

**TOTAL PERFORMANCE**  
**VAN'S AIRCRAFT**

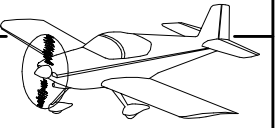
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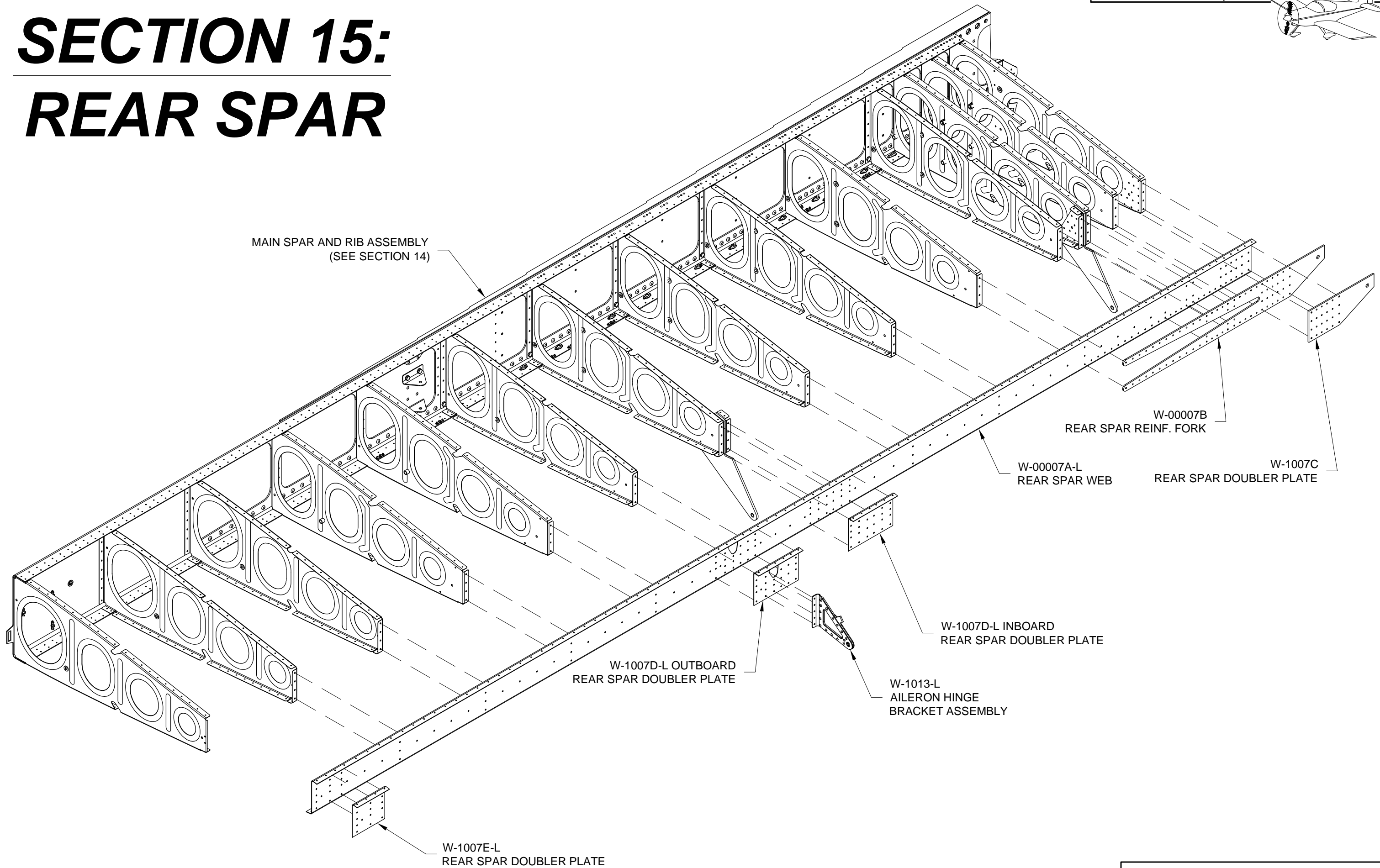
***REVISION DESCRIPTION:***

**Page: 15-04 REV 2:** Added "Step 1: Straighten the W-0007B Rear Spar Reinforcement Fork as described on Page 10-03, Step 4."

Remaining steps repaginated.



# SECTION 15: REAR SPAR



MAIN SPAR AND RIB ASSEMBLY  
(SEE SECTION 14)

W-00007B  
REAR SPAR REINF. FORK

W-00007A-L  
REAR SPAR WEB

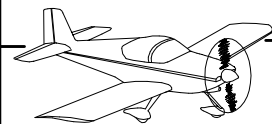
W-1007C  
REAR SPAR DOUBLER PLATE

W-1007D-L INBOARD  
REAR SPAR DOUBLER PLATE

W-1007D-L OUTBOARD  
REAR SPAR DOUBLER PLATE

W-1013-L  
AILERON HINGE  
BRACKET ASSEMBLY

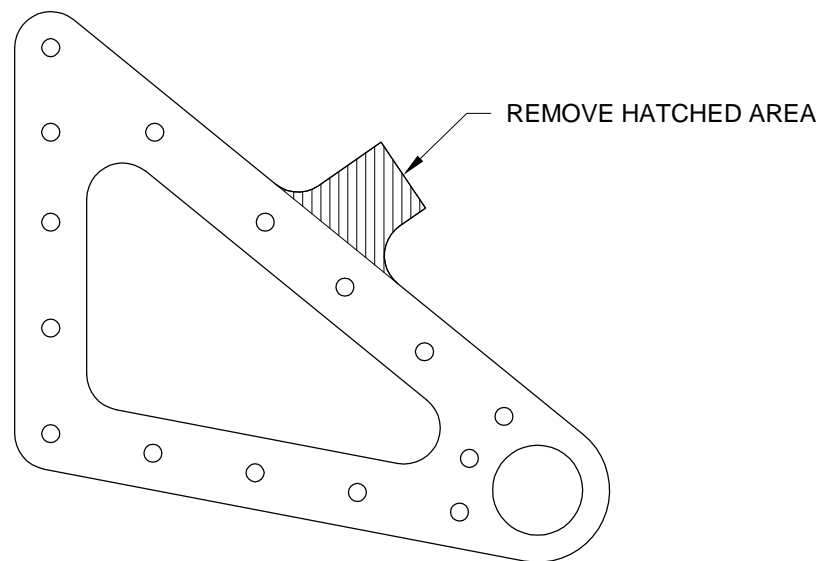
W-1007E-L  
REAR SPAR DOUBLER PLATE



**NOTE:** Before working on assembling the aileron hinge bracket assemblies, refer to Pages 15-01 and 16-01 to become familiar with the brackets' orientation as installed on the aircraft.

**Step 1:** The manufacturing process leaves the W-1013A Aileron Hinge Bracket Spacers slightly warped or bowed. Straighten the hinge bracket spacers as much as possible by clamping the part in a bench vise and applying firm hand pressure. Sight along the edges of the part to verify straightness and re-adjust as required.

**Step 2:** Of the four W-1013A Aileron Hinge Bracket Spacers supplied in the kit, two will be used in the W-1014-L & -R Aileron Hinge Bracket Assemblies and will need the aileron stop tab trimmed off as shown in Figure 1.

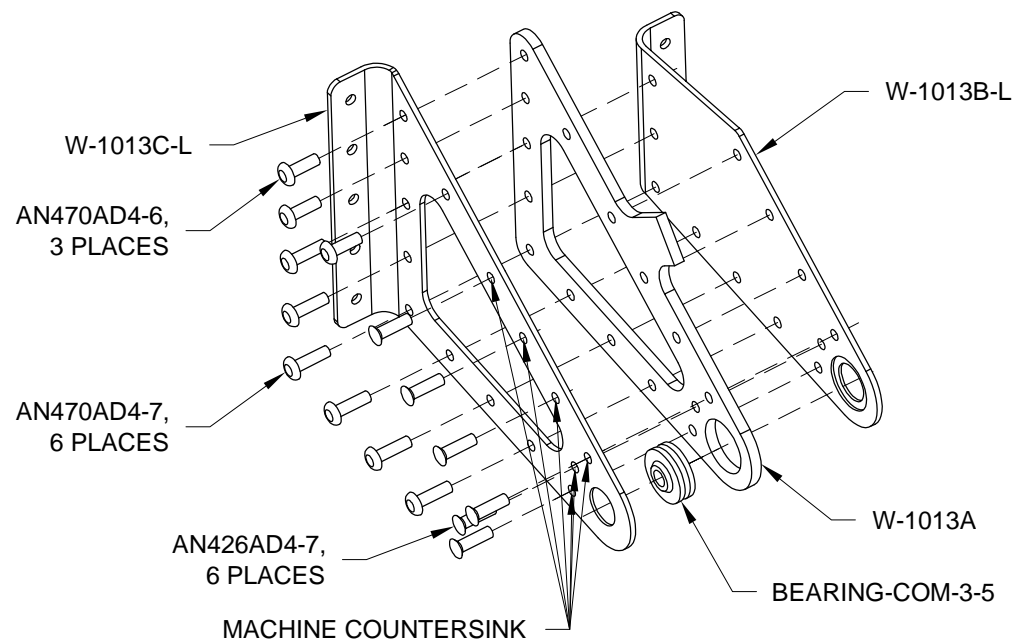


**FIGURE 1:** HINGE BRACKET SPACER TRIM FOR OUTBOARD AILERON HINGE BRACKET ASSEMBLIES

**Step 3:** Cleco the W-1013A Aileron Hinge Bracket Spacer, W-1013B-L and W-1013C-L Aileron Hinge Bracket Sides together as shown in Figure 2.

Final-Drill #30 all common attach holes. Machine countersink the aft holes as indicated in Figure 2 on the **outboard** face of the W-1013C-L Aileron Hinge Bracket Side for the head of an AN426AD4 rivet. See Section 5.5 for more information on countersinking.

Repeat this process for the Right Inboard Aileron Bracket Assembly.

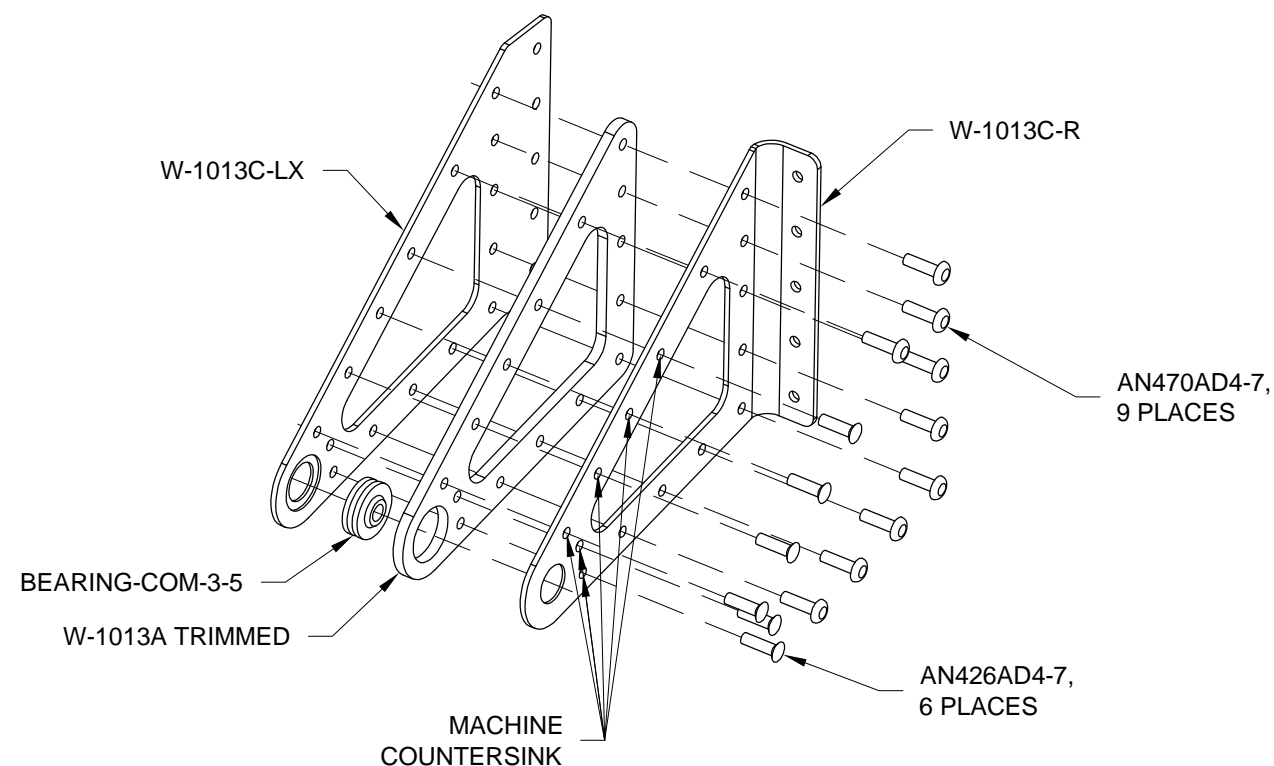


**FIGURE 2:** INBOARD AILERON BRACKET ASSEMBLY

**Step 4:** Cleco the W-1013A TRIMMED Aileron Hinge Bracket Spacer, W-1013C-LX and W-1013C-R Aileron Hinge Bracket Sides together as shown in Figure 3.

Final-Drill #30 all common attach holes. Machine countersink the aft holes (as indicated in Figure 3) on the **inboard** face of the W-1013C-R Aileron Hinge Bracket Side for the head of an AN426AD4 rivet.

Repeat this process for the Right Outboard Aileron Bracket Assembly.



**FIGURE 3:** OUTBOARD AILERON BRACKET ASSEMBLY

**Step 5:** Disassemble all parts. Thoroughly deburr the edges and holes in all parts. Prime all parts if/as required.

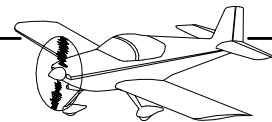
**Step 6:** Press a BEARING-COM-3-5 into all W-1013A and W-1013A TRIMMED Aileron Hinge Bracket Spacers as shown in Figure 2 and Figure 3. Use a 3/8 drive 7/16 (or 11 mm) socket to push the bearing and a 3/8 drive 9/16 (or 14 mm) socket to support the aileron hinge bracket spacers. Squeeze with a vise or c-clamp.

**Step 7:** Cleco the Aileron Bracket Assemblies back together per Step 3 and Step 4. Press the aft ends of the assemblies together to insure that the BEARING-COM-3-5 bearings are seated into the recesses on the aileron hinge bracket sides and are not spreading the aft ends of the assemblies apart.

**Step 8:** Rivet the Aileron Bracket Assemblies together using the rivet callouts shown in Figure 2 and Figure 3. Set the rivets in a random pattern to inhibit warping in the final assemblies.

The Inboard Aileron Bracket Assemblies will now be referred to as W-1013-L & -R. The Outboard Aileron Bracket Assemblies will now be referred to as W-1014-L & -R.

Set W-1014-L and W-1014-R aside, to be installed after the W-00002 Top Inboard Wing Skin and W-00003 Top Outboard Wing Skin are riveted in place. This will allow access to buck the outboard-most rivet on the upper flange of the W-00007A-L Rear Spar Web.



Step 1: With the W-1007D Rear Spar Doubler Plate oriented as shown in Figure 1, draw a line parallel with the edge of the rear spar doubler plate per the dimensions given in Figure 1.

Repeat this process on the remaining three rear spar doubler plates.

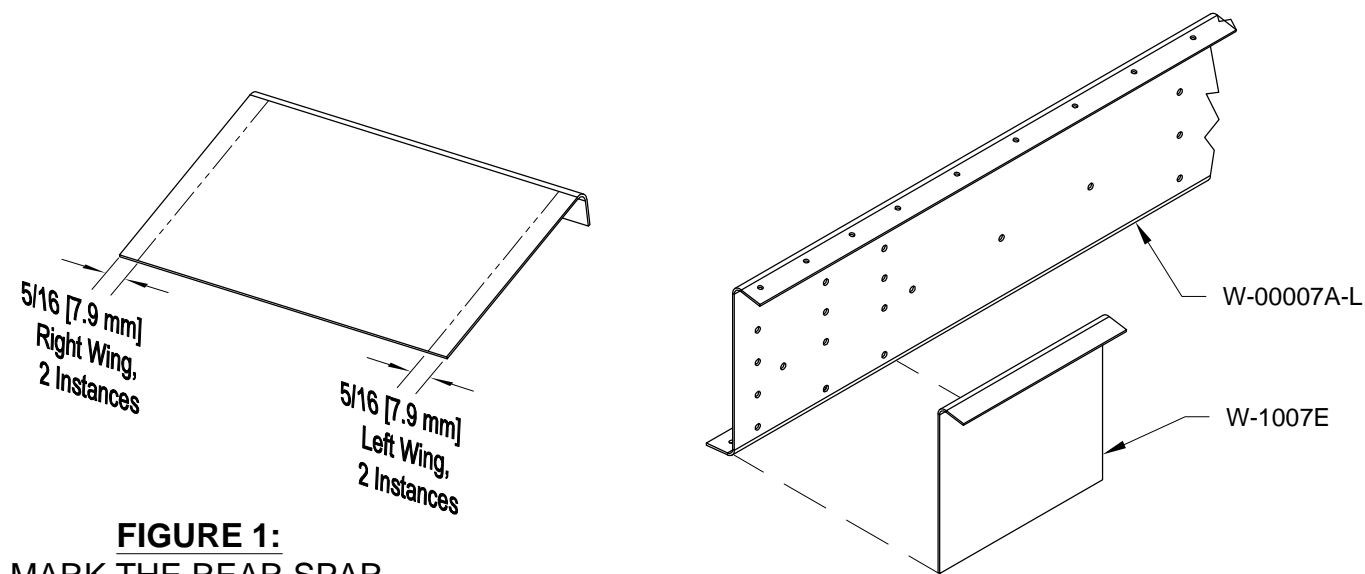
Step 2: Align the W-1007E Rear Spar Doubler Plate by nesting the upper flange underneath the upper flange of the W-00007A-L Rear Spar Web and aligning the doubler plate's outboard edge with outboard edge of the rear spar web and clamp in position. See Figure 2.

Match-Drill #30 then cleco all holes used to attach the doubler plate to the rear spar web using the rear spar web as a drill guide.

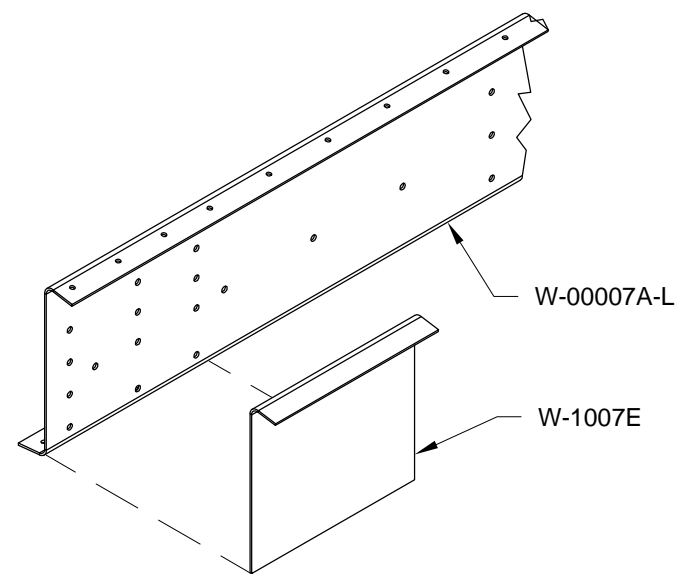
Match-Drill #40 all common attach holes in the upper flange of the rear spar and the rear spar doubler plate using the rear spar as a drill guide. This will create W-1007E-L.

Step 4: Drill pilot holes then remove the material within the traced outlines of the aileron pushrod holes on the W-1007D Outboard Doublers.

Step 5: Final-Drill 11/32 the rear spar attach hole in each W-1007C Rear Spar Doubler Plate as shown in Figure 4.



**FIGURE 1:**  
MARK THE REAR SPAR DOUBLER PLATE



**FIGURE 2:**  
MATCH-DRILL THE REAR SPAR DOUBLER PLATE

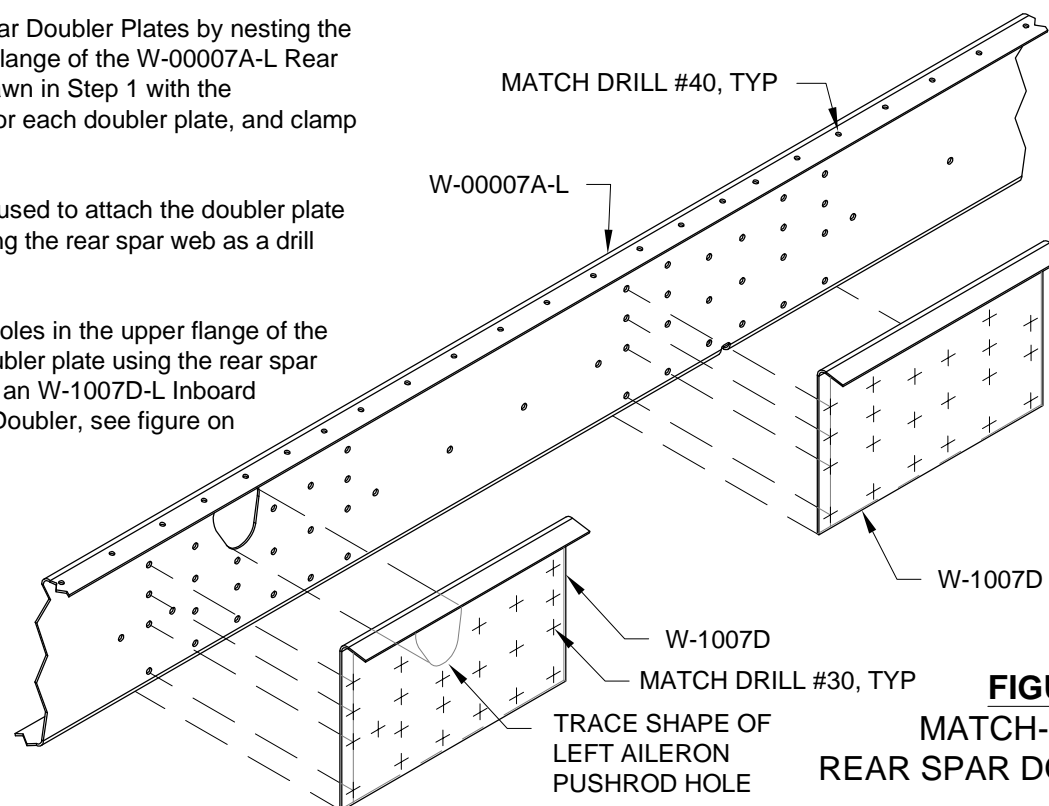
Step 3: Align the W-1007D Rear Spar Doubler Plates by nesting the upper flange underneath the upper flange of the W-00007A-L Rear Spar Web and centering the line drawn in Step 1 with the outboard-most row of attach holes for each doubler plate, and clamp in position. See Figure 3.

Match-Drill #30 then cleco all holes used to attach the doubler plate to the web of the rear spar web using the rear spar web as a drill guide.

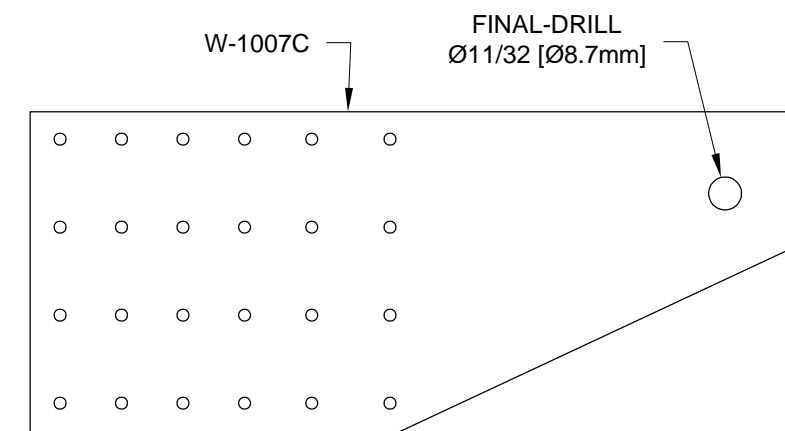
Match-Drill #40 all common attach holes in the upper flange of the rear spar web and the rear spar doubler plate using the rear spar web as a drill guide. This will create an W-1007D-L Inboard Doubler and W-1007D-L Outboard Doubler, see figure on Page 15-01.

Trace the shape of the left aileron pushrod hole onto the W-1007D Outboard Doubler as shown in Figure 3.

Repeat Step 2 and Step 3 for the Right Rear Spar Assembly.



**FIGURE 3:**  
MATCH-DRILL THE REAR SPAR DOUBLER PLATES



**FIGURE 4:** FINAL-DRILL REAR SPAR DOUBLER PLATE



NOTE: Except where separate instructions and/or figures exist for both left and right sides of the aircraft, only the left side parts, assemblies, or installations will be shown.

It is the builder's choice as to whether to complete all steps for the left side before repeating those steps for the right side or to complete each step for both left and right sides before moving to the next step.

Step 1: Straighten the W-0007B Rear Spar Reinforcement Fork and W-1007C Rear Spar Doubler Plate using the method described on Page 10-03, Step 4.

Step 2: Cleco the W-0007B Rear Spar Reinforcement Fork, W-1007C Rear Spar Doubler Plate, W-1007D-L Rear Spar Doubler Plate (Inboard), W-1007D-L Rear Spar Doubler Plate (Outboard), W-1013-L Aileron Hinge Bracket Assembly and Main Spar and Rib Assembly to the W-0007A-L Rear Spar Web as shown in Figure 1.

Final-Drill #30 all common attach holes that have rivet callouts shown in Figure 2 including all holes that will attach the main wing ribs to the rear spar. Note that all the rib to spar attach points are not shown in Figure 2.

Where no pre-punched holes in the ribs exist, Final-Drill #30 the six holes in the rear spar reinforcement fork into the third and fourth most inboard ribs.

Repeat this process for the right side rear spar.

Step 3: See Section 5.5 for information on countersinking.

Machine countersink the holes in the upper flange of the W-0007A-L Rear Spar Web that correspond to the W-1007D-L Rear Spar Doubler Plate (Inboard), W-1007D-L Rear Spar Doubler Plate (Outboard) and the W-1007E-L Rear Spar Doubler Plate to fit a skin that has been dimpled for an AN426AD3 rivet. See Figure 2.

Machine countersink the two rows of rivet holes on the W-1007C Rear Spar Doubler Plate as shown in Figure 2.

- ▽ AN470AD4-4
- △ AN470AD4-5
- ✱ AN470AD4-6
- ◻ AN470AD4-8
- ⊕ AN426AD4-8

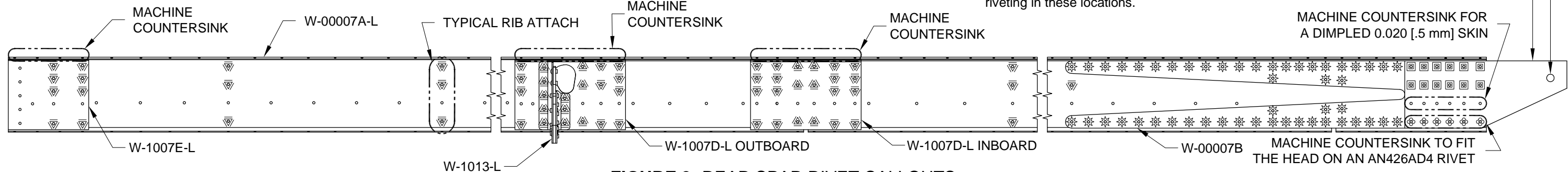


FIGURE 2: REAR SPAR RIVET CALLOUTS

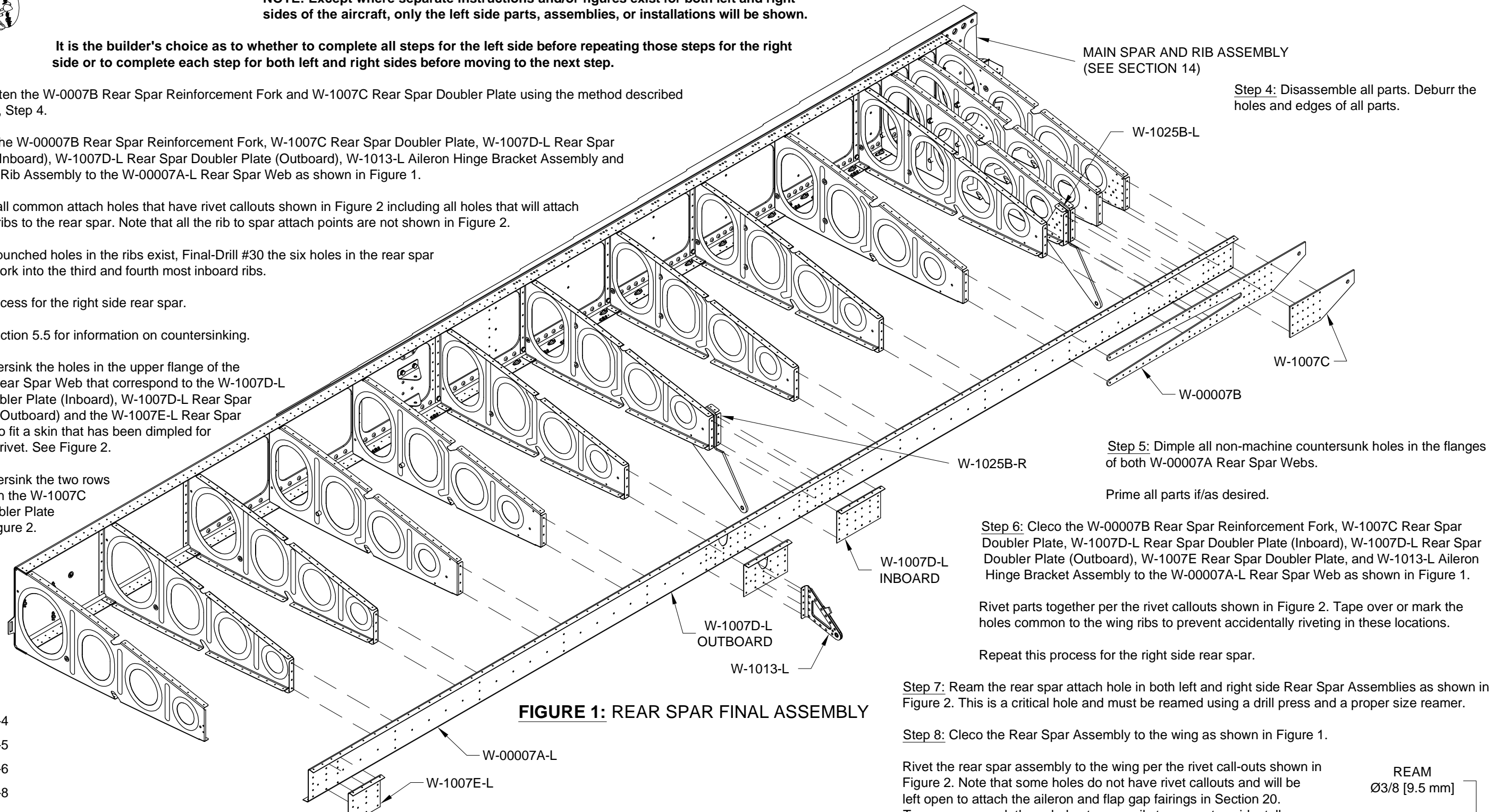


FIGURE 1: REAR SPAR FINAL ASSEMBLY

Step 4: Disassemble all parts. Deburr the holes and edges of all parts.

Step 5: Dimple all non-machine countersunk holes in the flanges of both W-0007A Rear Spar Webs.

Prime all parts if/as desired.

Step 6: Cleco the W-0007B Rear Spar Reinforcement Fork, W-1007C Rear Spar Doubler Plate, W-1007D-L Rear Spar Doubler Plate (Inboard), W-1007D-L Rear Spar Doubler Plate (Outboard), W-1007E Rear Spar Doubler Plate, and W-1013-L Aileron Hinge Bracket Assembly to the W-0007A-L Rear Spar Web as shown in Figure 1.

Rivet parts together per the rivet callouts shown in Figure 2. Tape over or mark the holes common to the wing ribs to prevent accidentally riveting in these locations.

Repeat this process for the right side rear spar.

Step 7: Ream the rear spar attach hole in both left and right side Rear Spar Assemblies as shown in Figure 2. This is a critical hole and must be reamed using a drill press and a proper size reamer.

Step 8: Cleco the Rear Spar Assembly to the wing as shown in Figure 1.

Rivet the rear spar assembly to the wing per the rivet call-outs shown in Figure 2. Note that some holes do not have rivet callouts and will be left open to attach the aileron and flap gap fairings in Section 20. Tape over or mark these holes temporarily to prevent accidentally riveting in these locations.