

# CHAPTER 4: WHEEL WELL PREPARATION

## 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 When such revisions are made, you should immediately replace all outdated pages with the revised pages.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 particular assembly step. However, time goes on and changes are made, so careful attention should be paid to the orientation arrows. That old cartoon of the guy agonizing over the plans for his canoe, built one end up, one end down, should not happen in real life. Especially to you.

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**1. INTRODUCTION**

This short chapter will see you through the sealing off of the cockpit from the wheel wells, and guide you in the preparation of the load transfer pads that transfer fuselage load to the wing.



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## 2. DRAWING LIST

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**3. EQUIPMENT REQUIRED**

**A. Parts**

- Landing gear assembly, main
- (2) AN970-4 washer
- (2) AN4 bolt



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**B.**

**Tools**

- Drill motor
- Drill bits:
  - 1/4" 5/8" (or hole cutter)
  - 7/8" (or hole cutter)
- Tape measure
- Utility knife



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- C. Materials & supplies**
- 1/4" phenolic material
  - BID material
  - Epoxy
  - Micro
  - Flox
  - .090 Aluminum material
  - 2 BID prepreg panel
  - Duct tape (for release)
  - Instant glue
  - Peelply or similar

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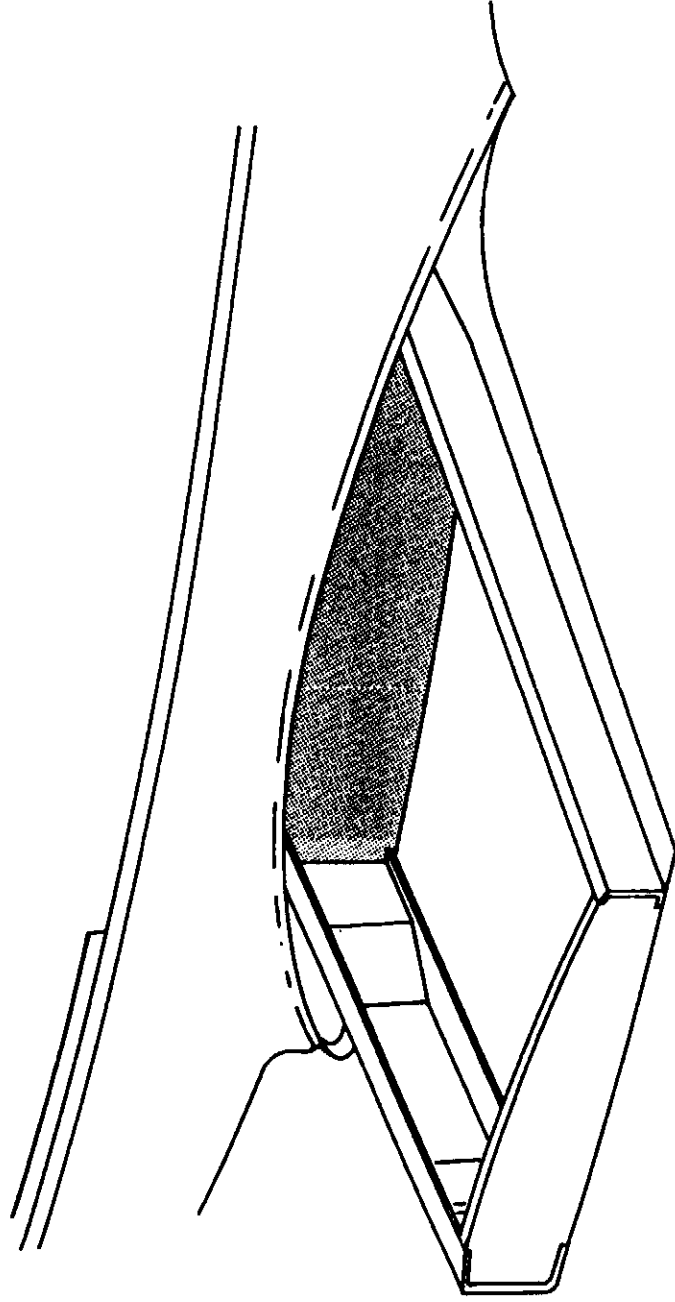
#### 4. PROCEDURE

##### A. Cockpit Closeout Rib

The cockpit closeout ribs will seal the cockpit off from the landing gear wheel wells. They will also be used for the outboard seat belt attachment and the inboard main gear door hinge attachment. To begin the following steps, your fuselage assembly should be right-side-up, level and well supported.

#### Cockpit closeout rib

Figure 4-1



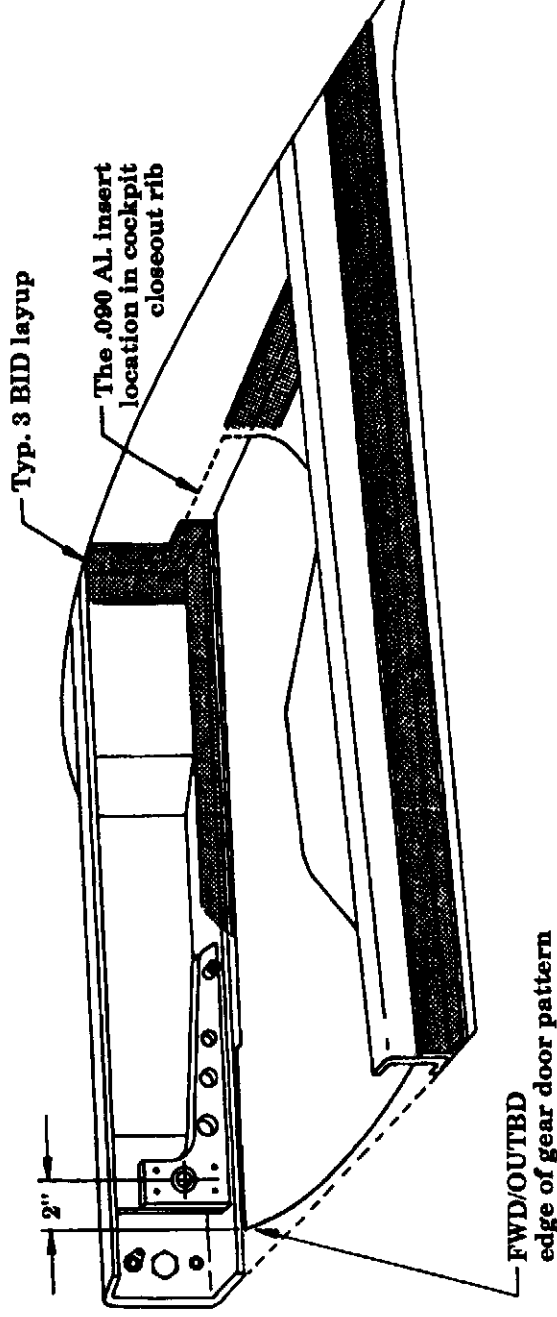
1. The closeout ribs (see blueprint "K") will install at approximately BL 19.25 (measured along their most outbd lower face). This rib position is primarily dictated by the required clearances for the landing gear when retracted. Before installing the closeout ribs, check the required dimensions on Blueprint "B" which has the gear door cut out pattern.

**NOTE:** The closeout rib will be installed with an outward "lean" of 6-12°s (i.e., the lower surface of the rib is more inbd than the upper surface). This lean should be established to provide adequate clearance for the tire when fully retracted. A fit check using the gear should be made to make sure you've got adequate clearances for the gear when retracted. The rib should be positioned perpendicular to the main spar since this will establish the inbd gear door axis.

There should be 3/8" clearance from the wheel to the closeout rib when the gear is retracted. You can install the landing gear assembly in a temporary fashion by simply inserting the gear in the GM4 fwd attachment and positioning the fwd to aft strut perpendicular. Lay the gear on the belly pan and check for tire clearances from the closeout rib.

### Gear door area

Figure 4-2



2. Fit the .090" aluminum into the outbd faces of the cockpit closeout ribs per figure 4-3. If you are using foam core ribs, see figure 4-4; if you are using the honeycomb prepreg panels, figure 4-5 shows an acceptable approach to potting in the aluminum.

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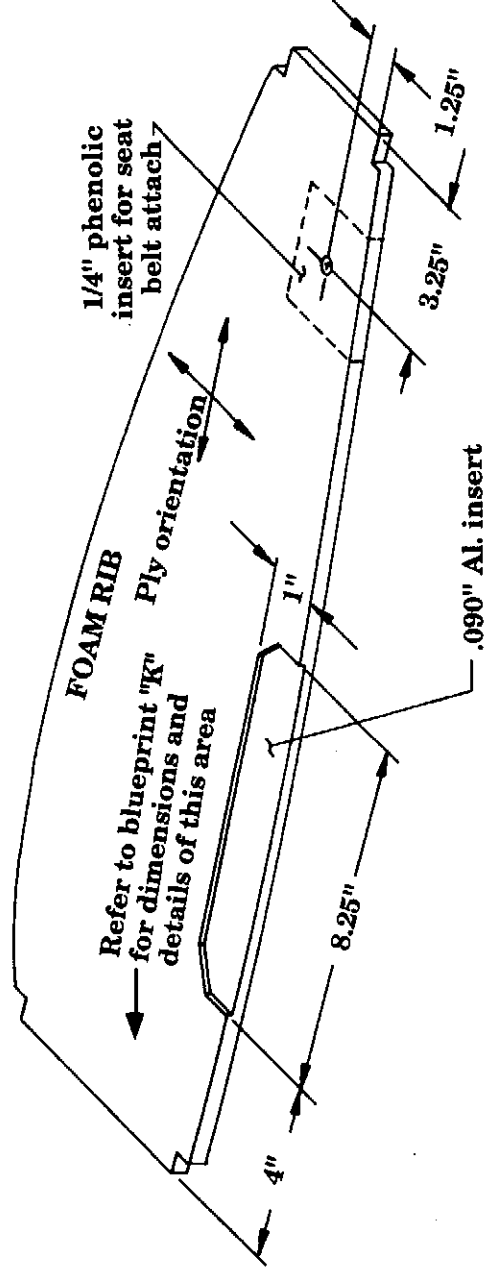
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3. Pot in the 1/4" phenolic for the outbd seat belt attach per figures 4-3 and 4-6.
- NOTE: Prior to installing the cockpit closeout ribs, read section 4.B. on "Fslg Jack Points", page 4-13.
4. With the fit established, pot the ribs into position in the usual manner using micro.
5. Add 3 BID around the junctures of ribs to fslg (using 3" wide tapes). Add 3 BID to the rib to spar junctures (except where the load transfer pads will later be installed - do not add any BID there at this time).
6. Add the additional BID ply schedule to form the outbd seat belt attach point. See figures 4-3 and 4-6.

**Cockpit closeout rib  
Figure 4-3**



7. Add 3 BID to outboard side of cockpit closeout rib.

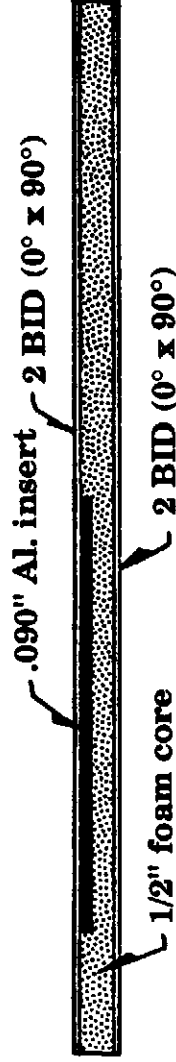
NOTE: Do not apply the above BID adjacent on the outbd side where the gear door will be cut out later. It won't do any harm but simply not necessary since that area will be cut out anyway.

# COCKPIT CLOSEOUT RIBS

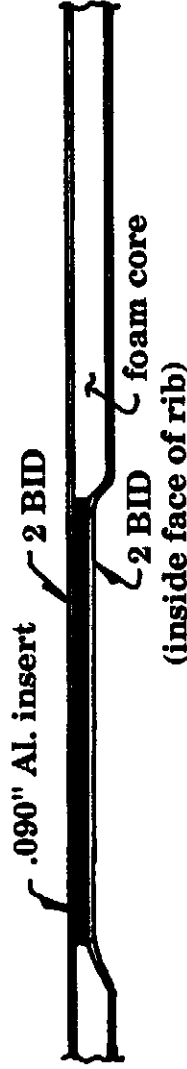
FIGURE 4-4

## SHOWING ALUMINUM INSERT FOR INBD GEAR DOOR HINGE INSTALLATION WITH A FOAM CORE RIB

**NOTE:** The alternate method is considered to be preferred. This alternate method also allows the installation of MS24694-S5 machine screws in place of the structural pop-rivets thus allowing full removal of the inbd gear door hinge sections.

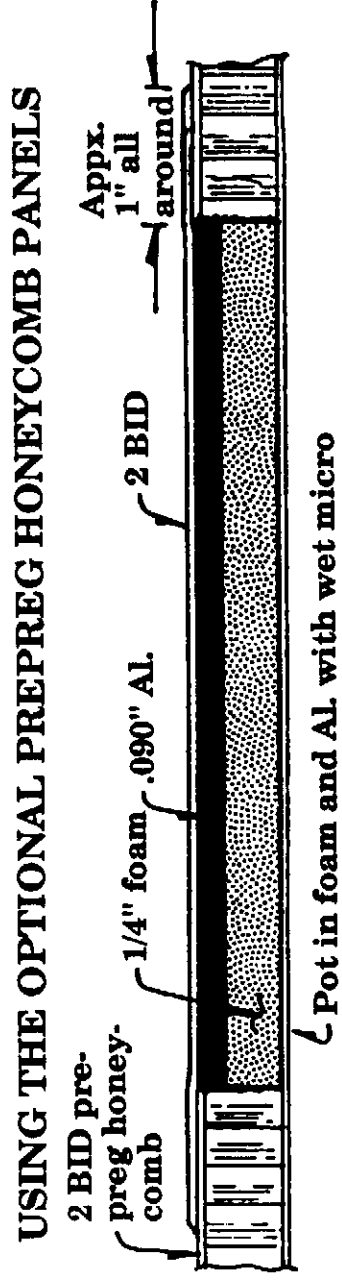


## ALTERNATE CLOSEOUT METHOD (PREFERRED)

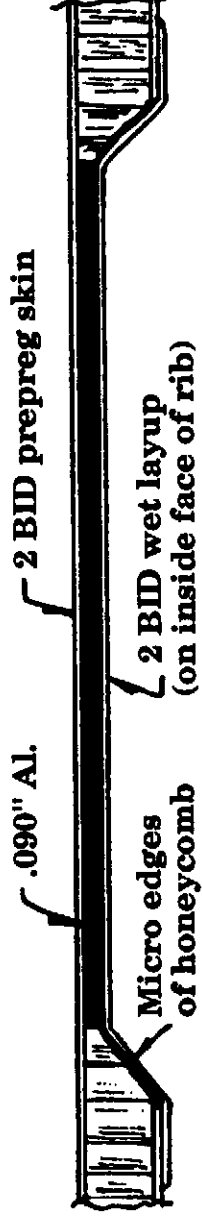


# COCKPIT CLOSEOUT RIBS

FIGURE 4-5

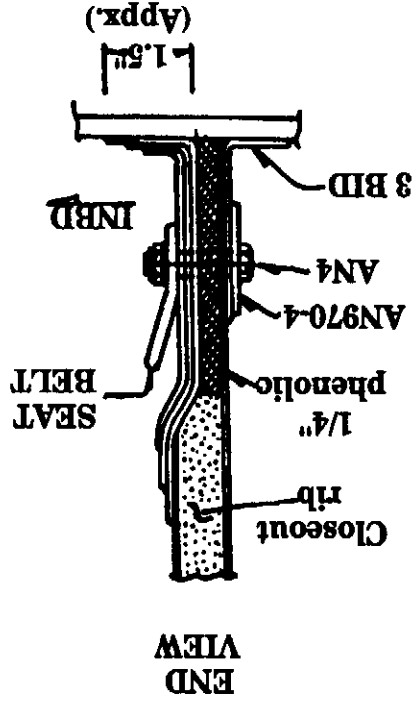
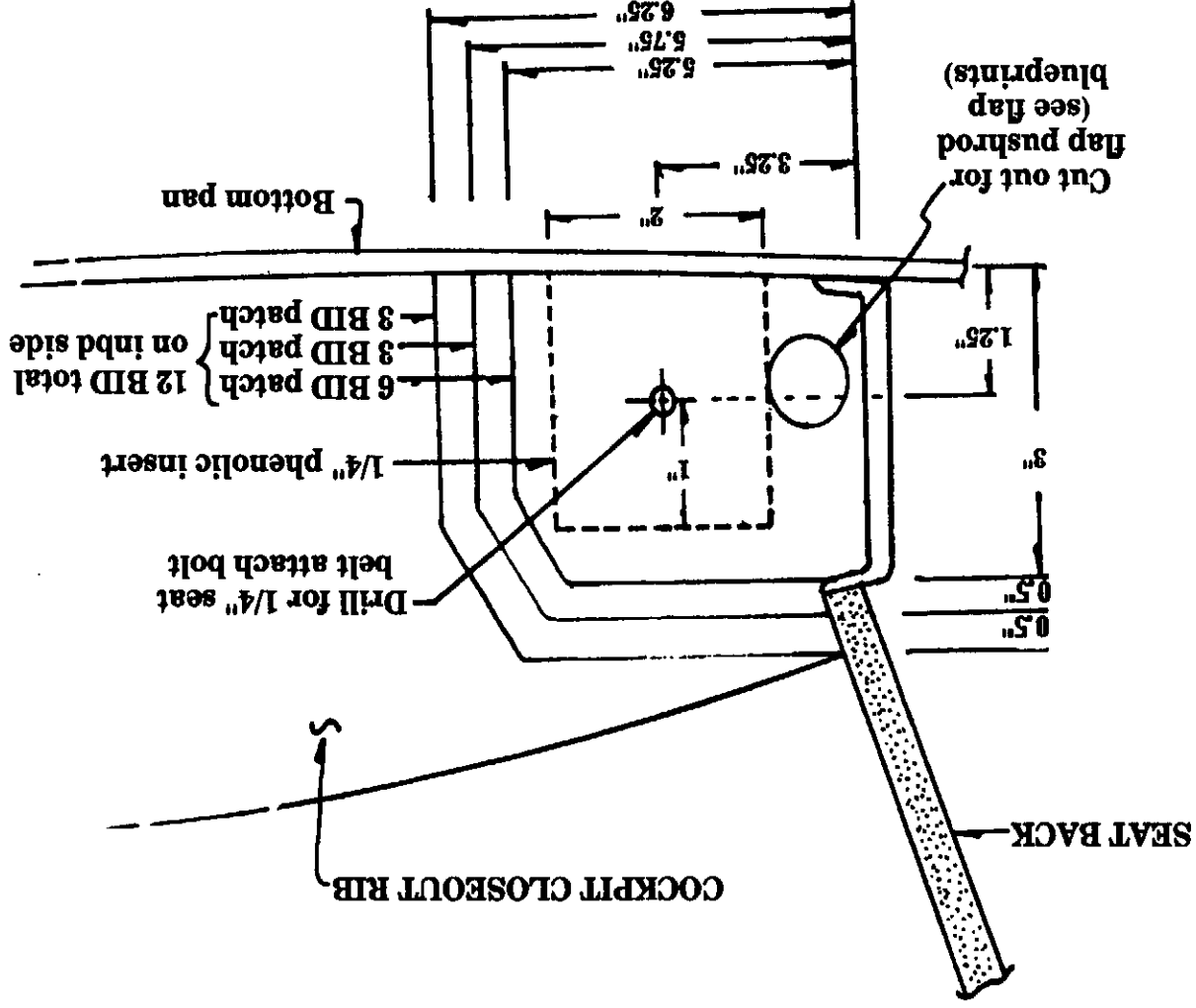


## ALTERNATE CLOSEOUT METHOD (PREFERRED)



# OUTBD SEAT BELT INSTALLATION

FIGURE 4-6



## B. Recommended FSLG Jacking Points

It should be obvious that from time to time you will want to jack the plane up to run gear retraction tests. There are several methods acceptable, but this is the preferred method:

1. Mark, on the bottom fsig pan, the location of both cockpit closeout ribs.
2. Per figure 4-7, mark out the area for the 1/4" phenolic or aluminum insert that will go into the bottom pan.
3. Pot these pieces into the bottom pan **prior** to the installation of the cockpit closeout ribs. As the ribs, hydraulic cylinder attachment and load transfer pads are added, a natural jack point will be developed.
4. Drill a 1/4" hole in the center of the insert, which can later be used as a centering pin location for the jacks.
5. Depending on the type of jacks used, fashion a jack receptacle with a 1/4" bolt end in the center for alignment, as shown in figure 4-7. Be sure that your receptacle fits well onto the jack and does not have the ability to slip off!!!
6. From these two points the plane can be safely jacked up and off the main gear. The tail will need to be held down to raise the nose gear. The typical approach is to fill a bucket with cement and attach it to either to the tail tie down ring or use a wide strap over the tail cone fwd of the horizontal stabilizer. It does not require too much weight to hold the tail down.

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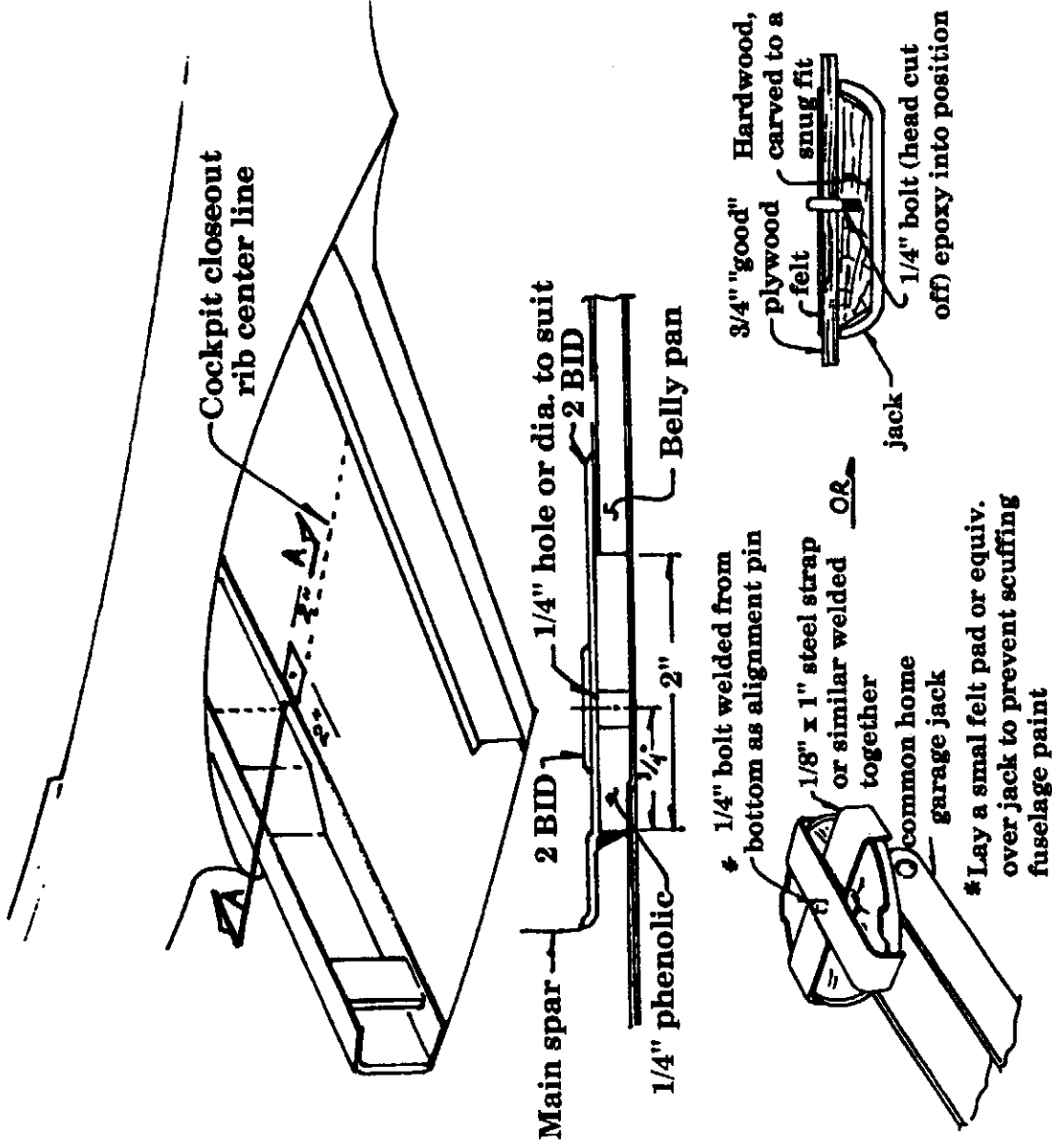
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# Installing hard points for FSLG jacking points

Figure 4-7



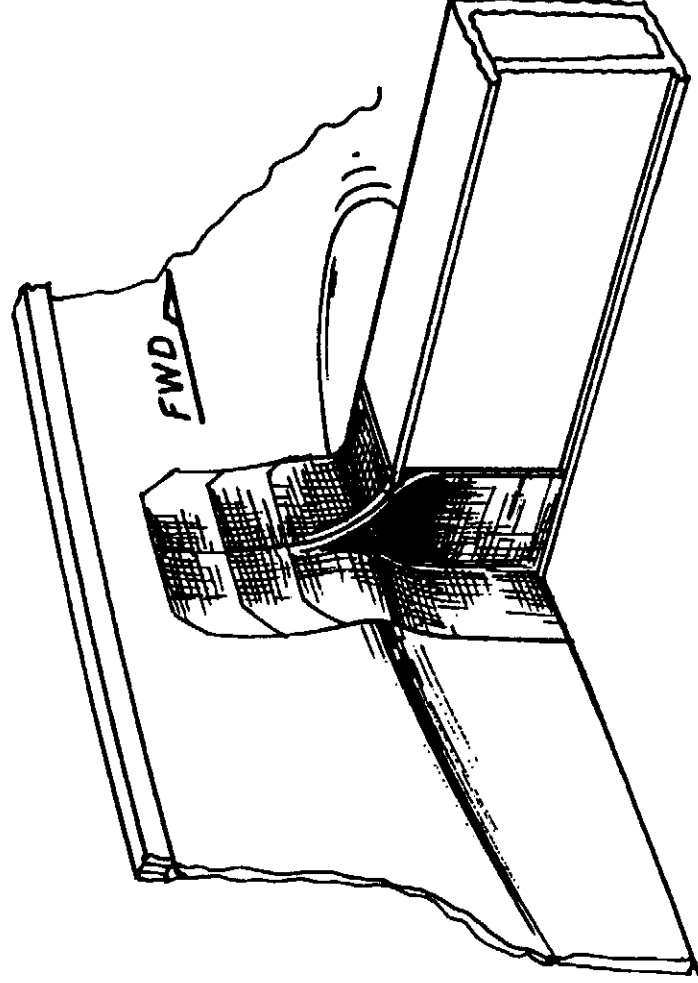
### C. CTR Spar Load Transfer Pads

These load transfer pads will transfer the load of the fslg onto the wing which must carry these loads during flight. With the Lancair design, much of the loads such as aux. fuel, main landing gear and pilot/passenger will automatically transfer themselves into the wing directly due to their relative positions.

This will be a multi-layered wet layup performed in two separate stages.

### Load transfer pad

Figure 4-8

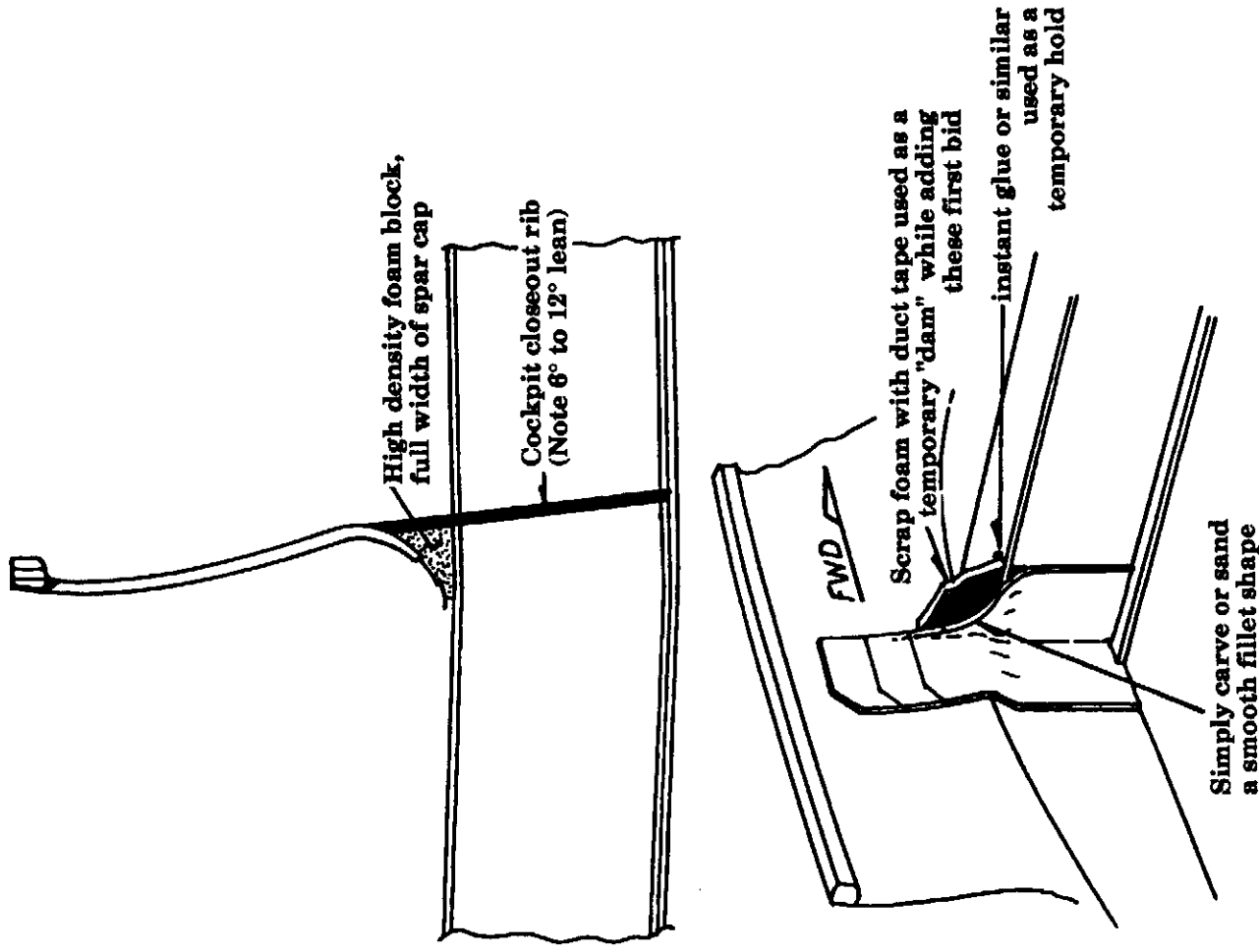


1. Prepare the bonding areas of the fslg, main spar cap, main spar web and closeout rib in the typical manner by roughing up with sandpaper and cleaning with MC.
2. These BID tapes will be applied over the high density foam that has already been fitted into the triangular area between fslg fillet and upper spar cap. This high density foam should be sanded so as to form a smooth transition from fslg fillet (inner cockpit side) to the upper spar cap. A small radius will be required at the spar cap juncture.

3. Form a **temporary "dam"** that will position on top of the spar cap and against the foam block side per figure 4-9. This can be made of anything handy; scrap foam with a coating of duct tape as a release seems to work well. This may be instant glued into temporary position. Its purpose is simply to provide a surface for the transition web to be laid up on.

### Forming temporary "dam"

Figure 4-9



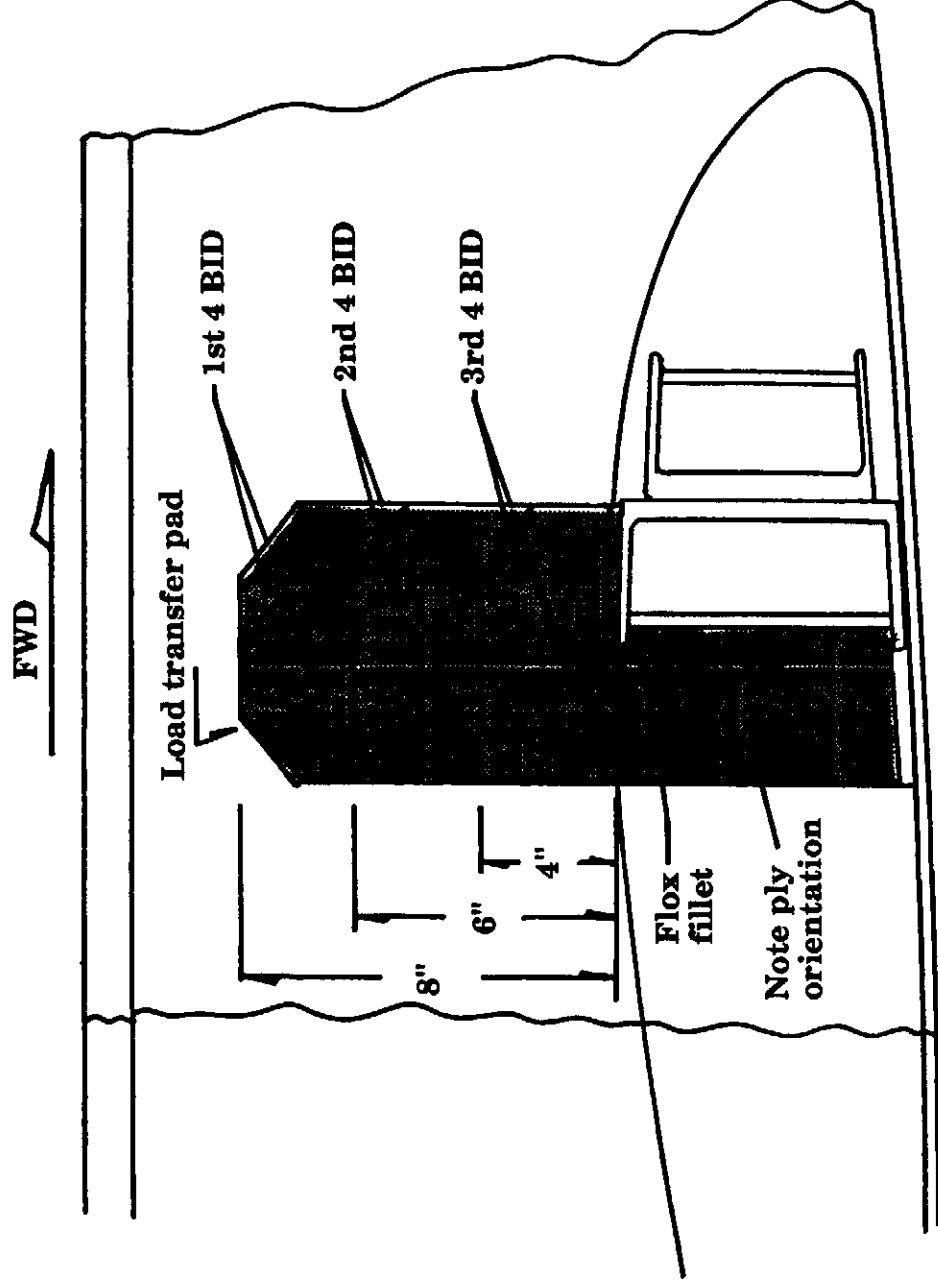


4. The 12 BID layout is best applied in three separate 4 BID applications. Apply the first 4 BID application starting at the fslg bottom extending vertically up the side of the fslg to a point 8" above the top of the spar cap. Be sure to contact 3" of the spar closeout web and 3" of the cockpit closeout rib and fslg side.

**NOTE:** The area of the spar web just below the top spar cap should have a generous fillet of epoxy/flox to transition from the web to the cap. See figure 4-10. Also note the area of contact on the "dam" which will form a transition fillet from spar web to fslg side. See figure 4-9.

### BID plan for transition web

Figure 4-10

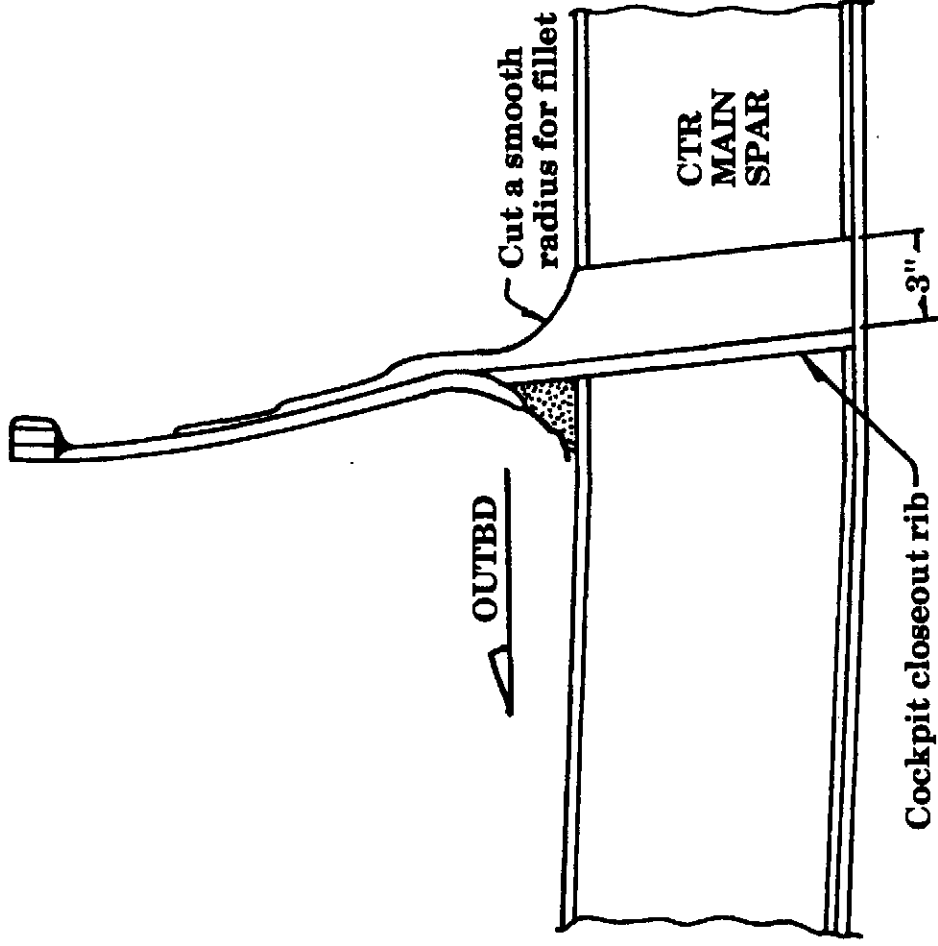


5. Add the next (2nd) 4 BID layout over the first 4 BID layout. It will extend only 6" above the top spar cap.

6. Add the last (3rd) 4 BID layup over the first two. This one will extend only 4" above the top spar cap.

### Trimming fillet area

Figure 4-11



7. It will be advantageous to use peelply or similar over this layup to attain a nice smooth transition of the 12 BID into the fslg side (which will be open to the cockpit). If you don't have "peelply" then use dacron cloth since it's the same thing. The peelply will be applied as if it were an additional layup. When the epoxy has cured, it will simply peel off, leaving a smooth surface underneath.

8. The above layup should be left to cure but the fillet area against the "dam" can easily be trimmed to the proper shape (see figure 4-11) when the layup is in the "green" state. This is usually (depending on temperature) from 4 to 7 hours after application. Use a utility knife for trimming. Allow to cure. (The fillet shape can also be ground in later after cure).
9. Remove the "dam" and clean/prepare the exposed area of the fillet for subsequent bonding.
10. Apply 3 (4 BID) bonding tapes to the fwd area in a similar manner as described above, see figure 4-10. These tapes must contact 3" of the full width of the top spar cap. They will extend vertically up the fslg to match the above described layup.
11. This completed layup may be trimmed along the fillet to match the first 12 BID layup. It too will be easier if trimmed while in the "green" state.
12. Cover with peelply and allow to cure. The load transfer pads are now completed.
13. With the load transfer pads now installed and cured, the access holes can be quickly cut through the closeout ribs for both the aileron push rods (at the fwd end) and the flap push rods (at the aft end).

You can use a standard circle cutter that chucks up into a hand drill, see figure 4-12 for location and size. Use the final assembly to check for clearances. There must be NO contact between push rods and ribs through the full travel limits.
- NOTE: The flap push rod hole centers (from left to right) are not the same distance from the aft ctr spar web.
14. After you have verified adequate clearances, the core material should be closed out with micro in the standard manner.

# Cockpit closeout rib

Figure 4-12

