# INSTRUCTIONS

Installation of Sub-Structure
For
One Piece Aluminum Gear Leg
In
Europa Aircraft

**Conventional Gear Support Structure**
**Instructions**
**(revised 4/23/01)**

**Step 1** Trim cockpit module per instructions in Europa Builders Manual. **Do not** cut outboard access holes on forward face of thigh support. The inboard cutout is per Builders Manual if desired. When completed with trimming, place module upside down on sawhorses. Clamp forward flange to the sawhorse with 2 c-clamps. The rear of the module is supported just aft of the headrest. Use the tunnel for the CS05 pitch tube as the level indicator. Secure as needed.

**Step 2** Make a pattern using poster paper, or anything suitable, of the rear face of the vertical portion of the thigh support. Do this for both Port and Starboard. Next, make patterns for the bottom of the thigh support Port and Starboard. Transfer patterns to 1/8$^{th}$ inch plywood and cut slightly undersize to allow for a rounded transition for the glass cloth. **(If you already have the pitch torque tubes installed, cut the plywood to slide under the tubes. Also cut out the area around the bolts on the forward face about 1 inch larger than the bolt pattern. This will allow about 1 inch overlap of the glass onto the surrounding surface. It is also not necessary to remove the 1/8-inch triangular plywood ribs that are inboard of the pitch torque tube. Cut the plywood pieces to butt against the triangular rib and run the BID onto it).** When your happy with the fit, round or bevel the edges slightly to eliminate air bubbles when doing the bid lay-ups.

**Step 3** Cut 4 pieces of BID for each side 24 inches x 20 inches to be installed 45 degrees to centerline. **(Less if pitch torque tubes are installed)**.

**Step 4** Scuff sand all surfaces and smooth any sharp edges being careful not to cut through the skin. Vacuum or blow the dust and wipe with Acetone. You will not be able to get the surface completely smooth so mix up some flox and fill in the rough areas.

**Step 5** Lay the BID on the bottom of the thigh support and up the vertical face. Wet out thoroughly and apply second layer. **Do not** overlap the sides and bottom with the first 2 layers. Once it is wetted out, apply some wet flox to the plywood and place over the 2 layers of wet BID on both the vertical and bottom. Once in place, apply wet flox to the top side (dry side) of the plywood. Make a fillet where the two pieces of plywood meet at the top of the thigh support. Lay up 2 layers of BID overlapping unto the module about 1 inch. When completed, cover the entire surface with peel ply. **Repeat for other side**.

**Step 6** Once everything is cured, find center of the module and measure outward on the forward flange of the thigh support 17 1/8 inches. This will be the center of the gear support block. Cut out the plywood triangular pieces per the Builders Manual but you will only need the inboard and center pieces. Install per the manual.

**Step 7** Using the **17 1/8** inch measurement, mark **1 ½** inch on either side of the line; this will be the outside mark for your ¾ inch plywood pieces. Make patterns and cut the plywood to fit. Since there is a curve in the vertical face of the thigh support, make sure that the plywood at the lowest point is at least flush with the forward and rear of the module bottom. The corners of the plywood that extend will be trimmed at the proper angle once bonded in.

**Step 8** You should now have 4 pieces of ¾ inch plywood 2 of them will be slightly larger which are the inside pieces closest to the CS05 pitch tube. The inside pieces will be fitted first. Cut 6 pieces of BID in a triangular shape large enough to cover the entire face of the plywood and overlap the forward face and bottom 2 inches. Mix up some flox and apply to the side which mates to the forward face and to the bottom of the thigh support. (Remember, the bottom is actually the underside of the seat when the module is right side up). Position the plywood with the side toward the centerline even with the inboard 1½-inch mark. **Make sure that it is vertical and parallel to the centerline.** (Refer to drawing if unclear). Make a flox fillet on all corners and lay-up 3 layers of bid. Peel ply the outside lay-up on the bottom and forward face. **Repeat for other side of module**.

**Step 9** When everything is cured and peel ply removed, trim the glass flush with the plywood edge. Trial fit the second plywood and fit the aluminum block over the both pieces for proper fit. **Allow a slight gap for the 3 layers of bid and mark the position and make sure that it is vertical.** Flox in position and apply 3 layers of BID on each side overlapping as the first piece. It will be a little difficult for the inside lay-ups due to space but it can be done. You will end up with 6 plies on the inside. It will not be necessary to peel ply. **Repeat for other side**.

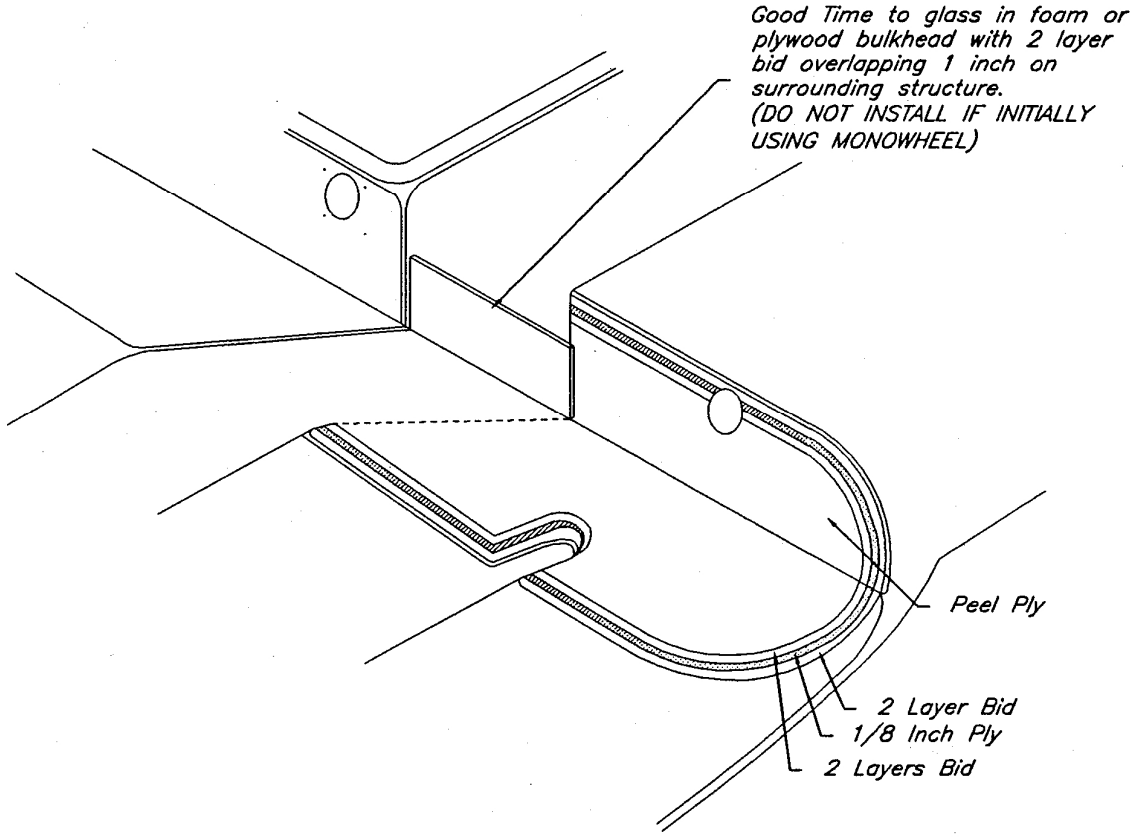
**Step 10** You should now have your 4 plywood supports bonded in place and your aluminum blocks fitting over the plywood. The plywood now needs to be notched to accept the aluminum blocks in a flat position. The outside plywood should need very little if any trimming. Measure in ½ inch from the forward edges of the plywood. Position the forward end of the aluminum block on the line and mark the aft position on the plywood. This will be the area that has to be trimmed. It is somewhat difficult to cut the notch without fancy equipment but it can be done with a coarse blade

in a hacksaw or a coping saw. If you have a router, the job will done easily. Cut the inside plywood approximately even with the top of the outboard plywood. Check to be sure that the cut is level. **Do this job slowly and do not try to cut to the final position on the first try**. It is better to not cut to the final position just yet as both sides have to be level to the centerline and horizontally. The notch should be cut just deep enough where the outside corner of the aluminum block is nearly flush with the outside of the module. If the forward corner sticks out slightly, it can be filed. Do not make the notch any deeper than necessary. It will be a cut and fit until the aluminum blocks fit properly and they are level to each other. When checking for fit, get 2 blocks 1-½ inch thick but they both must be identical. Place one on each aluminum block and position a straight edge across both. This needs to be level and to not have any twist. If you have the gear, it can be placed across both blocks to check for any twist. Check the gap at the center of the module. The fuselage skin is about 1/8 inch thick and 1/8 to 3/16 inch gap between the bottom and the top of the aluminum gear is necessary. If you have a ½ inch gap between the bottom of the module and the straight edge, you will be fine.

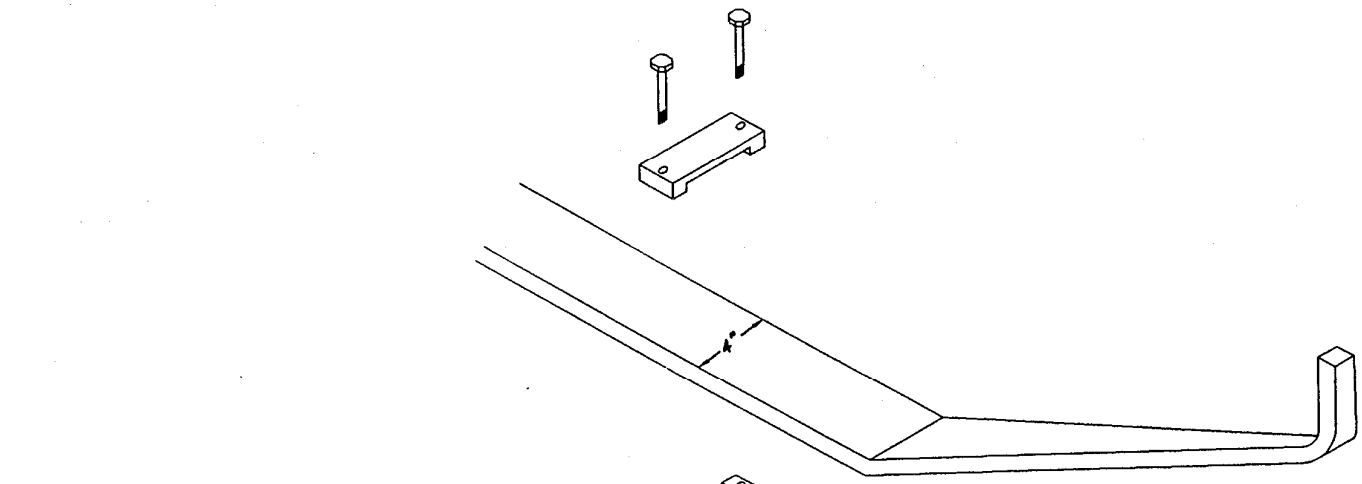
**Step 11** When your happy with everything level, drill the 2 holes through the aluminum and plywood. (**If you drill the holes approximately 2 inches from the forward and rear edge, you should not interfere with the bolts that will ultimately attach the main gear**). Do not go completely through the second plywood. It is better to have another pair of eyes helping you keep the drill level. Do not drill them any larger than ¼ inch at this time. When all the holes are drilled remove the aluminum block and using a 1-inch hole saw, cut through the 2 plywood supports. Scuff the aluminum bushing inserts and bond in with Redux. When all the inserts are in, and cured, re-position the aluminum block and drill through the inserts and through the other side of the aluminum block. The hole can now be enlarged to 3/8 inch. To keep the inserts from ever coming loose, remove the aluminum block and cut short pieces of aluminum tube that will fit snugly between the inserts and bond with 5 Minute. Replace the aluminum block and fit the bolts and nuts. Your support structure is now in place.

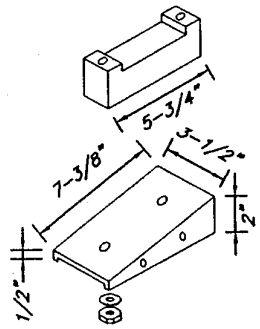
**Step 12** Once you have the module bonded into the lower half of the fuselage and you are at Chapter 27 in the Builders Manual, a slight change is necessary. The front stiffener is made 9 inches wide rather than the 3 inches called for in the manual. Use 3 layers of bid but extend the cloth unto the thigh support just past the mid point and down the front face extending on the bottom and sides forward approximately 12 inches, same distance aft of the stiffener. The aim is to spread the load on the gear hard point through the sides of the fuselage.

*Scuff sand bottom and forward face of thigh support.*
*Cut bid to cover bottom and lap up the forward face.*
*Cut plywood slightly undersize of forward face and bottom.*
*Mix flox to use as filler to smooth out any rough areas prior to lay–ups.*



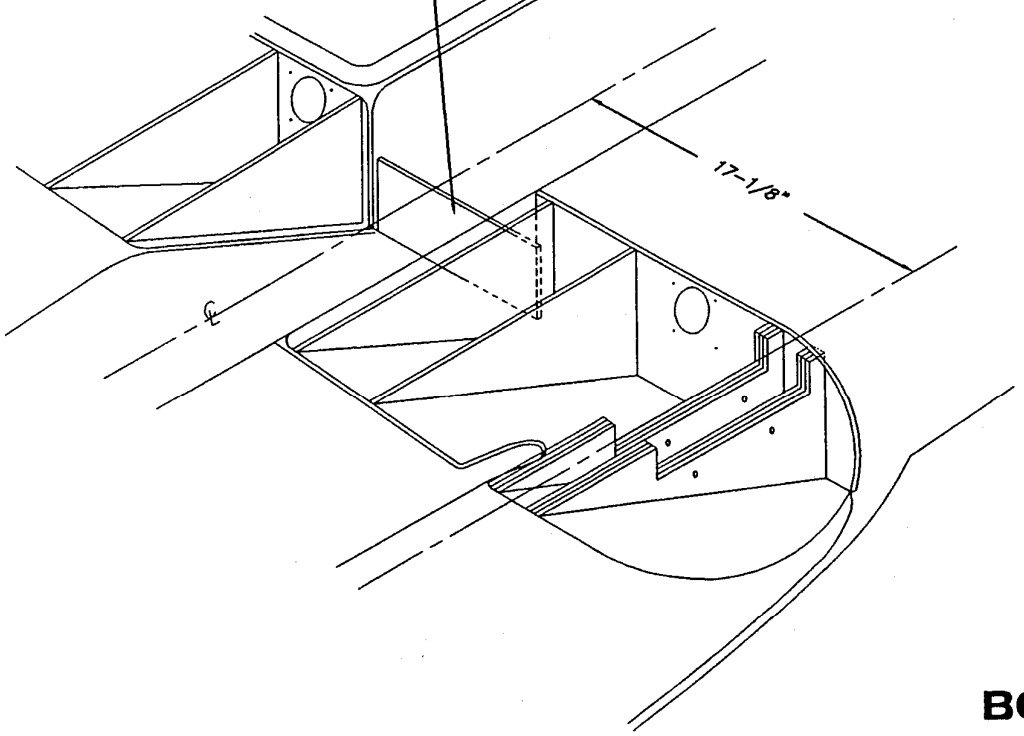

*Apply 2 layers bid to thigh support forward face and bottom.*
*Coat plywood with a thin layer of flox and place over the 2 layers of bid.*
*Add a thin layer of flox over the top of the plywood and a fillet where the 2 pieces join together. Add 2 layers of bid overlapping the bottom of the module 1 inch. Peel ply the entire surface.*



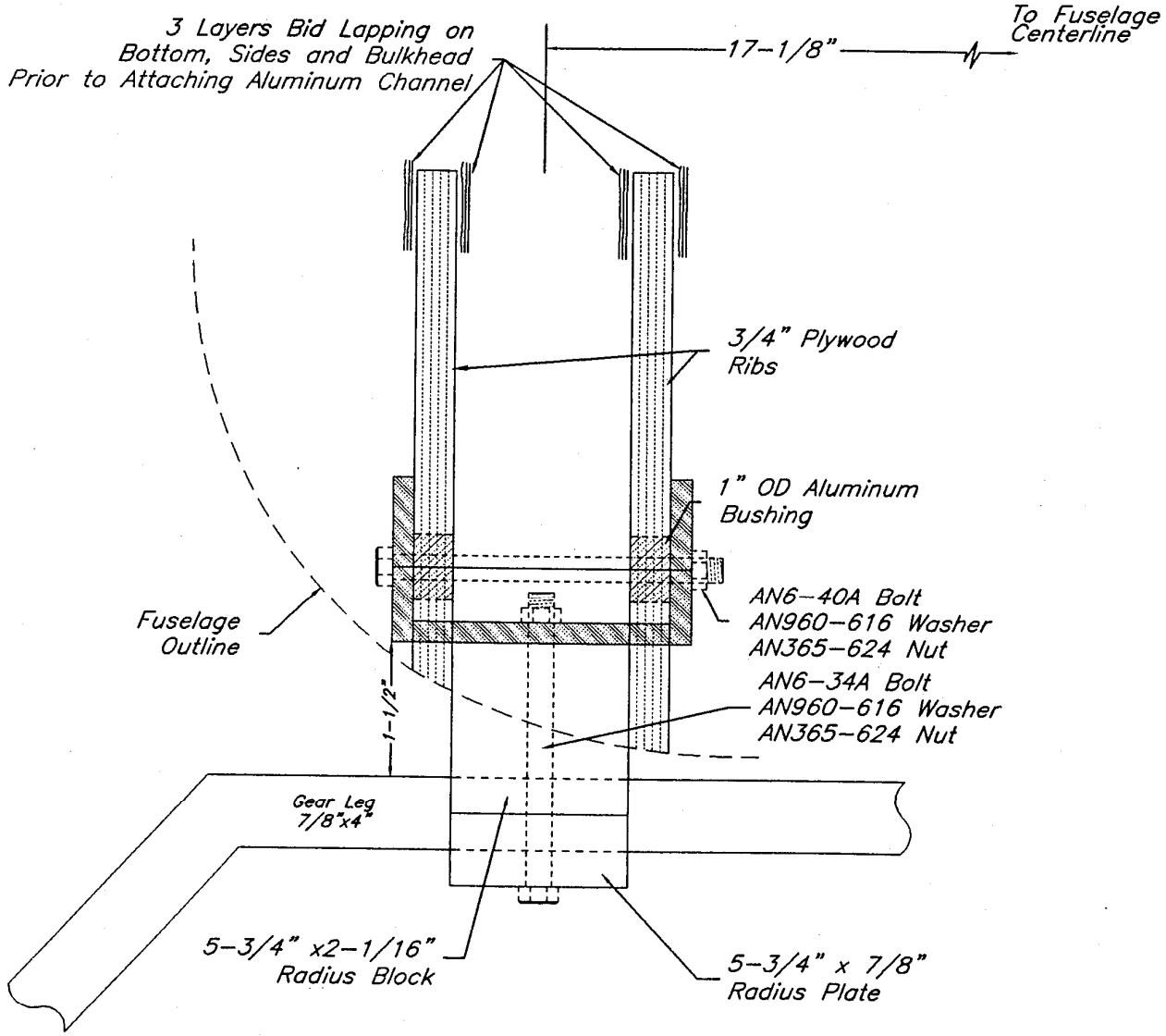



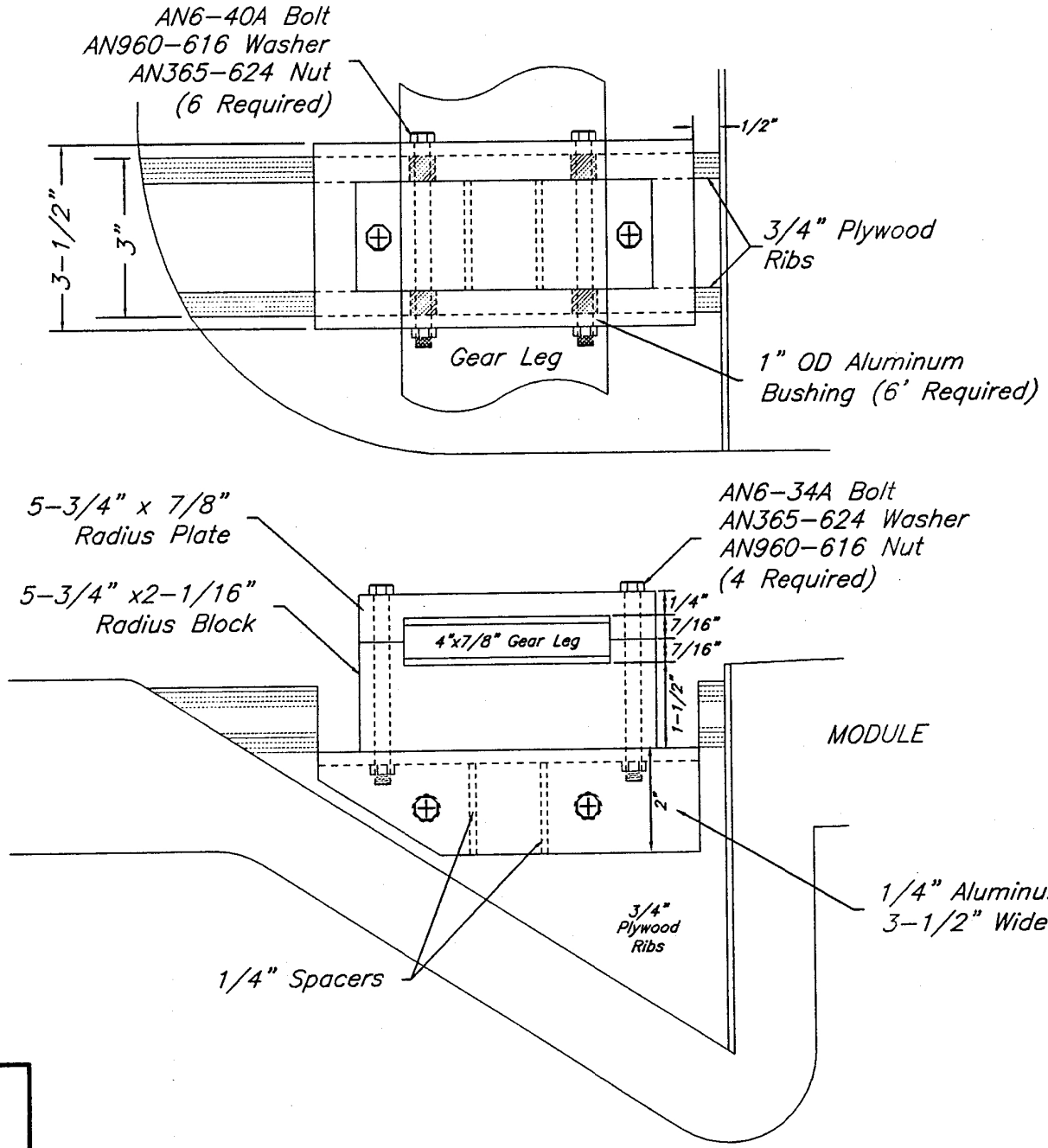

BULKHEAD: 4"x10"x1/4" FOAM
2 LAYERS BID-EACH SIDE

INSTALL 1/4" FOAM BULKHEAD
IN TUNNEL EXTENDING 1"
ABOVE THE THIGH SUPPORT




# BOTTOM ATTACH LOCATION


3 Layers Bid Lapping on
Bottom, Sides and Bulkhead
Prior to Attaching Aluminum Channel
17-1/8"
To Fuselage
Centerline
3/4" Plywood
Ribs
1" OD Aluminum
Bushing
AN6-40A Bolt
AN960-616 Washer
AN365-624 Nut
AN6-34A Bolt
AN960-616 Washer
AN365-624 Nut
Fuselage
Outline
1-1/2"
Gear Leg
7/8"x4"
5-3/4" x2-1/16"
Radius Block
5-3/4" x 7/8"
Radius Plate




SIDE VIEW
BOTTOM UP

REVISED 4/24/00 B. BERUBE