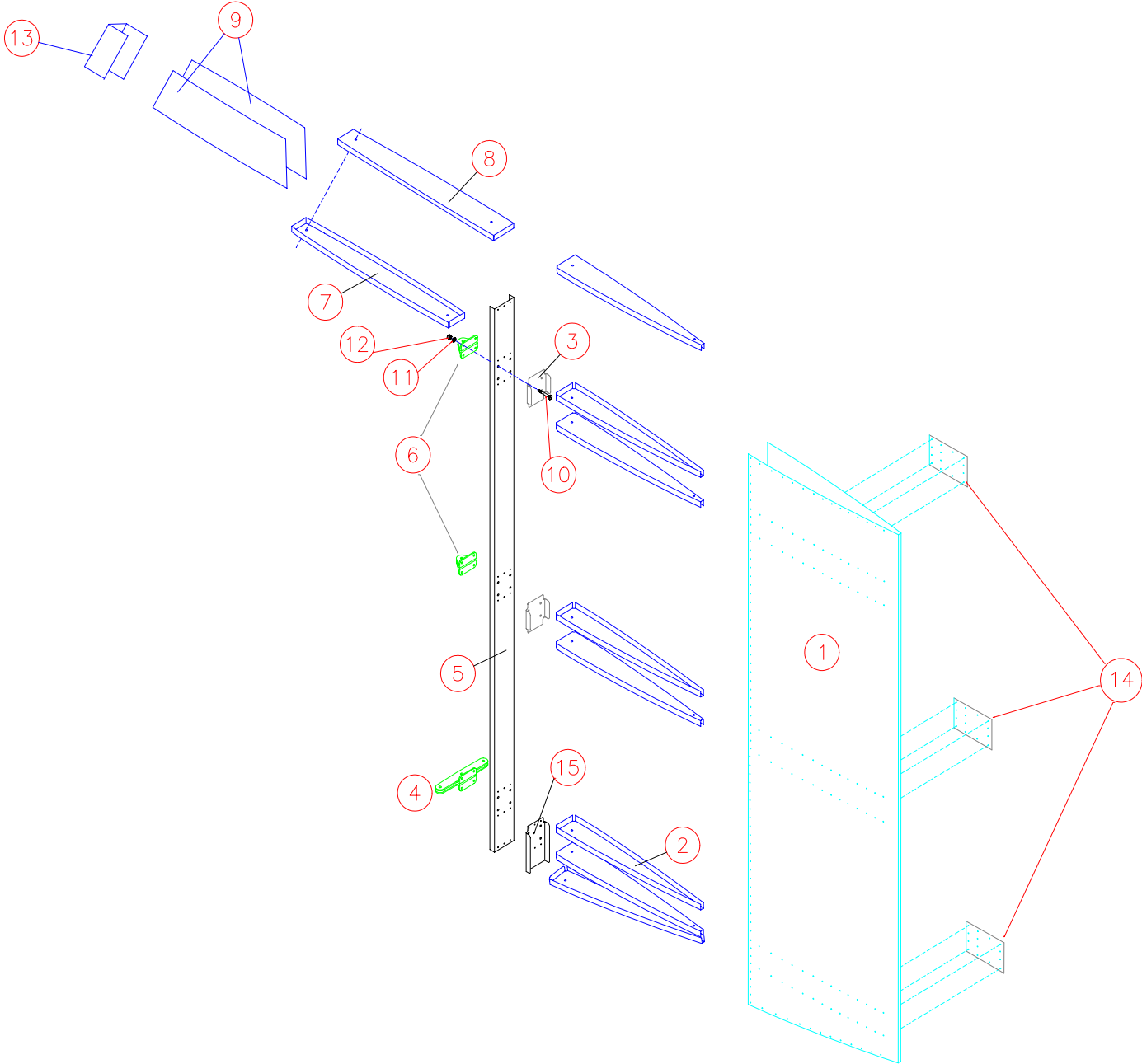


Rudder Assembly



ELITE RUDDER

ELITE Rudder Parts List

08-Jan-99

	NAME	NO.	AMOUNT
1	RUDDER SKIN	RU-401	1
2	ELEV/RUD RIB	EL-403	8
3	ELEV/RUD HINGE DOUBLER	EL-307	2
4	ELEV/RUD HORN	EL-301	2
5	RUDDER SPAR	RU-400	1
6	ELEV/ RUD HINGE	EL-300	4
7	TIP RIB	EL-402	1
8	OUTBOARD TIP RIB	RU-402	1
9	RUDDER TIP SKIN	RU-403	2
10	3/16" BOLT	AN3-5A	12
11	3/16" WASHER	AN960-10	12
12	3/16" FIBER NUT	AN365-1032	12
13	L.E.TIP SKIN	RU-405	1
14	INSPECTION COVERS	EL-409	3
15	RUDDER HORN DOUBLER	EL-318	1
	PARTS NOT SHOWN		
	RIVETS 1/8" X 3/16" AVEX	RV-1410	Approx. 500

To assemble the *Elite* Rudder, you will need the following tools:

1. Drill
2. Tape Measure
3. Felt Marker
4. #40, #30, 3/16" Drill Bits
5. 3/32", 1/8" and 3/16" Clecos
6. Cleco Pliers
7. Two 3/8" Wrenches
8. Aviation Snips
9. Riveter

5.1 Rib Install

- 1) Layout all the parts as in the Exploded view. **NOTE:** Do not handle the Rudder Skin (RU-401) until it is needed during assembly.
- 2) Draw center lines on all the Main Rib flanges. Cleco the Elevator/Rudder Doublers (EL-307) and Rudder Horn Doubler (EL-318) to the Rudder Spar. **NOTE:** The EL-403 Ribs must be straightened before they are installed. Record rivet locations on the rib by clecoing a rib to the skin. Flute the flanges between the rivet holes.
- 3) Drill #40 the three holes at the root end of the Spar into the EL-318. Layout and drill two evenly spaced rows of holes between the holes you just drilled and the next existing row.
- 4) Cleco the Elevator/Rudder Ribs (EL-403) to the Spar assembly. Figure 5.1.1. **NOTE:** You will have to trim the flanges of the two ribs that go inside the Rudder Horn Doubler.

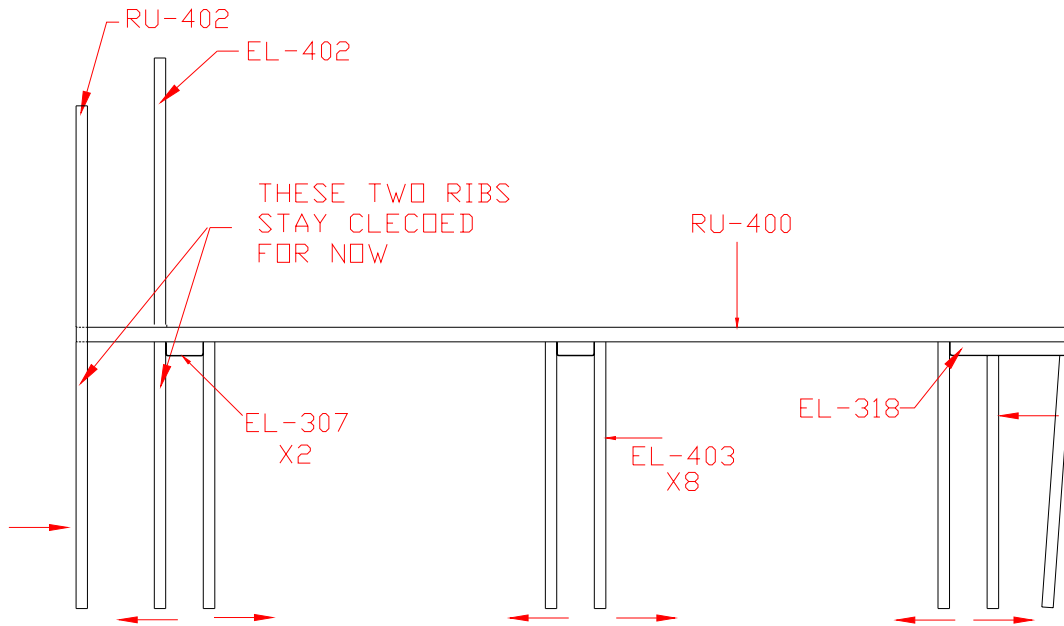


Figure 5.1.1

- 5) Drill all holes to #30, disassemble, debur, chromate and rivet the assembly using 1/8" (RV-1410) avex rivets. Bolt the Elev/Rud Hinges to the Spar using the prepunched aligning holes. Figure 5.1.2. **NOTE:** Do not drill or rivet the top two EL-403 Ribs at this time. The Rudder Balance Ribs will be installed later.

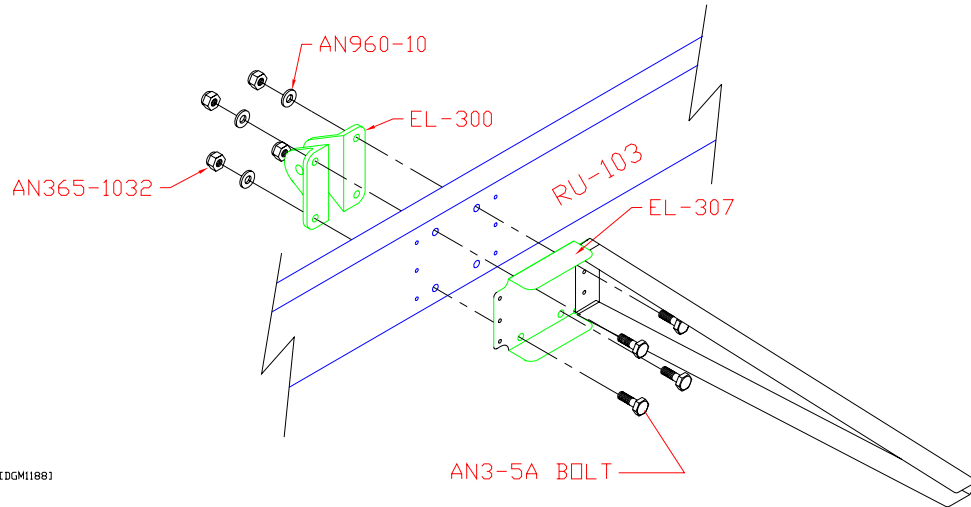


Figure 5.1.2

5.2 Skin Install

1) Position two 2 x 4s on a level work surface approx. 40" apart. See figure 5.2.1.

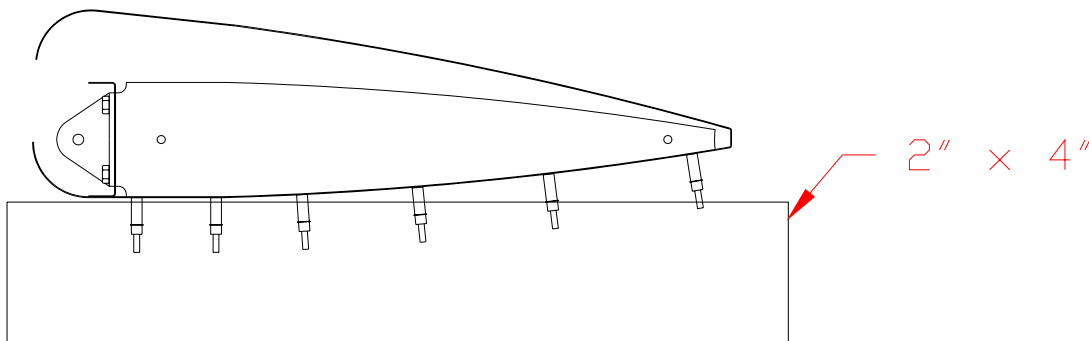


Figure 5.2.1

2) Position the Rudder Skin over the Spar/Rib assembly, cleco the Skin to the Ribs using the prepunched alignment holes. Figure 5.2.2.

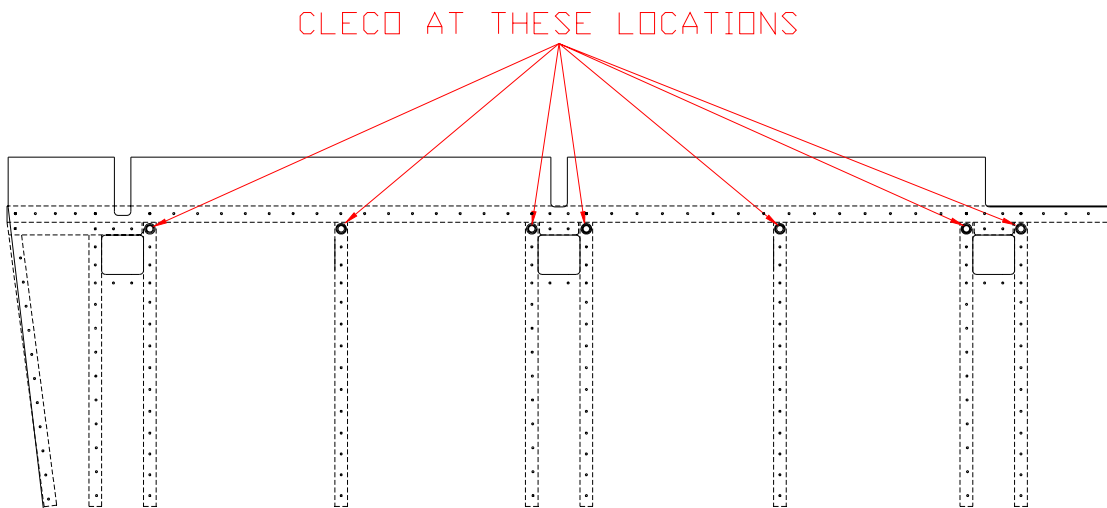


Figure 5.2.2

- 3) Drill #40 and cleco the EL-403 Ribs through the Skin using the Skin as a drill guide. Start from the Spar end and work toward the trailing edge. Be sure the center lines on the ribs are visible. Cleco as you go.
- 4) Turn the assembly over and repeat step.
- 5) To ensure that the assembly is level, take a measurement from the bottom of the Trailing Edge to the table top. It should be the same distance at both ends. Use some small wood wedges under the Trailing Edge at each end to adjust the height. Figure 5.2.3.

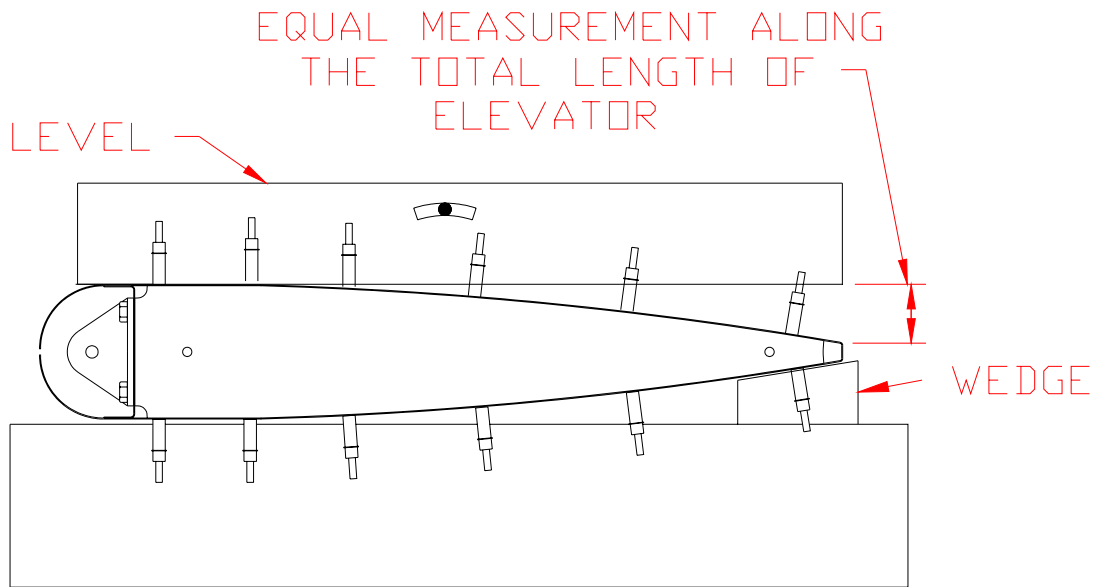


Figure 5.2.3

- 6) Using the Skin as a drill guide, drill and cleco the Spar to the Skin. Working from the center of the Spar to each end, drill #40. Cleco every 5 or 6 rivet holes. To ensure the structure remains level use weights to hold it in place. Layout and drill #40 three holes on the flanges of EL-318 using the existing holes on the Spar line as a guide. Figure 5.2.4

7) Turn the Assembly over and repeat step. **NOTE:** Check for level again at this time since once the assembly is drilled, it cannot be changed.

8) At the lower section of the Main Spar, trim out the area on both sides of the Main Spar using the Rudder Skin as a guide. Figure 5.2.4.

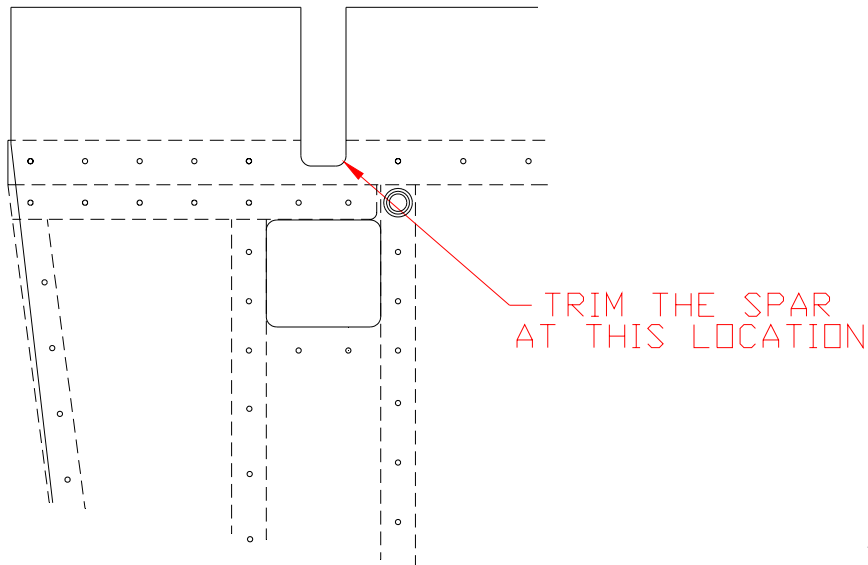


Figure 5.2.4

9) Drill all the #40 holes to #30, disassemble, debur and chromate all mating surfaces and rivet together. Use lots of clecos. **NOTE:** DO NOT rivet the Skin between the Two Top Ribs.

5.3 Tip Rib Install

1) Cleco the top Rudder Tip Rib (RU-402) into place at the top of the Rudder. Keep the Rudder in place with a straight edge. (Use a 1" x 1" piece of wood. You can cleco the Rib into the wood to keep it straight). Figure 5.3.1.

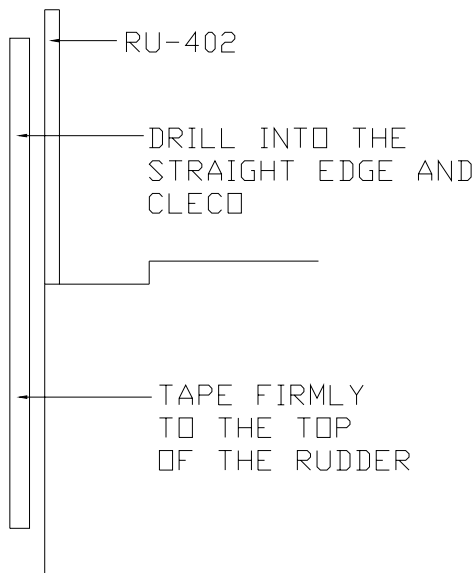


Figure 5.3.1

2) Cleco the lower Tip Rib (EL-402) into place. Use a piece of scrap clamped to the nose of the ribs to keep them parallel. Figure 5.3.2.

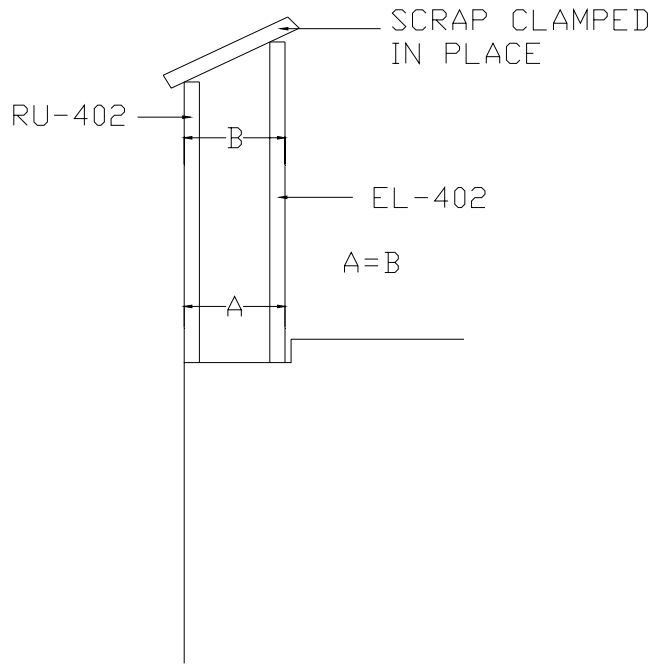


Figure 5.3.2

- 3) Find the two RU-403's and cut them to 5 1/8" x 19". File smooth. Next, layout and drill #40 rivet lines on the two RU-403 Tip Skins. Refer to figure 5.3.3 for dimensions. **NOTE:** You will draw a line across the part 1 5/16" from one end. Do not drill holes on this line. Figure 5.3.3.

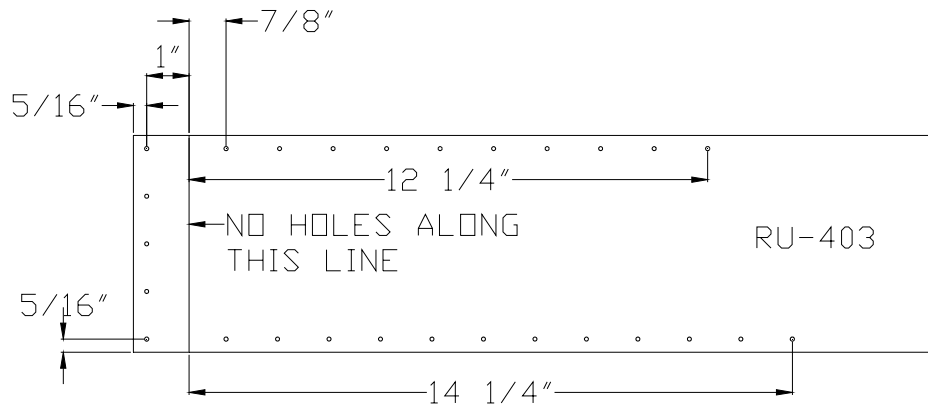


Figure 5.3.3

- 4) Slide the RU-403 between the Rudder Skin and the Spar. The line drawn in the previous step should be visible through the Spar rivet line on the Rudder Skin. Flush the top edge of the skin with the top Tip Rib. Tape into position.
- 5) Drill #40 holes through the Tip Ribs and Rudder Spar using the Skin as a drill guide.
- 6) Remove the Skin. Cleco it back in place overlapping the Rudder Skin this time. Drill #40 holes through the rivet line behind the Spar using the tip Skin (RU-403) as a drill guide. Mark the Skin for trimming and remove and trim. **NOTE:** Trim the skin flush with the end of the side flanges on EL-402 and RU-402, not the end of the Ribs. Figure 5.3.4.

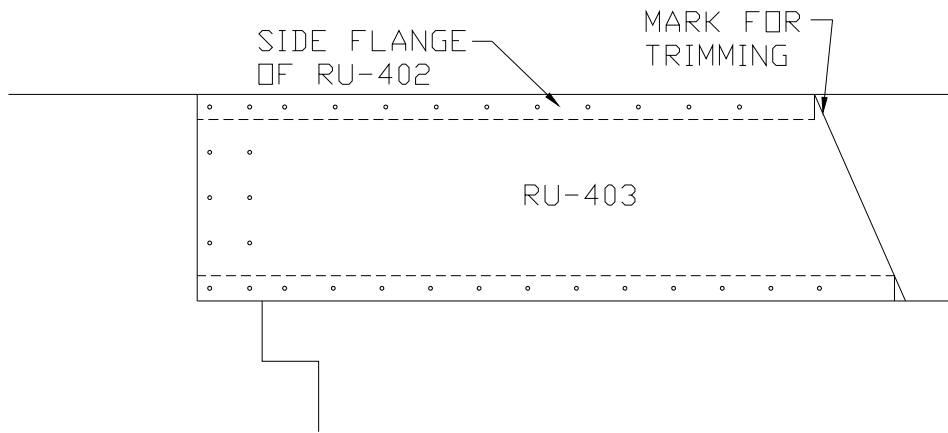


Figure 5.3.4

- 7) Repeat the previous steps for the other side.
- 8) Layout and drill a rivet line along the leading edge of both Tip Skins. Figure 5.3.5.

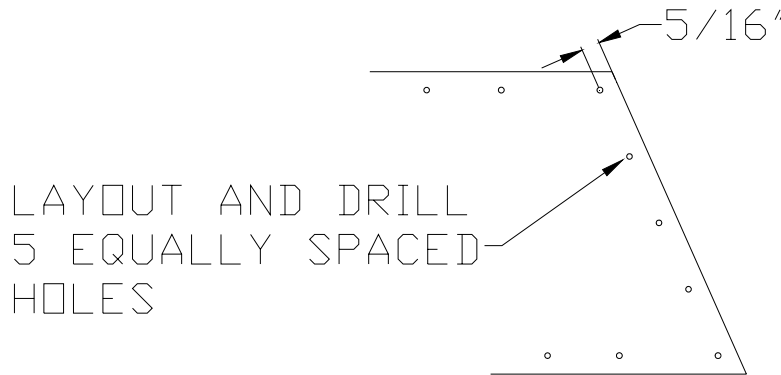


Figure 5.3.5

- 9) Re-install the Skins. Slide the RU-405 Leading Edge Skin so that the Tip Skins (RU-403) overlap. Tape it securely. Using the Tip Skins as a drill guide drill #40 holes through the Leading Edge Skin. Cleco. Figure 5.3.6.

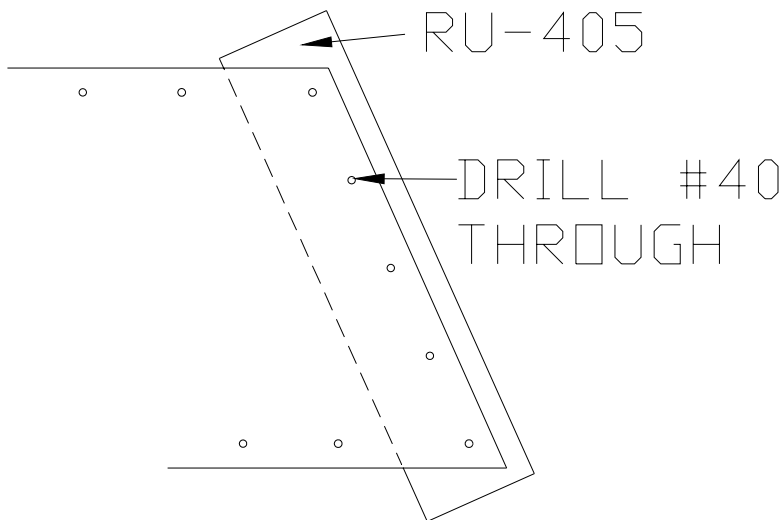


Figure 5.3.6

- 10) Mark the Leading Edge Skin for trimming (use Tip Ribs for a guide). Remove the skin and trim. Use a circle template to mark out for the corner radius. Figure 5.3.7.

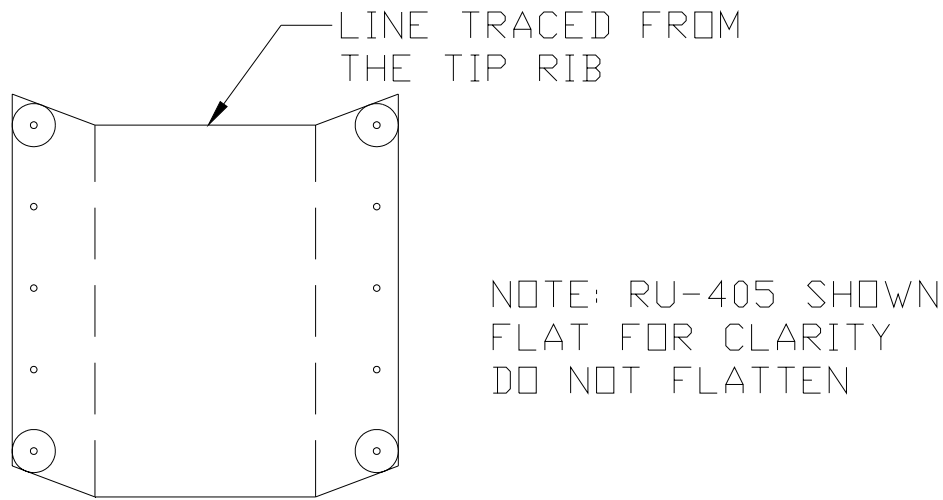


Figure 5.3.7

11) Layout two rivet lines on the RU-405. Figure 5.3.8.

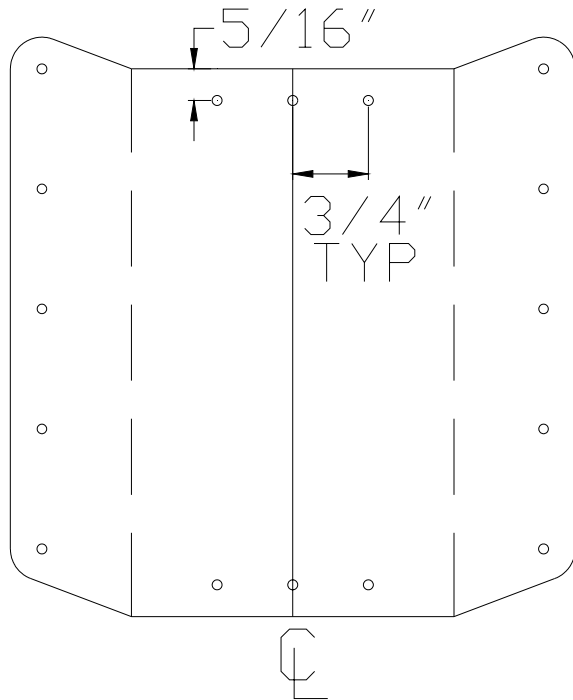


Figure 5.3.8

12) Re-install the Leading Edge Skin. Drill the new holes through the flanges of the RU-402 and EL-402. Drill all holes out to #30.

13) Disassemble, debur, chromate all mating surfaces, re-assemble and rivet using RV-1410 avex rivets.

5.4 Elev/Rud Horn Install

1) Install the Elevator/Rudder Horn to the bottom of the Rudder as in Figure 5.4.1. **NOTE:** The Rudder is shown exploded for clarity only. You will also have to notch out and radius the two flanges on the RU-400 in that area to accommodate the EL-301 Horn. See figure 5.4.1 for location.

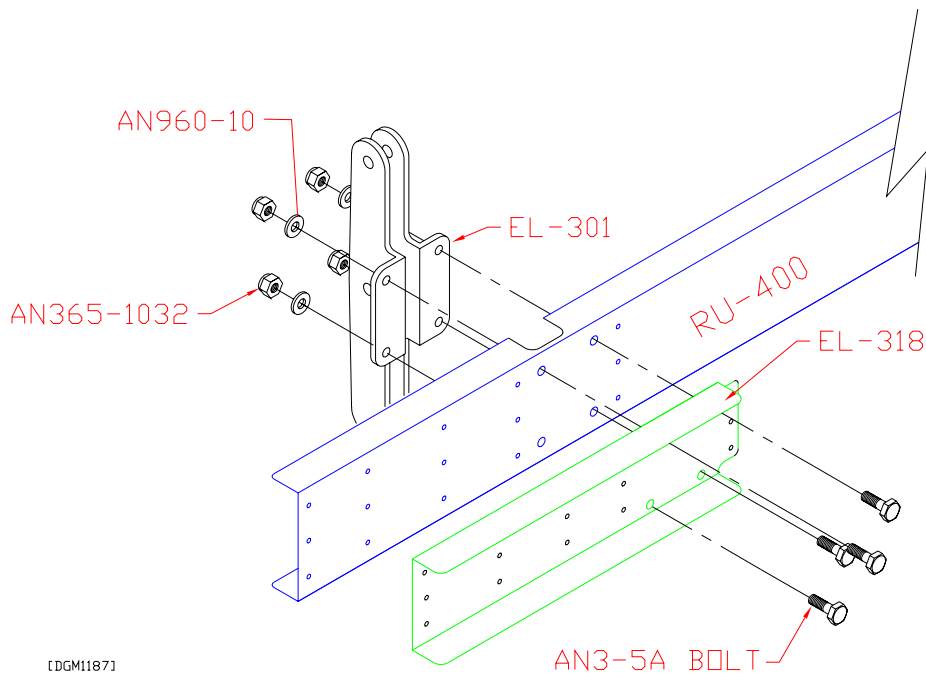


Figure 5.4.1

- 2) Cleco the Elevator/Rudder Inspection Covers into position. Drill to #30, remove, debur, chromate mating surfaces and rivet in place using 1/8" avex rivets (RV-1410).
- 3) Draw a 5/8" line down the length of the one of the Rudder Leading Edge rolled edges. Overlap the other side of the Leading Edge up to the mark. Tape securely.
- 4) Draw a rivet line 1/4" up from the overlapped edge. Drill a #40 rivet hole every 3 - 3 1/2" (not critical). Drill all holes out to #30.
- 5) Debur, chromate all mating surfaces and rivet with RV-1410 avex rivets.

