

CHAPTER 13

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
13-1 thru 13-5	0	None	
13-6	PB19	R&R	Changed FS 242 to 241, added NOTE
13-7	PB19	R&R	Changed FS 242 to 241, edited A4, A5.
13-8	PB19	R&R	Changed FS#'s.
13-9	PB19	R&R	Changed FS# in figure.
13-10 thru 13-16	0	None	
13-17 thru 13-19	PB19	R&R	Changed FS#'s.
13-20	PB19	R&R	Added NOTE.
13-21	0	None	
13-22	PB19	R&R	Changed FS 242 to 241.
13-23 thru 13-24	0	None	



CHAPTER 13

MOUNTING HORIZONTAL STABILIZER

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 When such revisions are made, you should immediately replace all outdated pages with the revised pages.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.

CONTENTS

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2. SPECIAL PARTS, TOOLS, AND SUPPLIES LIST
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 - B. MOUNTING HORIZ. STAB.
4. PHOTO PAGES



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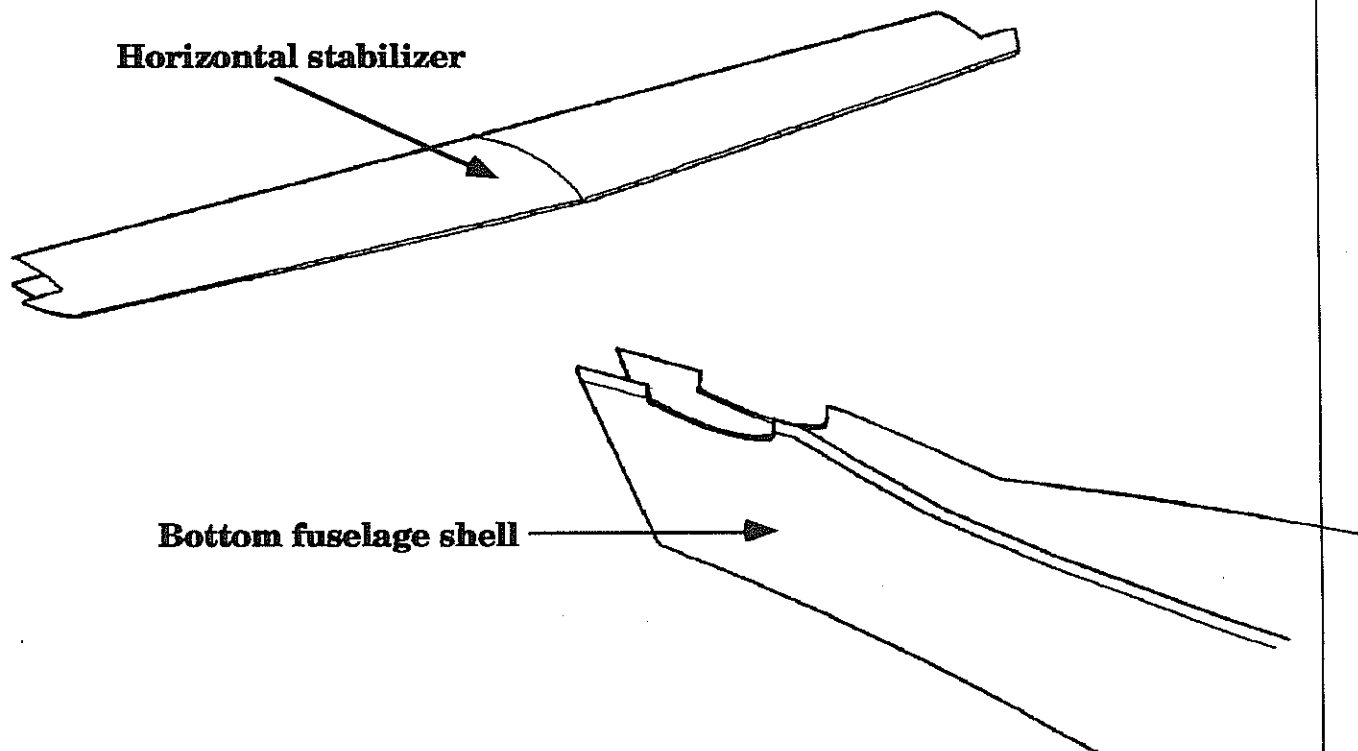
Mounting Horizontal Stabilizer

1. INTRODUCTION

Now the jumbled carbon fiber pieces you've been building start to go together and begin resembling a real airplane. In this chapter the horizontal stabilizer is mounted on a cradle you will form into the bottom fuselage shell.

Mounting horizontal stabilizer

Figure 14:i:1



Just as it was highly recommended that you paint the first few coats of primer onto the bottom fuselage shell before putting it in it's jig, it is also highly recommended that you primer the bottom surface of the horizontal stabilizer before mounting it to the fuselage. This saves the hassle of priming and sanding upside down later in construction. Don't paint the center area of the horizontal stabilizer because this area will be bonded to the fuselage later in this chapter.



2. SPECIAL PARTS, TOOLS, & SUPPLIES LIST

A. PARTS

Bottom fuselage shell
Horizontal stabilizer



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Mounting Horizontal Stabilizer



B. TOOLS

- Dremel tool
- 3' bubble type carpenter's level
- Smart level
- 25' tape measure
- Water level
- Transit
- Plumb bob
- Straight edge
- Shot bags, two (about 20 lbs each)



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C. SUPPLIES

- 1/2" thick particle board, 3" x 17"
- Fiberglass (BID)
- Epoxy
- Hysol adhesive
- Flox
- Micro
- Tongue depressors
- Release tape
- Mixing cups
- 40 grit sandpaper
- MC
- Paper towels



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Mounting Horizontal Stabilizer

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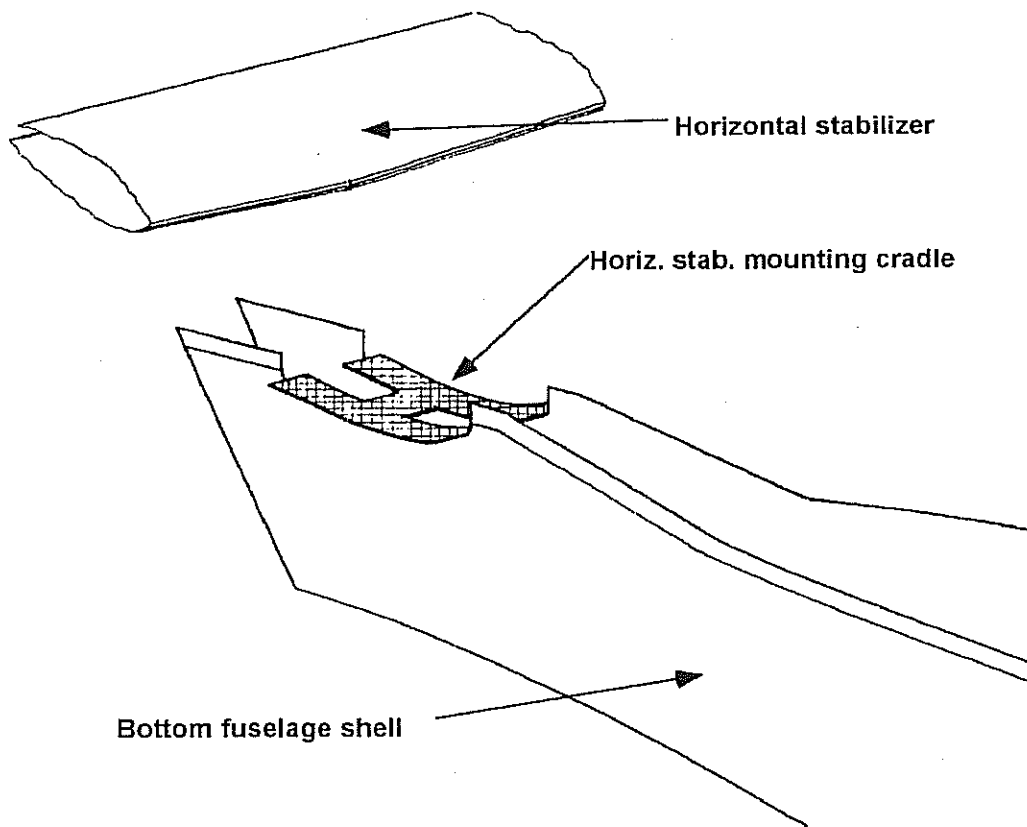
3. CONSTRUCTION PROCEDURE

A. FORMING HORIZ. STAB. MOUNTING CRADLE

The horizontal stabilizer is located using WL 22 and FS 241 as baselines. Be sure you are familiar with these reference lines. Helpful tools for positioning the horizontal stab are a Smart level, a water level, a transit, a plumb bob, and a 25' tape measure.

Horiz. stab. mounting cradle

Figure 13:A:1



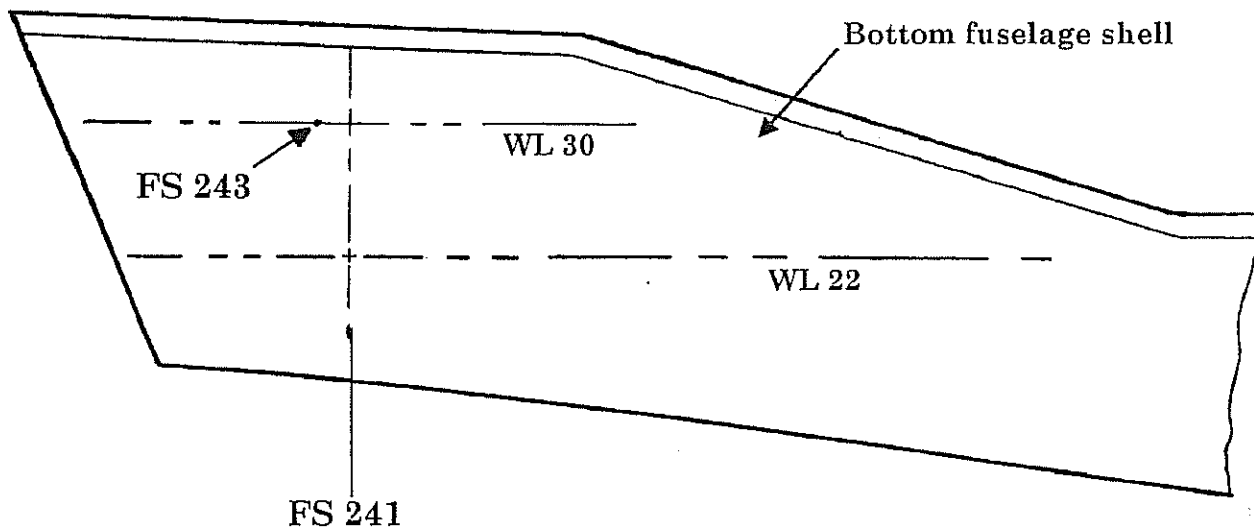
NOTE: The exact forward and aft position of the horizontal stab can vary a bit. This is not critical. The latest revision is to clear up discrepancies in the manual.

- A1. The bottom of the long fuselage joggle is located along WL 22. Using a water level, transit, or other leveling device, draw an extension of WL 22 on both sides of the fuselage under the area where the Horiz. stab will be mounted. Yes, making a straight line on a curved surface is not the easiest thing to do, so don't try to make a long line all the way to the joggle. See Figure 13:A:2.



Making reference lines for positioning Horiz. Stab.

Figure 13:A:2



- A2. Use a plumb bob to transfer FS 241 onto the fuselage sides. Mark vertical lines up from WL 22 to the top of the bottom fuselage shell.

NOTE: Remember that the fuselage leveling dimples are NOT located at FS 241, so don't use them as a 241 reference.

- A3. Measure up 8" from where WL 22 meets FS 241. The line (WL 30) through this point will be used for locating the horizontal stabilizer positioning tool.
- A4. Use a bubble type level to mark a level line at WL 30. Again, because of the curve of the bottom fuselage shell you won't be able to lay the level flat against the fuselage side. A little eyeball engineering is helpful here, sighting across the flat surface of the level to mark the line. A transit works well for this application also. Locate FS 243 on WL 30 two inches to the rear of FS 241.
- A5. Use the template on Blueprint A-065 to cut the horizontal stabilizer positioning tool from a good, stiff piece of cardboard. The reference mark on the template is at FS 243.

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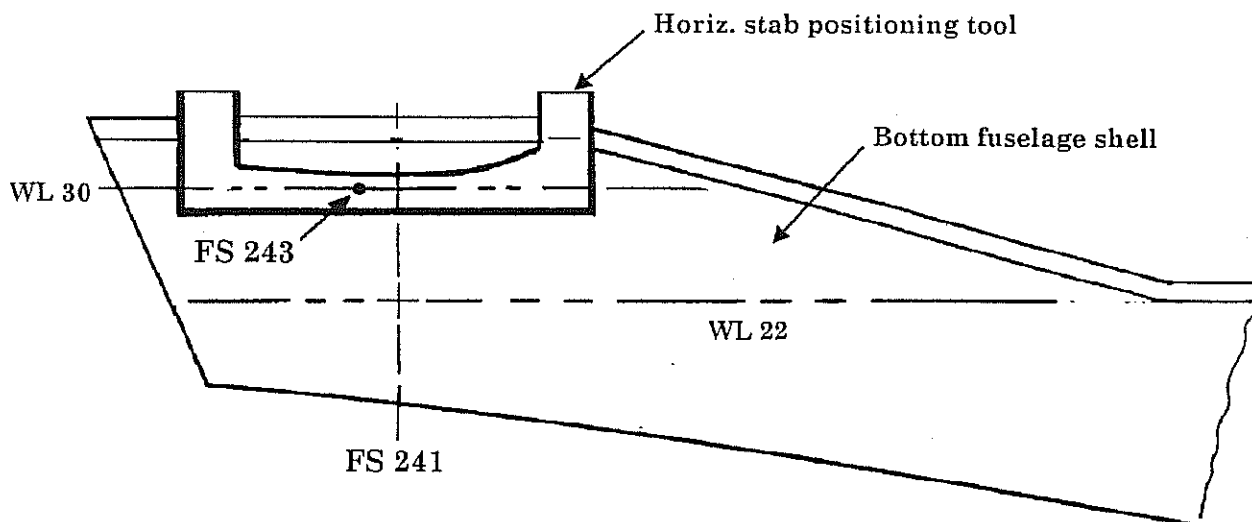
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Mounting Horizontal Stabilizer

Using the horiz. stab. positioning tool

Figure 13:A:3



- A6. Now place the positioning tool against the side of the fuselage with the WL 30 mark level with WL 30 on the fuselage and the FS 243 reference mark aligned as shown in Figure 13:A:3. Mark the outline of the horizontal stab onto the fuselage sides.
- A7. Remove the positioning tool and you will have an outline of where to cut the fuselage sides for the horizontal stabilizer mounting cradle. Trim the fuselage side to the mounting cradle lines. At the L.E. of the horiz. stab. you can cut the fuselage side vertical up to the top of the joggle. You will also have to cut off the top of the FS 241 bulkhead even with the fuselage sides.

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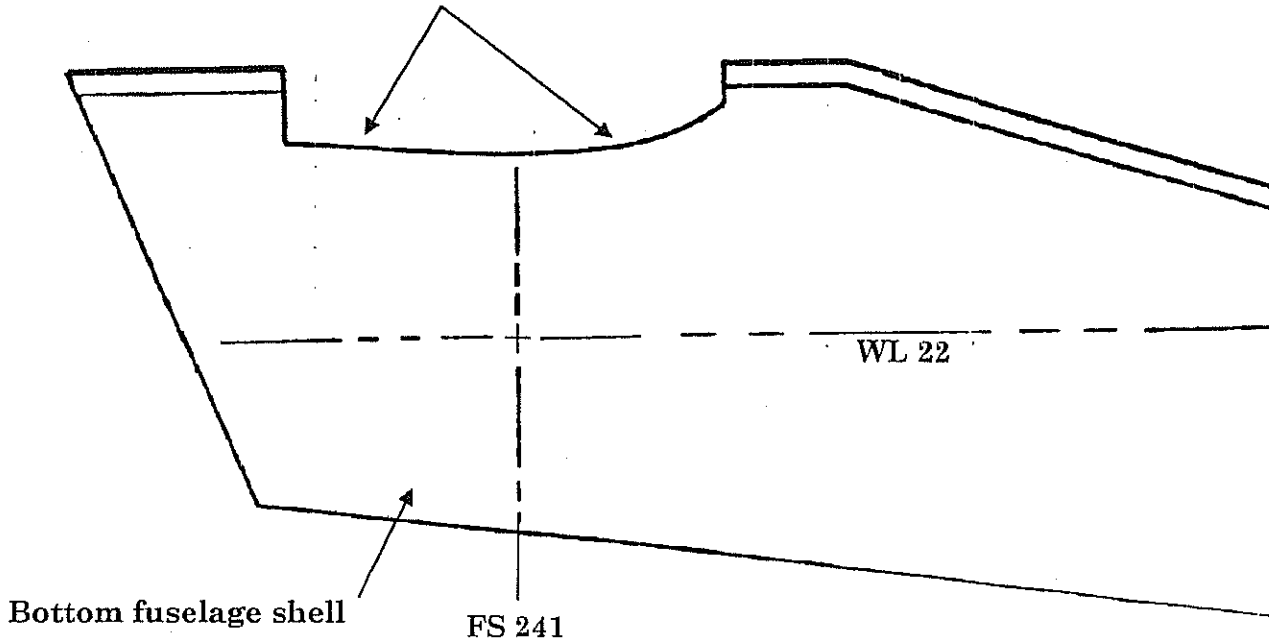
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Mounting Horizontal Stabilizer

Cutting horizontal stabilizer mounting cradle

Figure 13:A:4

The fuselage sides have been trimmed to accommodate the horiz. stab. They may be trimmed more when the stab is adjusted to the proper incidence.



- A8. At the BL 0 location of the horizontal stabilizer, make a mark at the center of the L.E. and the center of the T.E. Don't trust that your center horiz. stab. hinge is located exactly halfway between the top and bottom stab. skins. It is much safer to place a piece of masking tape between the bottom and top stab. skins, then put a mark on the masking tape that splits the total height.
- A9. Glue tongue depressors vertically to the L.E. and T.E. of the horiz. stab. where you have just made the center marks. Measure up from these marks 2" and make two more reference marks on the tongue depressors.

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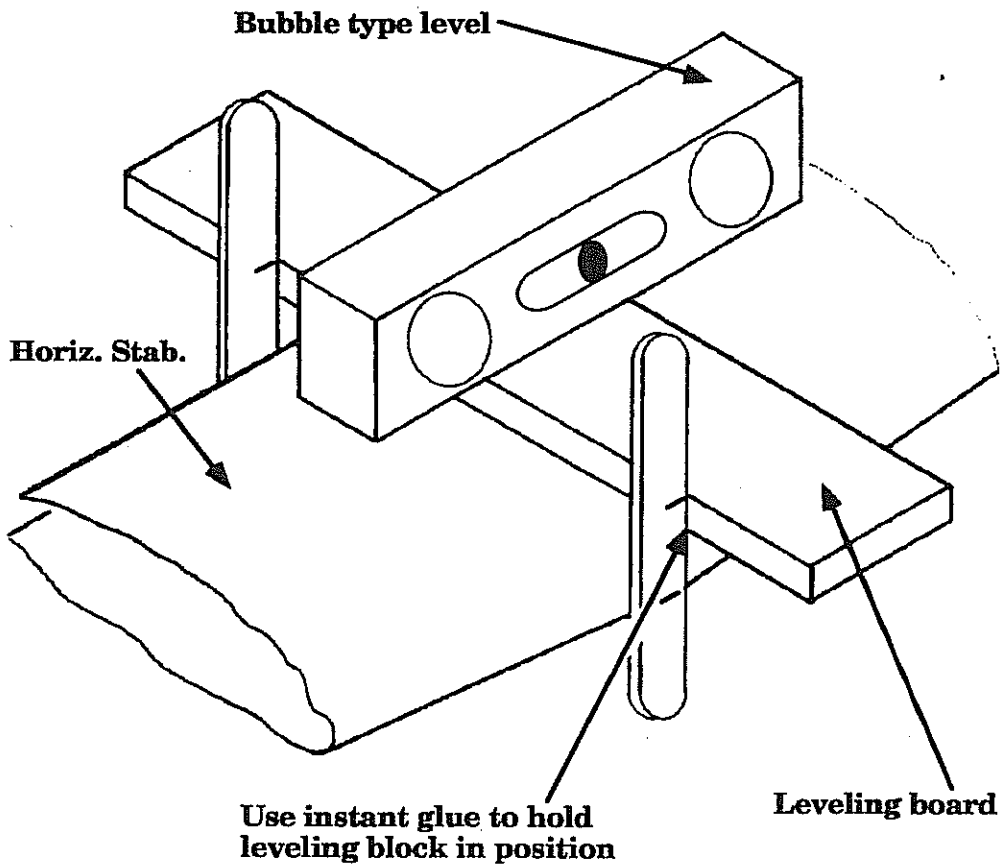
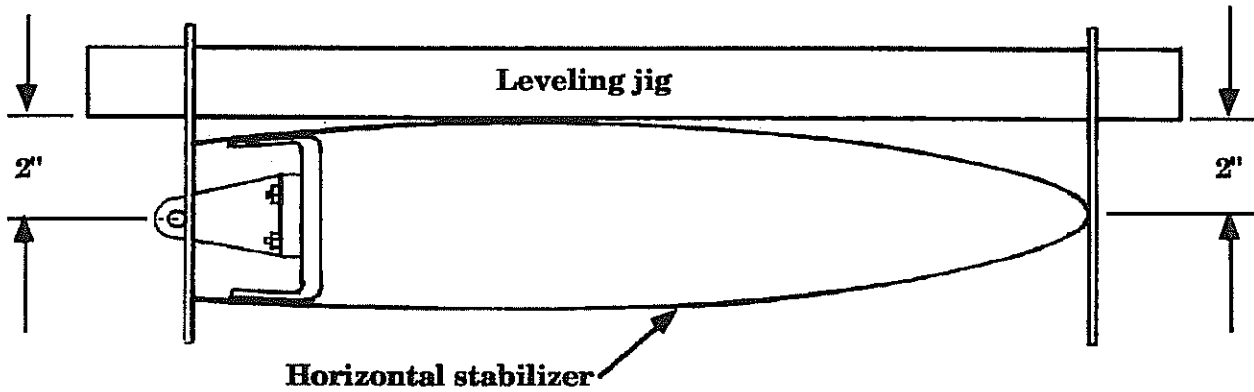
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Mounting Horizontal Stabilizer

Attaching leveling jig to stab.

Figure 13:A:5

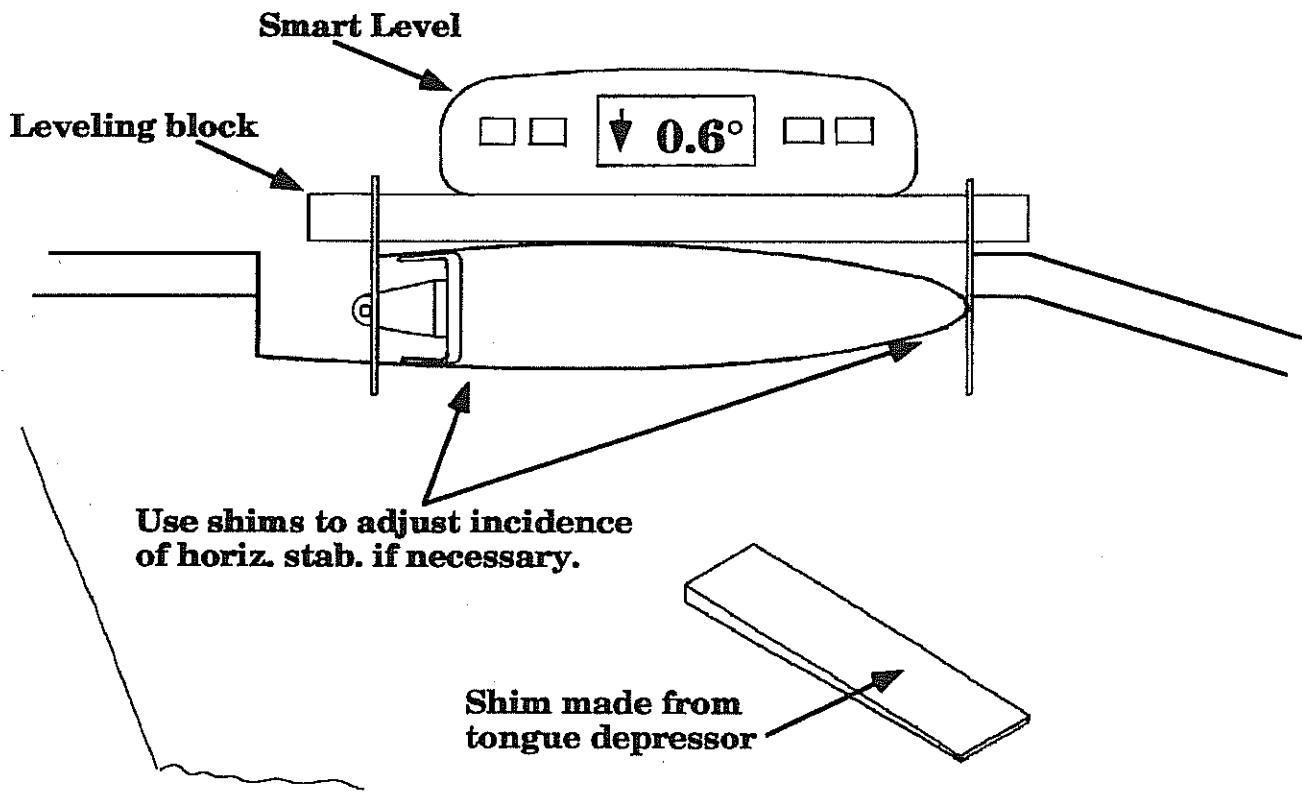




- A10. Find a straight piece of 1/2" thick particle board and cut a 3" x 17" segment. Place this particle board piece at BL 0 on top of the horiz stab and level it using the marks on the tongue depressors. Shim the piece until it is both level with the reference marks and level spanwise. Tack the leveled piece into position with instant glue.
- A11. Lay the horizontal stabilizer into position on the fuselage. Use tapered tongue depressors as shims to adjust the stab.. The first adjustment will be to attain a -0.6° stab. incidence. A Smart level is the obvious choice for this job.

Adjusting incidence of horiz. stab.

Figure 13:A:6



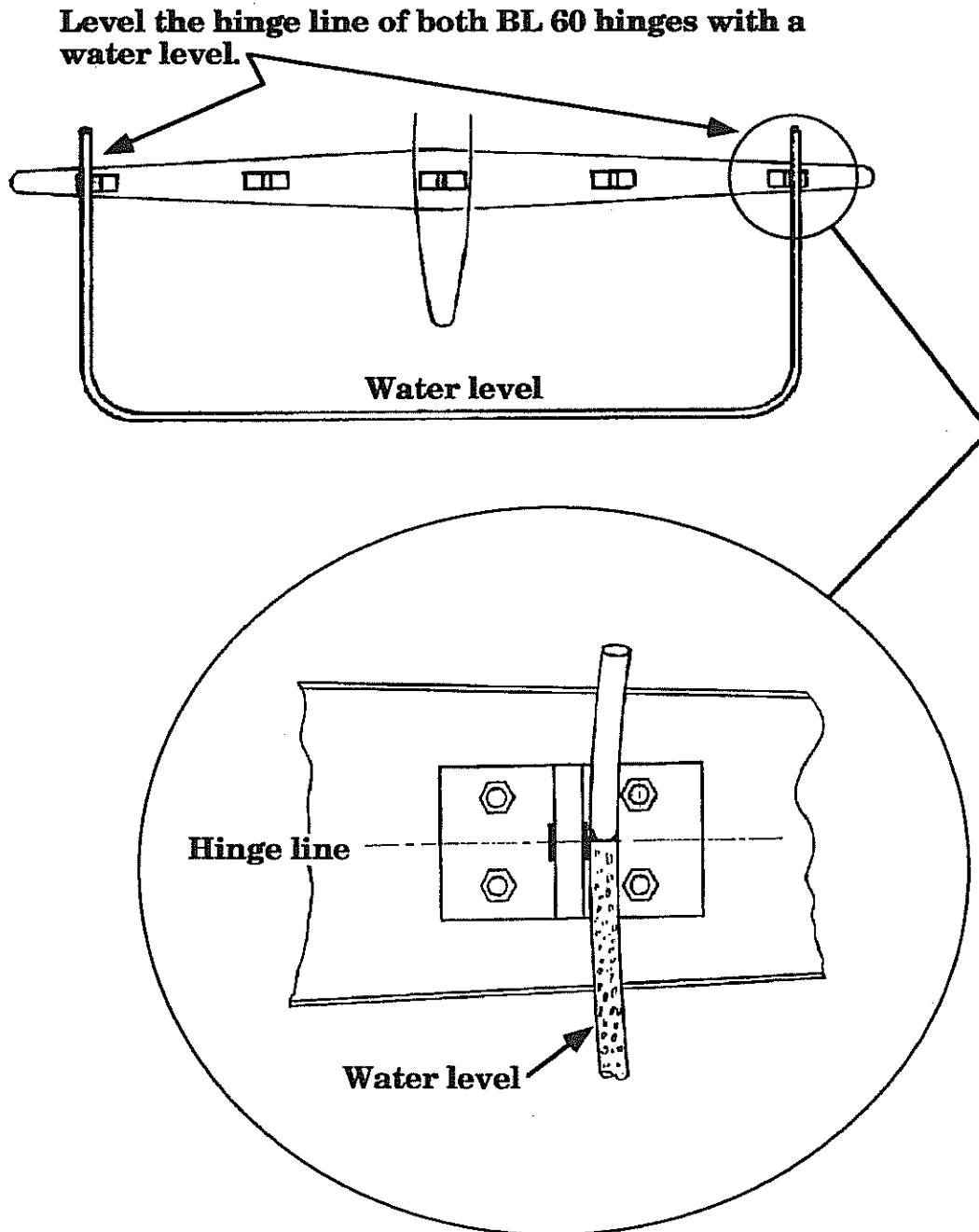
Remember that this is NEGATIVE incidence, the L.E. of the horiz. stab. is lower than the T.E..



- A12. A water level or a transit are good tools to check that the left and right tips of the horiz. stab are level with each other. The best level points in the outboard areas of the stab are the centers of the outboard hinge. Try to get the stab. leveled to within 1/8".

Leveling tips of horiz. stab.

Figure 13:A:7





A13. The last check of horizontal stabilizer alignment is to make sure that the stab. is perpendicular to the fuselage centerline. An easy way to check this is to measure (with a 25' tape measure) from the BL 0 mark at the top edge of the firewall back to the outboard hinges of the horizontal stab.. Compare the measurement to both left and right hinges and adjust the stab accordingly. *Don't* try to get the stab aligned to within a few thousandths of an inch, the airplane wouldn't even notice a 1/4" misalignment.



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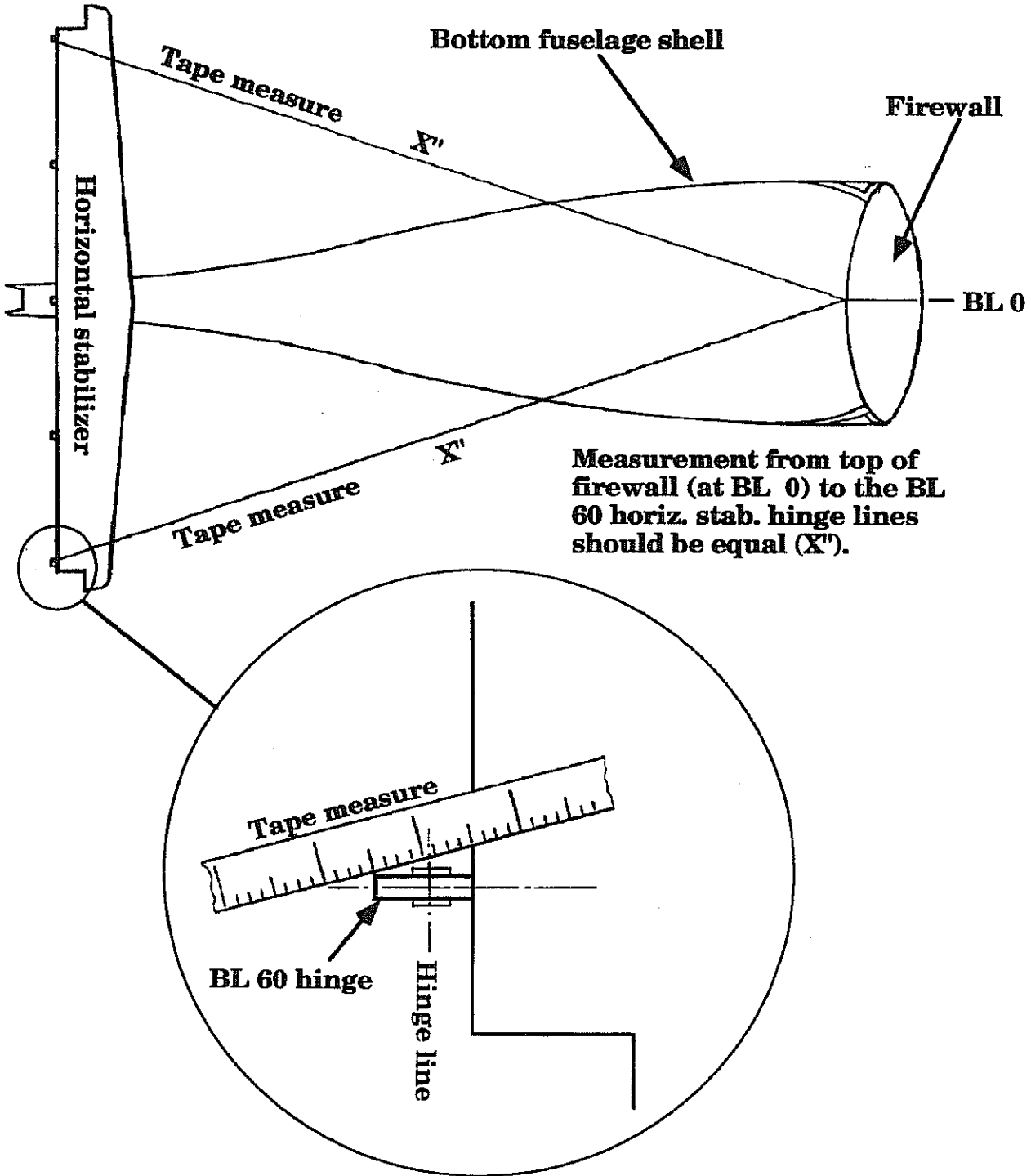
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Checking horiz. stab./centerline alignment

Figure 13:A:8



Measurement from top of firewall (at BL 0) to the BL 60 horiz. stab. hinge lines should be equal (X").

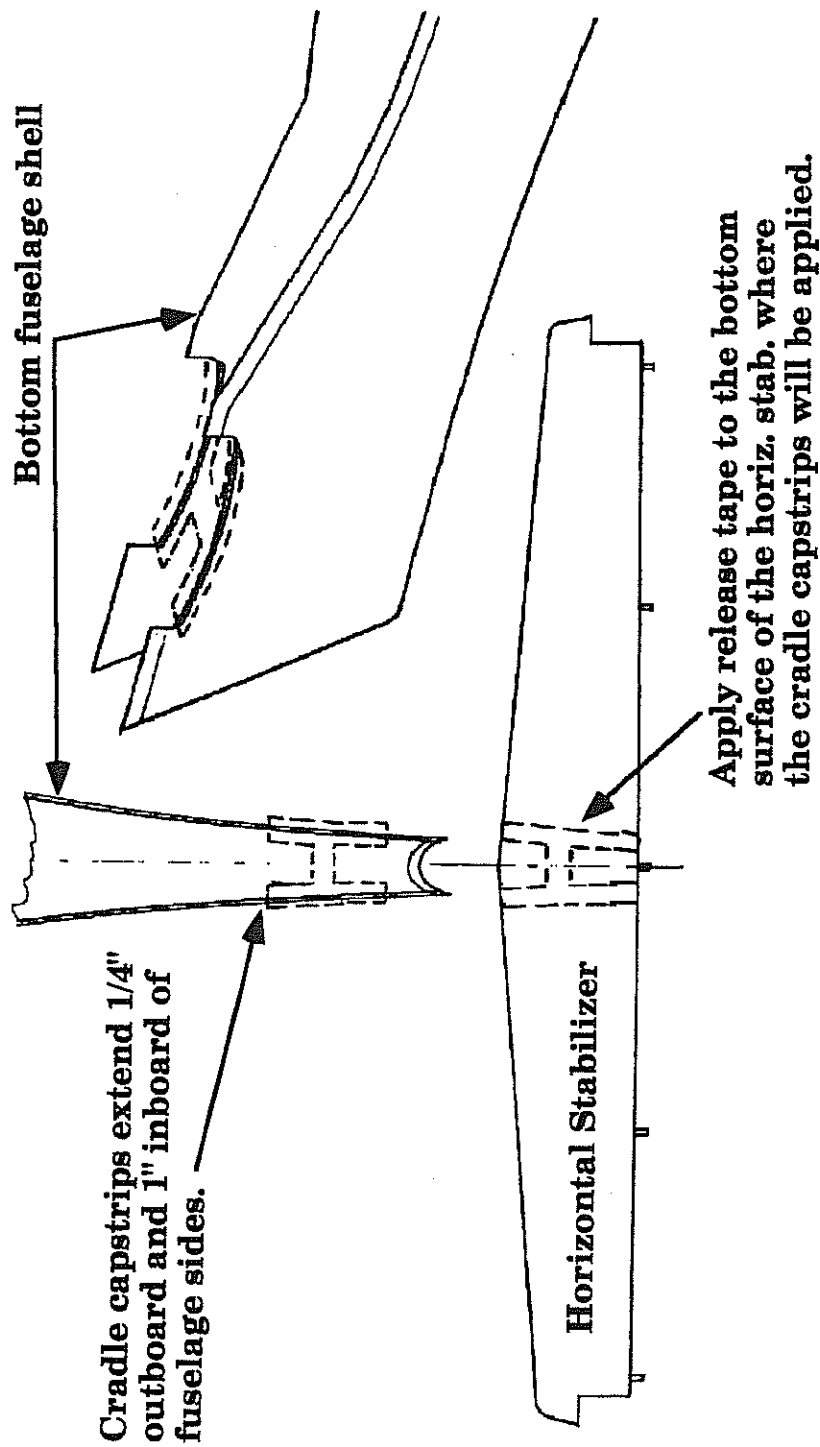


- A14. Now that your stabilizer is aligned, take note of the location and number of shims required to hold the stab in position. It's a good idea to make a few reference marks where the stab. joins the fuselage so you can quickly relocate it into position. Also make an outline of fuselage sides on the bottom surface of the stab..
- A15. Remove the horiz. stab. from the fuselage. Apply release tape to the bottom surface of the stab. where the cradle capstrips will be applied. See Figure 13:A:9.



Cradle capstrip locations

Figure 13:A:9

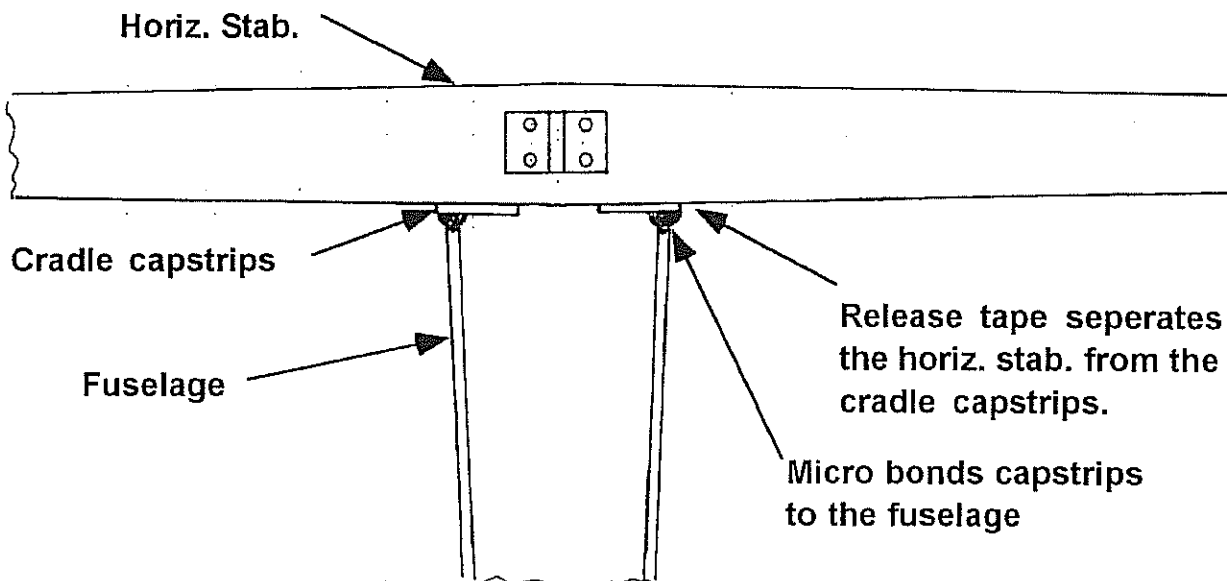




- A16. Rout out the core of the fuselage sides in the stab. cradle area and the top of the FS 241 bulkhead to form the standard 1/8 - 1/4" deep troughs.
- A17. Apply 2" wide, 2 BID capstrips to the bottom surface of the horiz. stab. Keep in mind that the capstrips only extend 1/4" outboard of the fuselage sides. Over the FS 241 bulkhead, the capstrip extends equally fore/aft of the prepreg.
- A18. Mound a thick epoxy/micro mixture in the core troughs you formed in the cradle area. Remember if you had a few tongue depressor shims in one place under the stab., you will have to mound the micro higher in that area.
- A19. Place the horiz. stab. back into position on the fuselage and realign it using the procedures in Steps A11 - A13. It's okay to have the tongue depressor shims sitting in the micro (this isn't a structural bond anyway) but you may want to trim the shims narrower.

Forming horiz. stab. mounting cradle

Figure 13:A:10

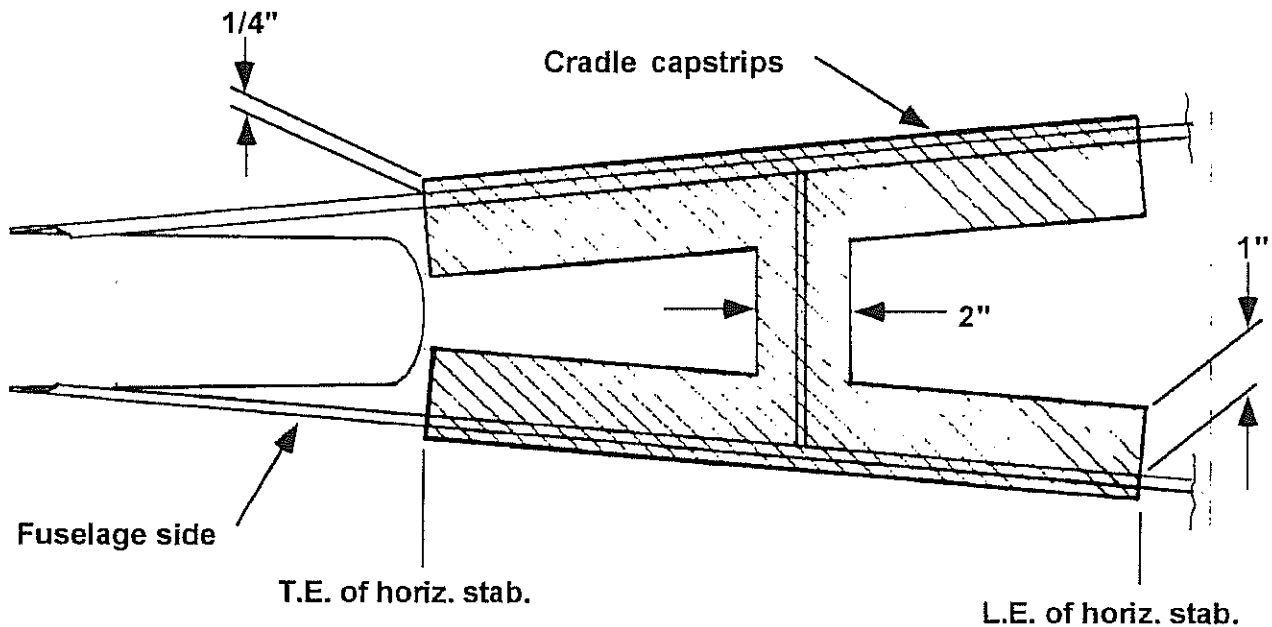




A20. After the micro and cradle capstrips have cured, remove the horiz. stab. from the fuselage. Trim the cradle capstrips as shown in Figure 13:A:11.

Trimming stab, mounting cradle

Figure 13:A:11

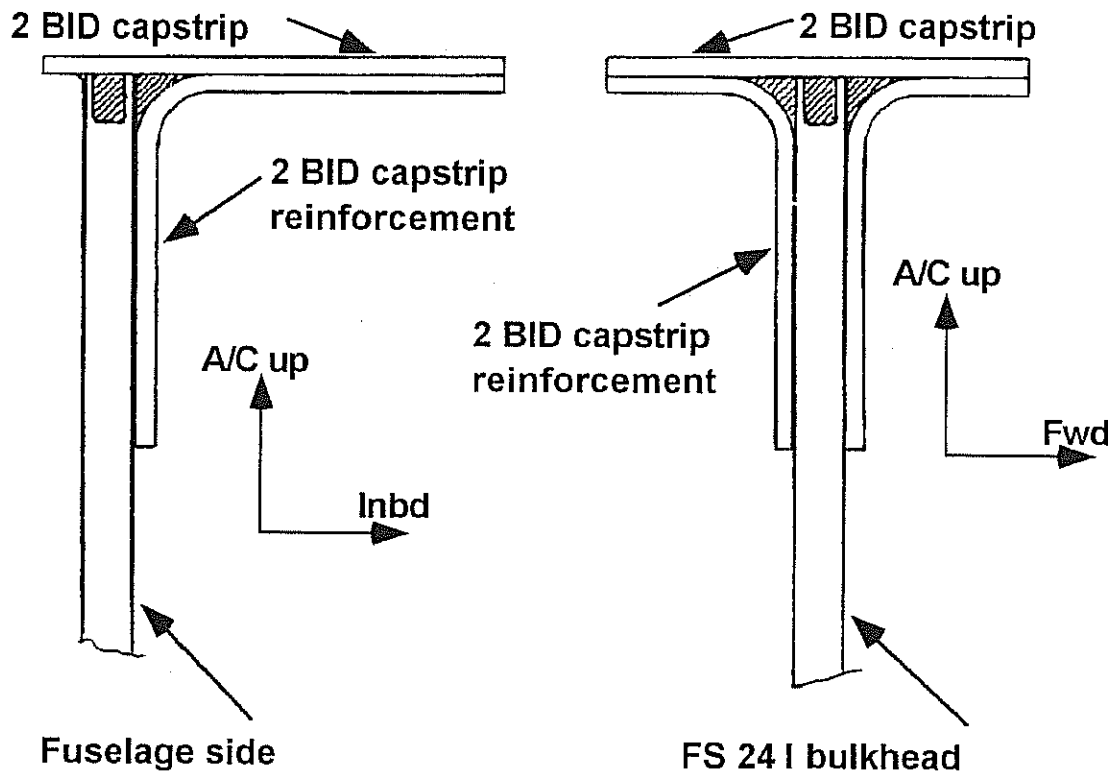


- A21. Grind away excess micro under the capstrips to form a smooth radius. Yes, this area is very tight to work in but a Dremel tool and a ball head bit will make quick work of the excess micro. If you have to add micro to get the minimum 1/8" radius, do so at this time.
- A22. With 40 grit, sand the bottom surfaces of the cradle capstrips, the fuselage sides 2" under the capstrips, and the FS 241 bulkhead 2" under the capstrips. Again, this is a tight area but you must sand it to get a good surface to apply BID. Clean these areas with MC.
- A23. Apply 2" wide, 2 BID strips to secure the cradle capstrips to the fuselage sides and the FS 241 bulkhead.



Securing cradle capstrips to fuselage

Figure 13:A:12

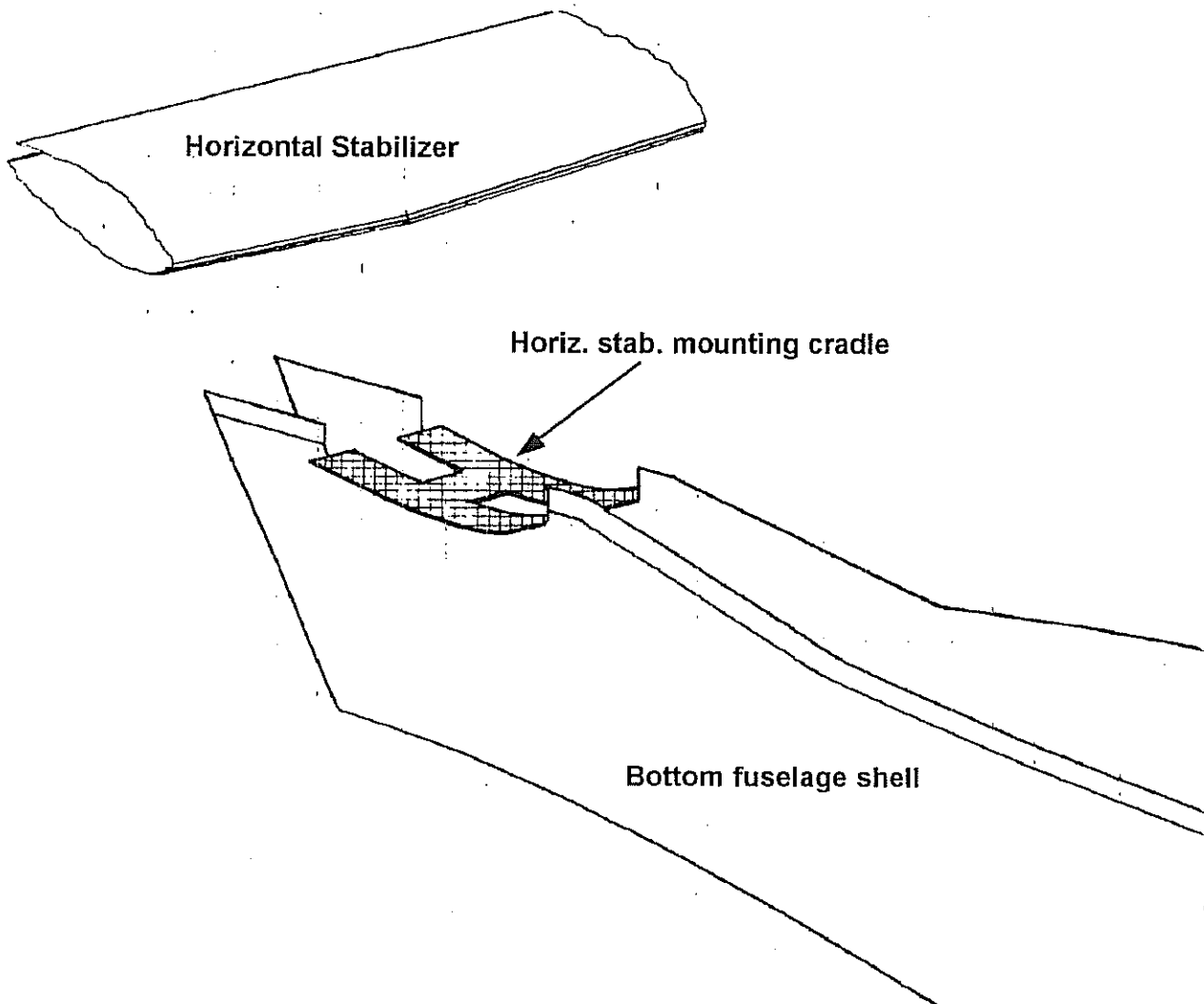


B. MOUNTING HORIZONTAL STABILIZER

In this section you will bond the horizontal stabilizer into the mounting cradle. More BID tapes will secure the stab. to the fuselage, but these are not added until the vertical stabilizer is built.

Mounting horizontal stabilizer

Figure 13:B:1



Note: On the fast build fuselage. Before bonding the horizontal stabilizer into position, check that the fuselage is level and that the horizontal stab. is level from tip to tip. Also, check for the correct incidence.

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Mounting Horizontal Stabilizer



- B1. Do a test run to assure yourself that the horizontal stabilizer fits into the cradle okay and your alignment is satisfactory. To help keep the stab. from drifting out of alignment while curing, use instant glue to bond a couple small wood pieces to the bottom surface of the stab., butted up against the fuselage sides. Make a few reference marks to help locate the stab. in the fore/aft direction.
- B2. To prepare the mounting cradle for bonding to the stab, sand the cradle capstrips with 40 grit and clean those surfaces with MC.
- B3. Repeat the sanding/cleaning procedure on the bottom surface of the horizontal stabilizer where it will be bonded to the cradle capstrips.
- B4. Mix up a batch of Hysol (it doesn't take much, maybe 5 ounces) and apply a thin film to the bonding areas of the horiz. stab. and the cradle capstrips. Mix a little flox into the Hysol and spread a thicker coat, mounded at the center, onto the cradle capstrips. Don't go overboard on the Hysol, your stab. should conform to the cradle to within .020".



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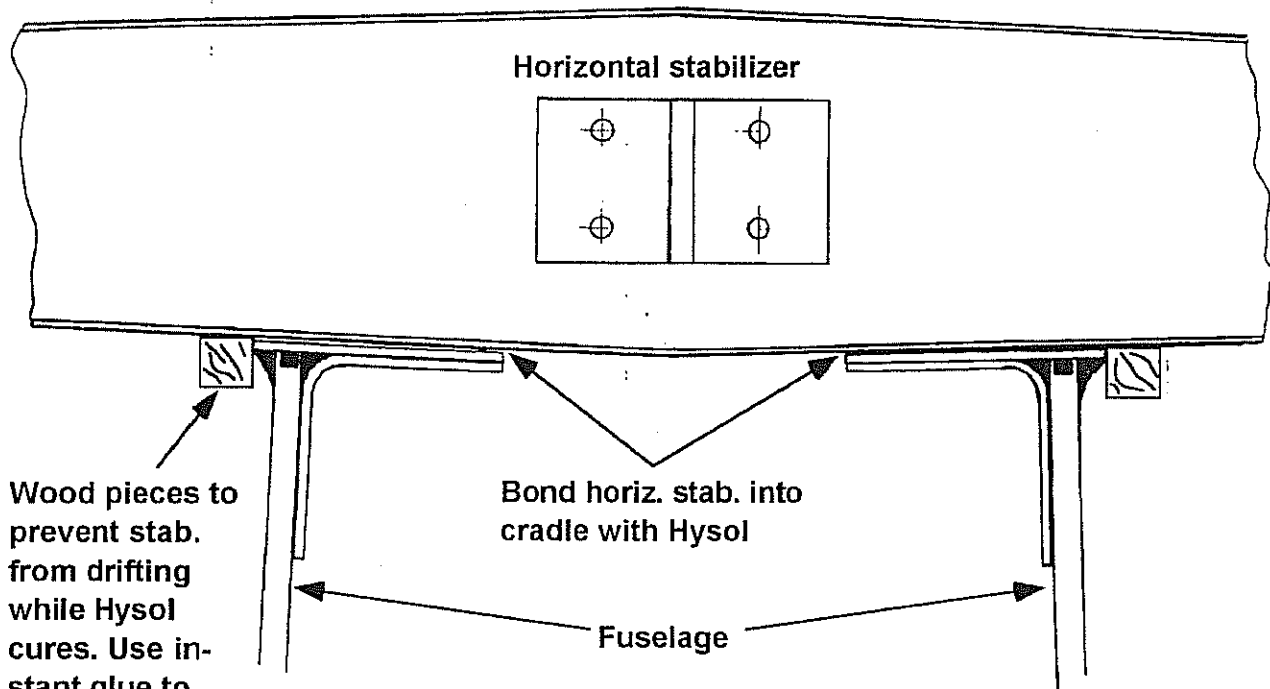
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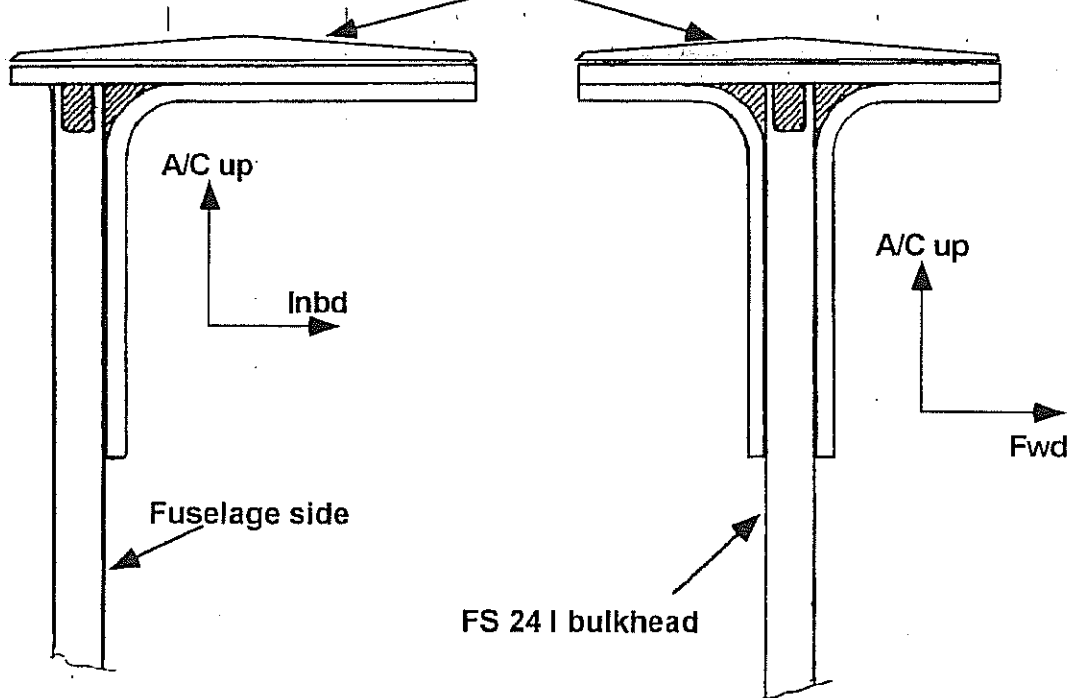
Mounting Horizontal Stabilizer

Bonding horiz. stab. to fuselage

Figure 13:B:2



Hysol, mounded toward center of cradle capstrips



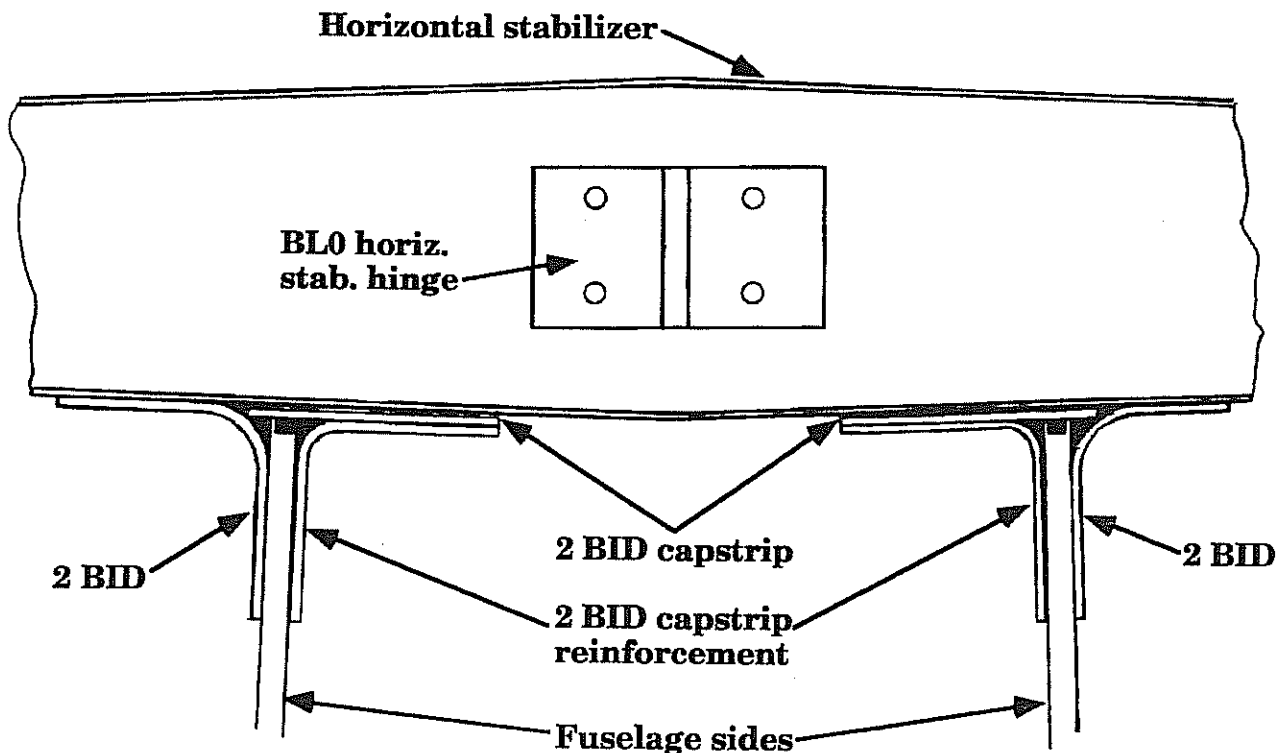
- B5. Place the horizontal stabilizer into position on the fuselage. Weight the stabilizer with one shot bag (20 lbs) on each side of the leveling block.
- B6. Now realign the horizontal stabilizer for the final time using the procedures in Steps A11 - A13. If a small adjustment is necessary, you can insert a small shim between the stab. and the cradle to raise a certain point. Be sure you have squeezeout of excess Hysol. It is a good idea to recheck the stab. alignment after ten minutes because the Hysol may have settled changing alignment somewhat.

Note: Now comes the real problem, how to keep your cat from jumping up onto your perfectly positioned stabilizer and sleeping on one tip that night. Just be sure nothing or no one can bump the stab. while it's curing.

- B7. When the Hysol has cured, remove the weights. Sand the area where the bottom surface of the horiz. stab. meets the fuselage sides. Clean these areas with MC.
- B8. Apply micro radii where the bottom surface of the horiz. stab. joins the fuselage sides.

Securing bottom horiz. stab. surface to fuselage

Figure 13:B:3



B9. Apply 2 1/2" wide, 2 BID strips to secure the bottom surface of the horiz. stab. to the fuselage sides. The top surface of the horizontal stabilizer will be secured to the vertical stabilizer later in construction.



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Mounting Horizontal Stabilizer

