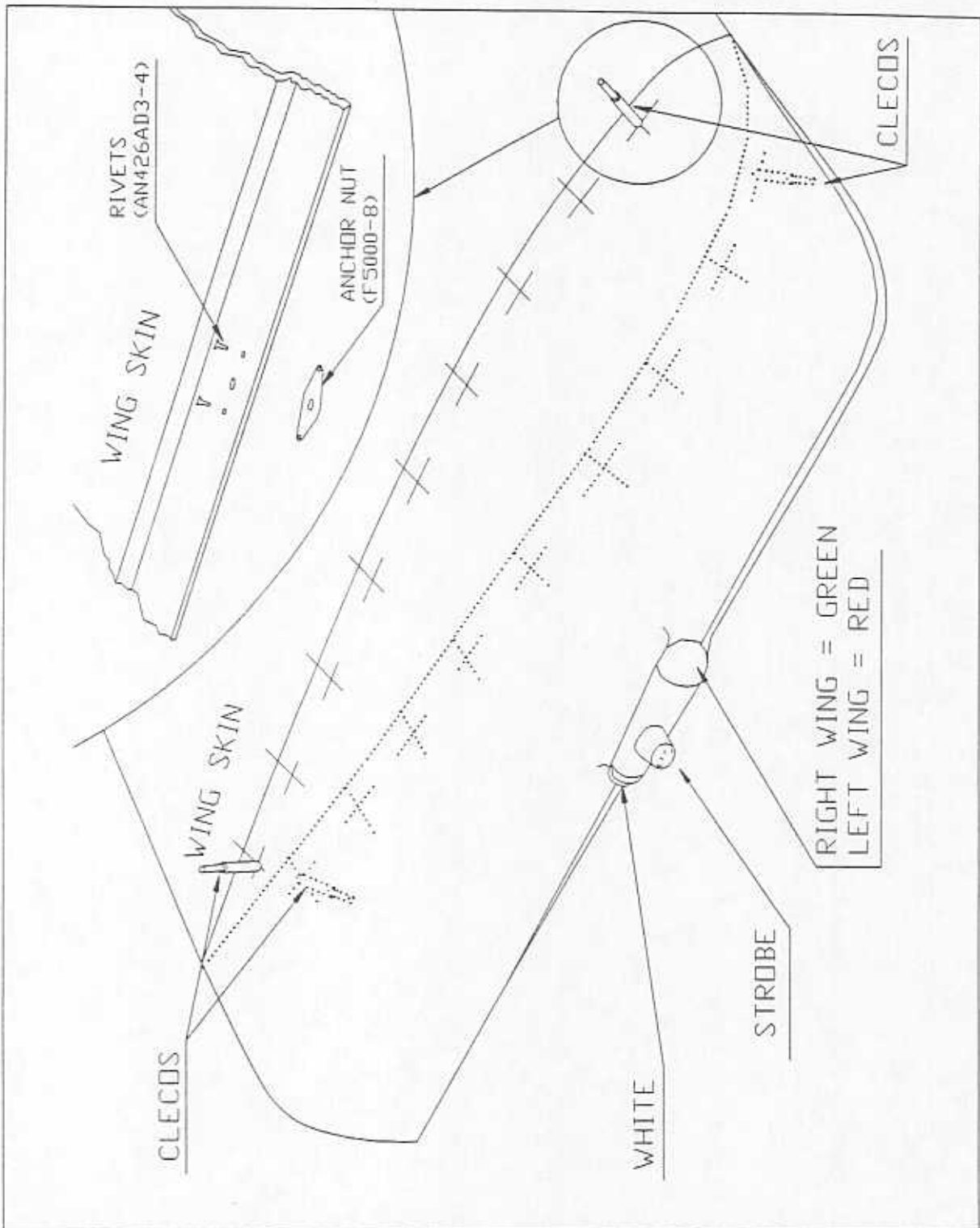


FIGURE 7.110-2

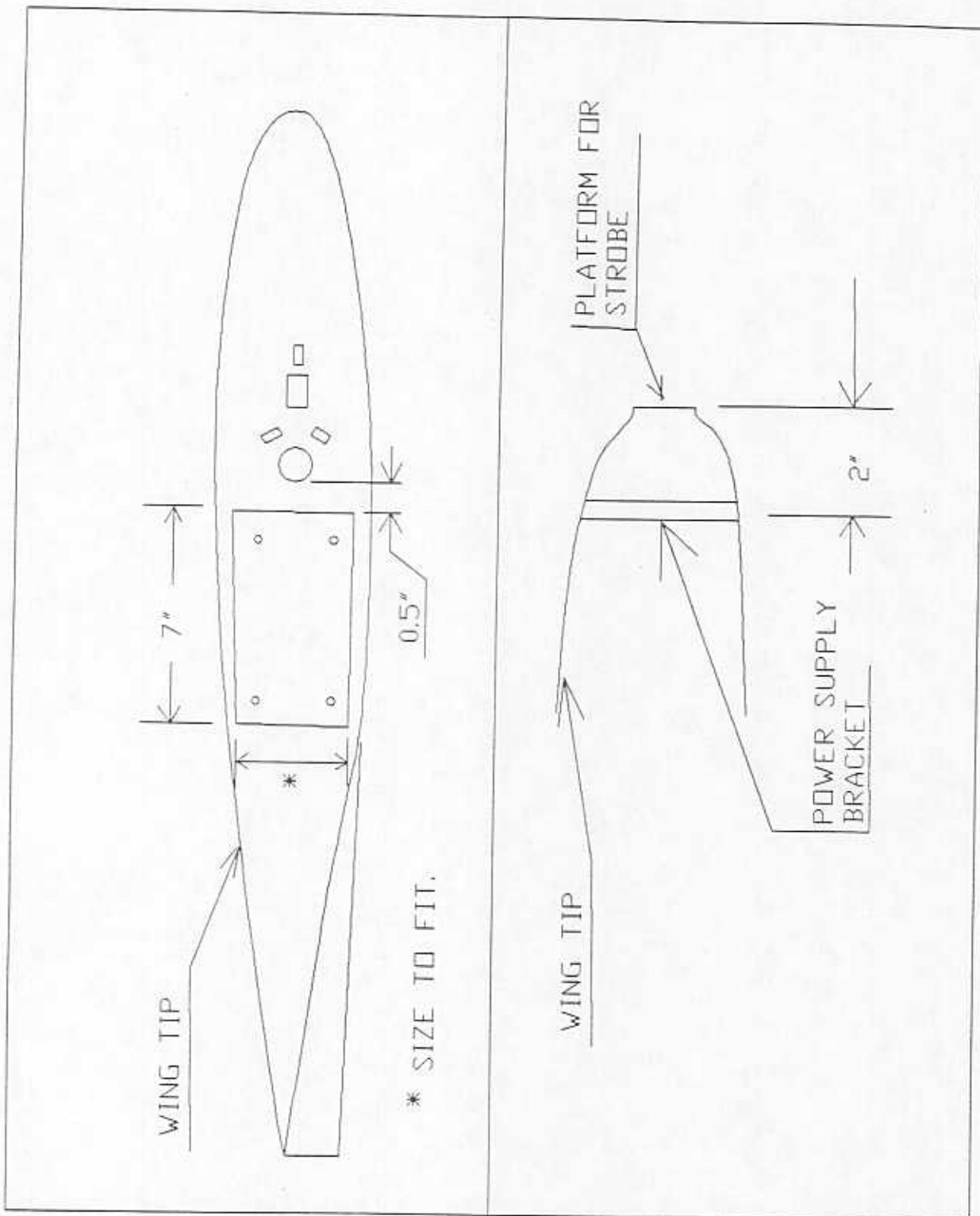


FIGURE 7.110-3

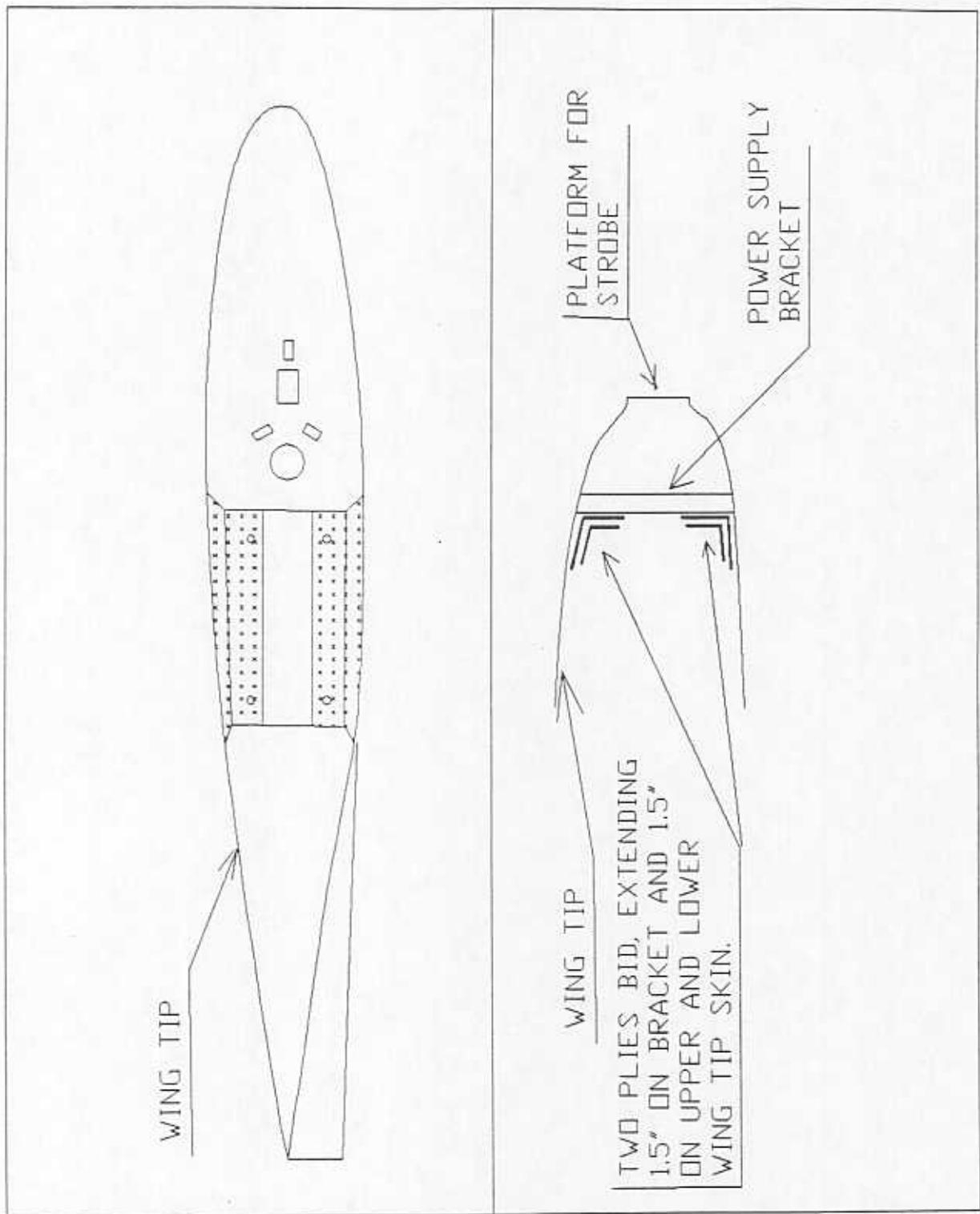


FIGURE 7.110-4