

TOTAL PERFORMANCE
VAN'S AIRCRAFT

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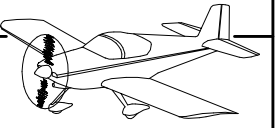
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REVISION DESCRIPTION:

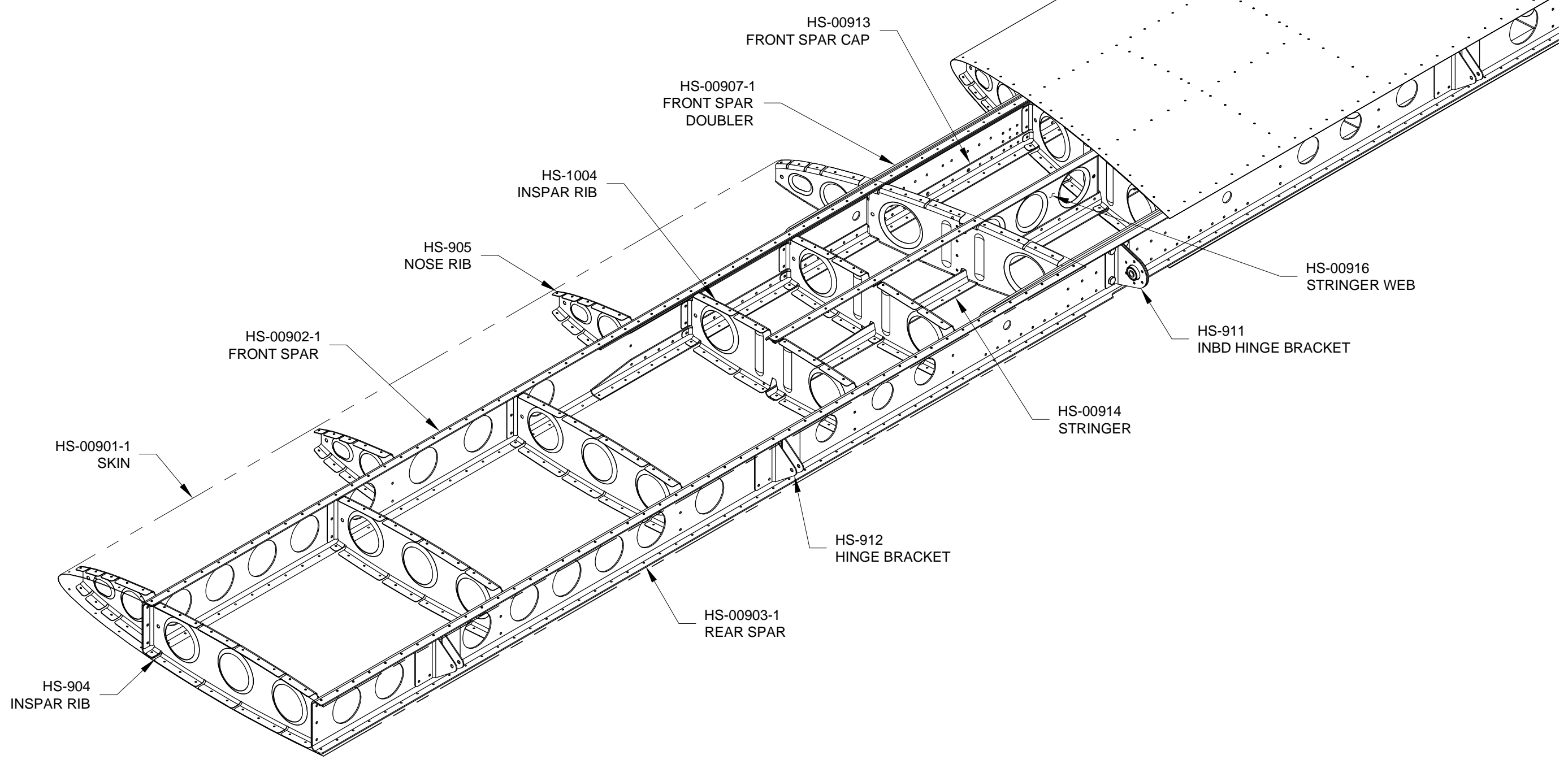
Page: 08-04 REV 1: Builders have installed horizontal stab rear spar upside down. Add note to identify the bottom side of the front spar by noting the 9 hole rivet pattern on the bottom side.

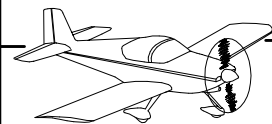
Page: 08-11 REV 1: Builders have installed horizontal stab rear spar upside down. Add note to identify the bottom side of the front spar by noting the 9 hole rivet pattern on the bottom side.

Page: 08-12 REV 2: Builders have installed horizontal stab rear spar upside down. Add note to identify the bottom side of the front spar by noting the 9 hole rivet pattern on the bottom side. Add orientation arrows to Figure 1. Add a caution note to check for orientation before riveting the rear spar in place before Step 3.



SECTION 8: HORIZONTAL STABILIZER





Step 1: Deburr the HS-00903-1 Rear Spar (include lightening holes) and HS-906 Rear Spar Doubler edges.

Step 2: Cleco the HS-906 Rear Spar Doubler to the HS-00903-1 Rear Spar as shown in Figure 1 detail.

Final-Drill #30 all 1/8 [3.2 mm] holes common to the doubler and spar. Be sure to drill perpendicular to the web.

Step 3: Match-Drill #30 the HS-00903-1 Rear Spar to the HS-906 Rear Spar Doubler the four holes indicated in Figure 1 detail.

Step 4: Cleco the HS-912 Hinge Brackets to the HS-00903-1 Rear Spar as shown in Figure 1. Final-Drill #30 the holes between the brackets and rear spar.

Step 5: Machine countersink two holes in the HS-00903-1 Rear Spar for AN426AD4 flush rivets as shown in Figure 1 detail.

Step 6: Final-Drill #12 the four 3/16 [4.8 mm] holes in the HS-00903-1 Rear Spar and HS-906 Rear Spar Doubler which are located above and below the holes countersunk in Step 5. Drill from the spar into the doubler.

Step 7: Remove the HS-912 Hinge Brackets and the HS-906 Rear Spar Doubler from the assembly. Mark the parts so that they can be reassembled in the same location.

Final-Drill #12 the single 3/16 [4.8 mm] hole in each of the hinge brackets as shown in Figure 1 Detail.

Deburr parts. Scuff the powder coating on the hinge brackets if you plan on painting them when the completed airplane is painted.

Step 8: Rivet the HS-906 Rear Spar Doubler to the HS-00903-1 Rear Spar using the rivets called out in Figure 1. Make sure not to put any rivets in the holes indicated (tape over the holes as a reminder).

Step 9: Rivet the HS-912 Hinge Brackets to the spar using the rivets shown in Figure 1. Place the domed, manufactured head of the rivets on the bracket.

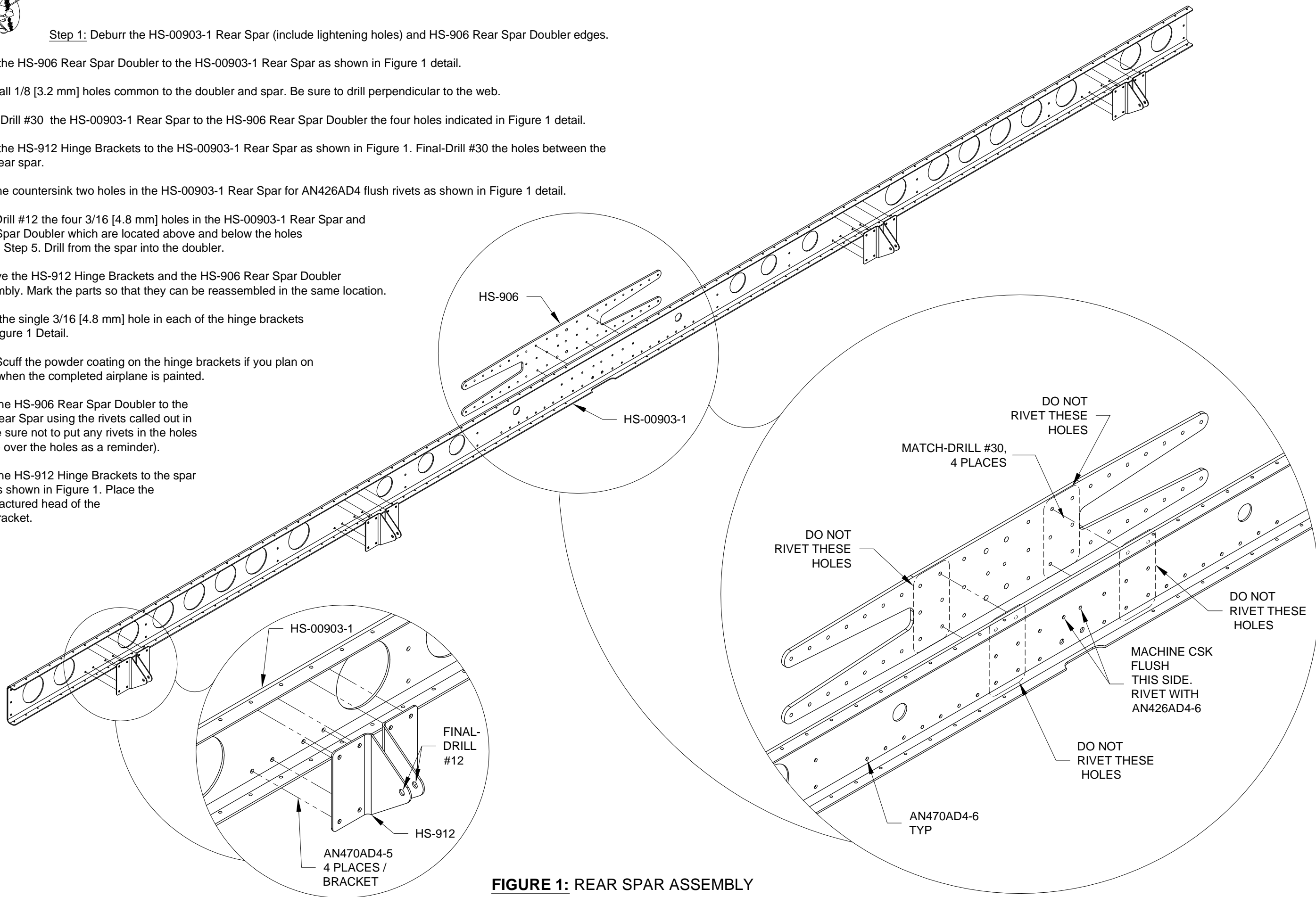
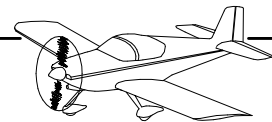


FIGURE 1: REAR SPAR ASSEMBLY



Step 1: Cleco the VA-146 Flange Bearing between the two HS-911 Inboard Hinge Brackets as shown in Figure 1.

Final-Drill #30 the holes common to all the parts.

Final-Drill #12 the holes in the flanges.

Disassemble, deburr, scuff the powder coating of the hinge brackets if desired, and reassemble.

Step 2: Rivet the VA-146 Flange Bearing and the HS-911 Inboard Hinge Brackets together with the rivets shown in Figure 1. Clamp the flanges of the two hinge brackets to a flat surface so that they remain square to each other while riveting.

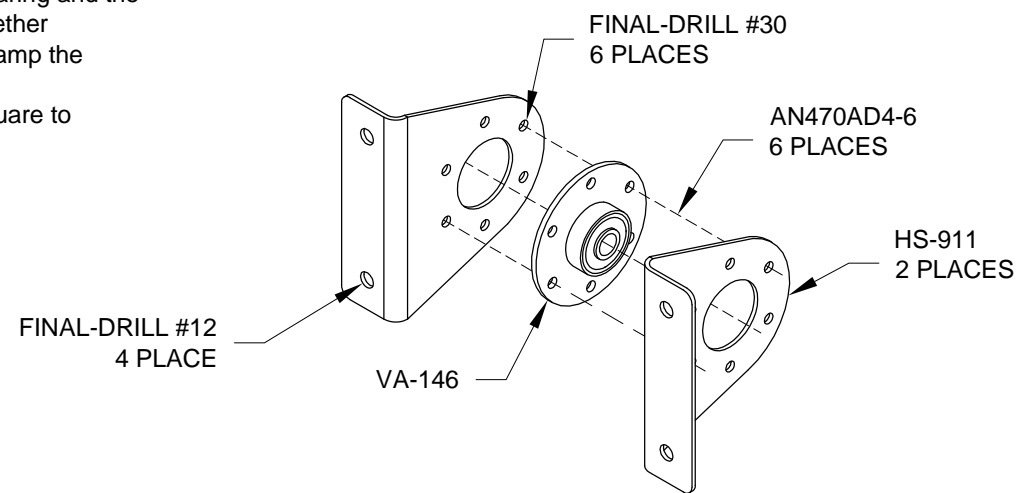


FIGURE 1: INBOARD HINGE BRACKET ASSEMBLY RIVETS

Step 3: Bolt the Inboard Hinge Bracket Assembly to the Rear Spar Assembly using the hardware shown in Figure 2. Use the correct torque on the nuts per the chart in Section 5.20.

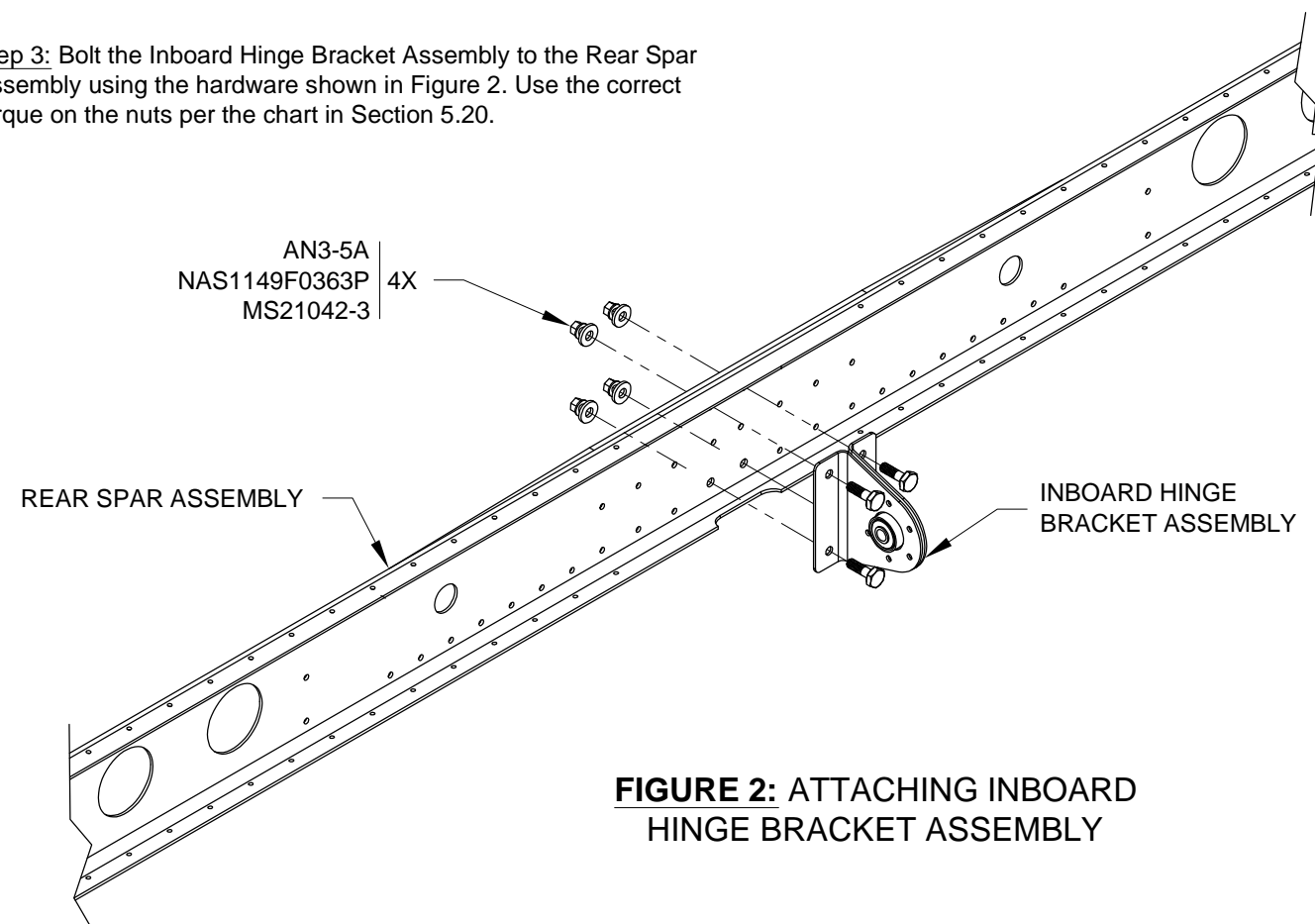


FIGURE 2: ATTACHING INBOARD HINGE BRACKET ASSEMBLY

Step 4: Trim material (shaded areas) from both ends of the HS-00913 Front Spar Caps, and the HS-00914 Stringers as shown in Figure 3. The parts are shown unbent in the figure for clarity. Use the notches in the parts to determine the trim line and note in the figure that the trim line completely removes the notches. See Page 08-04 Figure 1 for full view of the front spar caps, and Page 08-09 Figure 1 for a full view of the stringers.

Deburr and smooth all edges of the spar caps and stringers.

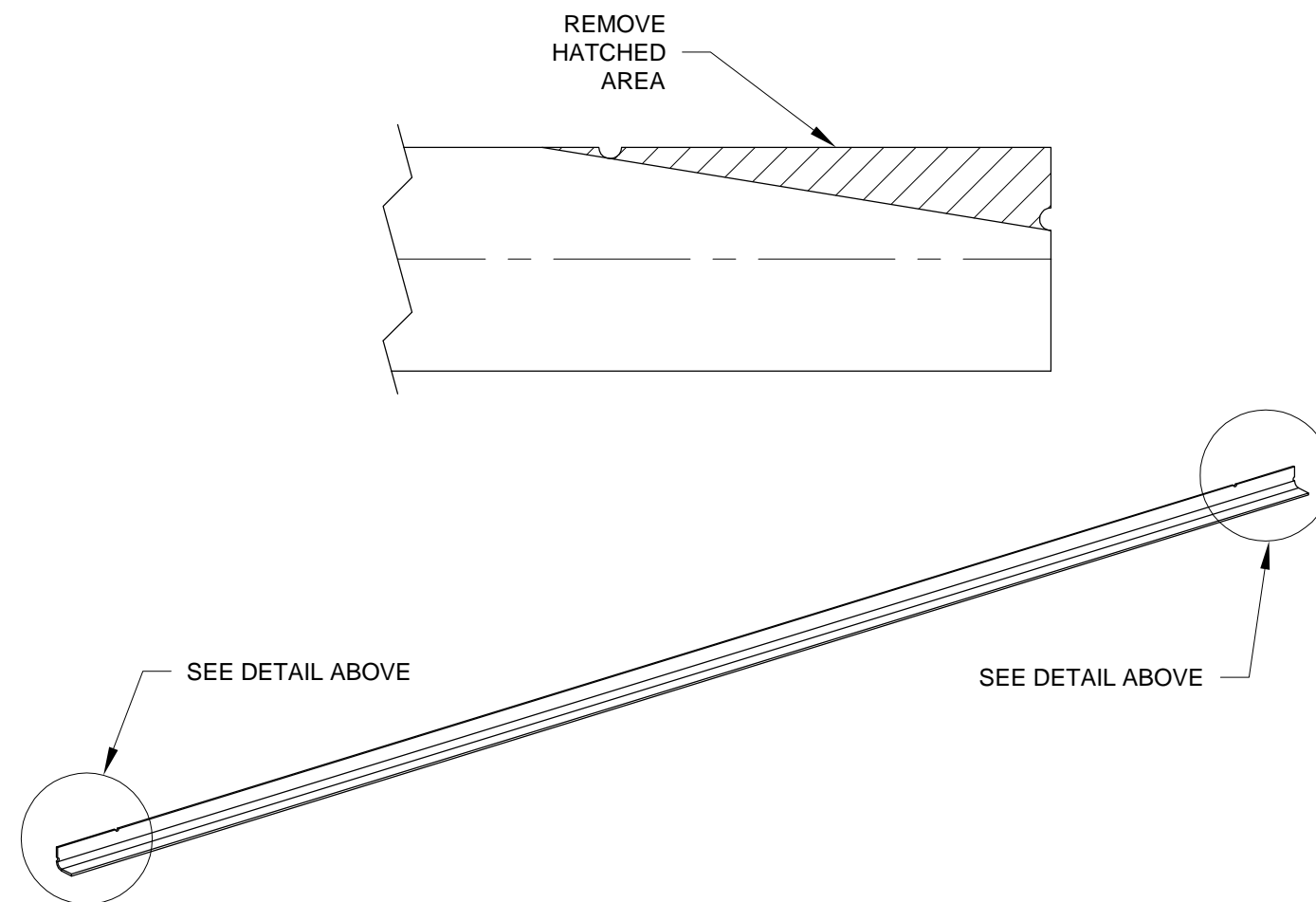
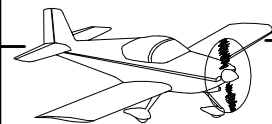


FIGURE 3: SPAR CAP AND STRINGER TRIM
(HS-00913 SHOWN, HS-00914 SIMILAR)



Step 1: Deburr the edges (including the lightening holes) of the HS-00902-1 Front Spar.

Step 2: The HS-00913 Front Spar Caps are nested inside the flanges of the HS-00902-1 Front Spar with the trimmed flange of the spar cap resting against the spar web. On one of the spar caps, make a mark on the flange (the one that rests against the flange of the spar) 3/16 [4.8 mm] from either end. Nest the spar cap in the spar. Then from the corresponding end of the spar, center the mark in the twenty-eighth flange hole. (Just for a check, make sure the other end of the spar cap covers the twenty-eighth hole in the other end of the spar flange.) See Figure 1.

Clamp the spar cap in place. Match-Drill #30 the 1/8 [3.2 mm] holes of the spar web into the entire length of the spar cap. The spar cap is somewhat bowed as supplied, use plenty of clamps to make sure the spar cap is tight against the spar web and flange while drilling.

Remove the spar cap, deburr the holes of the spar and spar cap, then cleco the spar cap back in place. It's important to deburr and clean out any chips, otherwise the spar cap will not fit tight against the spar web when match-drilling the spar flange holes.

Cleco the spar cap to the web of the spar. Clamp the spar cap to the flange of the spar. Match-Drill #40 the 3/32 [2.4 mm] holes of the spar flange into the spar cap.

Repeat this step for the second spar cap. See Figure 1.

Step 3: Cleco the HS-00907-1 Front Spar Doubler to the HS-00902-1 Front Spar as shown in Figure 1.

Step 4: Except for those indicated in Figure 1, final-drill #30 the 1/8 [3.2 mm] holes common to the HS-00902-1 Front Spar and the HS-00907-1 Front Spar Doubler.

Final-Drill #12 the four 3/16 [4.8 mm] holes common to the spar and spar doubler into the HS-00913 Front Spar Caps.

Use a drill press to Final-Drill 1/4 [6.4mm] the two holes indicated in Figure 1.

Step 5: Machine countersink the 12 holes of the HS-00907-1 Front Spar Doubler (called out in Figure 1) for AN426AD4 flush rivets.

Step 6: Machine countersink the middle nine holes (shown in Figure 1) in the top and bottom flanges of the HS-00902-1 Front Spar for AN426AD3 flush rivets.

Step 7: Mark the part locations. Disassemble, deburr, and prime parts if desired. Reassemble the parts in their original position.

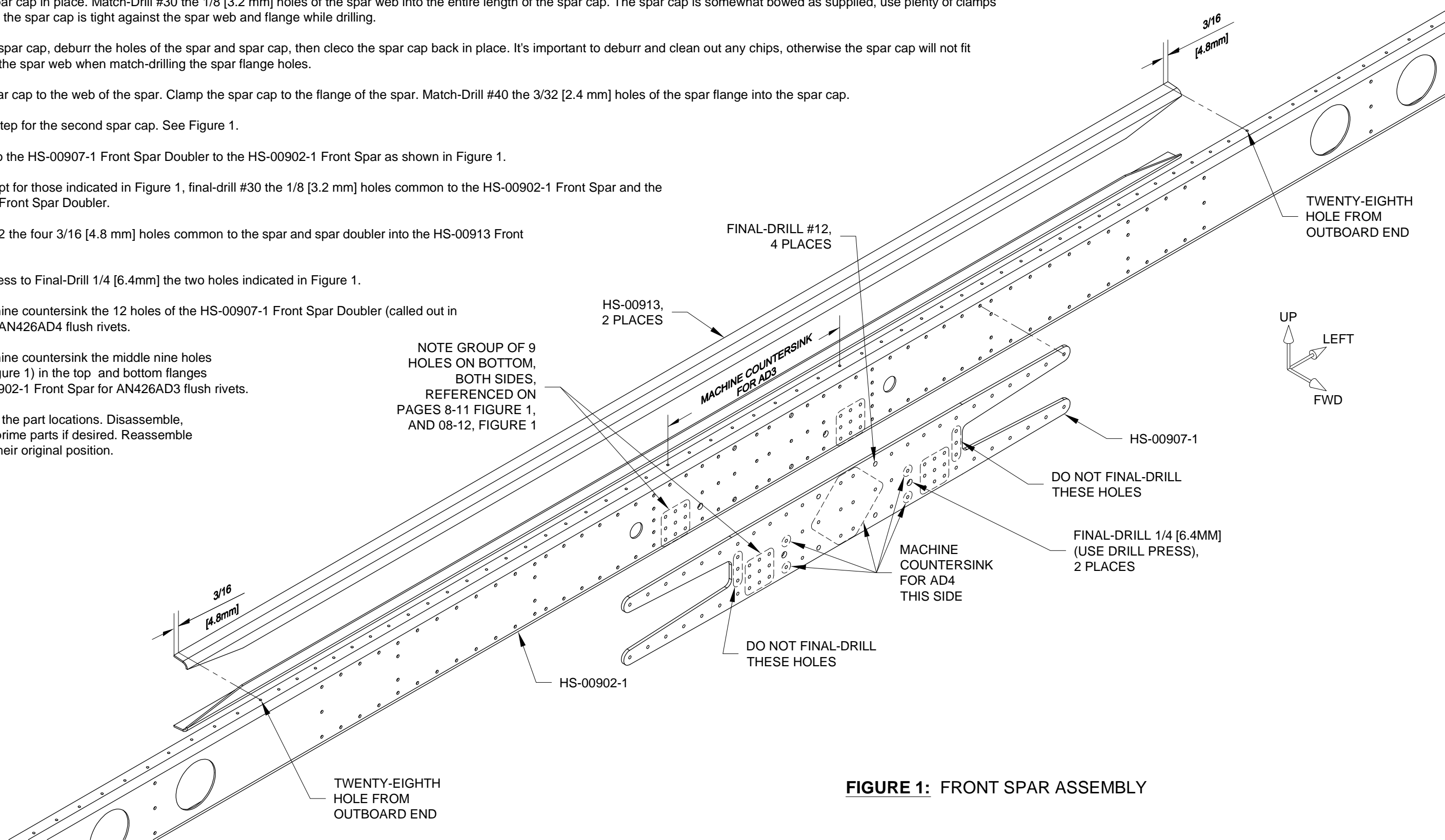
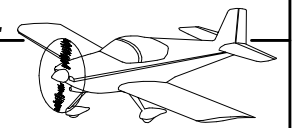


FIGURE 1: FRONT SPAR ASSEMBLY



NOTE: Tape over the open holes shown in Figure 1 to keep from accidentally riveting them.

NOTE: The left and right sides of the horizontal stabilizer are mirror images. The remaining figures of this section will not always picture the whole stabilizer.

Step 1: Rivet together the HS-00902-1 Front Spar, the HS-00907-1 Front Spar Doubler and the HS-00913 Front Spar Caps using the rivets shown in Figure 1.

- | | | | |
|--|------------|--|------------|
| | AN426AD4-6 | | AN470AD4-6 |
| | AN426AD4-7 | | AN470AD4-7 |
| | AN470AD4-5 | | |

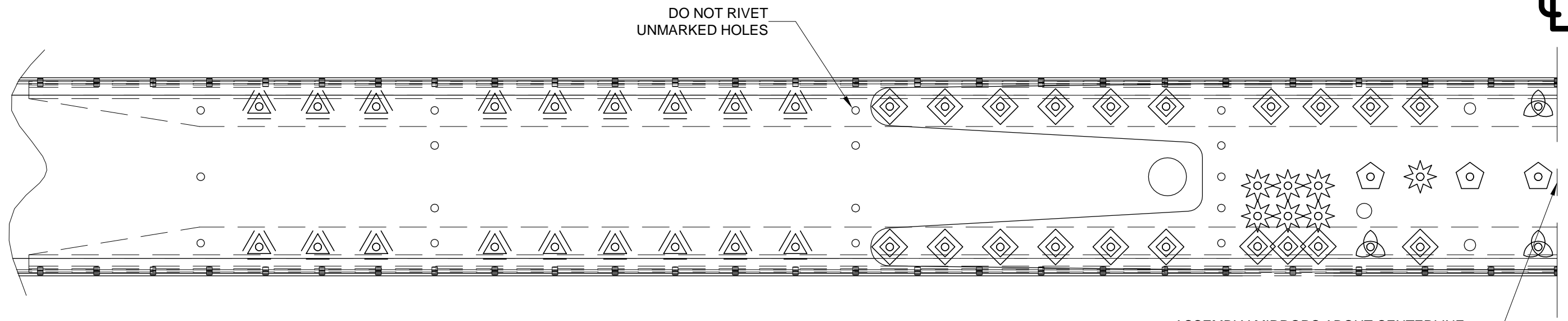


FIGURE 1: FRONT SPAR RIVETS

Step 2: Install the rivets called out in Figure 2 into the nine holes in the top and the nine holes in the bottom flanges of the HS-00902-1 Front Spar and the HS-00913 Spar Caps. These are the holes which were machine countersunk in the spar flanges on Page 08-04.

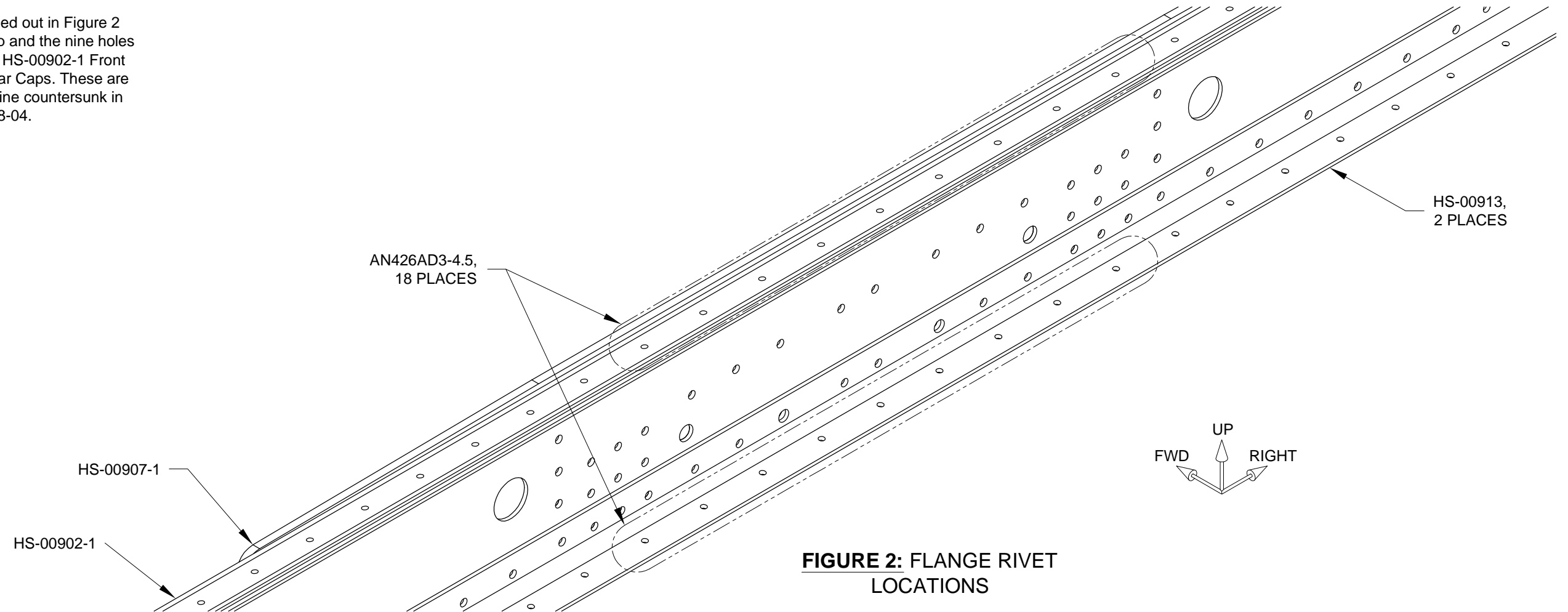


FIGURE 2: FLANGE RIVET LOCATIONS



Step 1: Deburr the edges of all the HS-905 Nose Ribs, HS-1004 and HS-904 Inspar Ribs. Flute, if necessary, the curved flanges of the ribs until the holes in the flanges are in a straight line as shown in Figure 1.

Radius the corners at the forward end of the nose rib flanges to prevent them from making small dents in the skins when the ribs are installed. See Figure 1 and Section 5.2.

Step 2: Put aside all but two of the HS-905 Nose Ribs. Use a hand seamer to open the bend in the aft flange of these two nose ribs by 10.0°. See Figure 1.

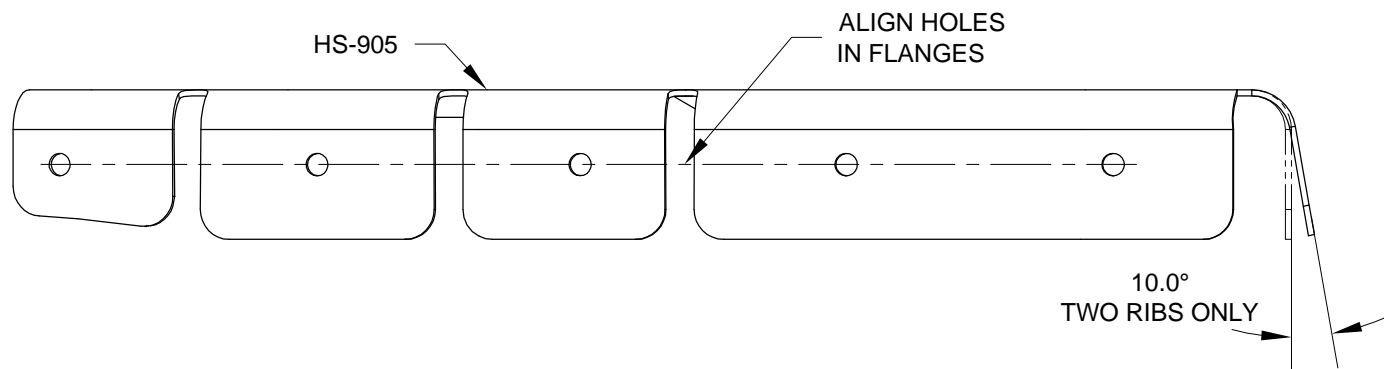
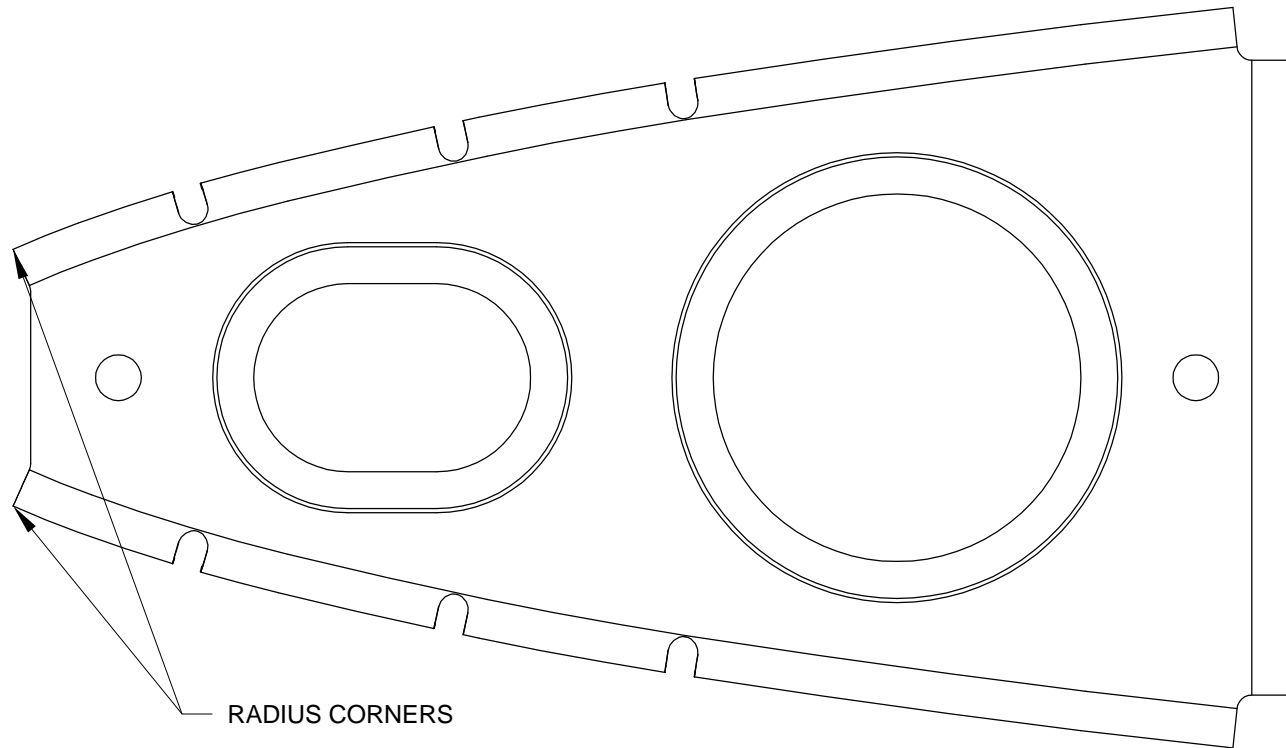


FIGURE 1: MODIFY NOSE RIBS

Step 3: Modify two of the HS-1004 Inspar Ribs by using a hand seamer to bend the aft flange of the ribs open by 10.0° as shown in Figure 2.

The forward flange of the rib must also be bent by 12.5° as shown at the top of Figure 2.

There is a 2.5° bend in the forward portion of the rib. This bend can be accomplished by holding the forward portion of the rib against a solid surface and pressing down along the bend-line with your fingers. The part will bend along the bend-line, between the two notches shown in the figure.

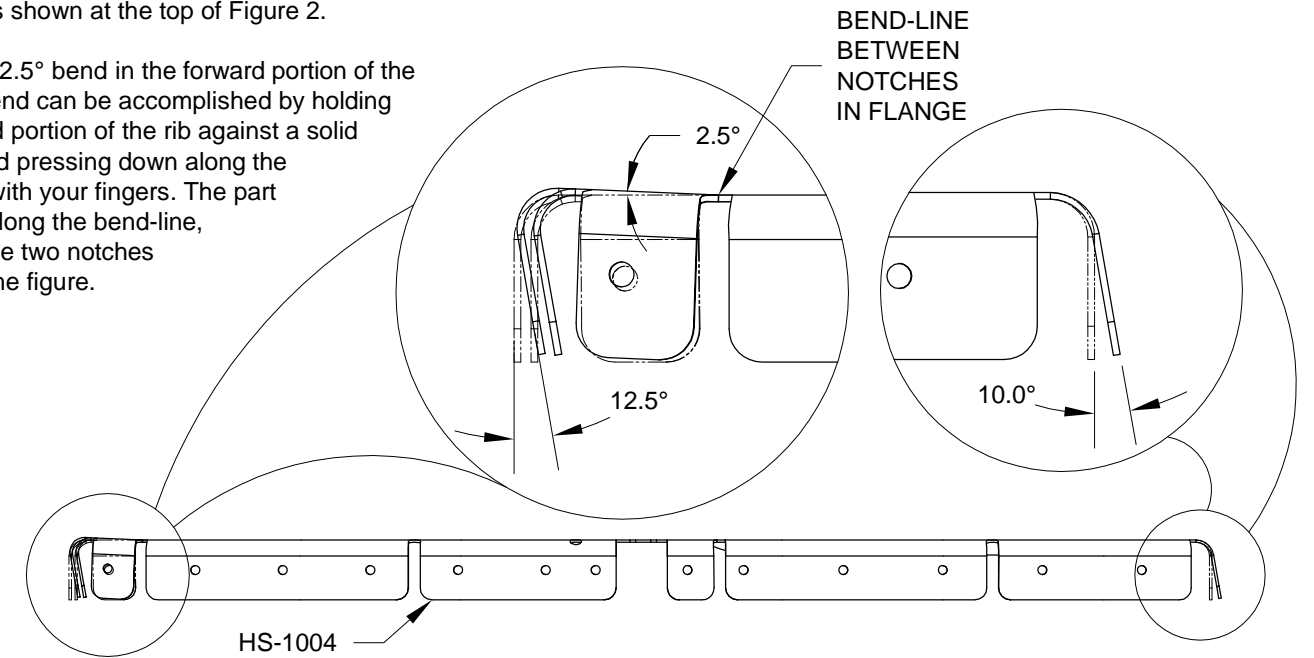


FIGURE 2: MODIFY INSPAR RIBS

Step 4: Fabricate four cradles out of 3/8 [9.5 mm] (min) plywood to hold the horizontal stabilizer during construction.

Don't waste time making the cradles perfect; they have no bearing on the alignment of the stabilizer.

Make a template, used to trace the stabilizer's cross-section, by clecoing together a HS-905 Nose Rib and HS-904 Inspar Rib. The 3/16 [4.8 mm] tooling holes in the ribs can be used to square the ribs with the plywood as shown in Figure 3. Offset the trace about 1/8 [3.2 mm] to allow for the thickness of the skins and a duct tape liner.

Cut out the cradles and attach a piece of angle or a wooden base to the bottom of each as shown in Figure 3. The cradles will need to be clamped to the work surface.

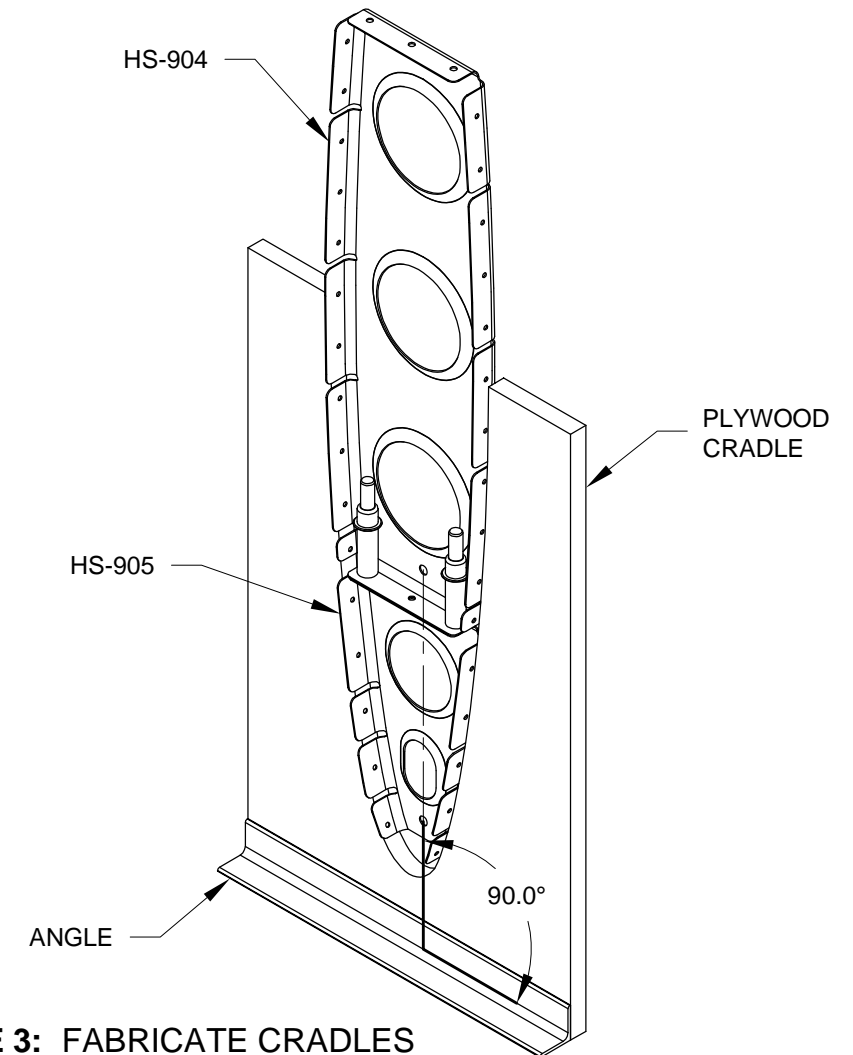
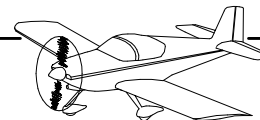


FIGURE 3: FABRICATE CRADLES



Step 1: Cleco the two modified inboard HS-905 Nose Ribs (the ribs with the modified flange angles) to the Front Spar Assembly as shown in Figure 1.

There are five holes in the spar at these two rib locations, but only three holes in the aft flange of the nose rib. Match-Drill #30 the two extra holes of the spar into the nose rib.

Step 2: Cleco the two inboard HS-1004 Inspar Ribs (with the modified flange angles) to the Front Spar Assembly. Match-Drill #30 the center hole of the nose rib and spar into the inspar rib flange.

Step 3: Mark the hole locations called out on the HS-905 Inboard Nose and HS-1004 Inboard Inspar Ribs so that they are not dimpled or riveted later.

Step 4: Remove the HS-905 Nose Ribs and the HS-1004 Inspar Ribs from the spar assembly. Mark the parts so that they can be reassembled in the same location. Deburr all edges and holes.

NOTE: Do not dimple the holes marked in Step 2 or the holes on the small tabs of all inspar ribs.

Step 5: Dimple all the #40 holes on the modified and non-modified HS-905 Nose Ribs, HS-904 Inspar Ribs and HS-1004 Inboard Inspar Rib flanges for AN426AD3 skin attach rivets. See Figure 1.

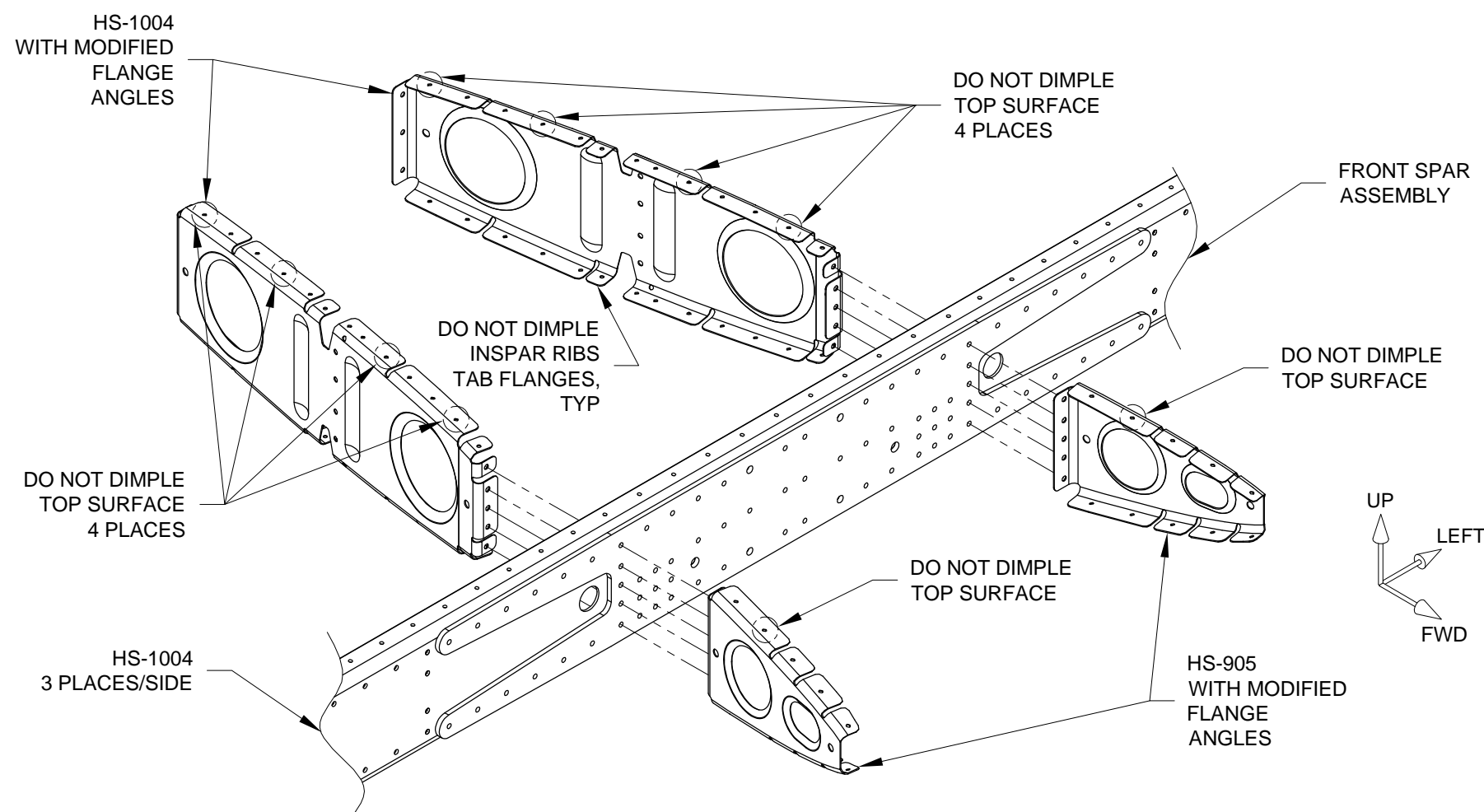
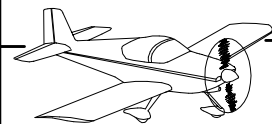


FIGURE 1: INSPAR RIBS AND FRONT SPAR ASSEMBLY



Step1: Deburr the edges of the HS-00901-1 Skins.

NOTE: The HS-00901-1 Skins are symmetrical at this point. There is no top, bottom, left or right sided skin. Take care when completing the following steps to mark and dimple the skins so that they are mirrored.

When these steps are completed there will be one left side and one right side skin with the angled side of the skin located inboard. See Figure 1 and the Figure on 08-01.

Step 2: Mark the empennage fairing and tip fairing screw holes on the HS-00901-1 Skins so that they are not dimpled or riveted later.

The empennage fairing screw holes are indicated on Figure 1 along the right side of the depicted skin. The tip fairing screw locations are indicated along the left side of Figure 1.

Step 3: Dimple the HS-00901-1 skins for the AN426AD3 exterior rivets. Do not dimple the holes marked in Step 2.

Step 4: Machine countersink, for dimples in .025 thick skin, the #40 holes in the flanges of the HS-00902-1 Front Spar and HS-00903-1 Rear Spar that correspond to the HS-00901-1 Skins.

Machine countersink the #40 holes of the HS-00914 Stringers for the dimples in the skin.

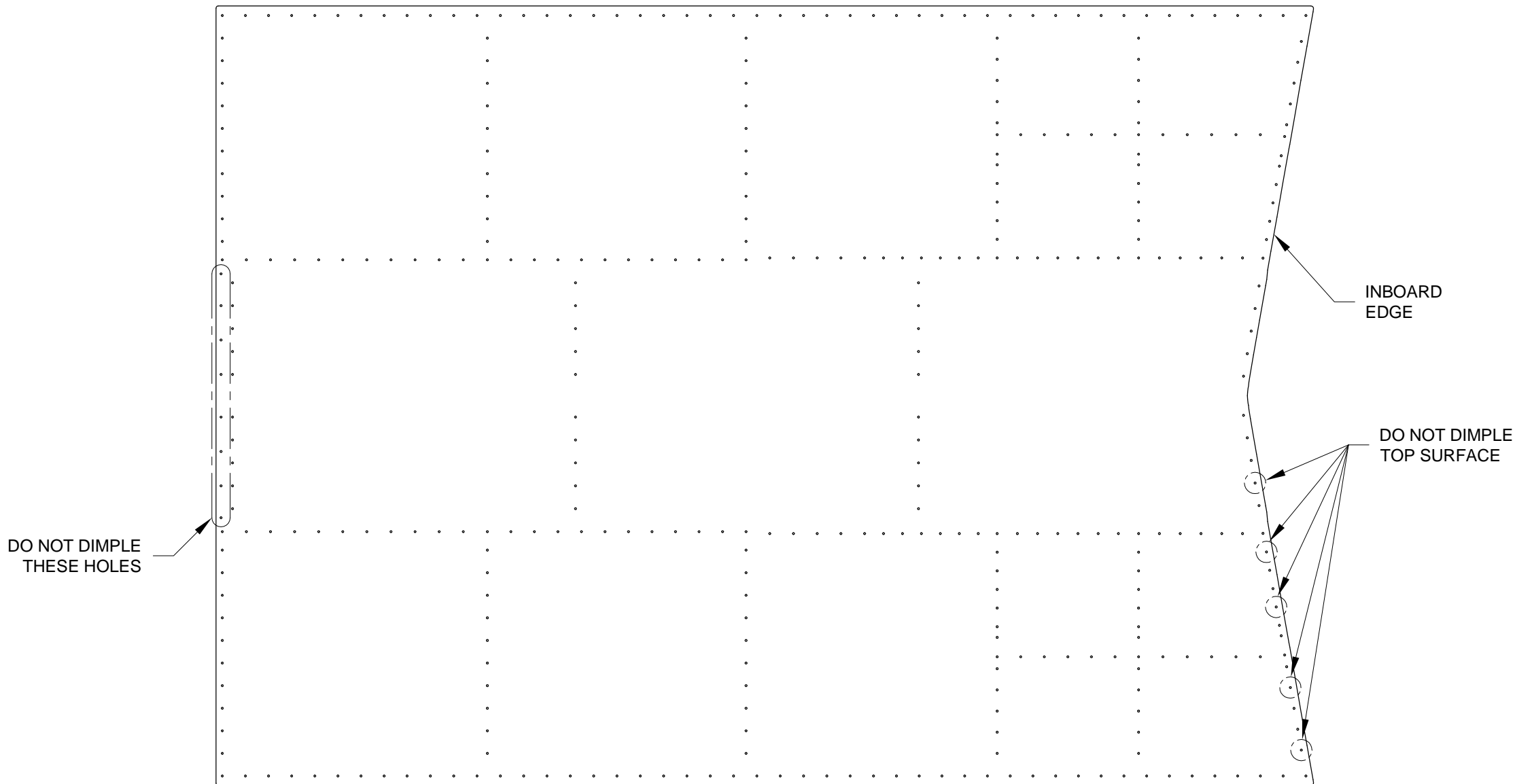
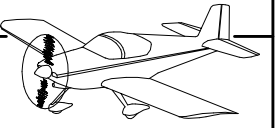


FIGURE 1: HORIZONTAL STABILIZER SKIN
(SHOWN FLAT)



Step 1: Rivet the two inboard HS-1004 Inspar Ribs to the flanges of the HS-00916 Stringer Web using the rivets called out in Figure 1.

Step 2: Cleco the HS-00914 Stringers into the stringer web assembly by dropping them into the notches in the HS-1004 Inspar Ribs. Rivet the HS-00914 Stringers to the HS-00916 Stringer Web using the rivets called out in Figure 1.

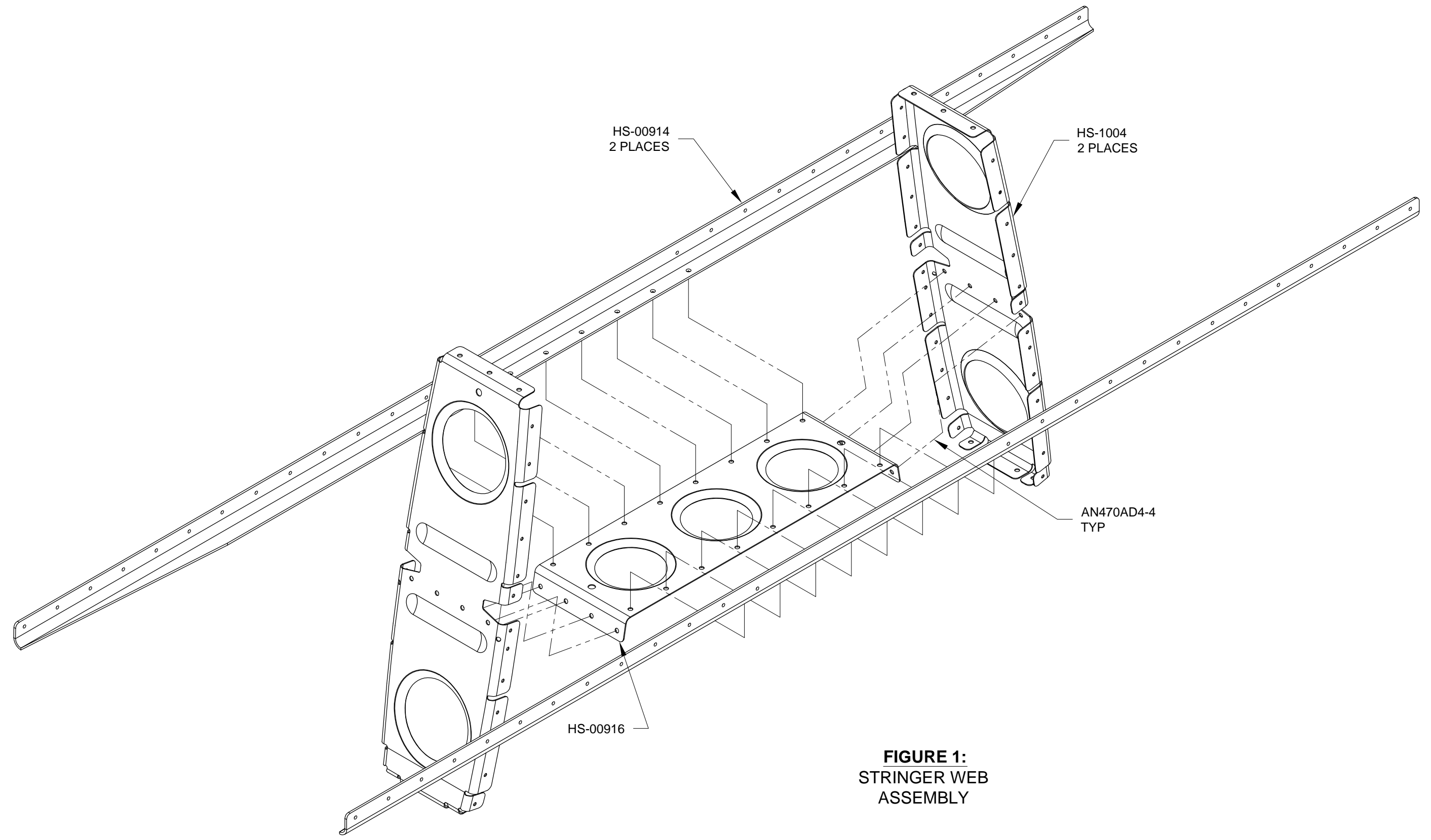


FIGURE 1:
STRINGER WEB
ASSEMBLY



NOTE: Do not rivet the two center HS-1004 Inspar Ribs to the Front Spar Assembly. They will be riveted later.

Step 1: Cleco then rivet the two outboard HS-905 Nose Ribs to the Front Spar Assembly as shown in Figure 1.

Step 2: Cleco the Inspar Rib, Stringer, and Stringer Web Assembly into position on the Front Spar Assembly. See Figure 1.

NOTE: Do not rivet the two inspar ribs at this time since they share rivets with two nose ribs.

Step 3: Cleco the HS-904 and HS-1004 Inspar Ribs shown in Figure 1 to the Front Spar Assembly. Slide the HS-1004 Inspar Ribs along the stringers to get them into position. See Figure 1.

Rivet these ribs in place using the rivets called out in Figure 1. The rivets called out in the detail apply to all the HS-1004 Inspar ribs except for the inboard two.

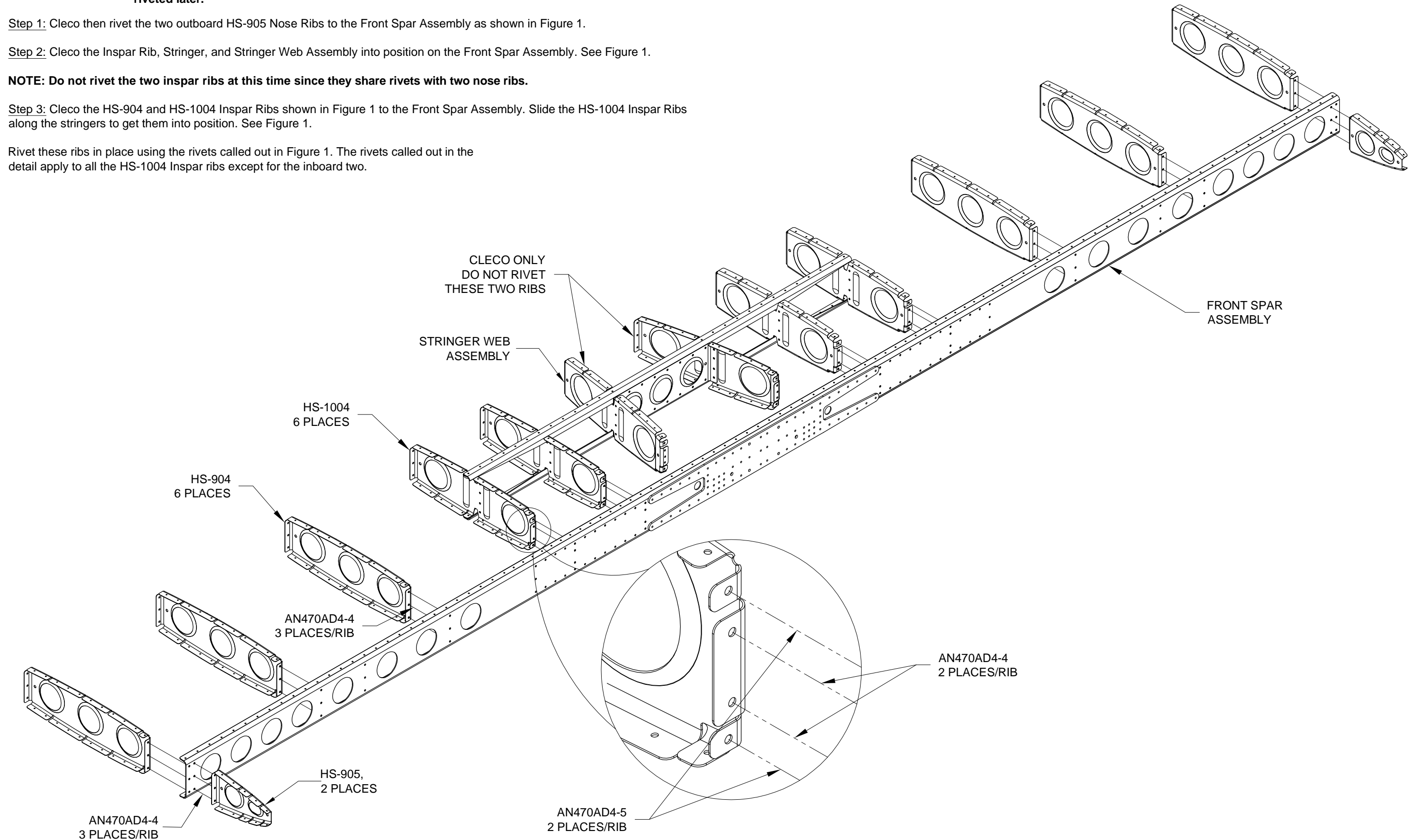


FIGURE 1: RIVETING THE INSPAR RIBS



Step 1: Set up the four cradles to support the HS-00901-1 Skins as shown in Figure 1. Clamp the cradles to the work bench.

Step 2: Put both HS-00901-1 Skins in the cradles. The angled end of the skins are facing inboard as shown in Figure 1. Adjust the position of the cradles if necessary.

Step 3: Cleco the HS-905 Nose Ribs to the HS-00901-1 Skins as shown in Figure 1. Rivet the nose ribs to the skins using the rivets called out on Page 08-13, Figure 1.

NOTE: The two modified HS-905 Inboard Nose Ribs may be riveted to the assembly after the rest of the construction is completed. The horizontal stabilizer can then be removed from the cradles giving better access.

Step 4: Insert the Front Spar/Inspar Rib Assembly into the HS-00901-1 Skins and cleco it to the HS-905 Nose Ribs and the skins.

Using the rivets shown in Figure 1, rivet the assembly to the nose ribs.

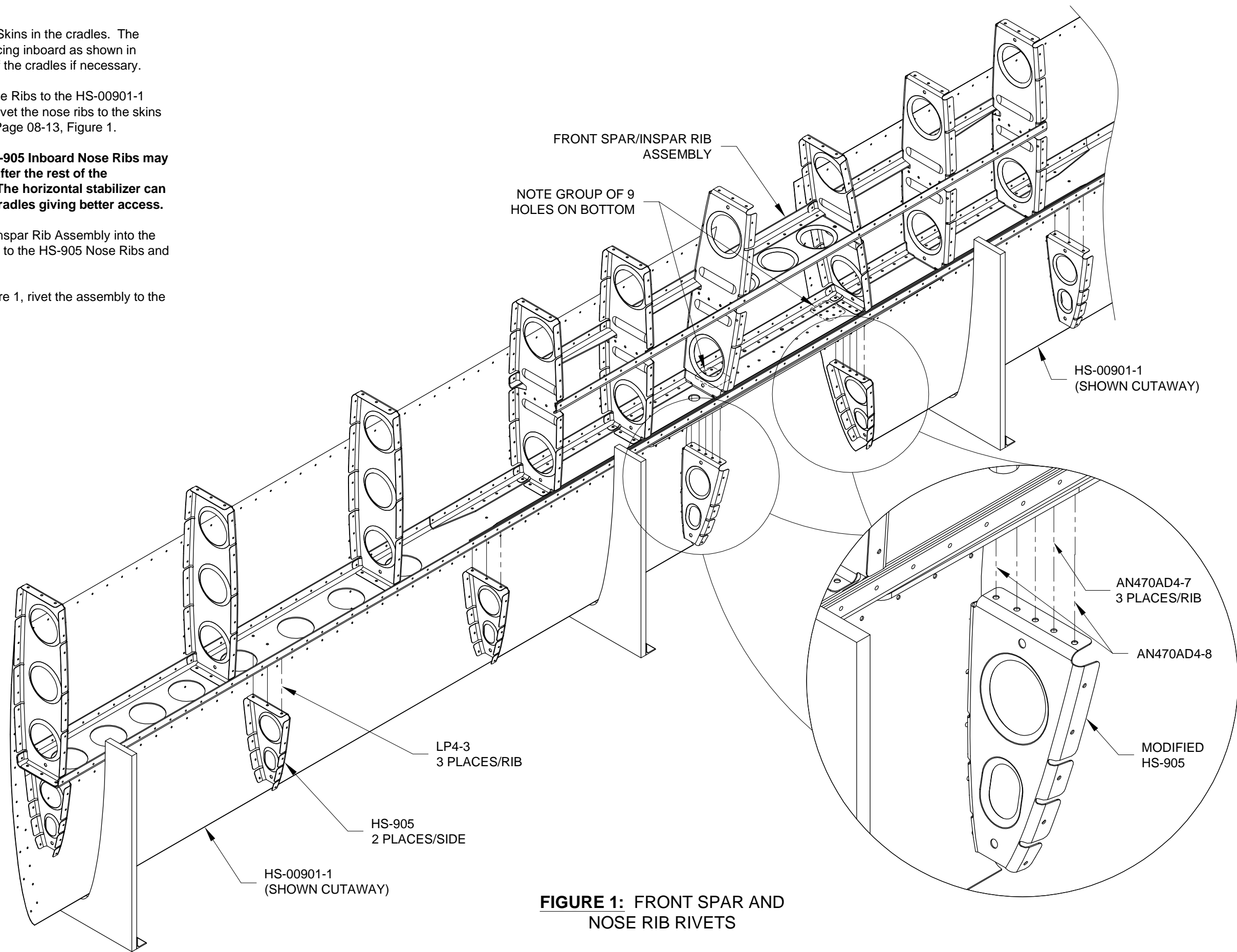
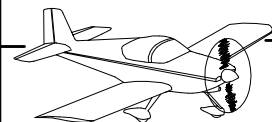


FIGURE 1: FRONT SPAR AND NOSE RIB RIVETS



Step 1: Rivet the HS-00901-1 Skins to the flanges of the Front Spar Assembly using the rivets called out on Page 08-13 Figure 1. Make sure to capture the flanges of the HS-904 and HS-1004 Inspar Ribs where they joggle under the flanges of the Front Spar Assembly.

Step 2: Starting from the Front Spar Assembly, rivet the HS-00901-1 Skins to the flanges of the HS-904 and HS-1004 Inspar Ribs up to the HS-00914 Stringers.

Rivet the skins to the stringers.

Rivet the skins to the remainder of the inspar ribs.

See Page 08-13 Figure 1 for rivet type and locations.

NOTE: Place the manufactured head of all inspar rib to Rear Spar Assembly rivets on the spar for clearance when the elevators are installed.

CAUTION: Double check rear spar (spar notch on bottom) and front spar (9 hole pattern on bottom) orientation before riveting in Step 3! See callouts in Figure 1.

Step 3: Cleco the Rear Spar Assembly into position, then rivet it to the HS-904 and HS-1004 Inspar Ribs using the rivets shown in Figure 1.

Step 4: Rivet the HS-00901-1 Skins to the flanges of the Rear Spar Assembly using the rivets called out on Page 08-13 Figure 1.

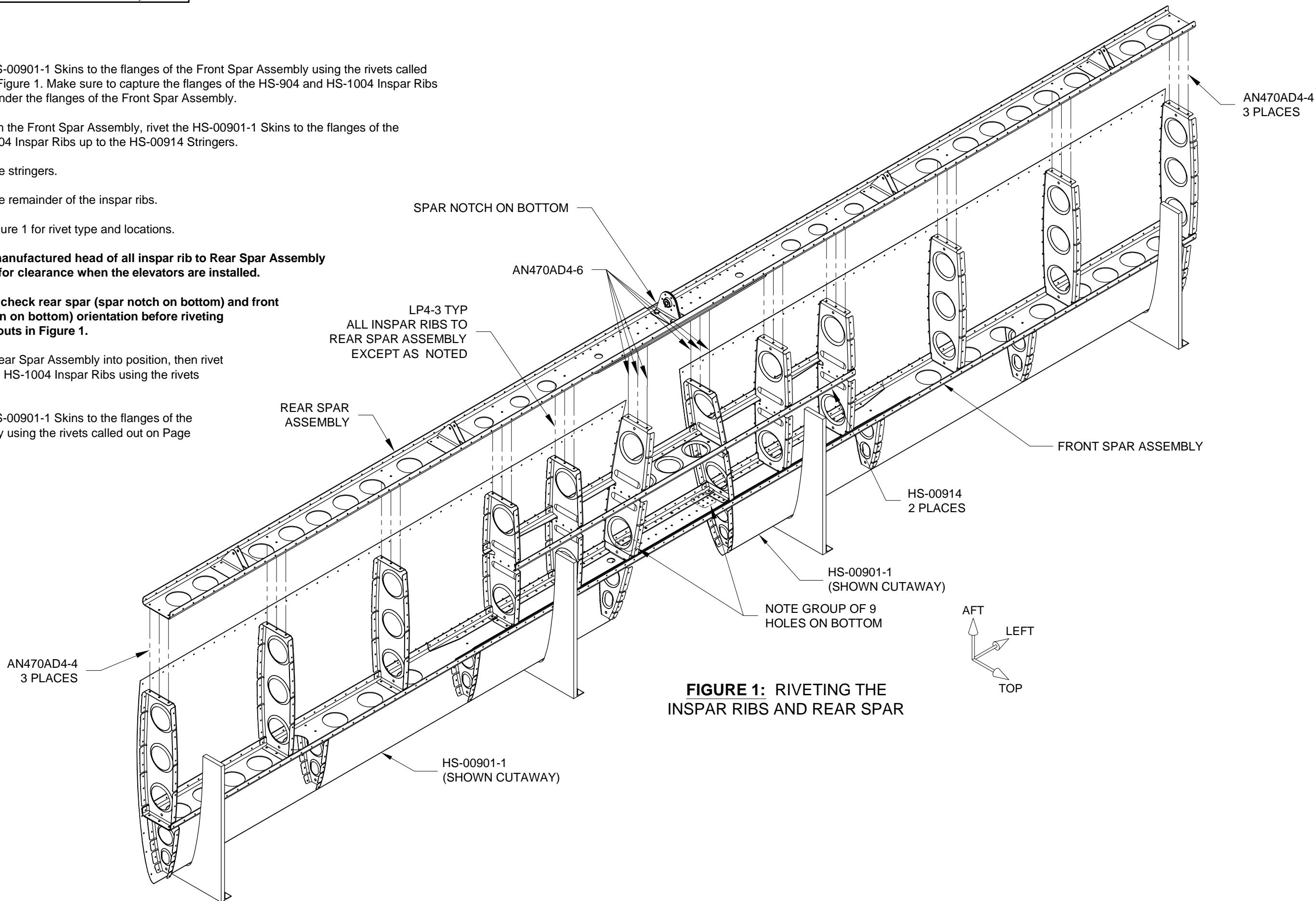


FIGURE 1: RIVETING THE INSPAR RIBS AND REAR SPAR

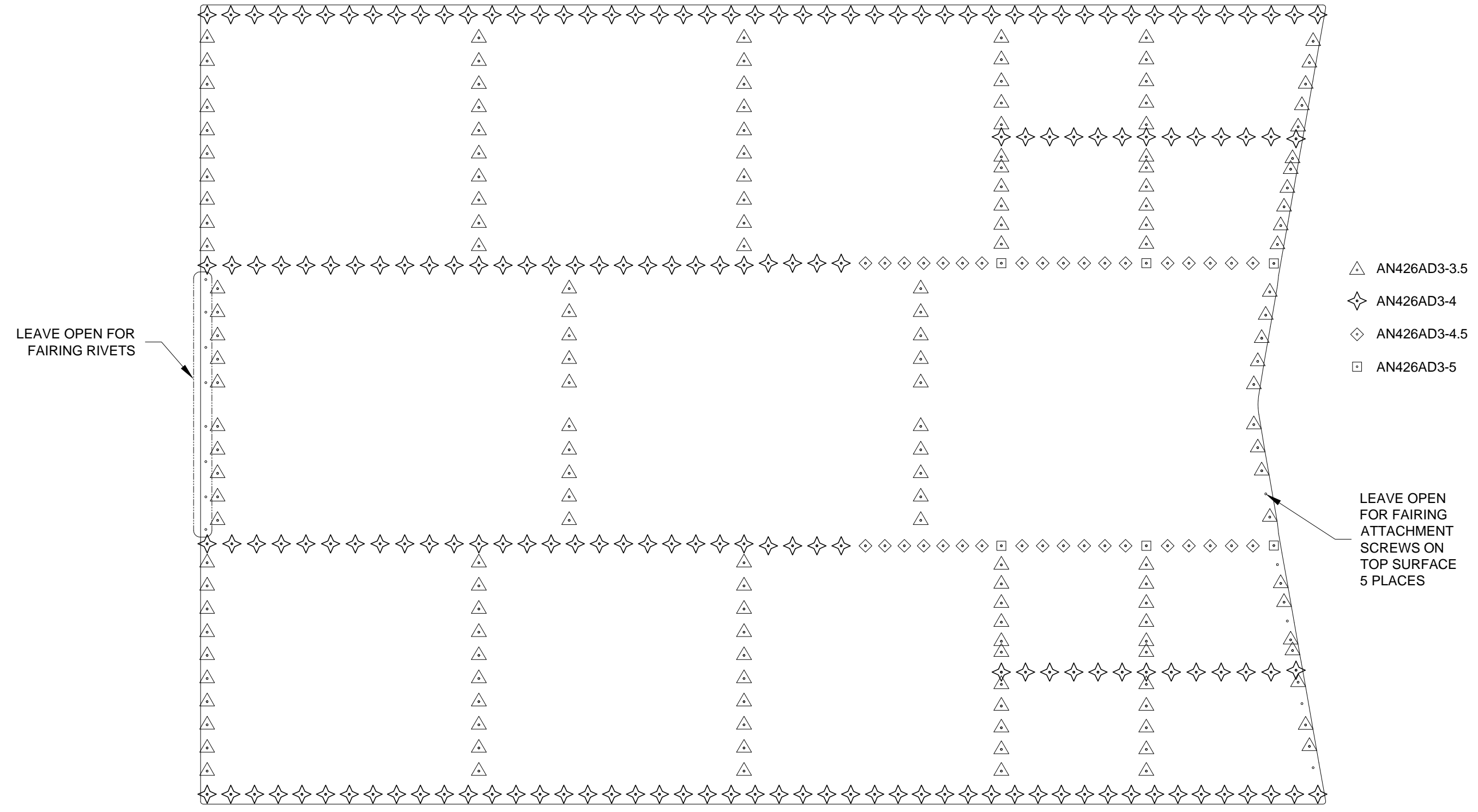
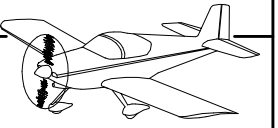


FIGURE 1: SKIN RIVETS



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