

CHAPTER 14

REVISION LIST

(Pressurized Version)



The following list of revisions will allow you to update the Lancair IV construction manual chapter listed above.

Under the "Action" column, "R&R" directs you to remove and replace the pages affected by the revision. "Add" directs you to insert the pages shown and "R" to remove the pages.

Page(s) affected	Current Rev.#	Action	Description
14-1 thru 14-6	0	None	
14-7	3	R&R	Corrected Step A3. Corrected Figure 14:A:2.
14-8 thru 14-15	0	None	
14-16	PB15	R&R	Edited Fig. 14:C:1.
14-17	PB15	R&R	Removed Figures and edited text.
14-18	PB15	R&R	Removed page.
14-19	PB19	R&R	Edited step D1.
14-20	PB19	R&R	Changed FS#, added <approx> to fig.
14-21	PB19	R&R	Changed FS# in fig.
14-22 thru 14-23	0	None	
14-24	3	R&R	Added Step D14 Added WARNING after Step D14.
14-25 thru 14-30	0	None	
14-31 thru 14-35	P2	R&R	Changed Step F1 Changed Figure 14:F:2, 3, & 4 Renumbered Steps F4-F13.
14-36 thru 14-42	0	None	
14-43 thru 14-47	PB19	R&R	Rewrote section H to reflect new avionics.
14-48 thru 14-55	0	None	



CHAPTER 14

VERTICAL STABILIZER ASSEMBLY

REVISIONS

From time to time, revisions to this assembly manual may be deemed necessary. When such revisions are made, you should immediately replace all outdated pages with the revised pages. Discard the out dated pages. Note that on the lower right corner of each page is a "revision date". Initial printings will have the number "0" printed and the printing date. All subsequent revisions will have the revision number followed by the date of that revision. When such revisions are made, a "table of revisions" page will also be issued. This page (or pages) should be inserted in front of the opening page (this page) of each affected chapter. A new "table of revisions" page will accompany any revision made to a chapter.

ARROWS

Most drawings will have arrows to show which direction the parts are facing, unless the drawing itself makes that very obvious. "A/C UP" refers to the direction that would be up if the part were installed in a plane sitting in the upright position. In most cases the part shown will be oriented in the same position as the part itself will be placed during that assembly step. However, time goes on and changes are made, so careful attention should be paid to the orientation arrows.

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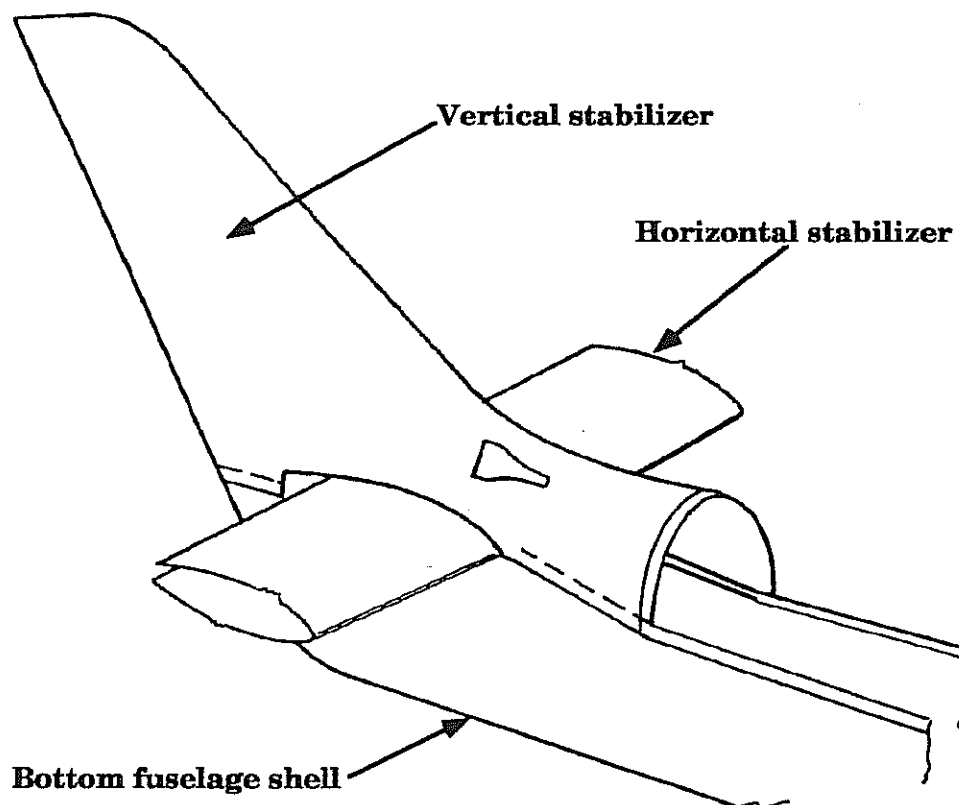
Vertical Stabilizer Assembly

1. INTRODUCTION

The vertical stabilizer of the Lancair IV is constructed of fiberglass because of the internally mounted antennas (communications and Loran). Back in Chapter 12, you made an initial fit of the vertical stabilizer and top fuselage shell. Don't get too attached to those few cleco holes you drilled to fit the vertical stabilizer in Chapter 12, because you'll probably drill all new ones in this chapter.

Vertical stabilizer

Figure 14:i:1



2. SPECIAL PARTS, TOOLS, & SUPPLIES LIST

A. PARTS

Right vertical stabilizer skin

Left vertical stabilizer skin

1/4" thick, 2 BID per side fiberglass prepreg panel



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Vertical Stabilizer Assembly



B. TOOLS

Dremel tool
Saber saw
Plumb bob
Smart level
Straight edge
Angle aluminum (or angle iron)



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Vertical Stabilizer Assembly

C. SUPPLIES

Epoxy
Micro
Flox
Hysol adhesive
Paper towels
MC
Paint brushes
Mixing cups
Release tape
40 grit sandpaper
Soda can



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Vertical Stabilizer Assembly



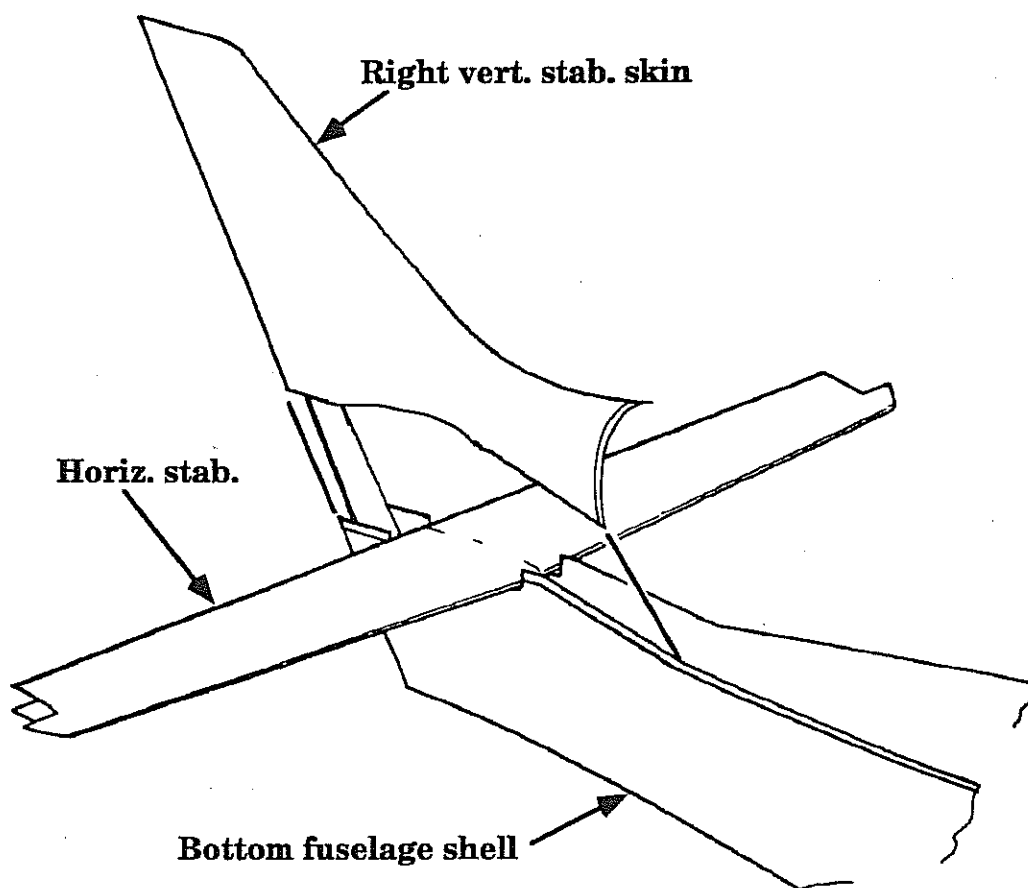
3. CONSTRUCTION PROCEDURE

A. MOUNTING RIGHT VERT. STAB. SKIN

Vertical stabilizer construction begins with mounting the right stab. half to the fuselage. Don't mount the left half first because the L.E. joggle would be difficult to align.

Right vertical stabilizer half

Figure 14:A:1

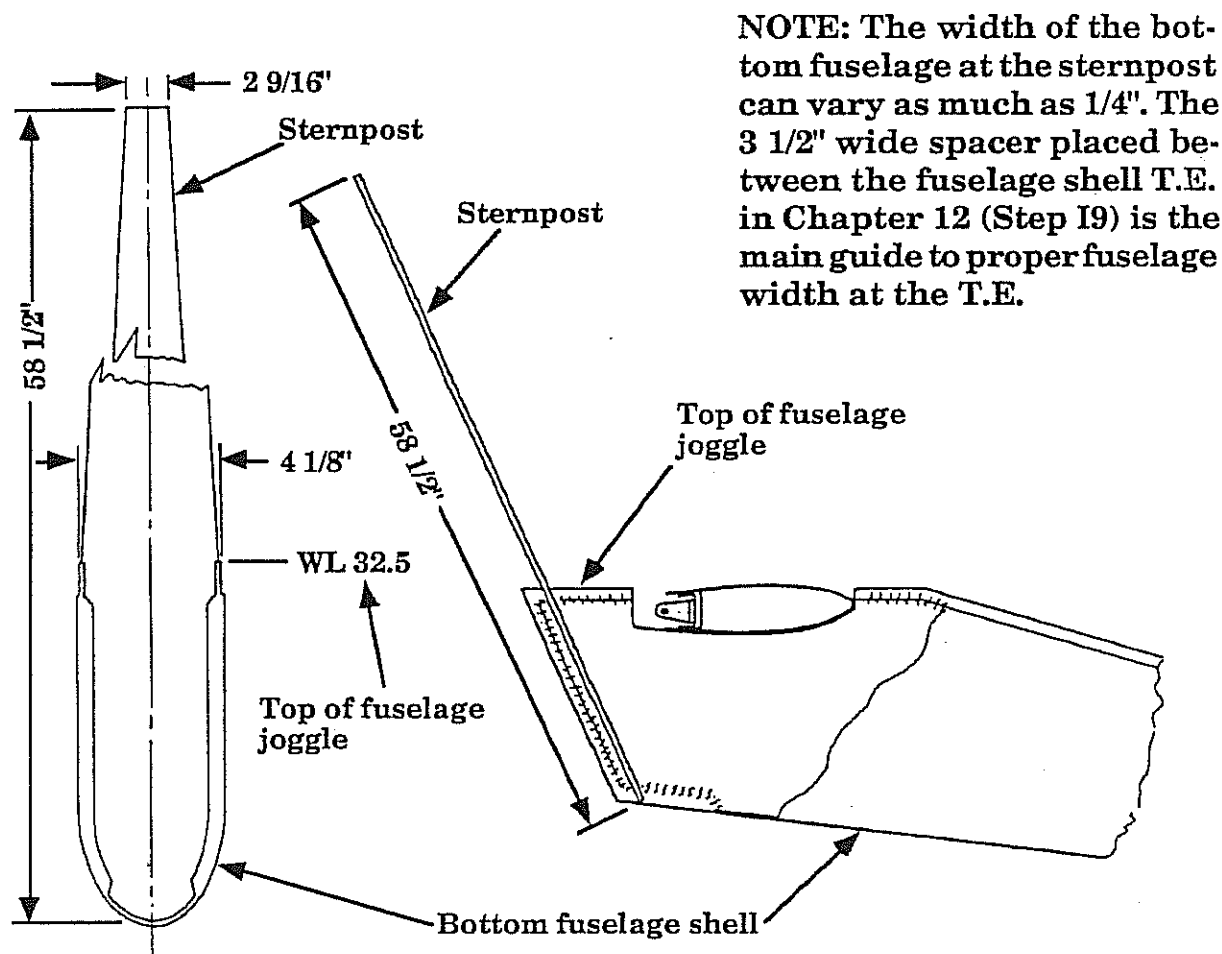


- A1. Trim the right vertical stabilizer skin so it will fit over the horizontal stabilizer. Trim just enough so you can use the cleco holes that you drilled in Chapter 12 to locate the vertical stabilizer on the fuselage.
- A2. With plumb bobs, check that your vertical stabilizer sternpost is still vertical and aligned with the fuselage centerline drawn on your shop floor.

- A3. Check that the width of the vertical stabilizer sternpost is $2 \frac{9}{16}$ " at the top. The sides of the sternpost should be straight from the top of the fuselage joggle up. Using the given width of $4 \frac{1}{8}$ " at WL 32.5 (the top of the fuselage joggle), the right vertical stabilizer skin can simply be bonded to the sternpost and have the proper thickness.

Checking vertical stab. width

Figure 14:A:2



- A4. Lay the top fuselage shell in position with its aft edge fitting over the vertical stabilizer joggle. The top fuselage shell's bottom edge should cover the WL 22 joggle of the bottom fuselage shell. If the vert. stab. is mounted too high, the joggles of the top and bottom fuselage shells may not have enough contact and the bond between them wouldn't be adequate. If you must trim the bottom edges of the vertical stabilizer halves to get them lower do so now. If the height of the vert. stab. looks correct, drill $\frac{1}{8}$ " dia. holes every $1 \frac{1}{2}$ " along the length of the joggles. You will later insert clecoes into these holes to hold the joggles together during bonding.

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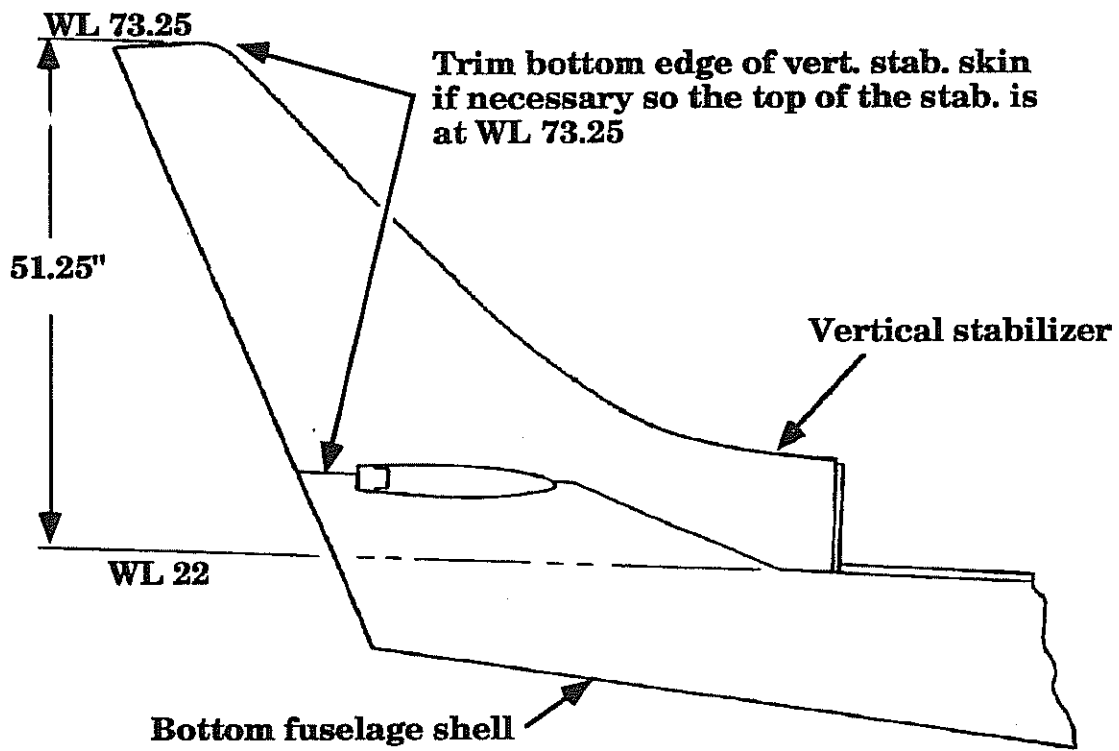
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Vertical Stabilizer Assembly

Checking vertical stabilizer height

Figure 14:A:3



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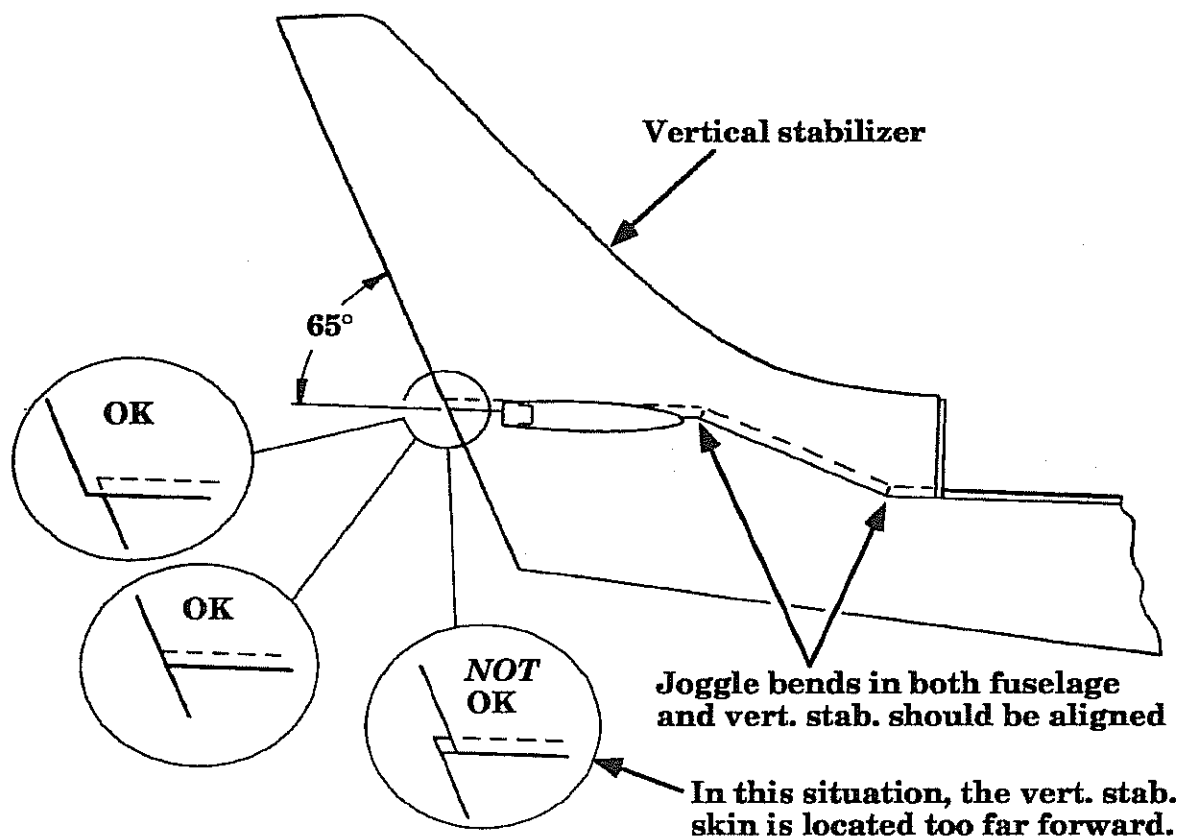
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Vertical Stabilizer Assembly

- A5. Make sure the right vert. stab. skin is positioned correctly fore/aft as shown in Figure 14:A:4. If the vert. stab. is mounted too far forward there will not be enough material to cut the T.E. in the rudder area. Adjust the vert. stab. aft if necessary so you can trim a straight T.E..

Checking vert. stab. fore/aft placement

Figure 14:A:4

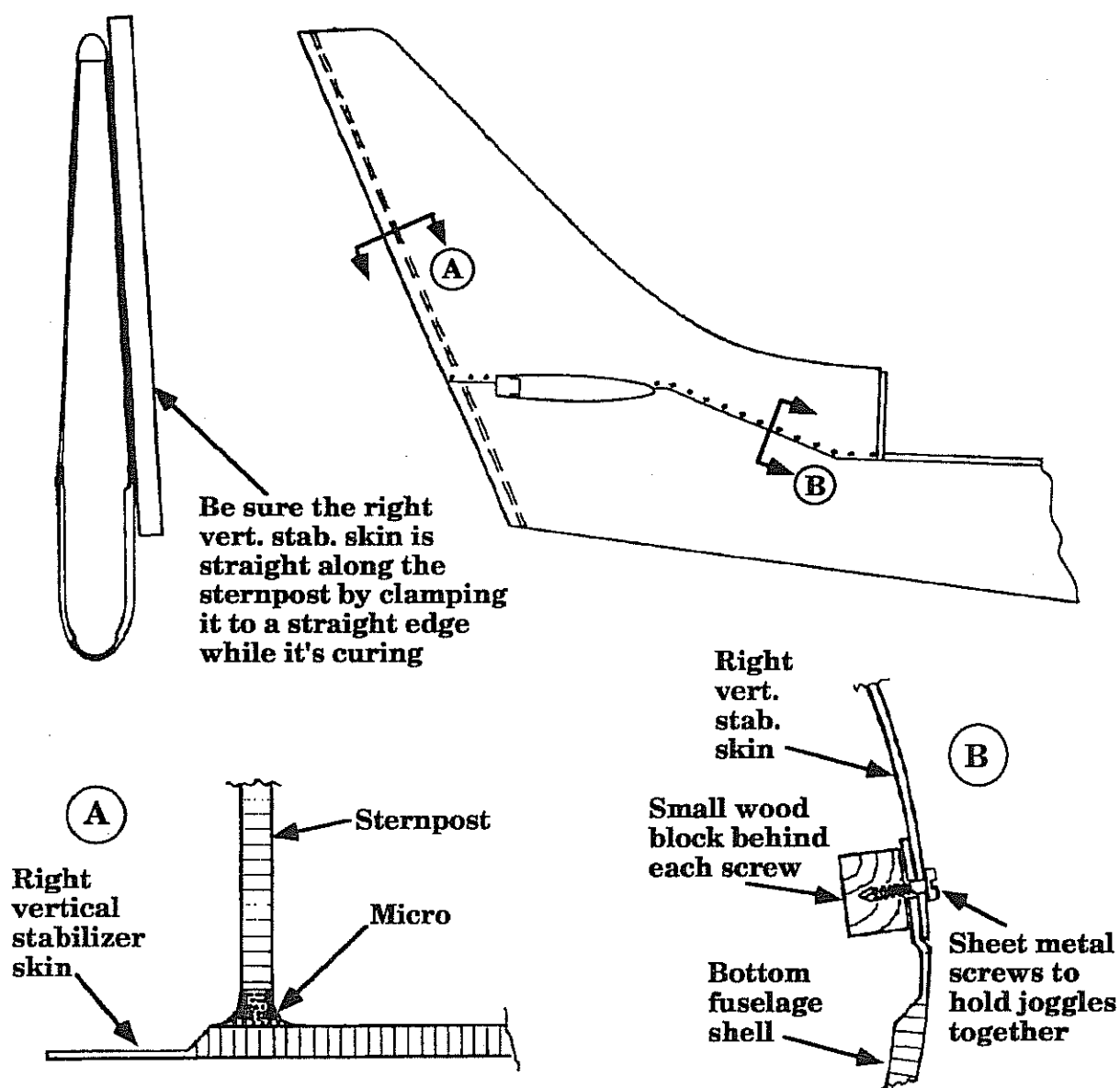


- A6. When you are satisfied with the fit of the vertical stabilizer, sand the joggles and other areas where the right vert. stab. skin will be bonded. Clean these areas with MC.
- A7. Before bonding the right vert. stab. skin in place, the sternpost must be straight. Use instant glue to secure a straight piece of wood or aluminum angle to the aft face of the sternpost. This will hold the part straight while the vert. stab. is curing.
- A8. Form a trough in the right side of the sternpost by removing 1/8 - 1/4" of core.

- A9. Bond the right vert. stab. skin to the fuselage. Use Hysol to bond the vert. stab. to the fuselage joggle and micro to bond it to the sternpost. Clamp the vert. stab. to the fuselage joggle with clecos in the holes you drilled in Step A4. Screws or pop rivets will also work to hold the joggles together if you don't want to mess up your clecos. Attach a straight piece of wood or angle aluminum to the side of the vertical stab. to keep the skin straight along the sternpost. Recheck that the sternpost is still vertical. A little care and attention in this step will prevent a lot of hassle later.

Bonding right vert. stab. skin to fuselage

Figure 14:A:5



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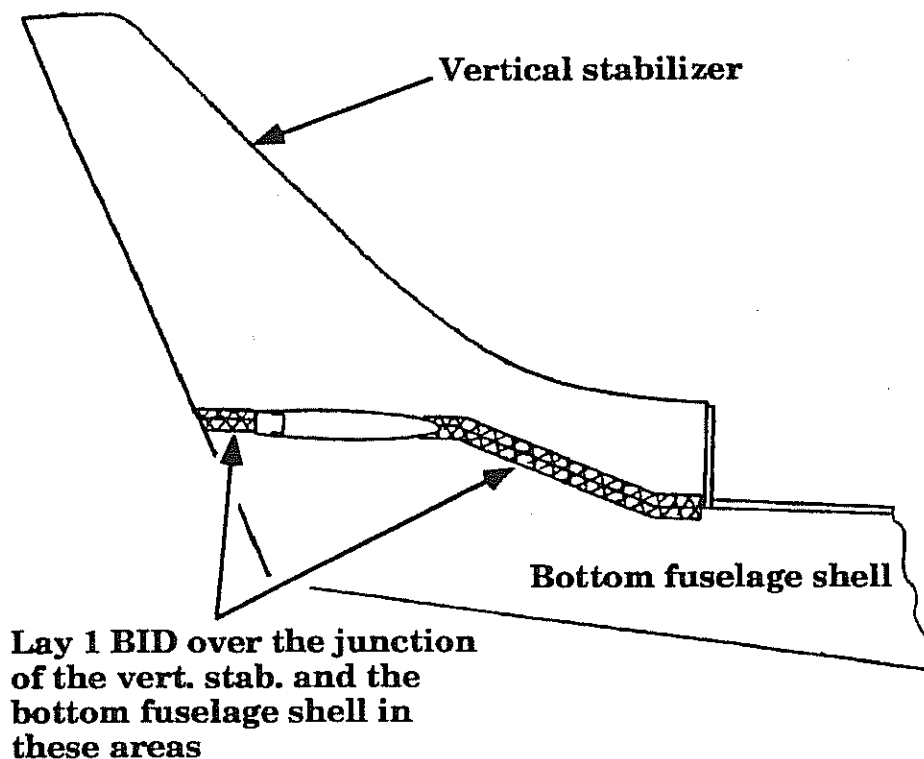
Vertical Stabilizer Assembly

A10. When the Hysol and micro have cured, remove the clecoes (or screws, or pop rivets) from the joggled areas. Sand the joggled areas with 40 grit and clean them with MC.

A11. Apply 1 BID in the joggled areas.

Applying 1 BID over joggled areas

Figure 14:A:6



A12. Apply a thin coat of micro over the 1 BID you have just laid into the joggles. When this micro cures, contour it smooth over the joggles areas.

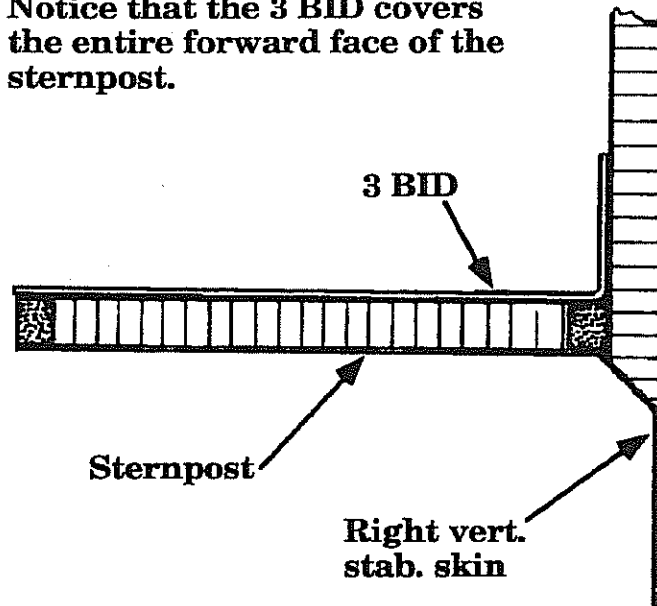
A13. With 40 grit, sand the forward face of the sternpost and the right vert. stab. skin 2" forward of the sternpost in preparation for a 3 BID laminate. Clean these areas with MC.

A14. Form a micro radius up the forward face of the sternpost where it joins the right vert. stab. skin.

Securing vert. stab. to sternpost

Figure 14:A:7

Notice that the 3 BID covers the entire forward face of the sternpost.



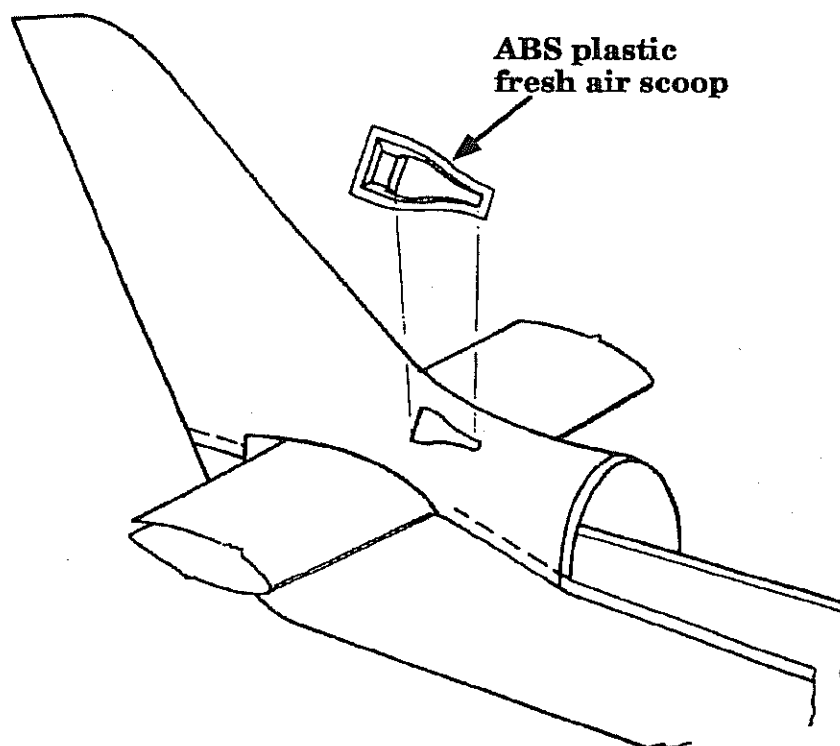
- A15. Apply 3 BID to the forward face of the sternpost overlapping 1" onto the right vert. stab. skin. The 3 BID should also extend 1" below where the vert. stab. skin joins the fuselage.
- A16. For added rigidity, secure the inboard surface of the right vert. stab. skin to the horizontal stabilizer with a 1 BID, 2" wide laminate. Be sure to sand and clean where the 1 BID is applied.

B. INSTALLING CABIN AIR SCOOP

The Lancair IV pulls the cabin fresh air from a single NACA scoop mounted in the vertical stabilizer. The fresh air travels through a length of scot tubing, into the overhead console, and blows onto the occupants through four eyeball vents. At first glance this scoop doesn't appear to have enough area to adequately cool four people, but it does its job very well. In fact at cruise speed you'll probably want to cut down the airflow a bit (more on this later).

NACA cabin air vent

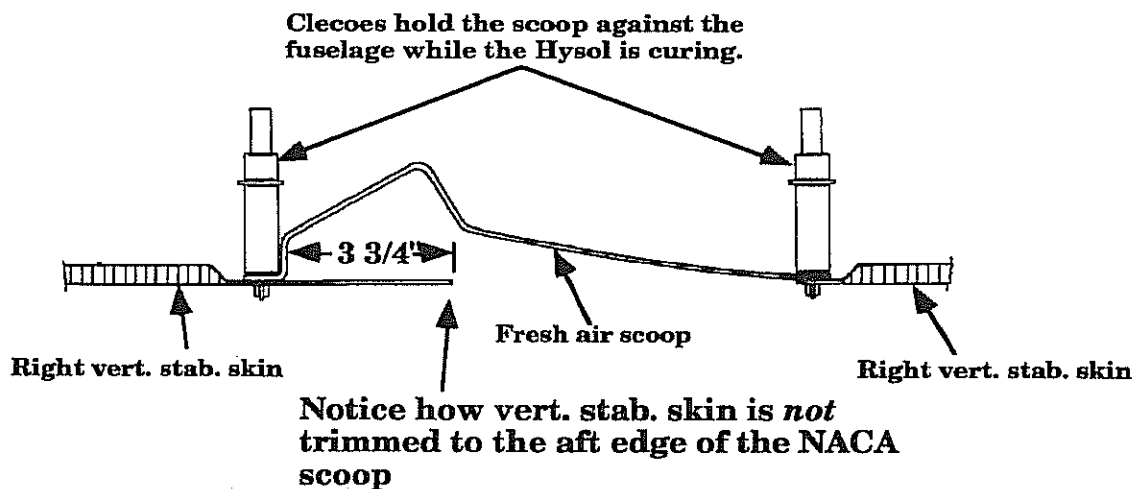
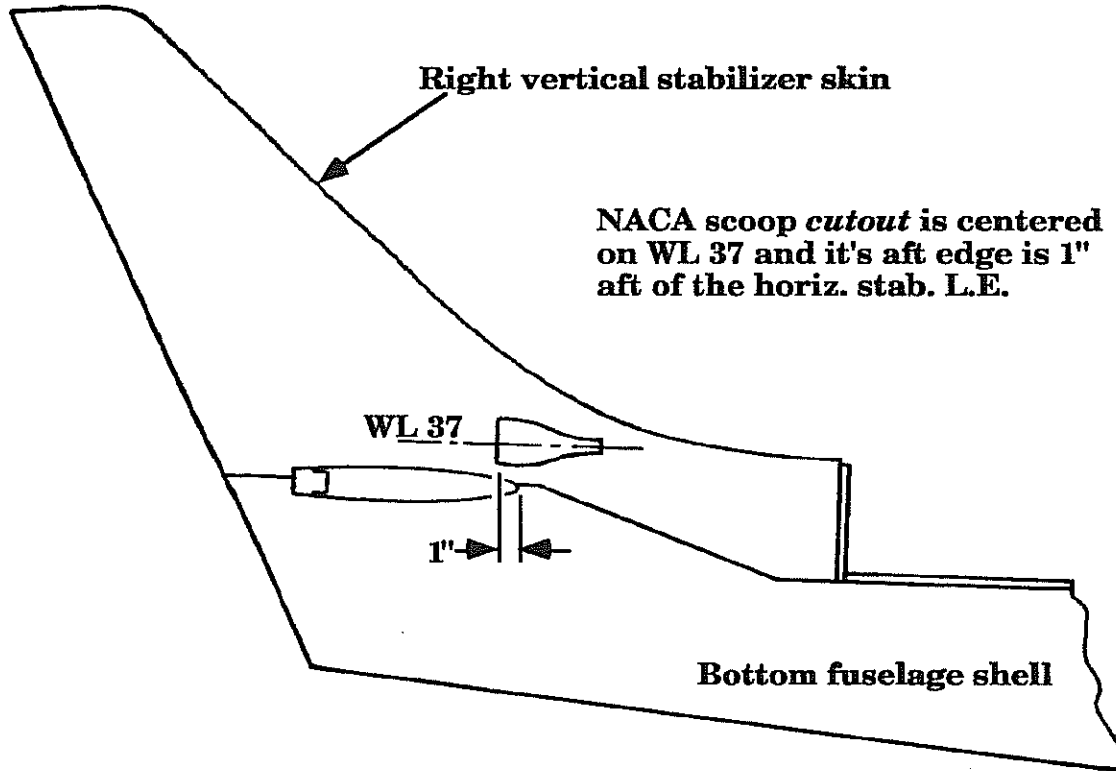
Figure 14:B:1



- B1. Trim the flanges of the NACA scoop so they are 1" wide. Trimming is easy because the scoops are made from ABS plastic.
- B2. Locate the NACA scoop as shown in Figure 14:B:2. The exact position is not critical, so $\pm 1/2$ " is fine. Grind the right vert. stab. skin as shown to provide an inlet for fresh air. Notice that the skin is *not* trimmed to the aft edge of the NACA scoop. When you have located the NACA scoop, secure it in position with a few clecoes.

Locating NACA scoop

Figure 14:B:2



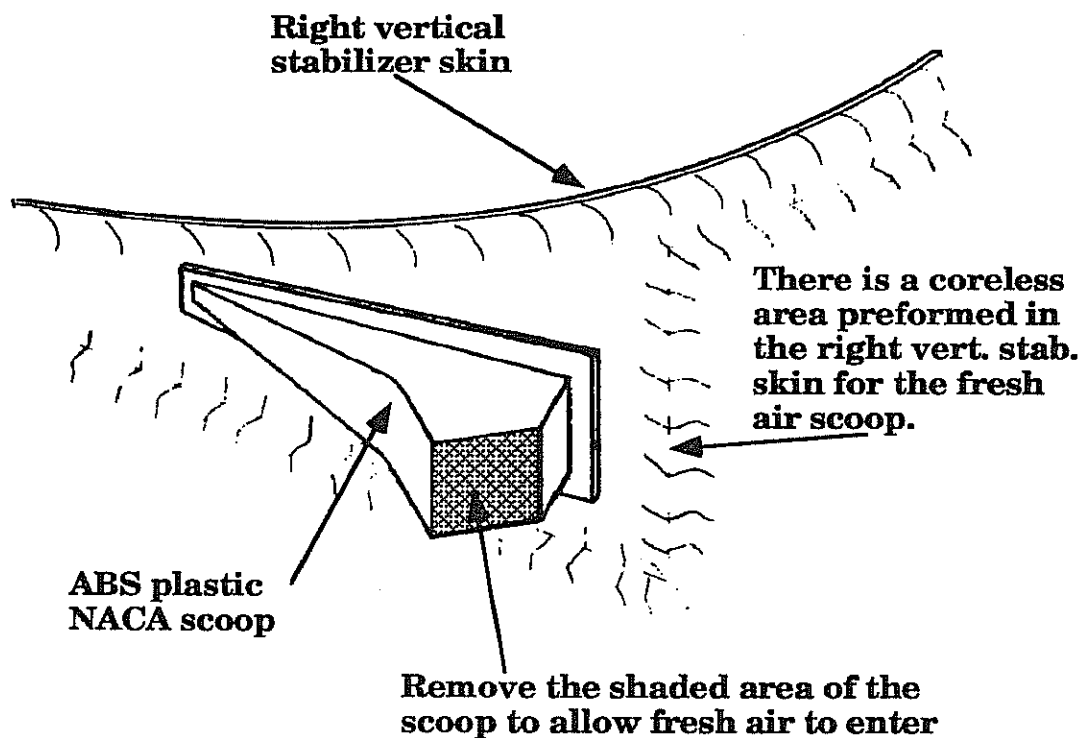
- B3. With 40 grit, sand the inside of the right vert. stab. skin where the NACA scoop will be bonded. Also sand the NACA scoop flanges.

NOTE: *Don't* clean the bonding surfaces of the NACA scoop with MC. MC will melt the ABS plastic.

- B4. Bond the NACA scoop in position with Hysol. Use the clecoes to hold the scoop while it's curing.
- B5. After the Hysol dries, secure the NACA scoop flange to the right vert. stab. skin with 2" wide, 1 BID strips.
- B6. Trim the NACA scoop as shown in Figure 14:B:3 so air can flow through. The two vert. stab. webs installed in the section "D" will form a plenum chamber for the incoming air, further pressurizing it for it's trip to the pilot and passengers.

Removing air flow hole in NACA scoop

Figure 14:B:3

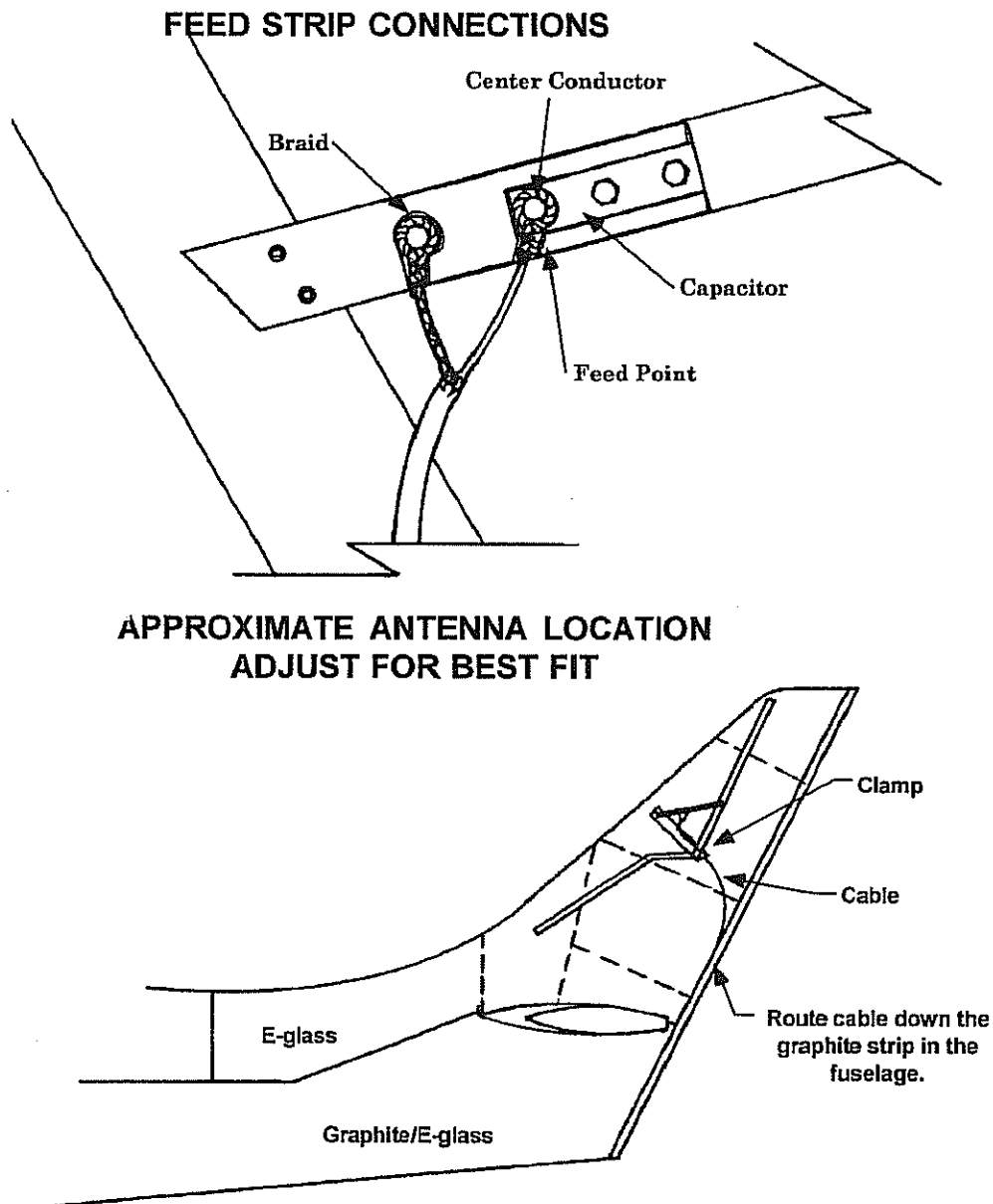


C. INSTALLING COMMUNICATION ANTENNA

If you're going to install the communications antenna in the vertical stabilizer, now is the time to do it. The com antenna shown in this chapter is the Sportcraft (SA-008). There are numerous com antennas that will work fine on the Lancair IV, unfortunately most of them must be mounted externally, causing more drag as well as being an eyesore.

Communications Antenna

Figure 14:C:1





- C1. Locate the communications antenna as far away as possible from the carbon fiber strap which is built into the vertical skins.
- C2. Sand the area where the com antenna will be mounted and clean with MC.
- C3. Use instant glue to bond the com antenna to the right vert. stab.
- C4. Secure the antenna to the vert. stab. with 1 BID of the lightweight fiberglass cloth that you used on the elevator trim tab and the ends of the flaps and ailerons. It's also a good idea to mound up some flox around the antenna (where the coax cable will attach) to secure it to the stab.
- C5. The coax cable for the communication antenna is routed along the leading edge of the vertical stab. Small dabs of silicon are enough to hold the cable in position. Space the silicon dabs about 4" apart. Connect the cable to the com antenna and leave the excess cable rolled up in the bottom fuselage. You will later run this antenna cable forward to the instrument panel.



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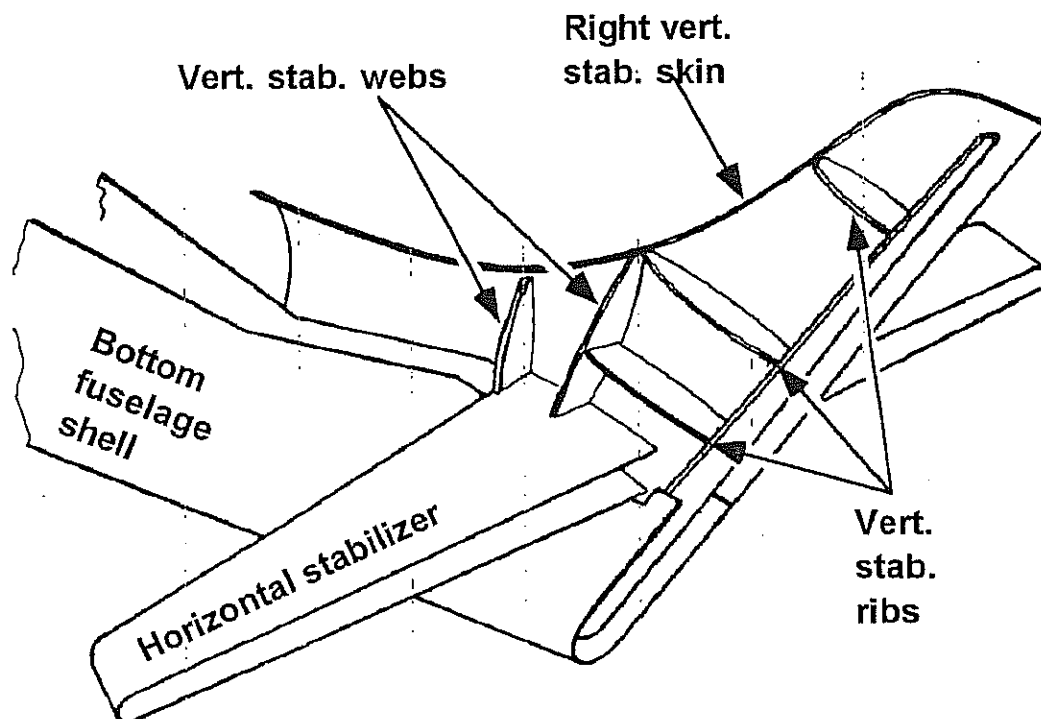
Vertical Stabilizer Assembly

D. INSTALLING VERT. STAB. RIBS & WEBS

The vertical stabilizer contains two webs and three ribs. These parts are installed in a similar fashion as the ribs in the wing, with custom formed capstrips for added bonding area during closeout.

Vert. stab. ribs and webs

Figure 14:D:1



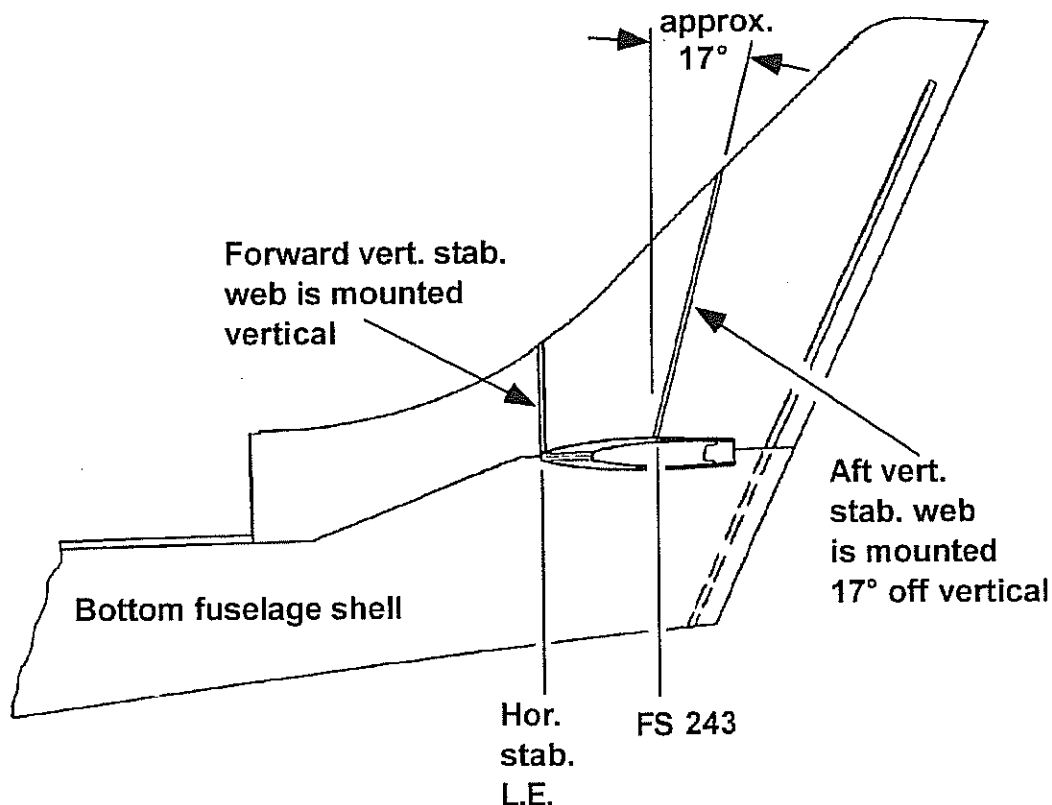
- D1. Use the templates on Blueprint A-313 to cut the vert. stab. ribs and webs from 2 ply per side prepreg. The blueprints may need some adjustment to allow for variation of core placement, etc. Cut the pieces oversize so you can custom fit them to your vertical stab.

- D2. Locate the two vert. stab. webs in the vert. stab. using the dimensions in Figure 14:D:2. Trim the webs as necessary to fit against the right vert. stab. skin. Notice that the forward web must be notched to fit around the NACA vent.

Note: The vert. stab. webs and ribs will have to be notched to fit over the com antenna and coax cable. Be careful not to grind or sand into any part of the antenna while installing the ribs and webs.

Locating vert. stab. webs

Figure 14:D:2

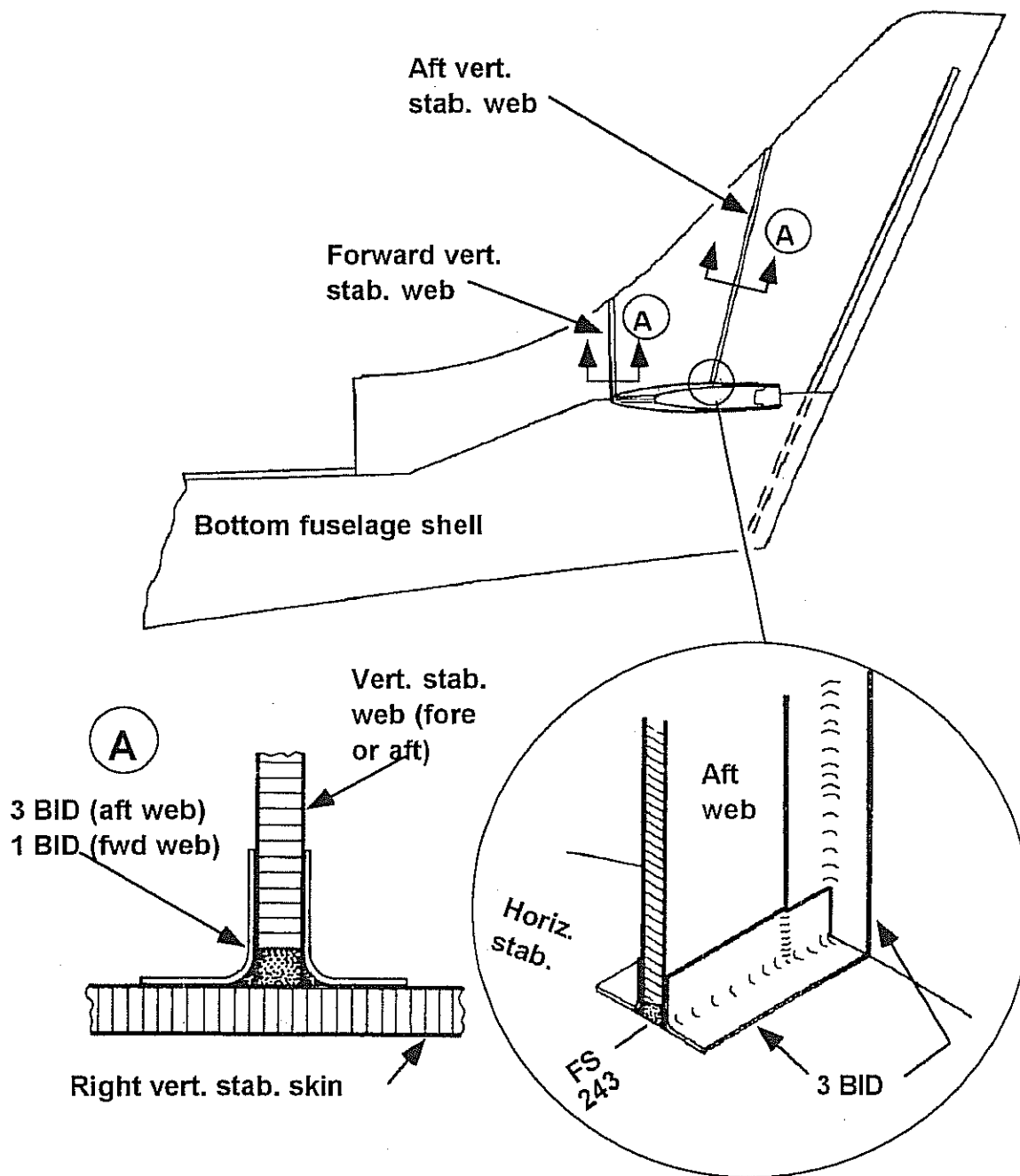


- D3. With 40 grit, sand the vert. stab. webs and the inside of the vert. stab. where the webs will be bonded. Clean these areas with MC. Again, be sure not to clean the ABS plastic NACA scoop with MC.
- D4. Remove 1/8 - 1/4" of core material from the webs where they will be bonded to the right vert. stab. skin and horiz. stab..
- D5. Bond the webs in place with epoxy/micro.

- D6. Sand the areas of the webs, horiz. stab., and vert. stab. skin, where BID tapes will be added. Clean these areas with MC.

Securing webs to vert. & horiz. stabs

Figure 14:D:3



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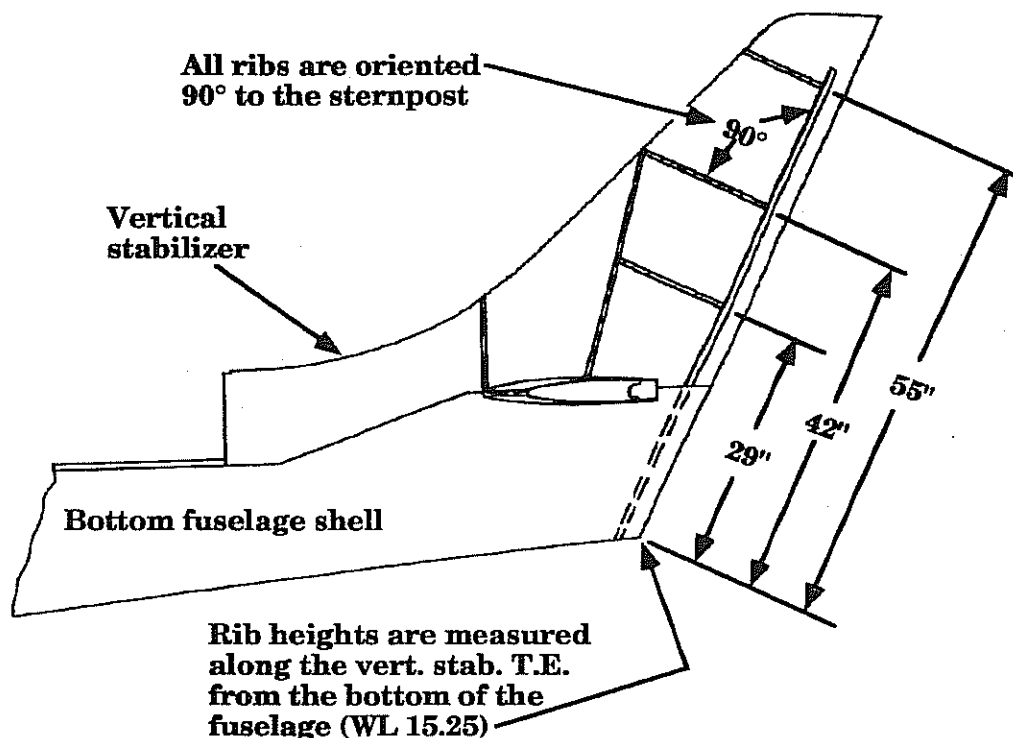
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Vertical Stabilizer Assembly

- D7. Secure the forward web to the vert. and horiz. stabs with a 2" wide, 1 BID laminate. Secure the aft web with a 2" wide, 3 BID laminate.
- D8. Trim and fit the vert. stab. ribs in the positions shown in Figure 14:D:4.

Locating vert. stab. ribs

Figure 14:D:4

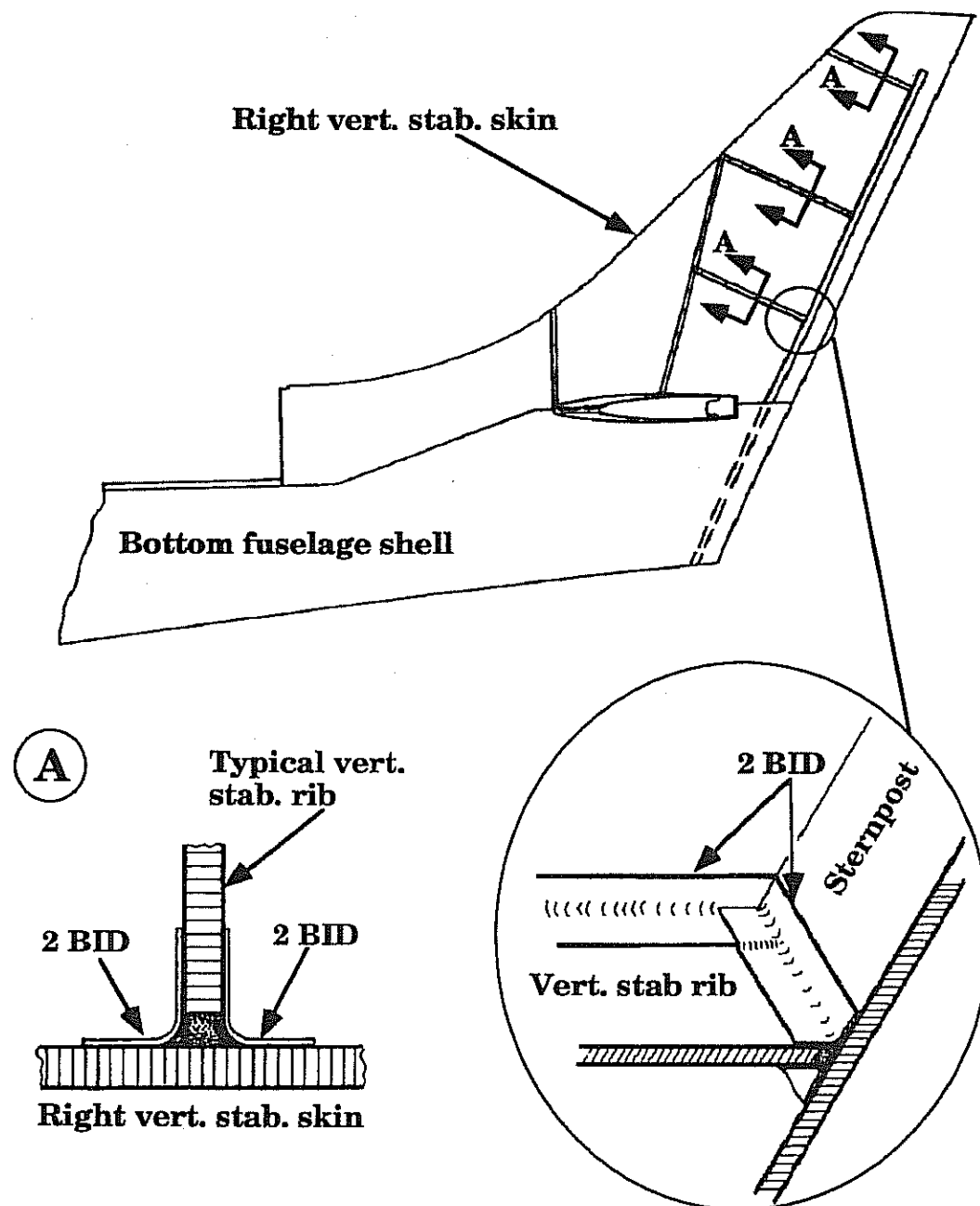


- D9. Sand the vert. stab. ribs and the areas where the ribs will be bonded. Clean these areas with MC.
- D10. Remove 1/8" - 1/4" of core material from the ribs where they will be bonded to the right vert. stab. skin and webs.
- D11. Bond the vert. stab. ribs in position with epoxy/micro.

- D12. Sand the areas of the ribs, webs, and vert. stab. skin where BID tapes will be applied. Clean these areas with MC.

Securing ribs to vert. stab. skin and webs

Figure 14:D:5



- D13. Secure the vert. stab. ribs to the right vert. stab. skin and webs with 2" wide, 2 BID laminates.
- D14. Drill 1/8" dia. vent holes in all vert. stab. ribs. This is very important for expansion. Vent holes are not needed in the forward and aft vert. stab. webs because of the cabin air scoop installed previously.

WARNING: Failure to drill vent holes could cause structural failure.

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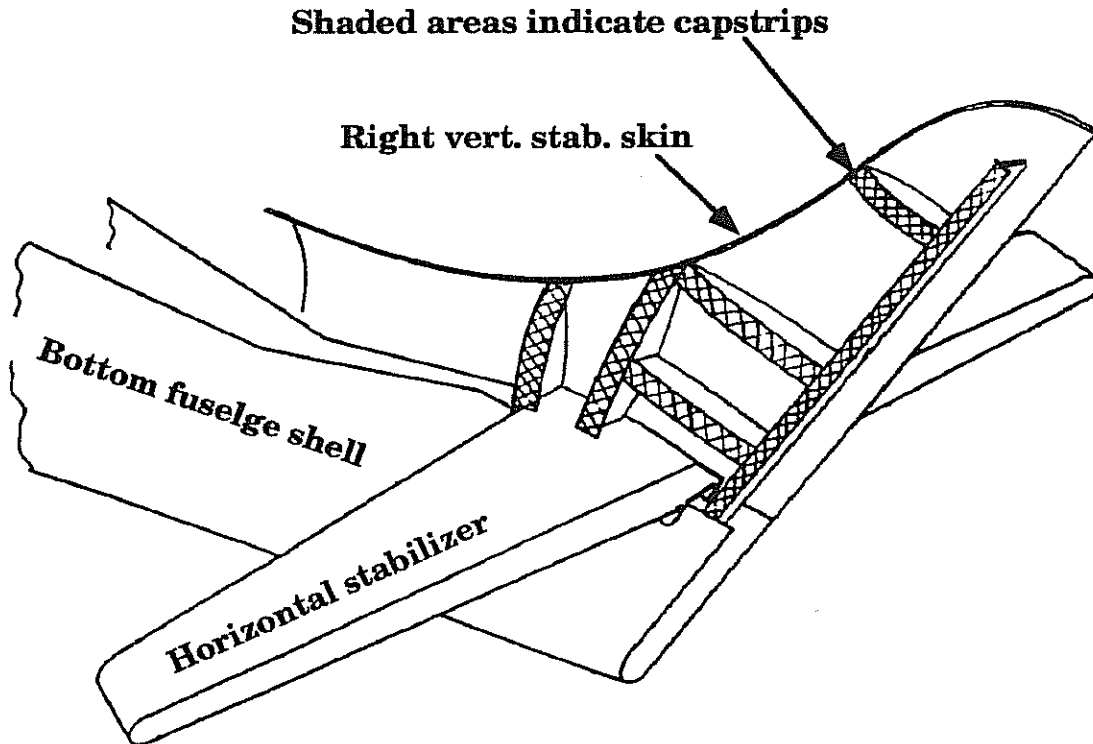
Vertical Stabilizer Assembly

E. FORMING VERT. STAB. CAPSTRIPS

Just like all other flying surfaces of the Lancair IV, the vertical stabilizer uses capstrips to increase the bonding area of the ribs and webs.

Vertical stabilizer capstrips

Figure 14:E:1

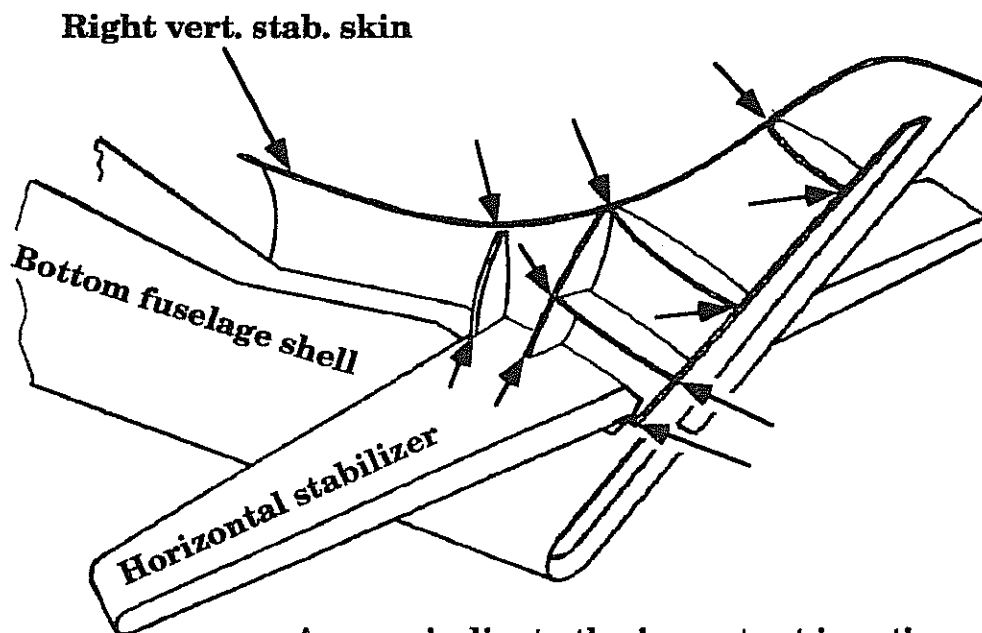


- E1. Trim and fit the left vertical stabilizer half as you did the right half. Trimming down the ribs and webs to fit the left stab. skin is a matter of feel. The ribs and webs should be fairly close to their final shape, but if your left stab. skin does not want to rest in the L.E. and bottom joggles, one or more of the ribs or webs must be holding it away. The sternpost may also have to be trimmed, but be sure to keep it symmetrical with the right half. Trial and error isn't exactly scientific, but that's the way we do it.

- E2. To mark the locations of the ribs, webs, and sternpost on the inside surface of the left stab. skin, mound up a bit of epoxy/micro at each intersection of the ribs/webs, ribs/sternpost, ribs/L.E., webs/L.E., and webs/horiz. stab. Gently place the left stab. skin in position and press the skin against the ribs, webs, and sternpost. Remove the skin and the micro will have made impressions of the important intersections of the ribs and webs. Connect the dots with a marker to represent the rib, web, and sternpost locations and clean away the micro you used to locate these parts. See Figure 14:E:2.

Marking rib and web locations on left skin

Figure 14:E:2



Arrows indicate the important junctions whose locations should be transferred to the inside surface of the left vert. stab. skin. Mound up a blob of micro at these locations, set the left skin in position, then remove. The micro will mark the junction locations on the inside of the left skin. Use these reference marks for laying up your capstrips.

- E3. Apply release tape to the inside surface of the left vert. stab. skin where the rib, web, and sternpost capstrips will be applied.

- E4. Rout out 1/8 - 1/4" of core from the vert. stab. ribs, webs, and sternpost.
- E5. Apply 2 BID, 2" wide capstrips to the inside surface of the left vert. stab. skin. Be sure that you're only applying the capstrips over release tape.
- E6. Mound up a thick epoxy/micro mixture in the troughs you formed in the ribs, webs, and sternpost.
- E7. Place the left vert. stab. skin in position and use a few clecoes to hold it there while the micro cures. Treat this procedure as you would treat closing out the vert. stab. for the last time. Be sure the left stab. skin is straight along the sternpost from the bottom joggle to the top. Also be sure you haven't torqued the stab so it isn't on the fuselage centerline (this is hard to do with the ribs and webs installed but check anyway).

Lastly, check that the contour of both vert. stab. sides are similar. An unscientific (but effective) method of checking this is to stand behind the vert. stab. and place one hand on each side. Move your hands fore and aft together (in the direction that airflow would travel) and feel for an obvious mismatch of the skin contours. They don't have to match perfectly, so don't alter a skin shape unless it's obviously wrong.



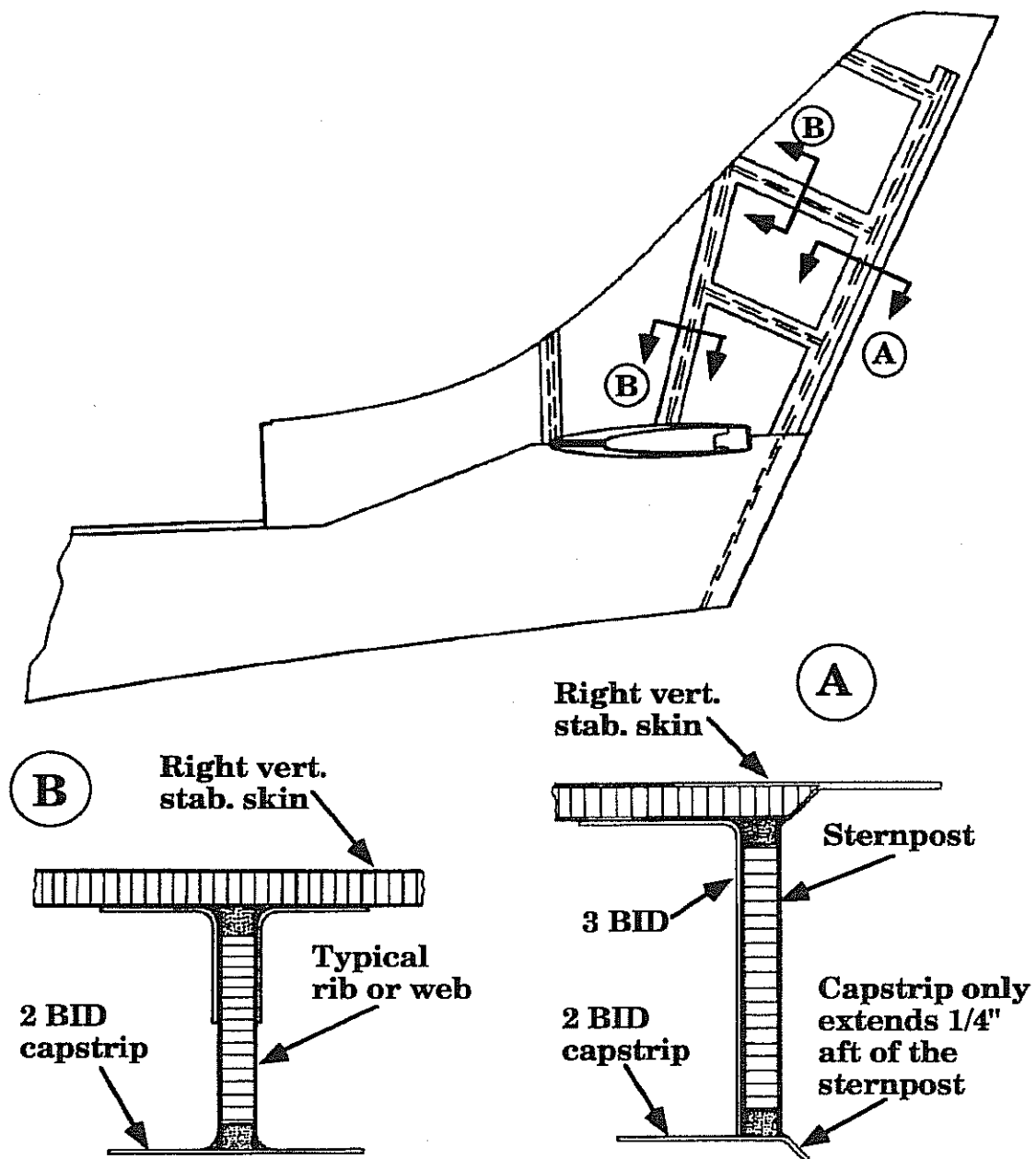
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Vertical Stabilizer Assembly

Vert. Stab. capstrips
Figure 14:E:3



- E8. After the micro has cured, pop the left vert. stab. skin off and, with 40 grit, sand the areas where the capstrip reinforcement BIDs will be applied. Clean the sanded areas with MC.
- E9. Secure the capstrips to the ribs, webs, and sternpost with 2" wide BID tapes. Use 1 BID to secure the capstrips to the forward web and 3 BID for the aft web. The rib capstrips are secured with 2 BID. The sternpost capstrip is secured with 3 BID. See Figure 14:E:4.
- E10. Trim the capstrips to an even 2" width.



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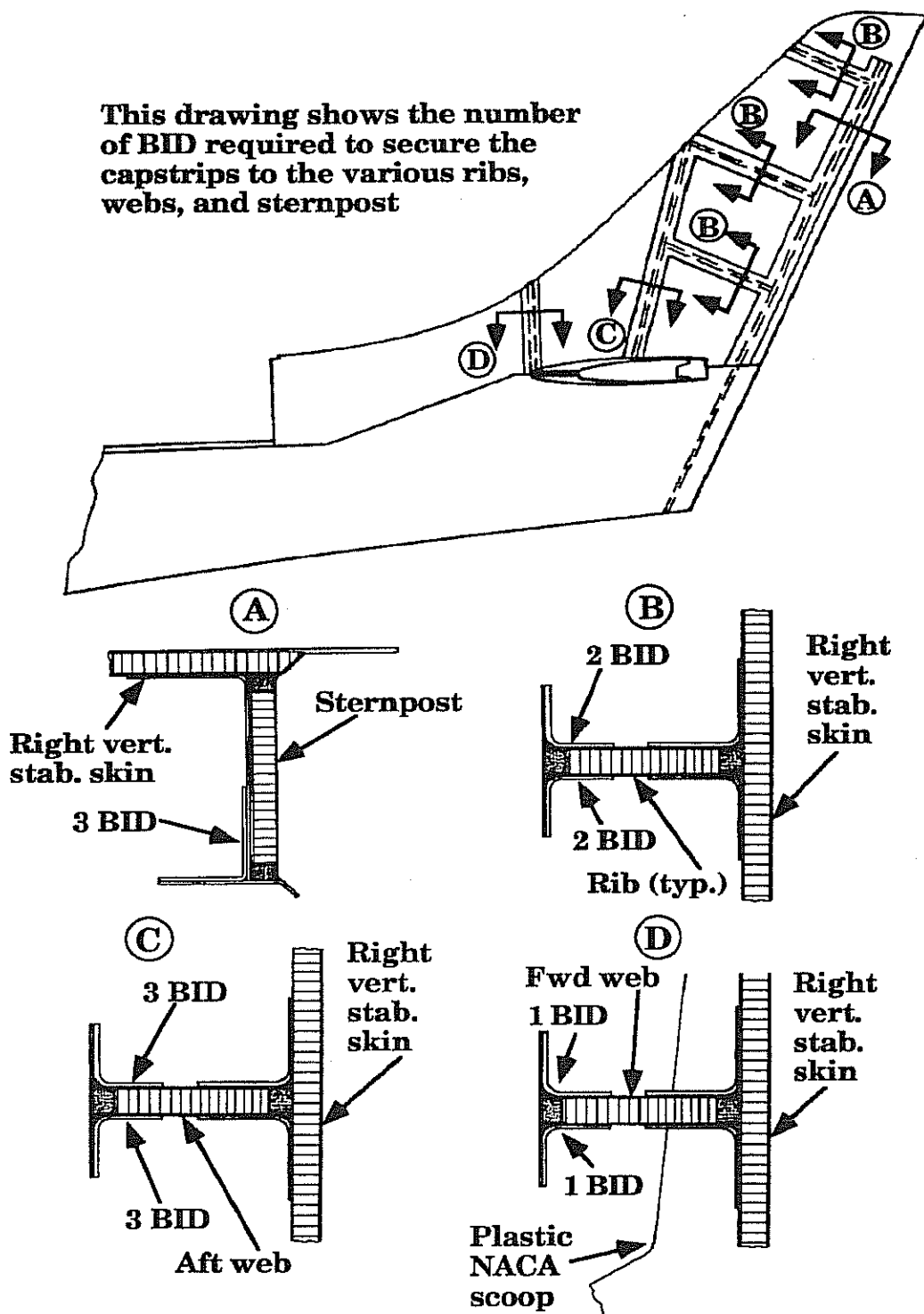
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Vertical Stabilizer Assembly

Securing capstrips

Figure 14:E:4

This drawing shows the number of BID required to secure the capstrips to the various ribs, webs, and sternpost

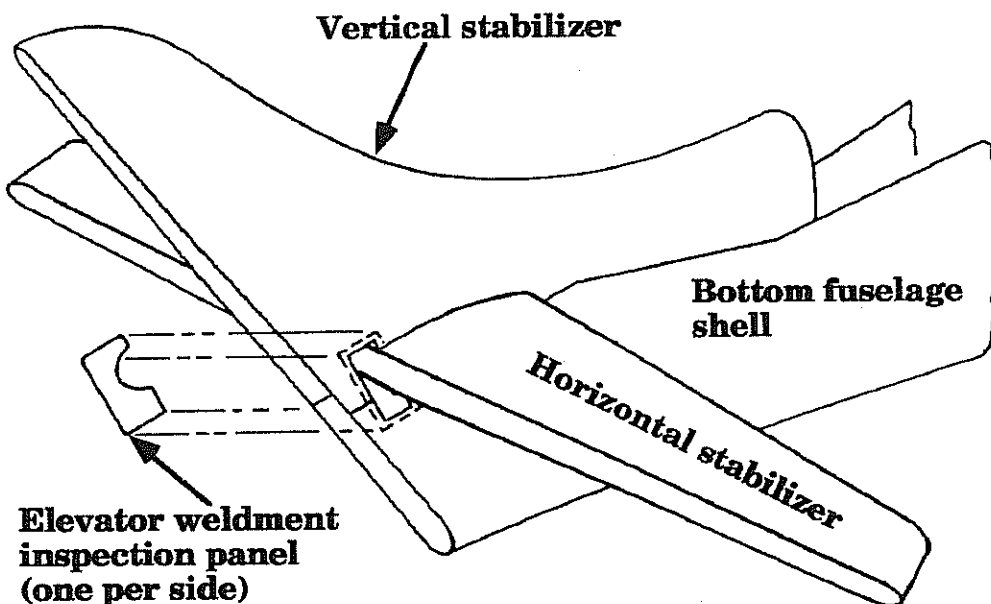


F. ELEVATOR WELDMENT INSPECTION PANELS

Inspection panels are necessary for easy removal of the elevators. These panels are located just behind the horizontal stabilizer.

Elevator weldment inspection panels

Figure 14:F:1

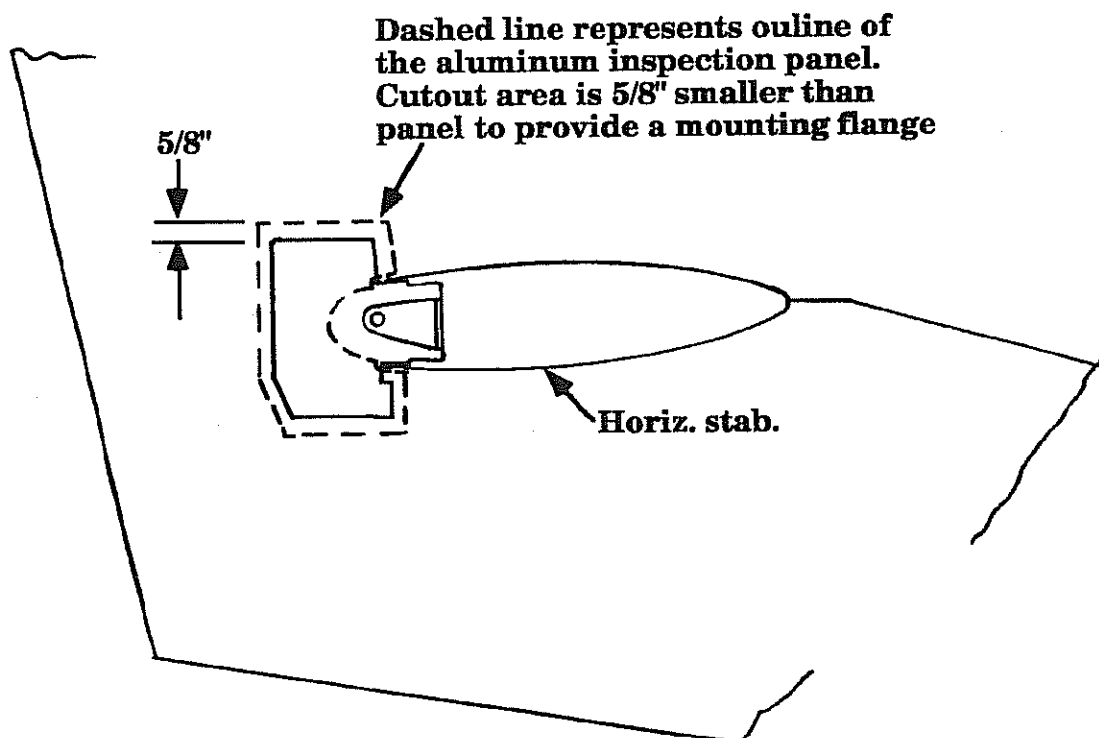


- F1. Two inspection panels are provided in your kit. For earlier "B" kits, the lower aft corner of both inspection panels should be cut on an angle to provide clearance from the sternpost. The dimensions for this angle cut are shown in Figure 14:F:4, on page 14-34. Cut these angles now, before you cut the inspection panel holes.

- F2. Position the inspection panels as shown in Figure 14:F:2. Mark an outline of the panels on the outside surface of the vert. stab. and bottom fuselage shell. The panels mount to 5/8" wide flanges, so cut the access holes in the fuselage accordingly. Again, refer to Figure 14:F:2.

Location of inspection panels

Figure 14:F:2

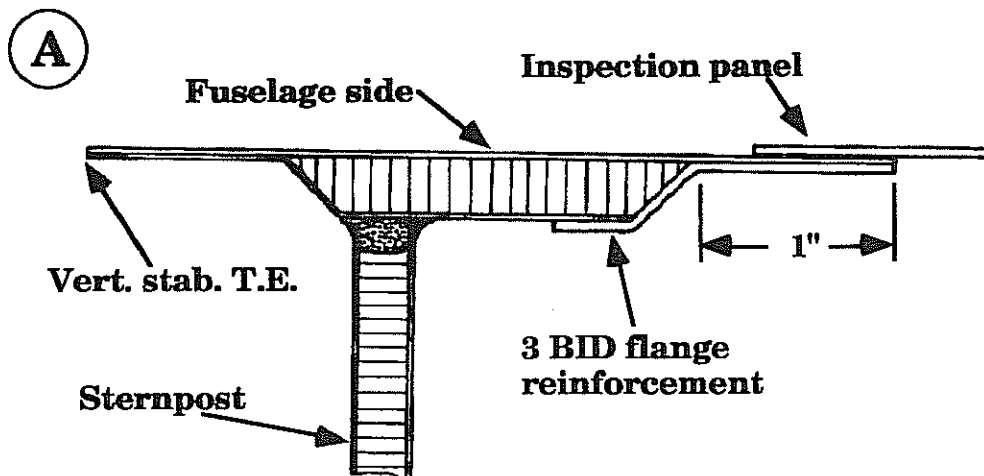
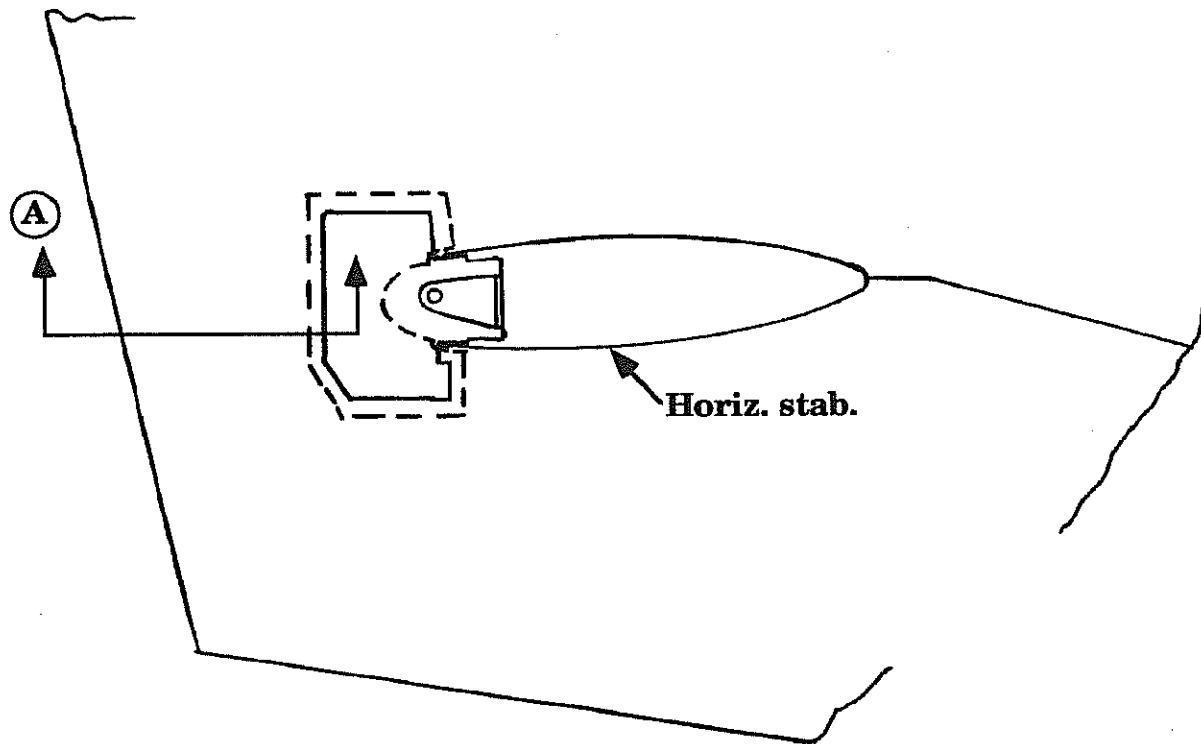


- F3. The inner laminate and core of the vertical stabilizer and bottom fuselage shell must be removed to form a flange which the panels will mount to. To figure out where to cut the core, measure 1" back from the access holes you cut in Step F2. Make an outline on the inside surfaces of the vert. stab. and bottom fuselage shell where the core will be removed. Refer to Figure 14:F:3 for clarification.

Note: We realize that you have not yet installed the left skin of the vertical stabilizer. However, since you have already formed your capstrips, you should have a few cleco holes that will accurately locate the left vert. stab. skin. in it's final position. It is much easier to remove the core and add the reinforcement BID for the panel flanges now, before the vert. stab. is closed out. After the stab. is closed out, you can finish installing the left inspection panel per instructions in this section.

Removing core for inspection panel flanges

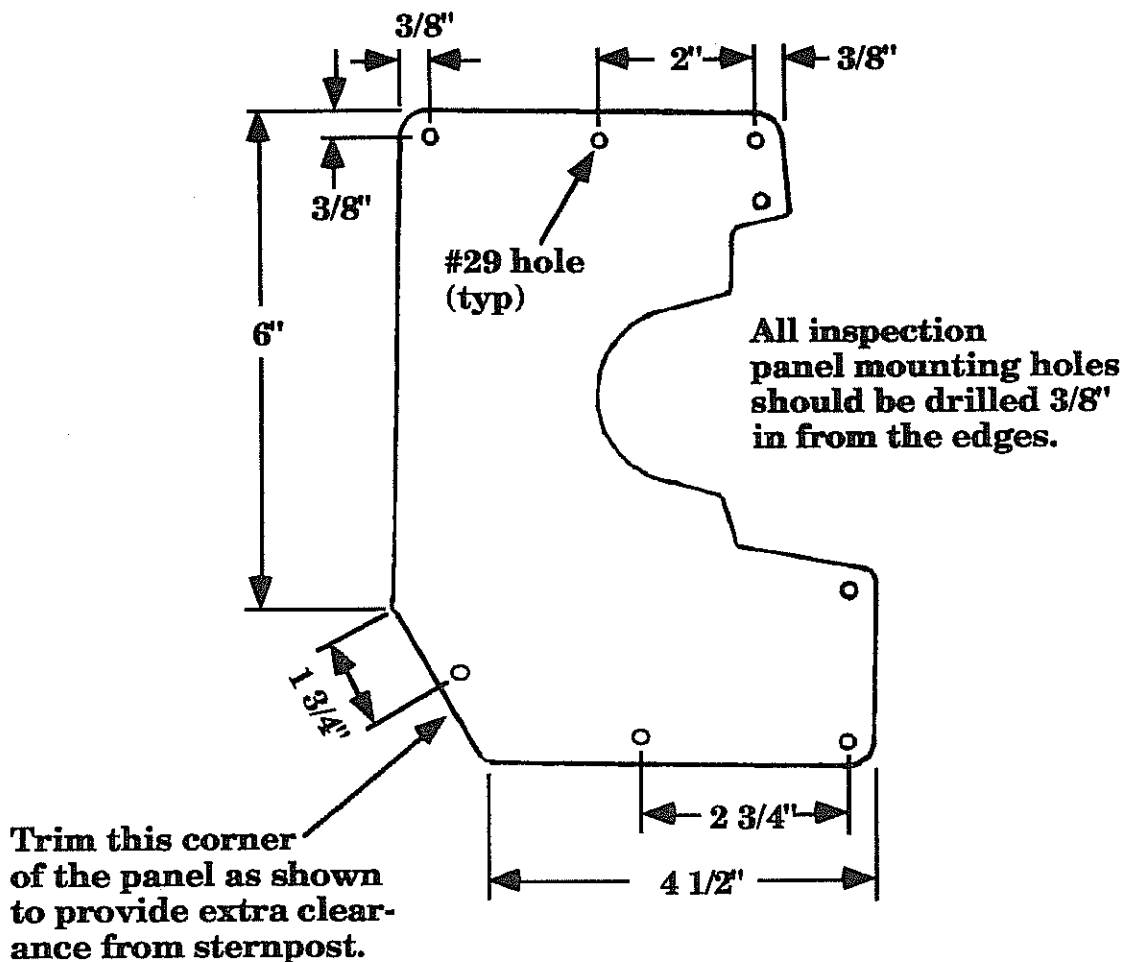
Figure 14:F:3



- F4. Reinforce the flange area by applying 3 BID as shown in Figure 14:F:3. Overlap the 3 BID onto the original inner surfaces by 1".
- F5. Reposition the panels onto the outer surface of the vert. stab. and bottom fuselage shell. Drill #28 holes through the panels and fuselage where the mounting screws are located.
- F6. Countersink the aluminum inspection panels for the MS24693-S28 mounting screws.
- F7. Use AN426A3-5 rivets to mount the MS21069-06 nutplates to the bottom fuselage shell and vertical stabilizer.

Mounting inspection panels

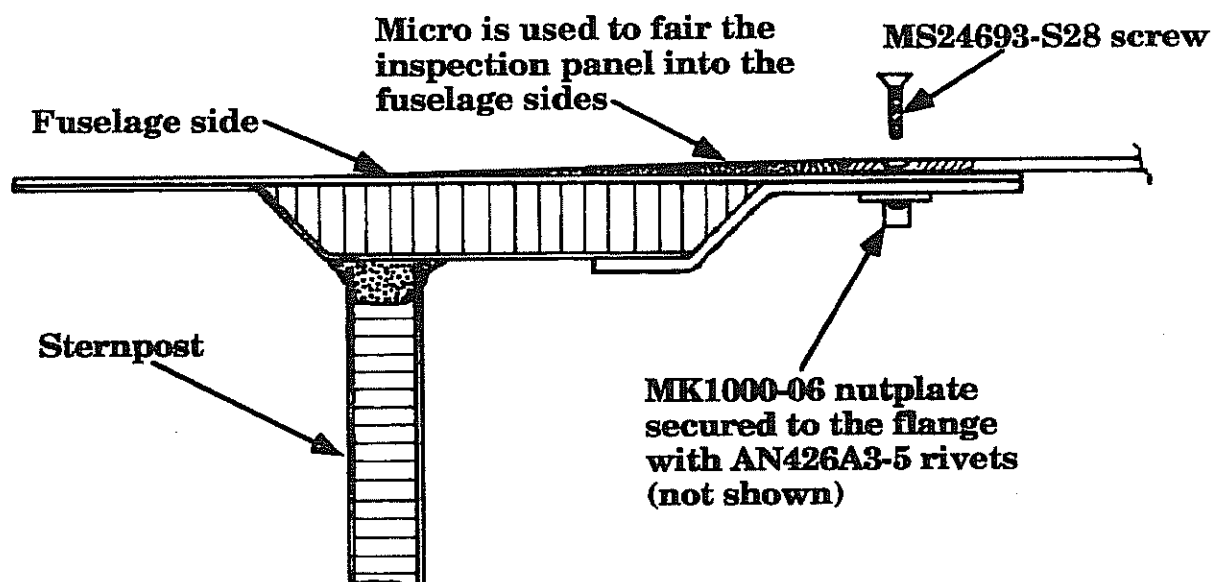
Figure 14:F:4



- F8. To make the inspection panels appear flush with the surrounding surface, you must fair in the panels with micro. Apply release tape to the inspection panels.
- F9. With 40 grit, sand the outer surfaces of the vert. stab. and bottom fuselage shell in an area 4-6" larger than the inspection panels. Clean these areas with MC.
- F10. Screw the inspection panels in place. It's a good idea to cover the heads of the screws with bits of release tape to prevent the slots from filling with micro.

Fairing in the inspection panels with micro

Figure 14:F:5



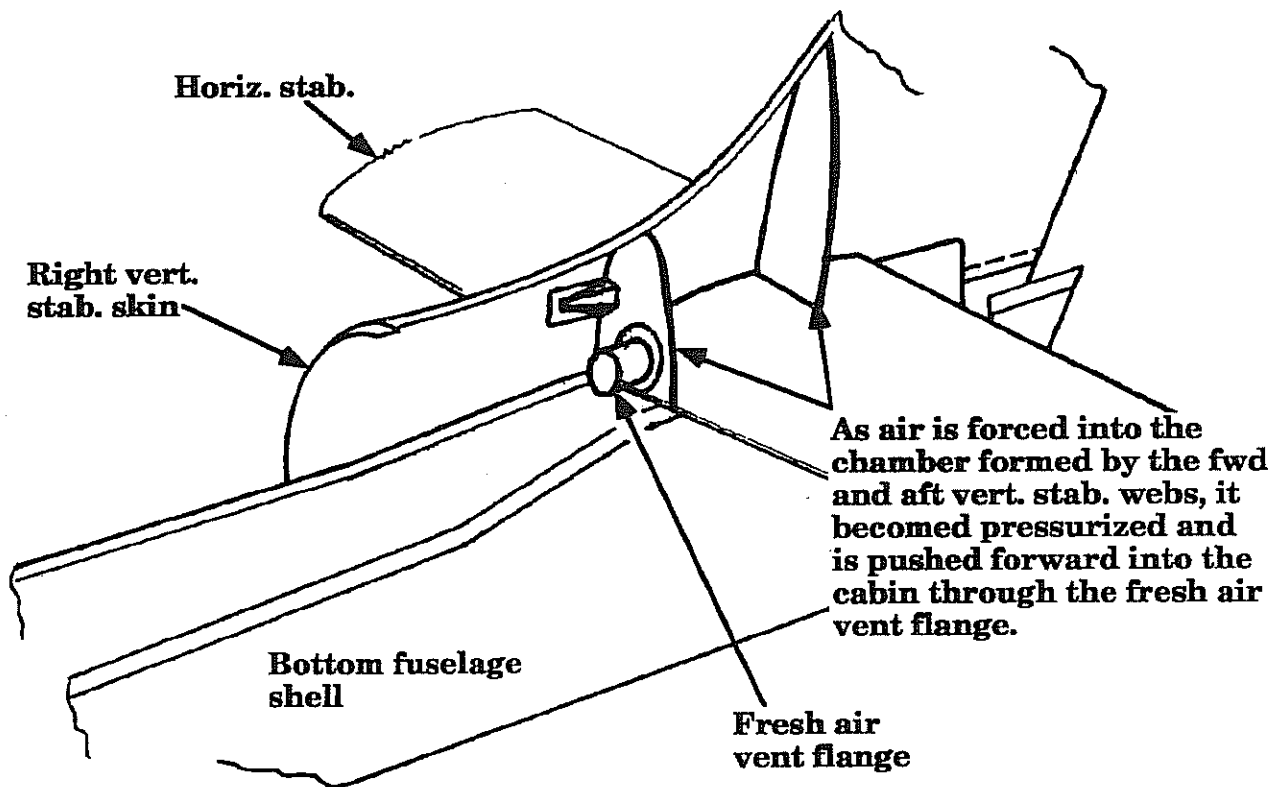
- F11. Apply a thick epoxy/micro mixture to the area surrounding the inspection panel (the area you sanded in Step F8).
- F12. After the micro has cured, sand it so there is a smooth transition from the inspection panels to the fuselage surface.
- F13. Remove the inspection panels and remove the release tape. A little final sanding around the perimeter of the panels should complete the job. Try to get about a .020" gap between the panels and the micro.

G. INSTALLING FRESH AIR VENT

You've probably been wondering how the cabin fresh air will move from the NACA scoop into the overhead console. As air enters the NACA scoop it is pressurized slightly in the plenum chamber formed by the forward and aft vert. stab. webs. The air is then pushed forward to the overhead console through a 3" diameter flexible Scat tube. A flange is needed so the Scat tube can be connected to the forward vert. stab. web. This flange is what you'll be installing in this section.

Fresh air vent flange

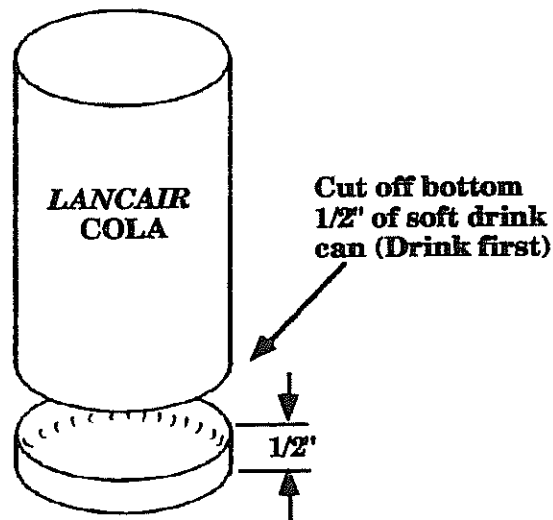
Figure 14:G:1



- G1. Did you know that the diameter of a 12 oz. soft drink can is approximately 2.6"? Well now you do. Why this bit of trivia? You'll be using a soft drink can as a form to lay up a 4 BID flange. So drink up and cut off the bottom of the can as shown in Figure 14:G:2.

"Modified" soft drink can

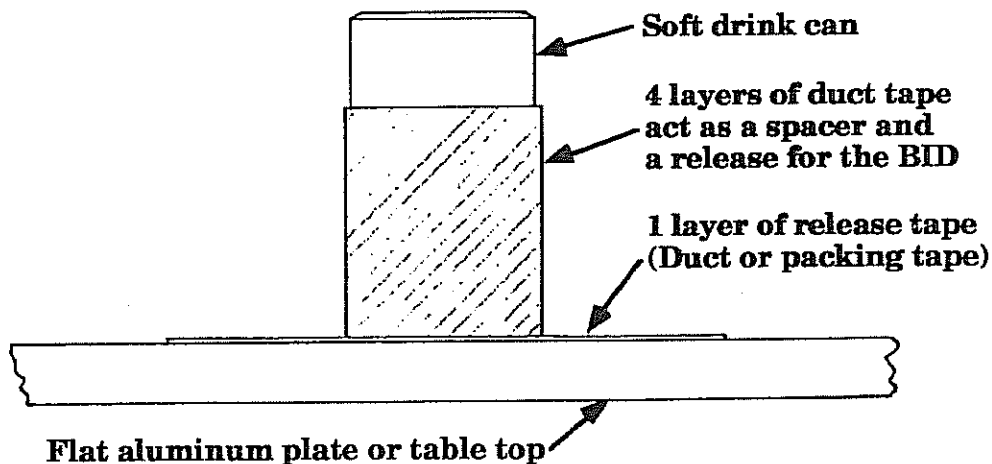
Figure 14:G:2



- G2. Apply 4 layers of duct tape to the soft drink can to act as a release for the fiberglass flange. The duct tape also gives the flange the slightly larger diameter needed for the Scat tubing.
- G3. Apply a layer of release tape to a flat surface (a piece of aluminum or a table top work well).
- G4. Use instant glue to tack the soft drink can to the flat release surface as shown in Figure 14:G:3.

Finished flange mold

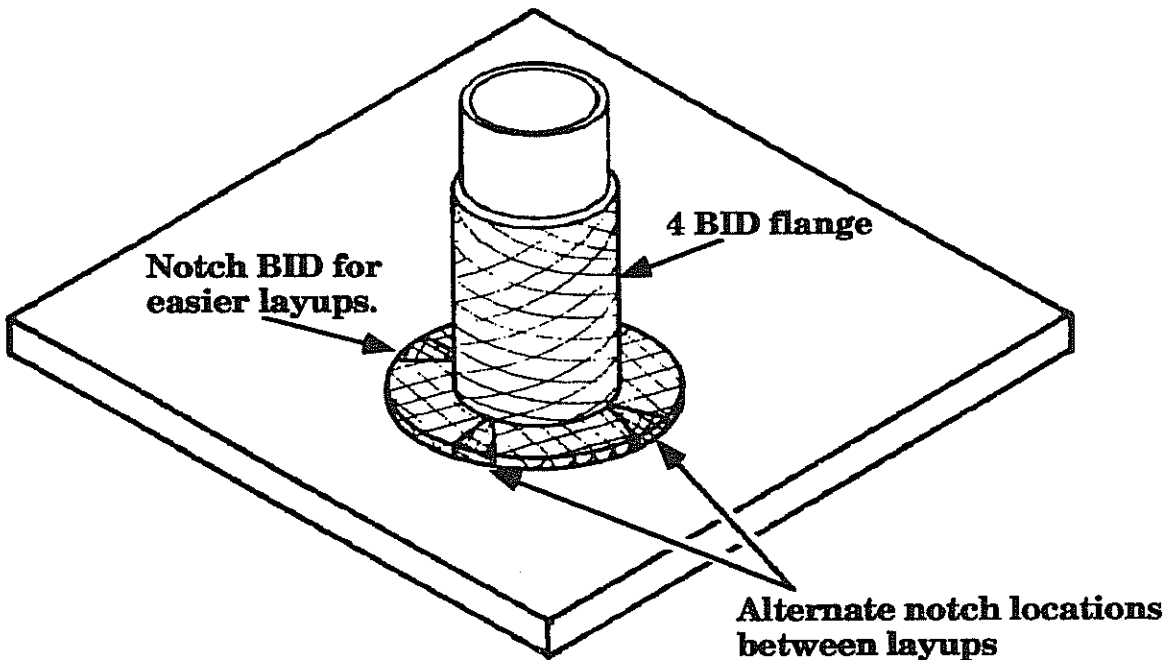
Figure 14:G:3



- G5. Lay up a flange with 4 BID. Don't try to wrap the 4 BID all the way around the can in one step. It is easier to apply 1 BID at a time, covering half the perimeter of the can at a time. Alternate the location of the BID tape junctions from layer to layer.

Laying up flange

Figure 14:G:4

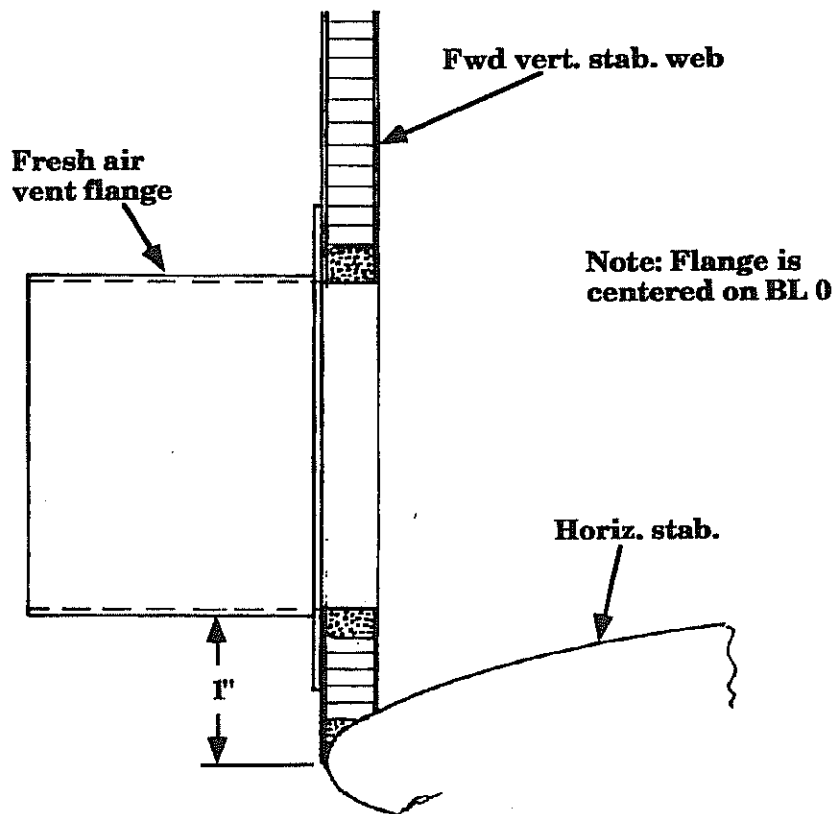


- G6. After the 4 BID flange has cured, slip the 3" diameter Scat tube over the flange and check that it is a close fit. If the flange diameter is too small you will feel slop in the Scat tube. You can add more BID layers to the flange to increase it's diameter.
- G7. Crush the aluminum can and remove the flange from the mold. Sand the edges of the flange smooth.

- G8. Locate the flange on the forward vert. stab. web as shown in Figure 14:G:5. Mark and grind out the vent hole in the web to match the I.D. (inside diameter) of the flange.

Locating flange on forward vert. stab. web

Figure 14:G:5

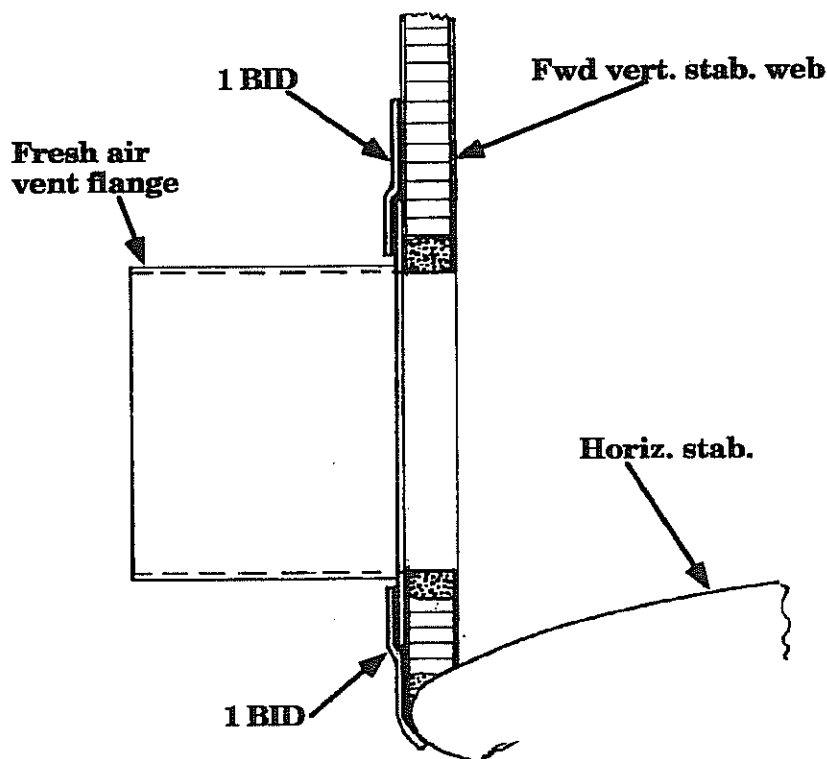


- G9. Remove 1/4" of core around the perimeter of the vent hole and fill the trough with micro. When the micro has cured, you can sand it smooth to the original vent hole diameter. The micro will protect the web core from the moisture that might enter the stab through the NACA scoop.
- G10. Sand the bonding surfaces where the flange will be mated to the web. Clean these surfaces with MC.

- G11. Bond the flange to the web with flux. Reinforce this bond with 1 BID as shown in Figure 14:G:6.

Bonding flange to web

Figure 14:G:6

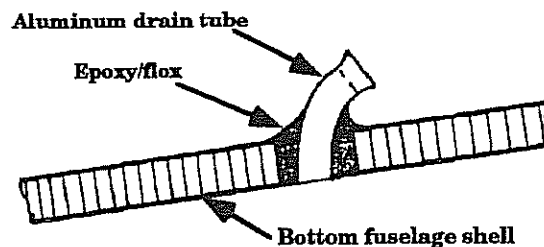
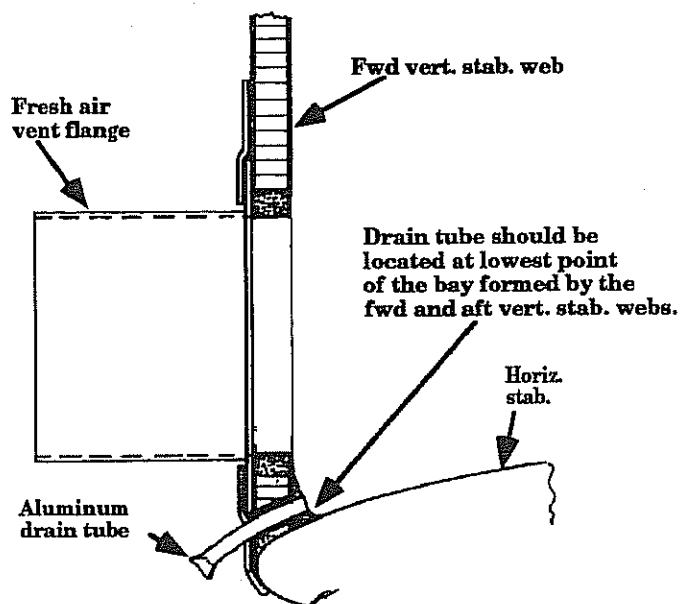
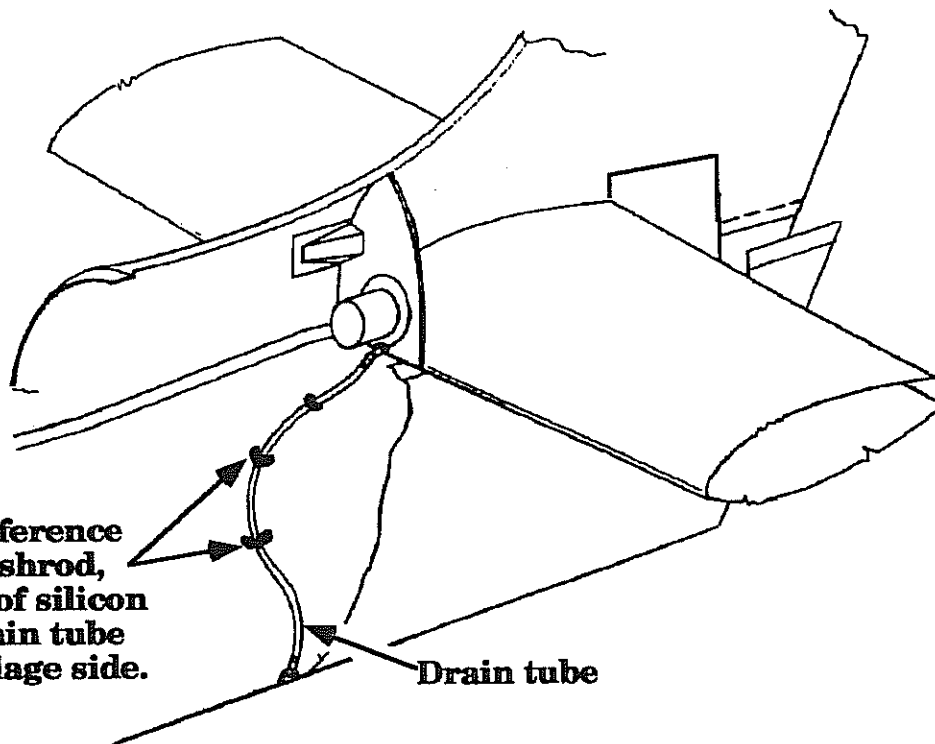


- G12. A drain tube must be added at the lowest point of the air plenum chamber (this is the vert. stab. bay formed by the forward and aft vert. stab. webs) so water that enters through the NACA scoop can flow out. A 6" long section of 1/4" dia. aluminum tube is provided for this drain tube. Cut the tube in half, making two, 3" sections.
- G13. Grind a hole just forward of the horizontal stabilizer just large enough for the 1/4" dia. tube. Grind a similar hole in the bottom of the fuselage directly under the horiz. stab. L.E.. Refer to Figure 14:G:7.

Drain tube installation

Figure 14:G:7

To prevent interference with elevator pushrod, use a few blobs of silicon to secure the drain tube to the right fuselage side.



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- G14. Use 40 grit to rough up the bonding surface of the two tubes and pot them into position with epoxy/flox.
- G15. When the flox has cured, bend the tubes as shown in Figure 14:G:7 so the clear plastic drain tubing can be routed along the right side of the fuselage. Routing the drain tube straight down would interfere with the elevator pushrod.
- G16. Secure the clear plastic tube to the aluminum tubes with a few tie wraps. Be sure not to clog the drain tube with dust or adhesive during the rest of construction.



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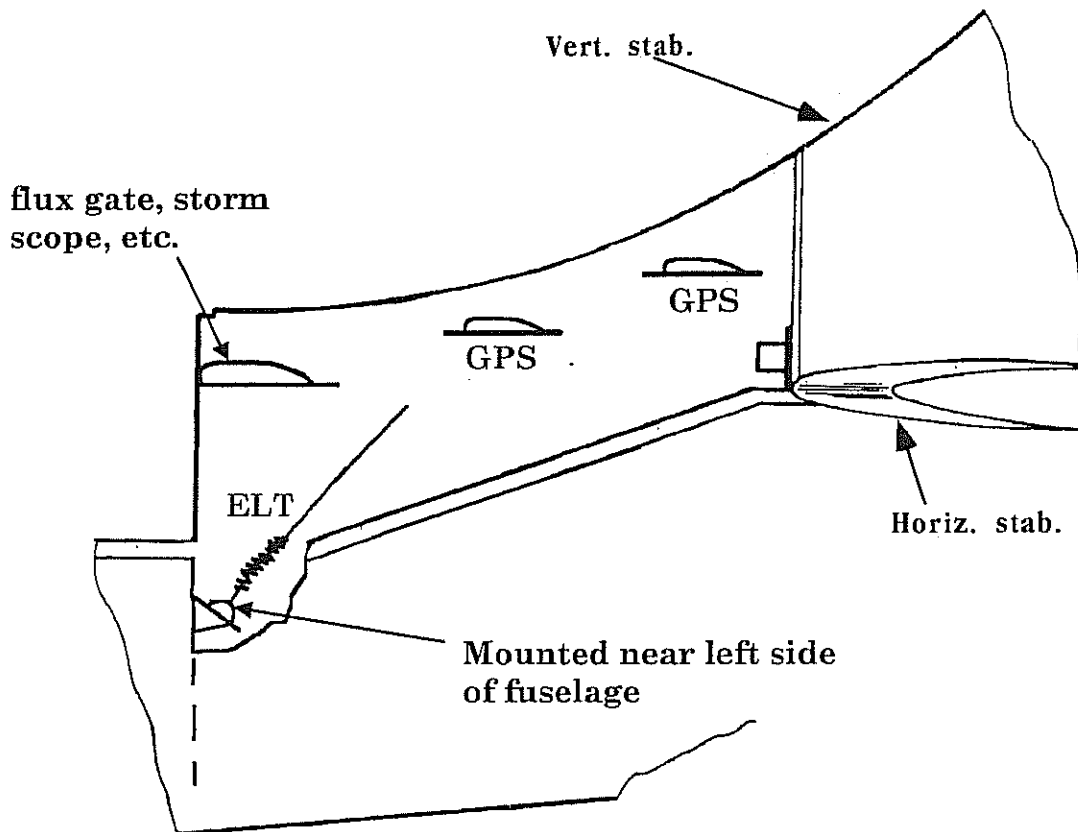
H. OTHER ANTENNAS

One or two GPS antennas and an ELT antenna can be mounted in the area at the base of the vertical stabilizer (see Figure 14:H:1).

All of the antennas can be mounted on the flanges that are attached to the right fuselage side, except the ELT, which can be mounted on the bulkhead near the left side (see Fig. 14:H:4). Use a flat aluminum plate with release tape on it to form the flange. If a ground plane is needed (consult installation instructions), the aluminum plate can be mounted between the antenna and the flange.

Antenna locations

Figure 14:H:1



Left side of fuselage not shown for clarity





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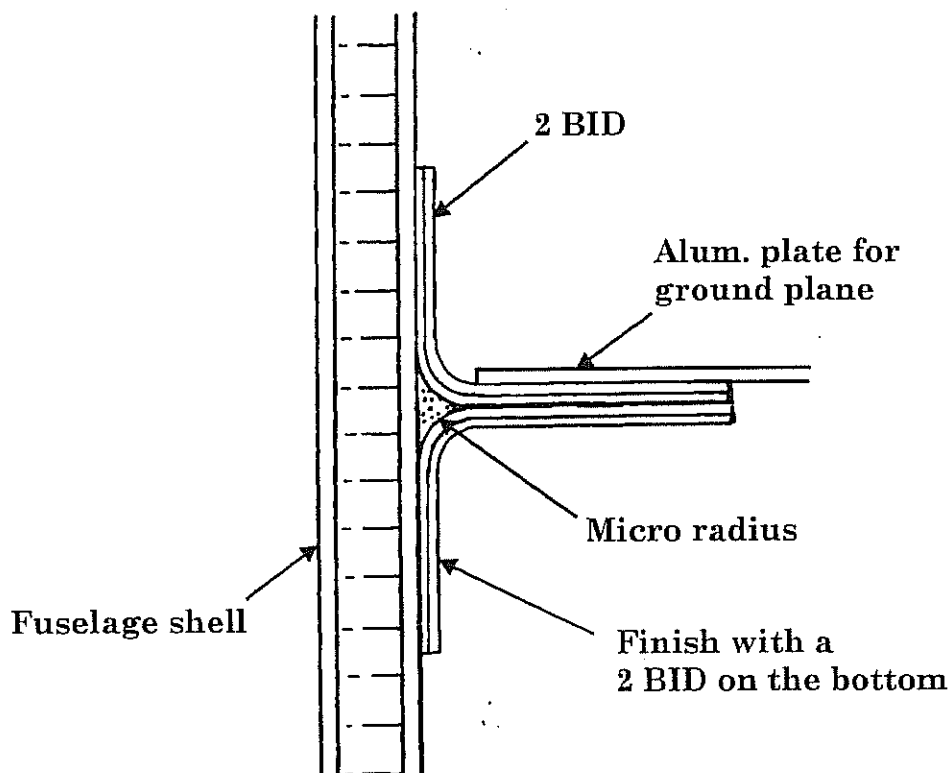
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- H4. With 40 grit, sand the areas of the bottom fuselage shell where the flanges will be located. Clean the areas with MC.
- H5. Lay up the mounting flanges using 4 BID total.

4 BID antenna mounting flanges

Figure 14:H:4



- H6. When the flanges have cured, drill holes through both the aluminum plate and the fiberglass flanges as necessary.
- H7. Pop the aluminum plate away from the fiberglass flanges and remove the release tape. Mount the antenna to the flange using whatever hardware is necessary for your brand of antenna (usually whip type antennas are mounted with flush head screws and elastic locknuts). Mount the plate between the flange and the antenna if you need a ground plane.





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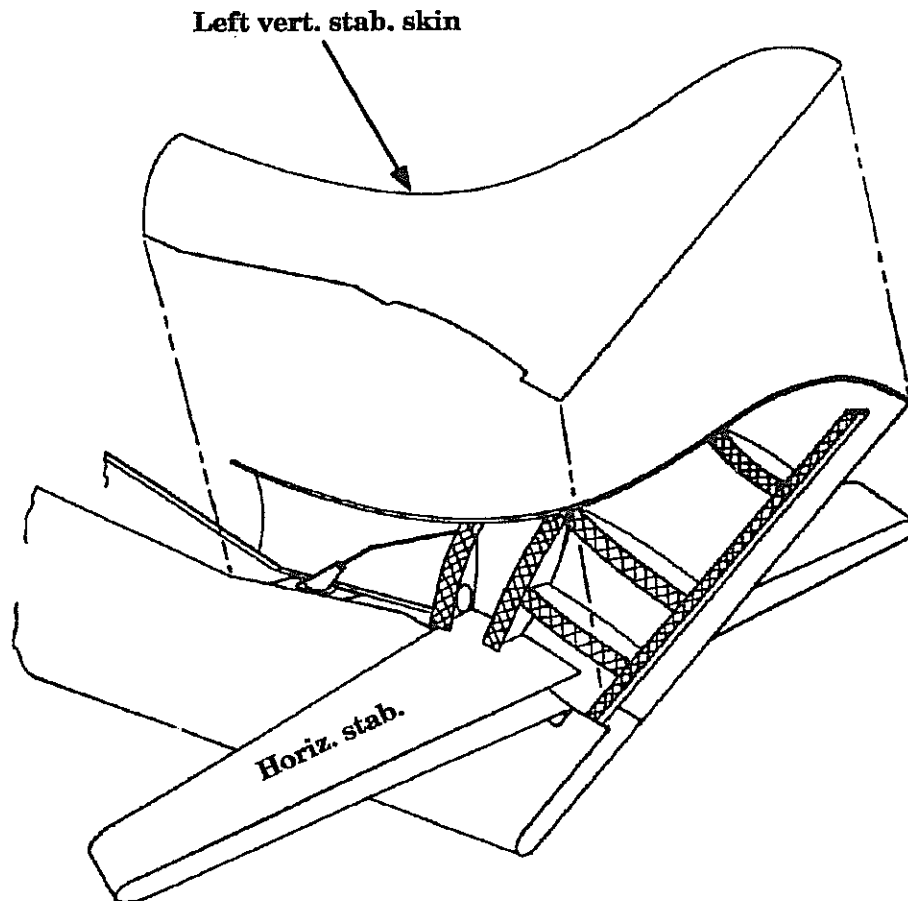


I. CLOSING VERTICAL STABILIZER

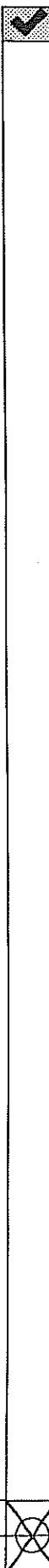
As usual with flying surfaces, closing out the vertical stabilizer should be an anticlimax. Don't take this step lightly though. Be sure your capstrips are close fitting so minimum adhesive is necessary. Also be sure the left vert. stab. skin is straight along the sternpost.

Closing vertical stabilizer

Figure 14:I:1

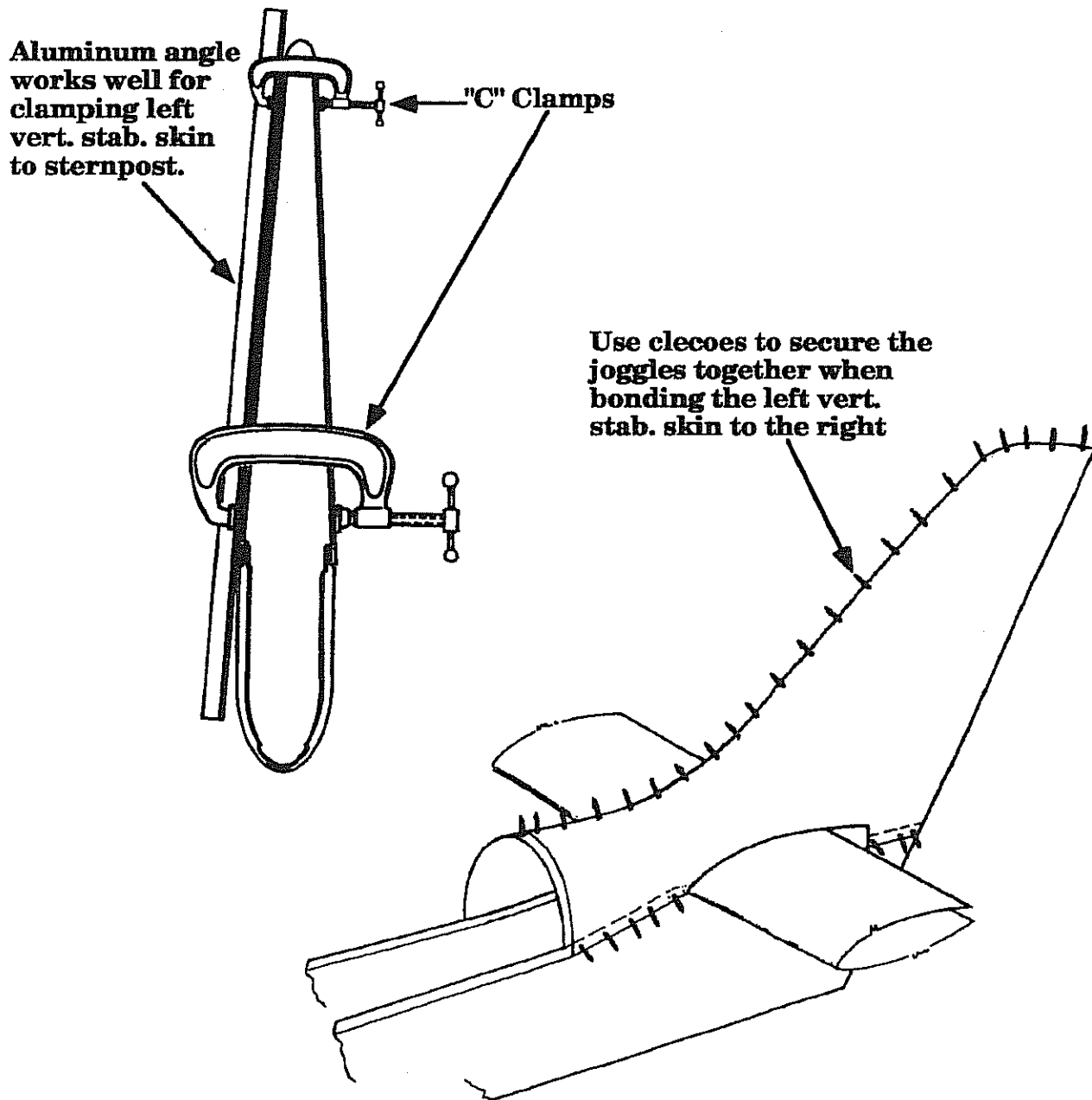


- I1. With 40 grit, sand all the surfaces where adhesive will be used to bond the left vert. stab. skin in place. The bonding surfaces include the bottom fuselage joggles, the vert. stab. L.E. joggle, all the capstrips, and the corresponding sections of the left vert. stab. skin.
- I2. Clean all bonding surfaces with MC.
- I3. Do a trial run of the closeout and decide where you're going to use clecoes (or sheet metal screws). Drill cleco holes now if you haven't already (from when you formed the capstrips). Now is also the time to test your clamping fixture along the sternpost. You need a straight length of angle aluminum or similar material along the sternpost for even clamping pressure. It is also a good idea to recheck that your stab. is still vertical by checking it to the fuselage centerline on the floor.



Clamping left vert. stab. skin

Figure 14:I:2



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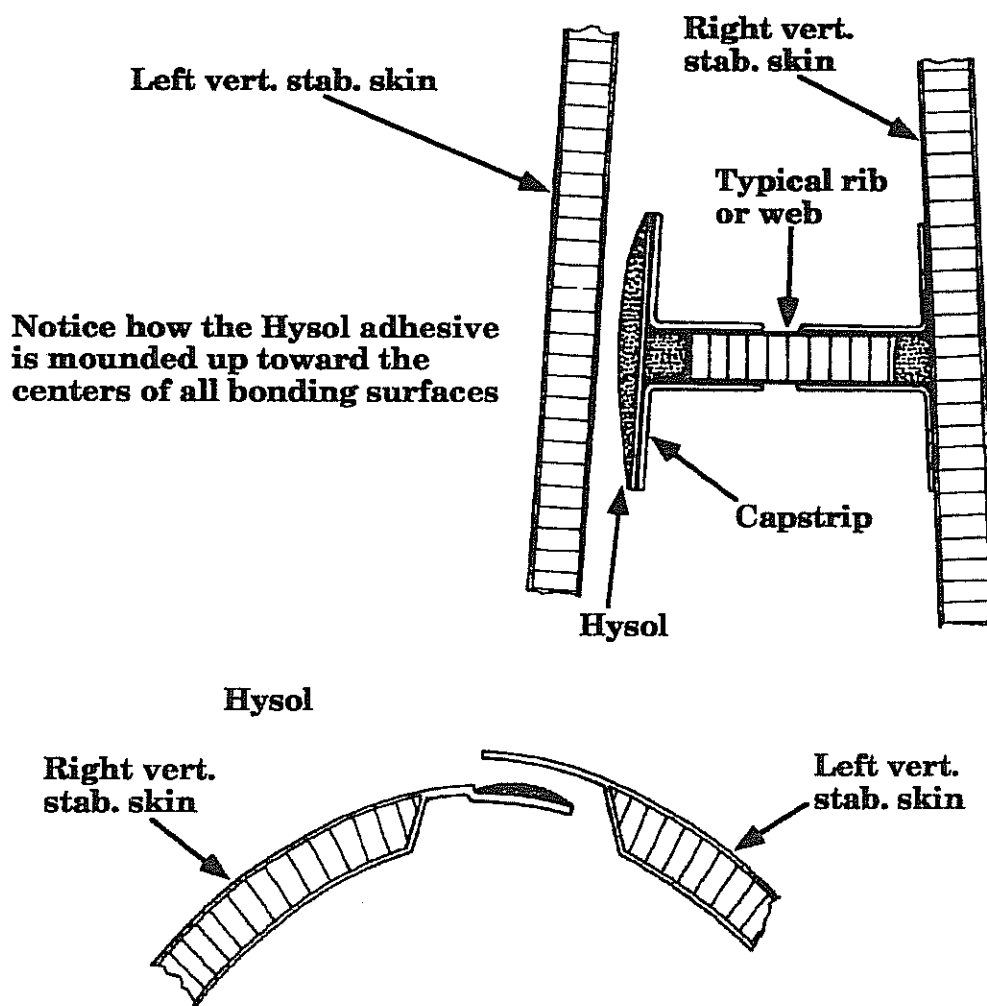
14. When you're satisfied that you clamps will hold the left stab. skin in position, remove the skin and prepare for bonding. Have you left any tools laying on a vert. stab. rib? Is your communications coax cable secured to the com antenna? Good, it's time to close.

Note: Notice that the inside surface of the left vert. stab. skin is not secured to the horiz. stab. with 1 BID as was the right vert. stab. skin. The 1 BID is not necessary, but we added it because it was accessible.

15. Mix up a batch of Hysol and apply a thin coat to all bonding surfaces. Now mix a bit of flox into the Hysol to give it some body and apply a thicker coat on the rib, web, and sternpost capstrips, L.E. joggle, and bottom fuselage joggles. Mound up the Hysol toward the center of each bonding surface to avoid trapping any air.

Applying adhesive to bonding areas

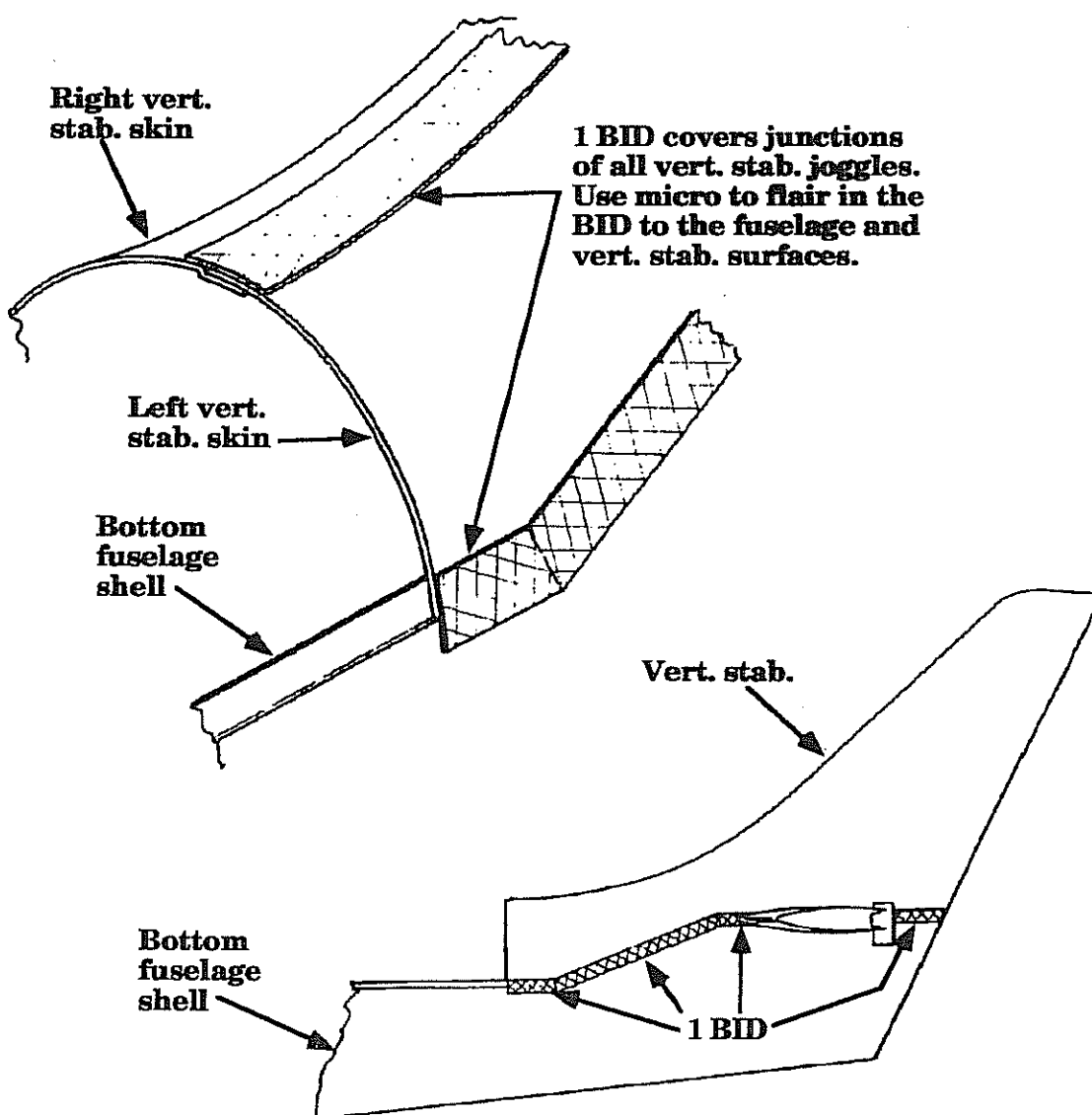
Figure 14:I:3



- I6. Carefully place the left vert. stab. skin in position and replace the clecoes and clamps in the locations you have decided on. Is there good squeeze out of Hysol? Look up through the elevator inspection holes and check for adequate Hysol squeeze out in the bonding areas you can see.
- I7. When the Hysol has cured, remove the clamps and clecoes. Sand the L.E. of the vert. stab., the junction of the vert. stab. and bottom fuselage shell, and the junction of the vert. and horiz. stabs. Clean all sanded areas with MC. See Figure 14:I:4.

Applying 1 BID junction tapes

Figure 14:I:4



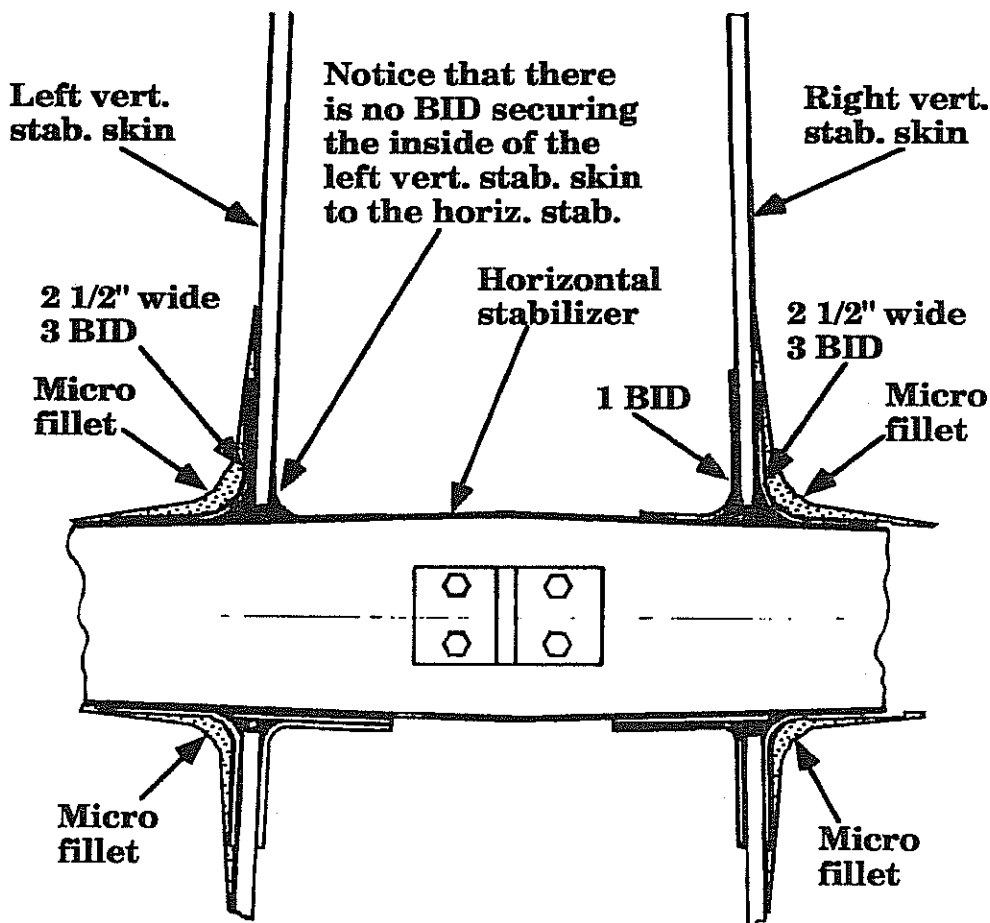
18. Apply 2" wide, 1 BID to the L.E. of the vert. stab. and where the vert. stab. joins the bottom fuselage shell. When these laminates have cured, you must flair them into the surrounding surfaces with micro. See Figure 14:I:4.

Note: If you held off on installing the left elevator weldment inspection panel, now is a good time to finish it's installation. The micro that is added to flair in the 1 BID tapes can also be used to flair in the inspection panel.

19. Apply 2 1/2" wide, 3 BID where the vert. stab. joins the top surface of the horiz. stab. This is similar to the laminate you applied to join the bottom fuselage shell to the bottom surface of the horiz. stab. back in Chapter 13, Step B9.

Applying 3 BID at vert./horiz. stabilizer junction

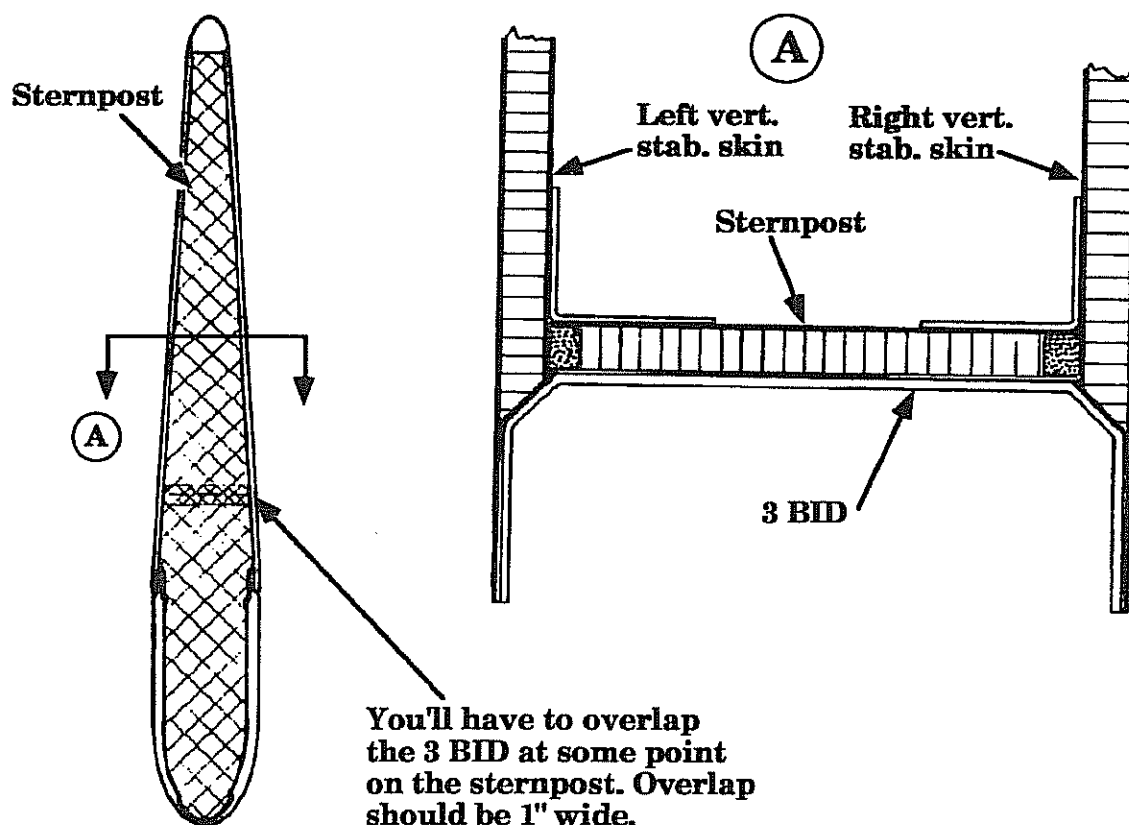
Figure 14:I:5



- I10. A fillet made of a thick epoxy/micro mixture is applied around the horiz. stab. where it joins the vert. stab. and bottom fuselage shell. The size of this fillet is personal preference, but we find the smaller the better (and lighter!). When the micro has dried, use a piece of PVC pipe of the appropriate diameter as a sanding block. Take it slow and easy when sanding, you don't want to fall into the time trap of applying micro, sanding too much off, then having to apply more micro. See Figure 14:I:5.
- I11. Sand the aft face of the sternpost and the vert. stab. skins where the 3 BID "U" shaped laminate will be applied. Clean with MC.
- I12. Apply micro radii where the sternpost joins the vert. stab. skins and the bottom fuselage shell.
- I13. Apply a 3 BID "U" shaped laminate to the aft face of the sternpost as shown in Figure 14:I:6. Since the BID is cut on a 45° bias, two segments will be needed to cover the total height of the sternpost. Simply overlap the junction of the 3 BID segments by 1".

3 BID sternpost laminate

Figure 14:I:6



- I14. Try to catch the 3 BID sternpost laminate in the green cure state and trim the laminate flush with the vert. stab. and bottom fuselage shell trailing edges. Otherwise, use a heat gun to soften the cured 3 BID along the edges and then trim accordingly.



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Vertical Stabilizer Assembly

