

9.3 MATING THE TAIL CONE TO THE CABIN

1) Trim the bottom flange of both FUS-339 side skins on the tailcone assembly as in Figure 1.

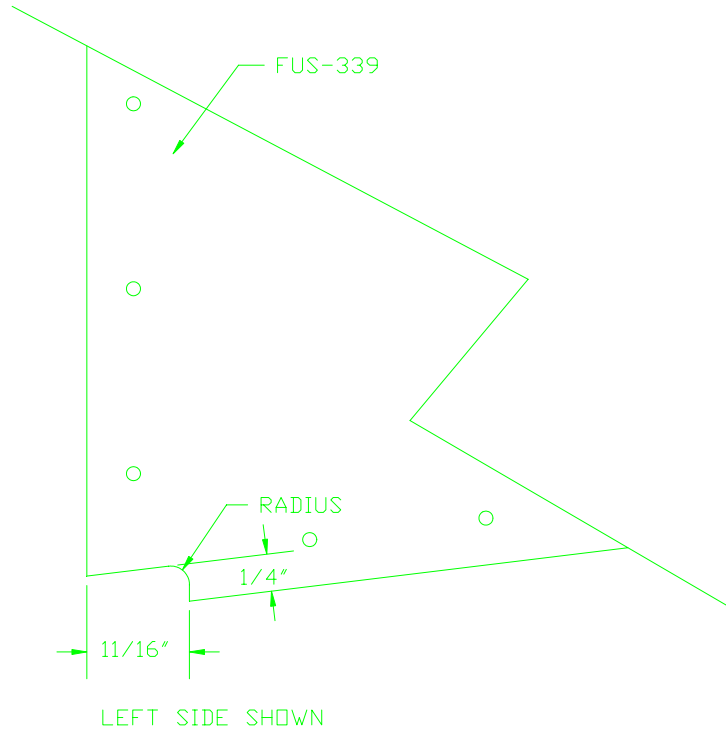


FIGURE 1

2) Remove the bottom two RBULK 2A's of bulkhead "A" on the tailcone.

3) Level and secure the cabin to the workbench. Block the tailcone up with 2 x 4's and slide into position. Cleco the FUS-339 side skins of the tailcone to the FUS-337 fuselage side skins. The tailcone side skins should go behind the FUS-337 fuselage side skins. Figure 2.

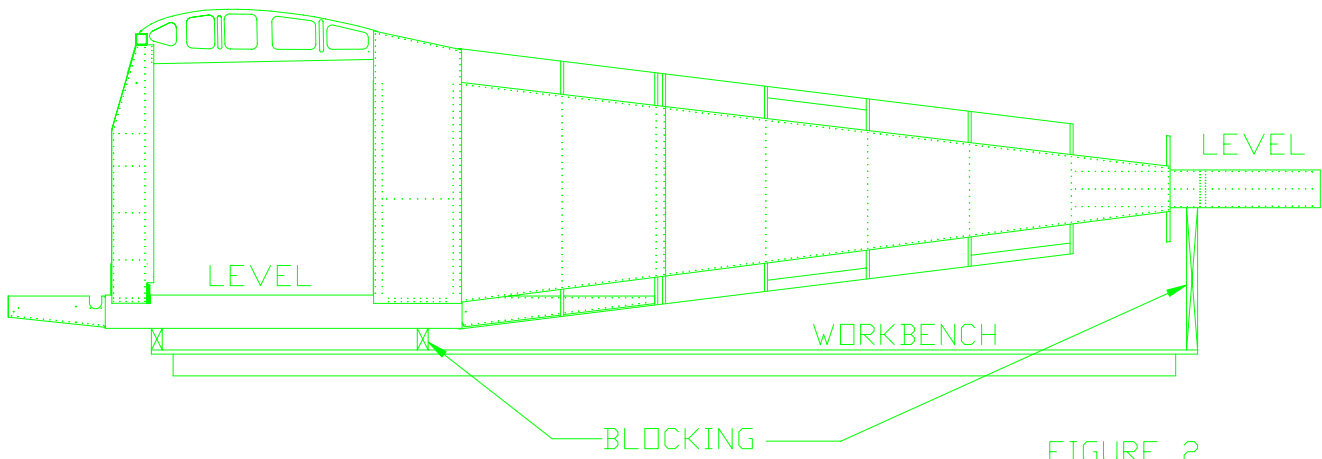


FIGURE 2

- 4) The FUS-342 top skin of the tailcone should be on top of the cabin top.
- 5) Put clecos in the two positioning holes.
- 6) Back drill to #40 the cabin top and station 8 RBULKS using the FUS-342 top skin as a drill guide. Start at the center and make sure the RBULK'S are straight.
- 7) Mark the cabin top along the sides for trimming and remove.
- 8) Trim the cabin top sides. Trim at station 8 to have a 5/16" edge distance.
- 9) Replace the cabin top. It should now go on top of the tailcone top skin.
- 10) Drill to #30.
- 11) Dimple all #30 holes that go through both the cabin top and root ribs and cabin top and angles. This will leave a smooth surface for the upper wing fairings to be installed later.
- 12) At this time you can rivet the following:
 - a. The cabin top to the root ribs and RBULKS. At station 8 do not rivet at the ends.
 - b. The cabin top to the carrythrough.
 - c. The corner gussets to the carrythrough.
 - d. The FUS-300 channels to the carrythroughs and corner gussets.
 - e. The FUS-337 Fuselage side skins to the station 6 & 7 uprights only.

Do not put any rivets into the post skins or spacers at this time.

- 13) Carefully turn the entire aircraft assembly over onto its side. Use 2 x 4's as blocking to clear clecos.
- 14) Using the FUS-342 bottom skin as a drill guide, drill to #40 the bottom floor skin and station 8 carrythrough. The center lines of the two skins should match.
- 15) Peel the bottom floor skin from under the FUS-342 bottom skin and cleco back together with it on top.
- 16) Drill out to #30.
- 17) Rivet the skins to the carrythrough.

- 18) Carefully turn the aircraft upright and level fore and aft and side to side.
- 19) Position the FUS-344 horizontal bulkhead between the FUS-357 fuselage rear panels. Drill three or four #40 holes on each side. Figure 3.

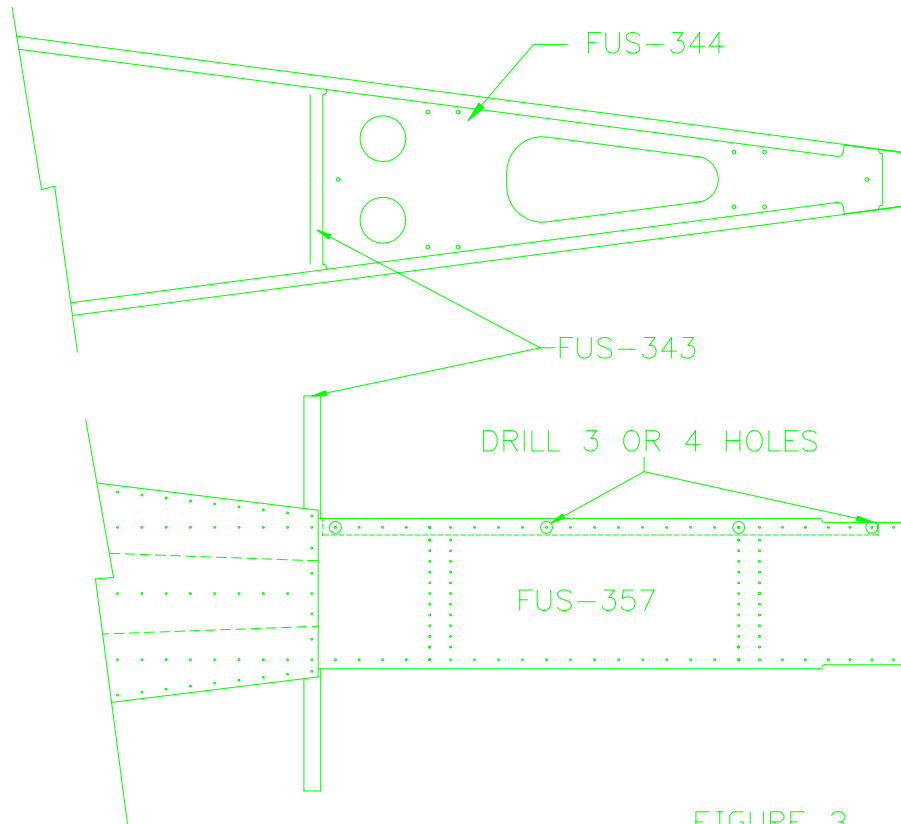


FIGURE 3

- 20) Check that the horizontal bulkhead is level both fore and aft and side to side. Drill the remaining holes.
- 21) Backdrill through the FUS-343 bulkhead into the upright flange of the horizontal bulkhead. Ensure the centerline of both bulkheads align.
- 22) Trace the outline of a RBULK 2 onto a piece of 1/2" or thicker plywood and cut out. Make six pieces. Figure 4.

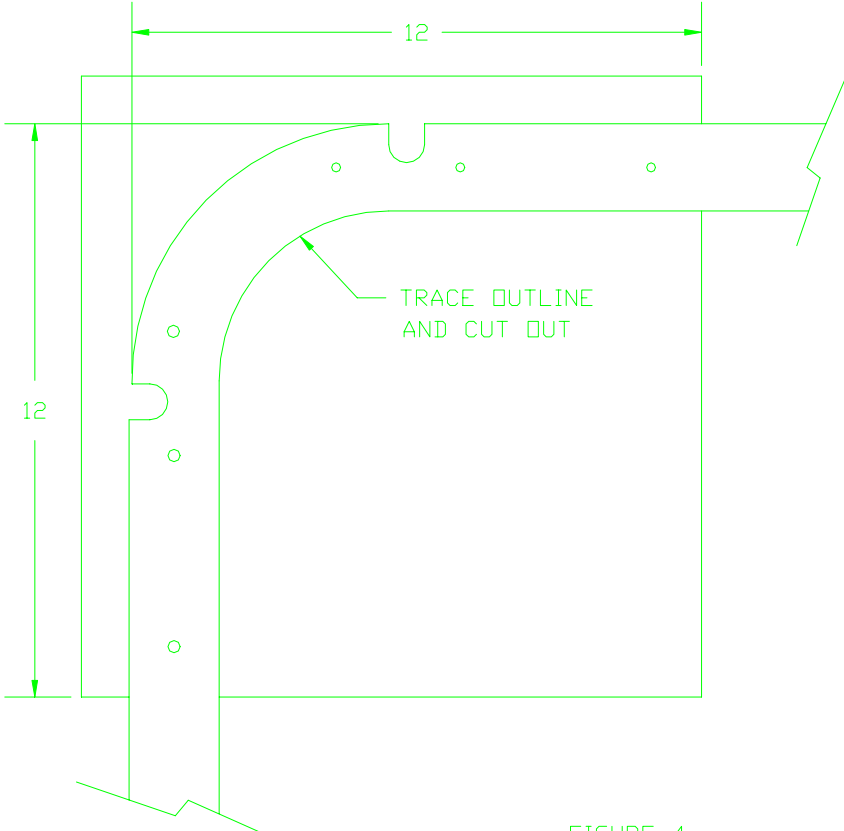


FIGURE 4

23) Clamp two wood corner blocks to the top flat sides of bulkheads G, F, and E. Figure 5.

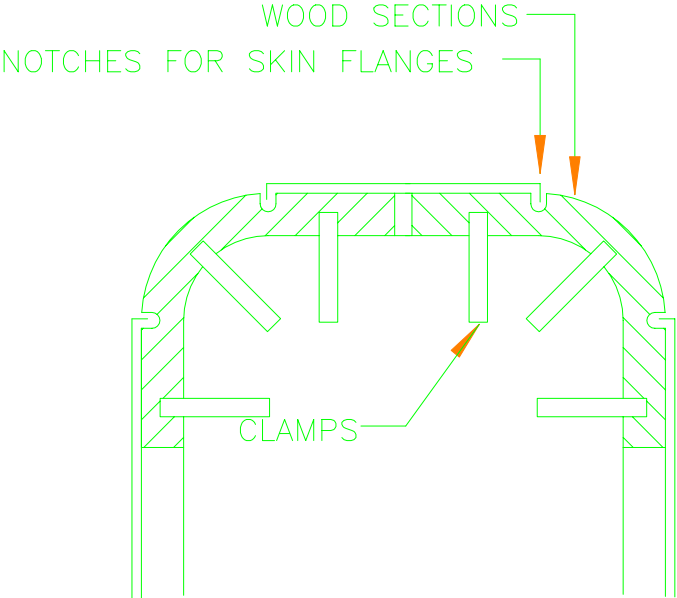


FIGURE 5

24) Draw a line 5/16" inboard on one edge of all FUS-33 corner wraps.

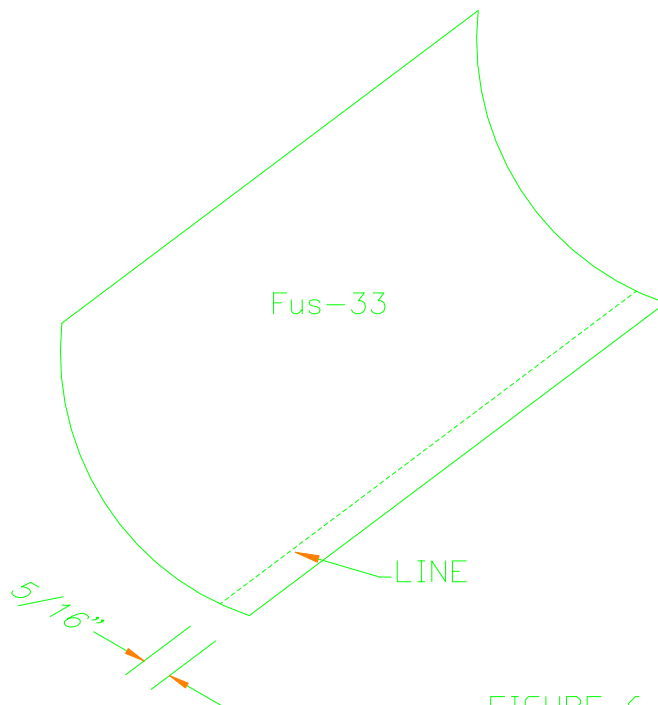


FIGURE 6

25) Lay a straight edge over the same tabs of three bulkheads. Bend the tabs to be flush with the straight edge. Do this for all the tabs on each bulkhead. The tabs will now fit much better to the corner wraps.

NOTE: Drilling is easier with a helper to put pressure on the corner wrap from the outside.

26) Starting at bulkhead "G" tape one corner wrap to the cone side skin so the line drawn in step 24 is visible through the prepunched holes in the cone side skin. Ensure the corner wrap sticks out past bulkhead "G" enough to be trimmed later. Figure 7

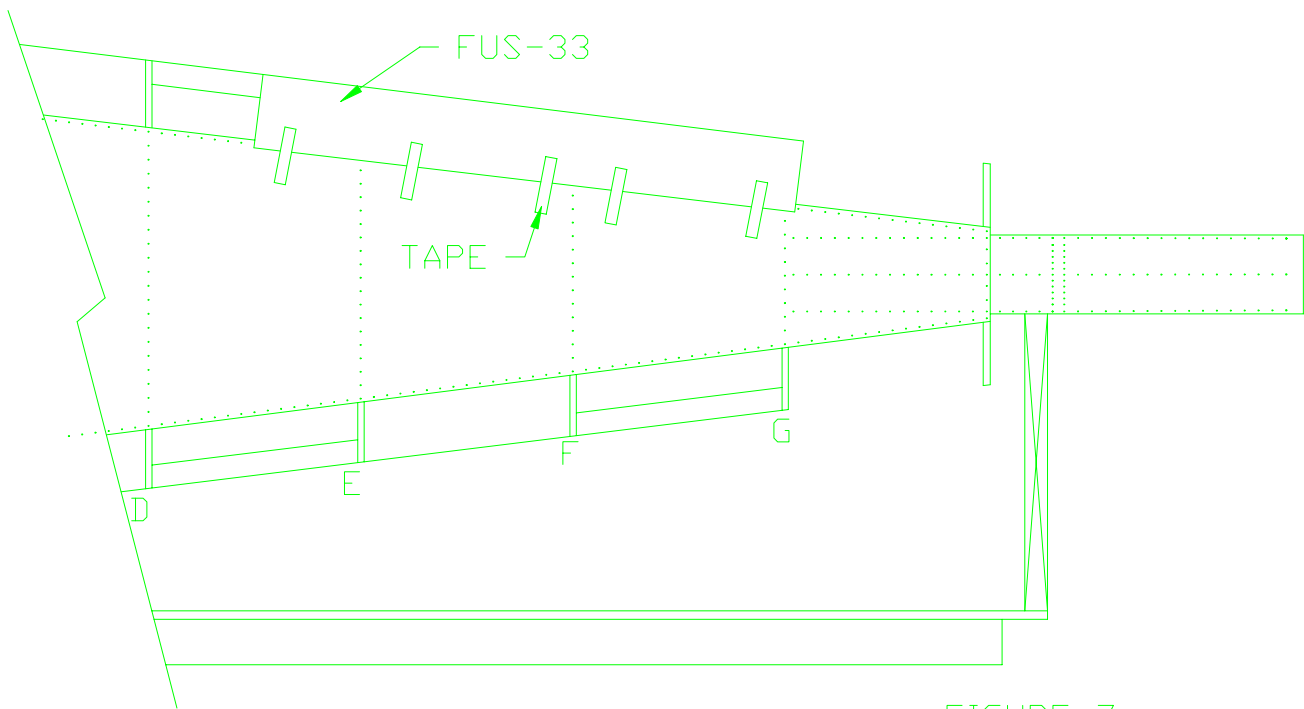


FIGURE 7

- 27) Backdrill through the cone side skin the corner wrap to #40. Cleco.
- 28) Pull the corner wrap tight to the top skin and hold with tape. Do not pull so tight as to distort the top flanges of the bulkheads. Drill to #40.
- 29) Use a long #40 drill to drill back through the bulkhead tabs.
- 30) Remove the corner wrap and trim 5/16" from the rivet holes. Use an edge roller to put a very light crease on the sides. The crease will force the edges down when riveted. Deburr and replace.
- 31) Move the wood corner blocks from G & H to D & C. Leave the ones on E in place.
- 32) Position the next corner wrap with the back end over lapping the one just drilled.
- 33) At bulkhead "B" there will be a gap between the bulkhead and the corner wrap. Use scrap material to make packers to close up the gap.
- 34) Install all FUS-33 corner wraps except from station "8" to bulkhead "B". Check fuselage alignment frequently. Drill only to #40.
- 35) Draw a line down the center of a FUS-452 tapered corner panel Figure 8.

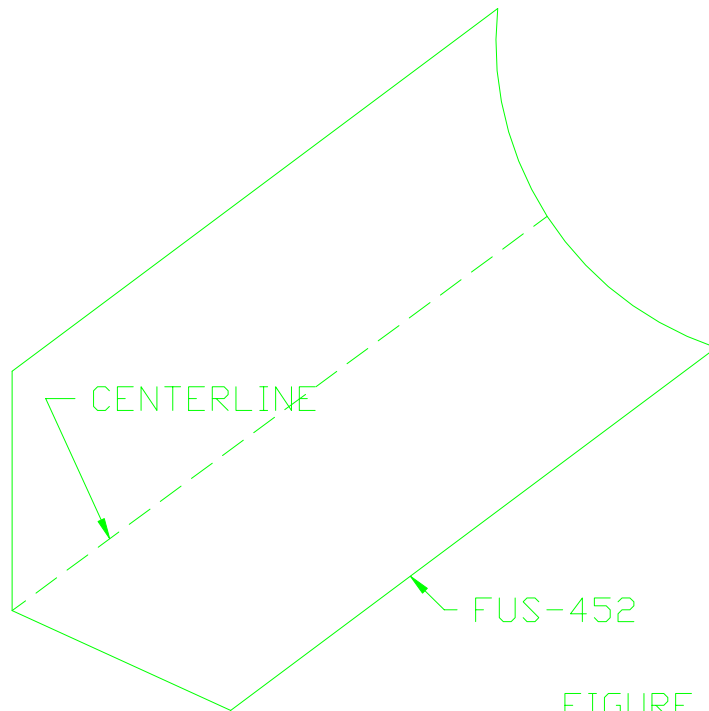


FIGURE 8

- 36) Tape the tapered corner panel in place so the center line is on the center of the round corner wrap. Drill one side only to #40.
- 37) From the inside, mark the opening on the corner panel and remove.
- 38) Trim to the approximate size. Approximately 1" larger all around marked in step 37.
- 39) Stretch the round flange so it will lie flat on the round corner wrap.
NOTE: Stretching is best done with a shrinker stretcher but can also be done by holding the panel upside down with the flange area overhanging the workbench and tapping the flange down with a round pipe or heavy wood dowel (baseball bat?)
- 40) Replace and finish drilling to #40.
- 41) Remove and trim, then replace with the front end under the side skin and cabin top.
- 42) Repeat for other side.
- 43) The final position of the inside shear web angles between station 8 and bulkhead B (installed in step 75 of the Fuselage Cabin Assembly) can now be determined. Drill and cleco.
- 44) The two outer shear webs(FUS-315,section 9.2,fig34) should be bent inwards to be parallel with the side of the bottom skin.

- 45) Cut an angle (RAWST-5) to fit between station 8 and bulkhead B. Position and drill back through the shearweb and bottom skin.
- 46) Trim the two bottom RBULK 2As of bulkhead "A" to fit between the shear webs.
- 47) Make clips from ST-40 angle to secure the bulkhead sections to the shearwebs. Drill three #30 holes in each leg.
- 48) Install corner wraps from station "8" to bulkhead "B". Shrink the forward end of the corner wraps to fit tightly under the sills. Shrink the back end of the sill as well.
- 49) Draw a center line down the back of a FUS-413 rear fuselage wrap. Figure 9

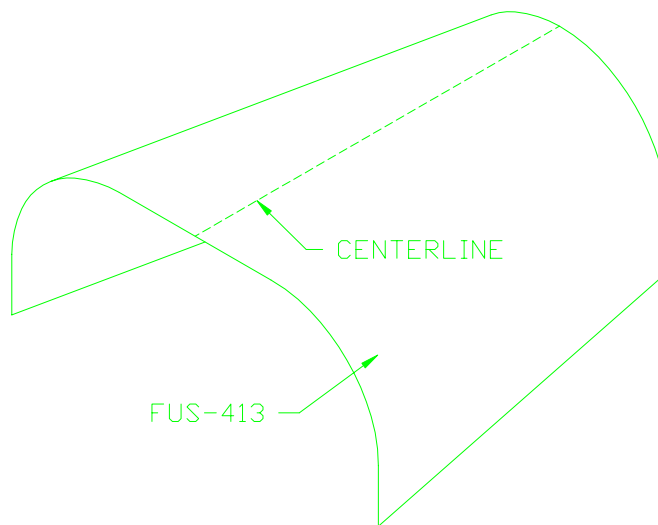


FIGURE 9

- 50) Slide the wide end of the wrap between bulkhead "G" and the corner wraps so the centerline is on the center of the bottom skin. Align the rear of the wrap on the center of the FUS-343 bulkhead. Tape sides to cone side skins.
- 51) Start at the center and drill up on both bulkheads to #40. Check fuselage alignment. After drilling remove and trim for 5/16" edge distance.
- 52) Repeat for the top wrap.
- 53) Replace all corner wraps and tapered corner panels.
- 54) Check fuselage alignment. Drill out to #30 all corner wraps holes except:
 - a. between station "8" and bulkhead "B".
 - b. Holes that go in the bottom tabs of FUS-343 bulkhead.

55) Block up the cone section just behind bulkhead "C". Figure 10

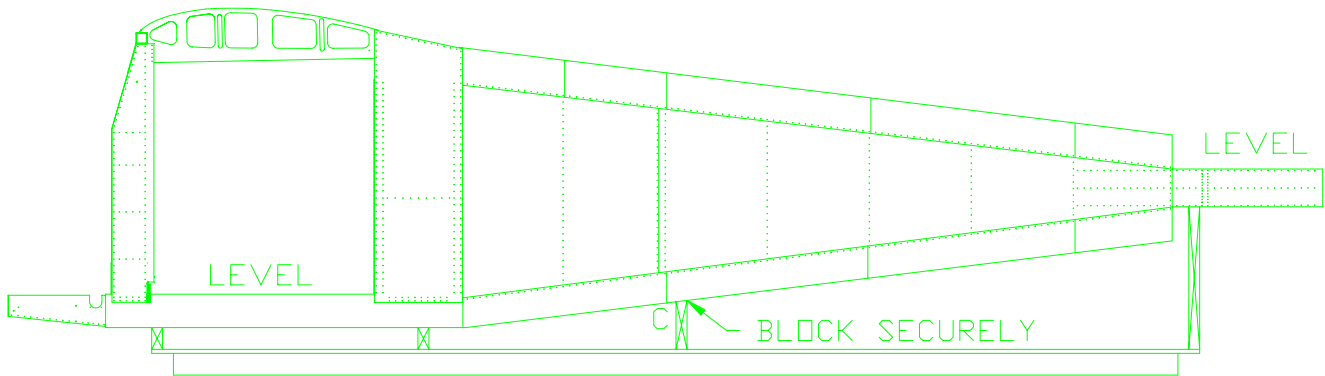


FIGURE 10

56) Carefully remove the left FUS-339 side skin. Figure 11

57) Cut the center section of bulkhead "A" out as in Figure 11.

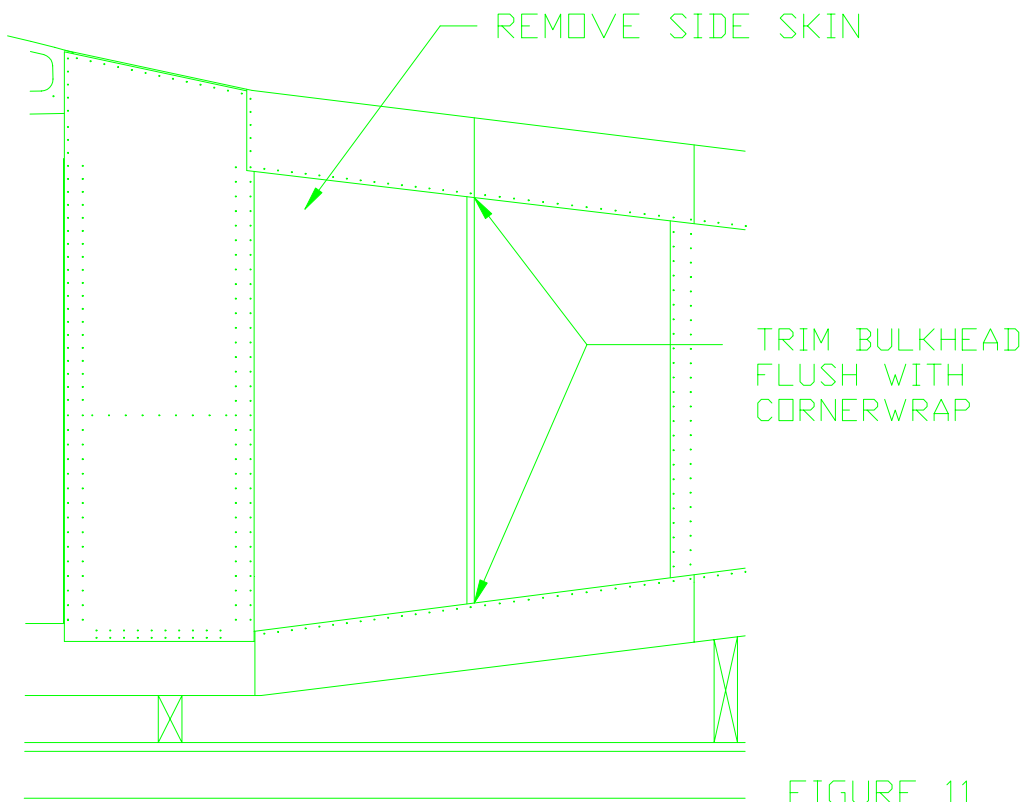


FIGURE 11

58) Cut two lengths of FUS-300 channel to fit between station 8 and bulkhead B parallel to the corner wraps. Figure 12

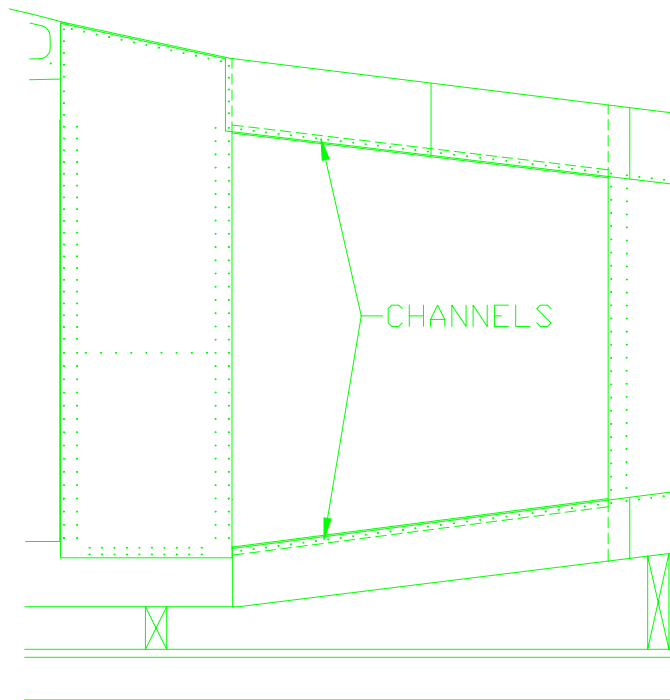


FIGURE 12

- 59) Position the channels so the radius of each channel is proud to the corner wrap edge. Drill to #30.
- 60) From ST-40 angle make clips to tie the channel to station 8, bulkhead "A" and bulkhead "B". At bulkhead "B" do not drill through the clip into bulkhead "B". This will be done after the interior door has been installed.
- 61) Cut a FUS-37 corner gusset into four pieces.
- 62) Position one of the quarter sections in the upper rear corner of the cargo door as in Figure 13. Drill.

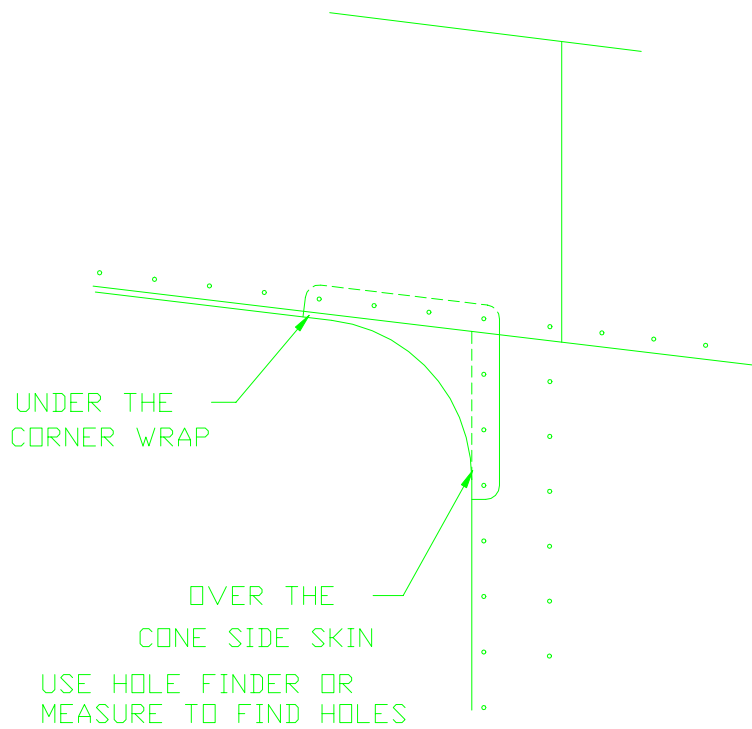
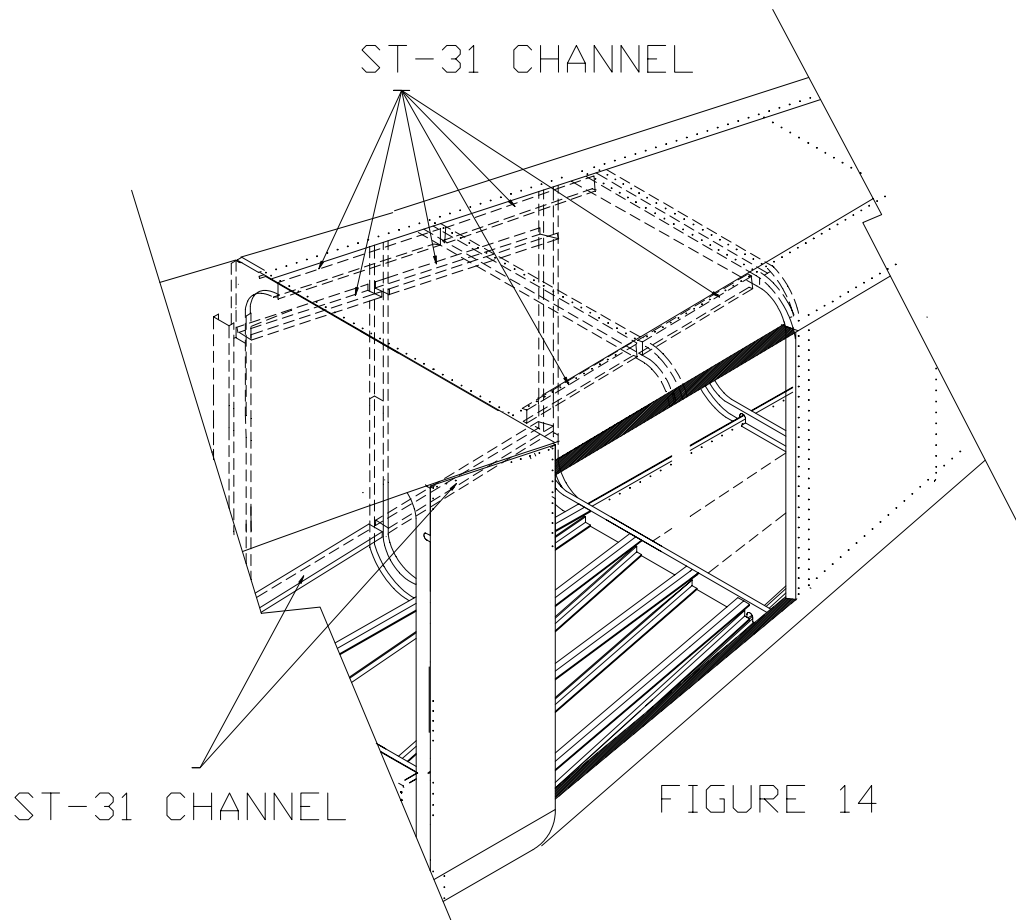


FIGURE 13

- 63) After drilling remove and trim to 5/16" edge distance.
- 64) Repeat for other four corners. The front gussets go under the corner wrap and side skin.
- 65) Dimple the upper, lower and rear line of rivet holes around the door. This will allow the door flange to fit flat.
- 66) Rivet the three sides with 1/8" avex CS rivets.
- 67) From ST-31 channel cut eight lengths to go at the corners shown in figure 14. These channels should go from station "8" to bulkhead "A" and from bulkhead "A" to bulkhead "B".



68) Position and drill.

69) From ST-40 make clips to tie the channels into the bulkheads. As in step 60 do not drill into bulkhead "B".

70) The corner wraps and tapered corner panels can now be riveted in place with 1/8" avex rivets. Do not rivet the front row of the cargo door opening at this time or the bottom aft row. This will be done when the door hinge is installed. Do not rivet the top rear fuselage wrap (FUS-413) as it will be removed later to install the control pulleys.

71) Draw a center line on the end flange of the FUS-344 horizontal bulkhead. Figure 15.

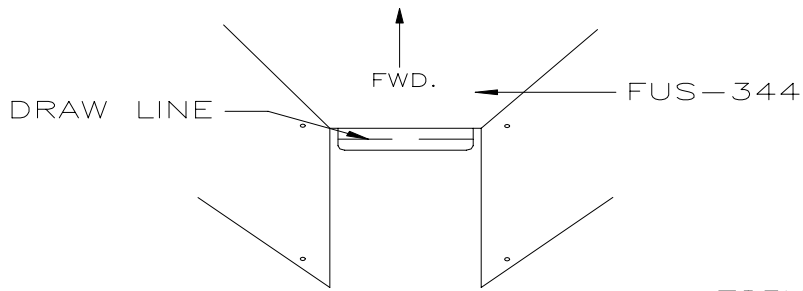


FIGURE 15

72) On the fin assembly, drill out one hole in the attach brackets (FUS-446 and FUS-407) to #11 as shown in Figure 16.

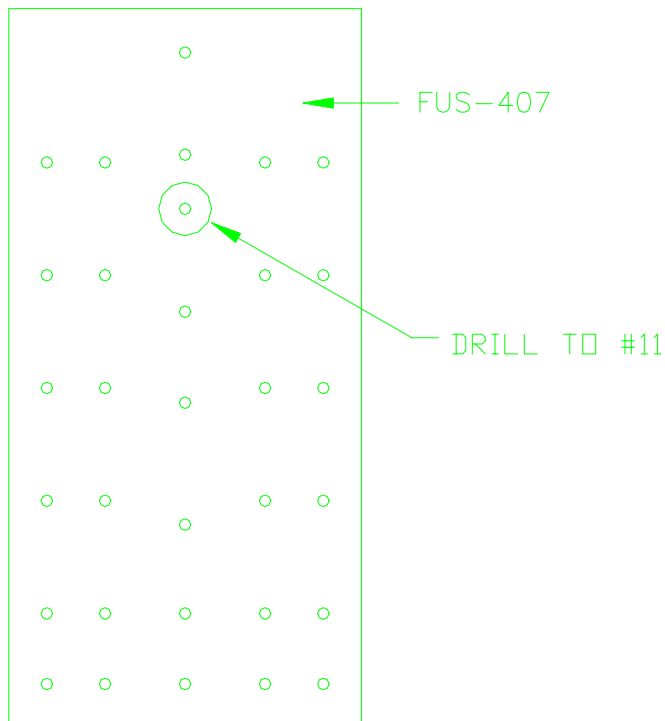


FIGURE 16

73) Cleco the fin assembly to the FUS-343 bulkhead using the #11 tooling hole in the bulkhead. Figure 17.

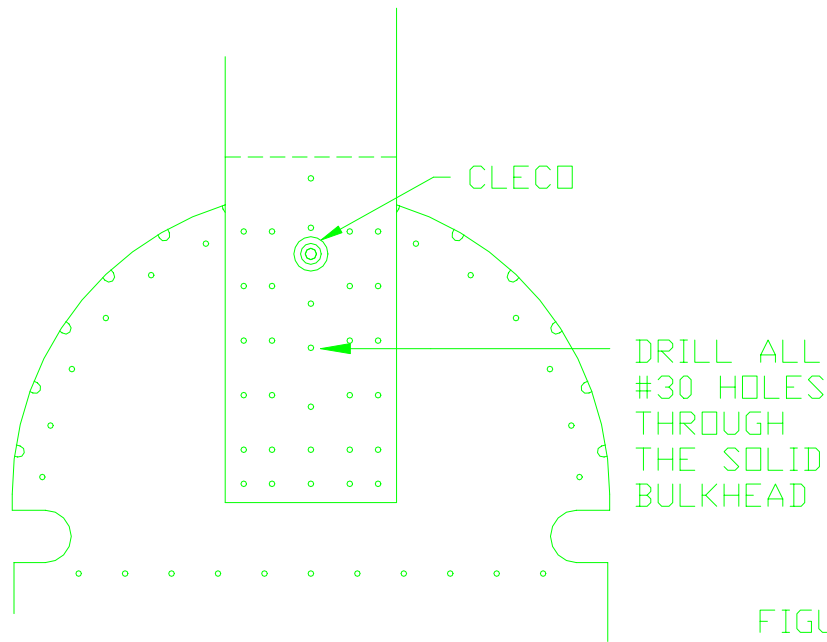


FIGURE 17

74) Ensure the fin is vertical then drill one of the bottom holes to #30 and cleco.

75) Align the three attach holes in the rear spar of the fin over the line drawn on the horizontal bulkhead flange. Figure 18. Drill the center hole and again check alignment. Drill the other two holes.

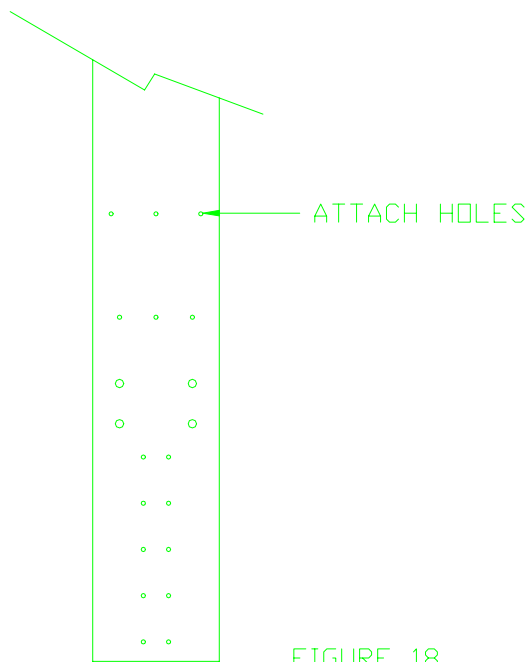
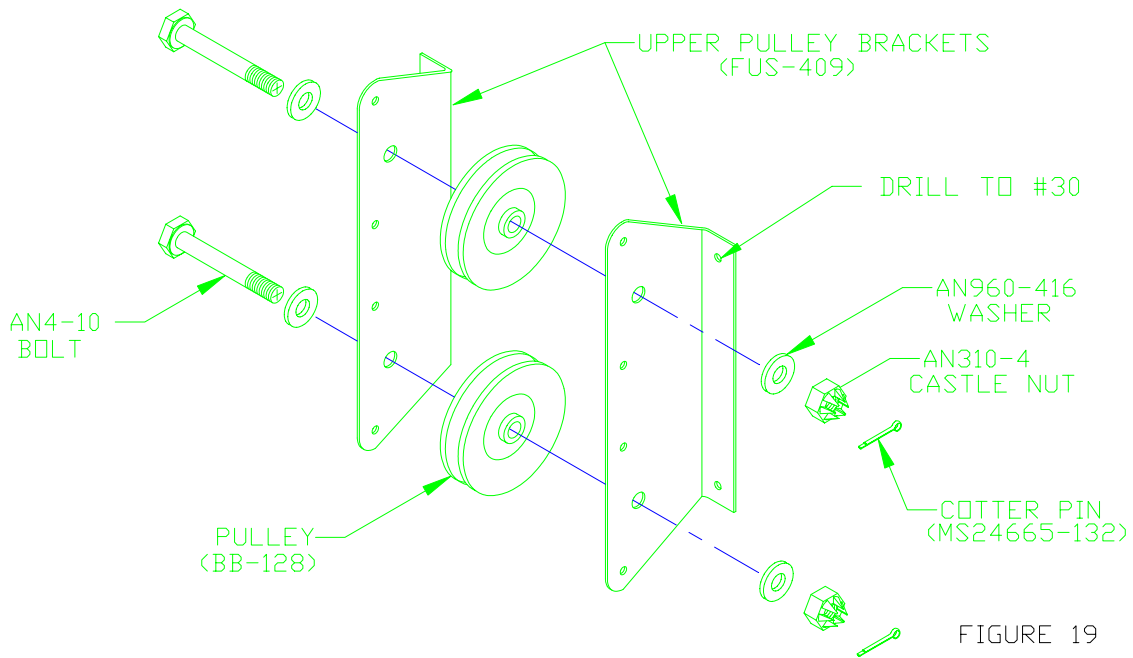


FIGURE 18

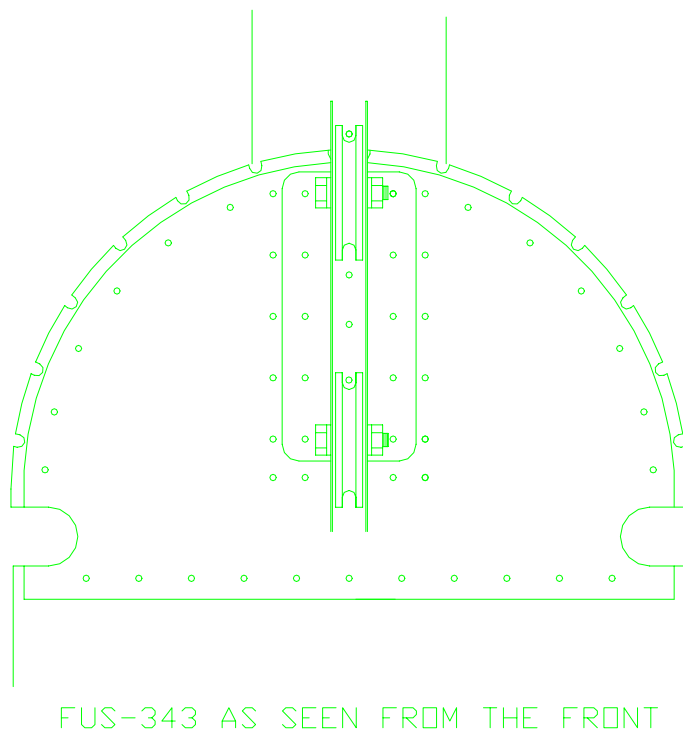
76) Drill all #30 holes in the attach brackets through the FUS-343 bulkhead. Cleco securely.

77) Remove the top rear fuselage wrap.

78) Assemble the two upper pulley brackets (FUS-409) and pulleys as in Figure 19.



79) Cleco the pulley assembly to the front side of bulkhead FUS-343 as in Figure 20. The pulley will stand proud to the top of the bulkhead.



80) Backdrill the pulley bracket flanges first to #30 then drill all holes in pulley bracket and fin attach brackets to #11.

81) Remove the pulley assembly and drill out the pulley cable holes to 1/2". Figure 21.

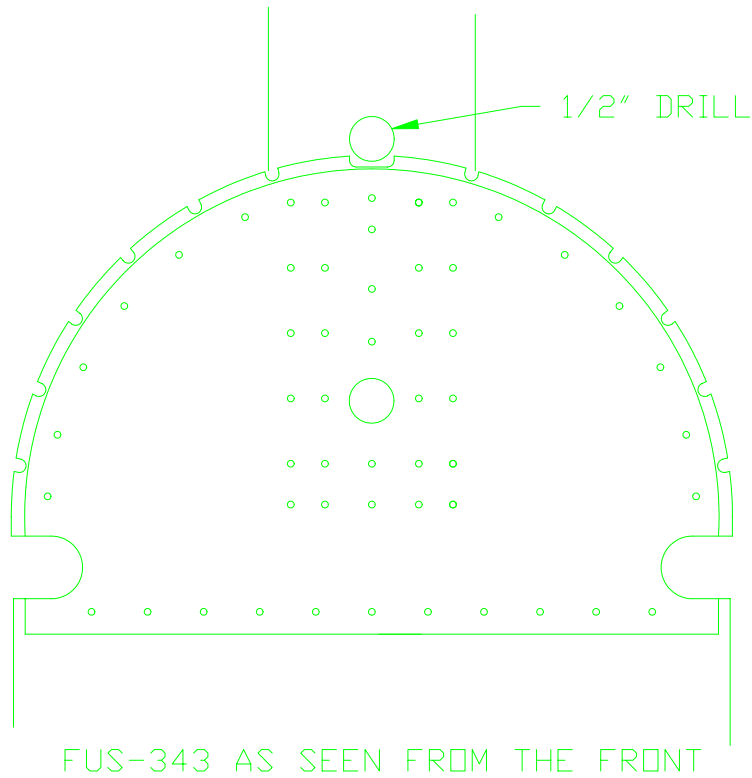
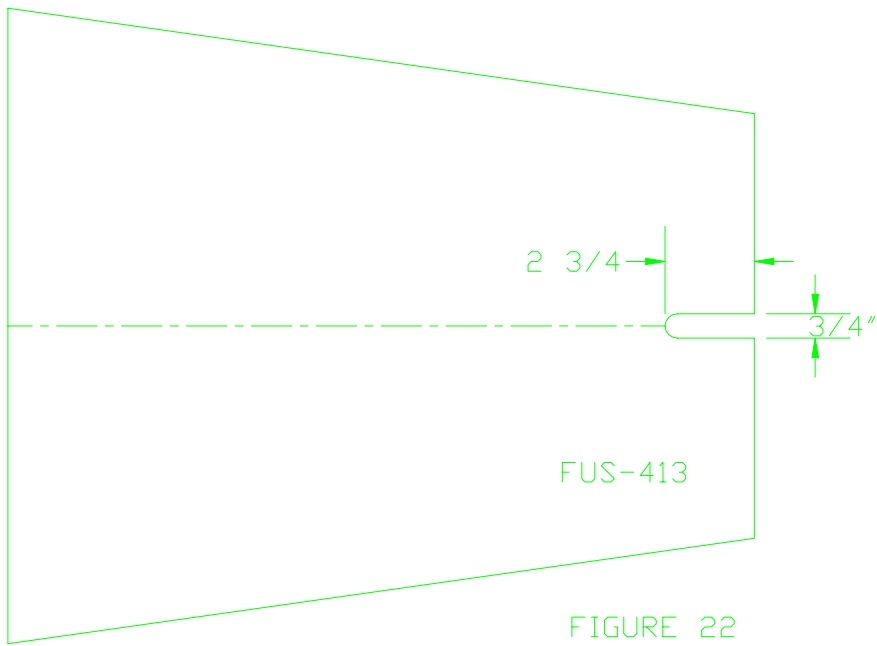


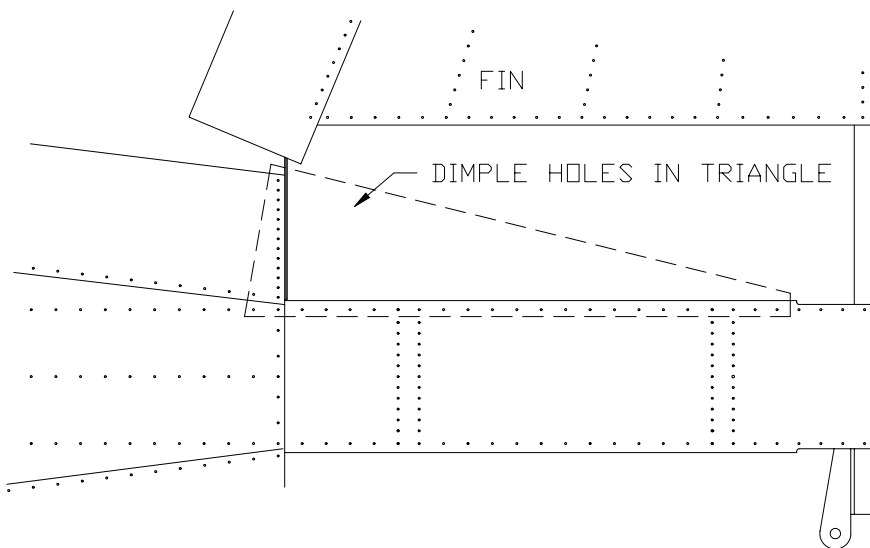
FIGURE 21

82) Rivet the pulley and fin assemblies to the bulkhead with 3/16" avex rivets.

83) Trim the rear fuselage wrap to clear the pulley assembly as in Figure 22.



84) Cleco the fuselage wrap in place and dimple holes as shown in Figure 23. Using countersunk rivets in this area will allow the Stabilizer fairings to lie flat when they are installed.



85) Cleco the FUS-359 and FUS-359A bulkheads together using the #11 tooling holes. Drill out all holes to #30. Figure 24

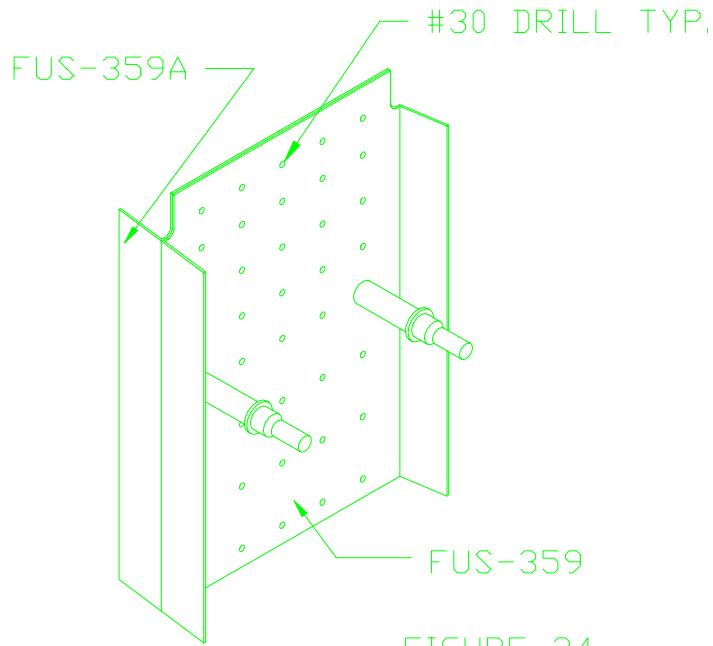


FIGURE 24

86) Cleco the two FUS-352 stab rear mount brackets to the bulkheads and drill the ten common rivet holes to #11. Figure 25.

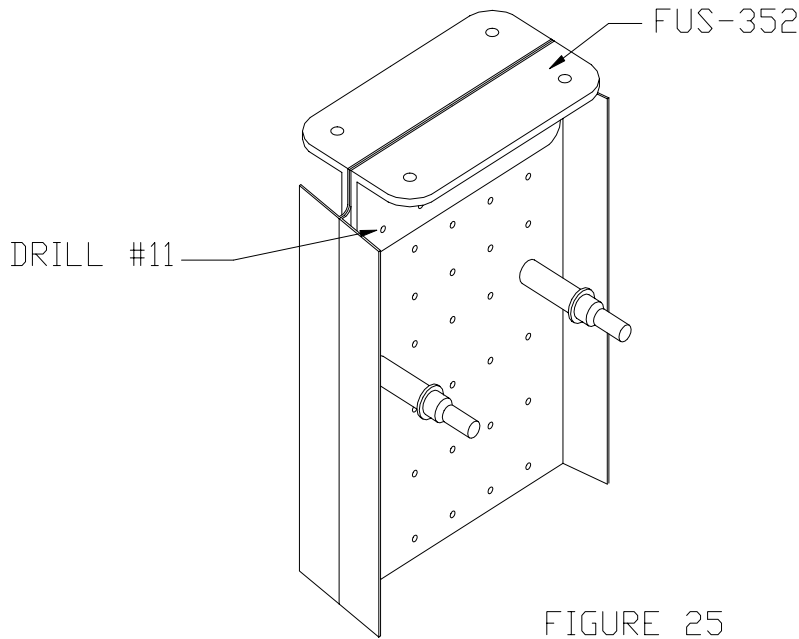


FIGURE 25

87) Rivet together with appropriate 1/8" and 3/16" avex rivets.

88) Cleco the FUS-358 and FUS-358A bulkheads together using the #11 tooling holes. Drill out to #30.

89) Cleco the two FUS-336 stab mount brackets in place and drill to #11.

90) If you are building a Trike you can now rivet the FUS-358/FUS-336 assembly together with appropriate 1/8" and 3/16" avex rivets. If you are building a Taildragger continue with step 91.

91) Center the FUS-374 packer on the narrow side of the FUS-358 assembly. Drill to #30. Figure 26

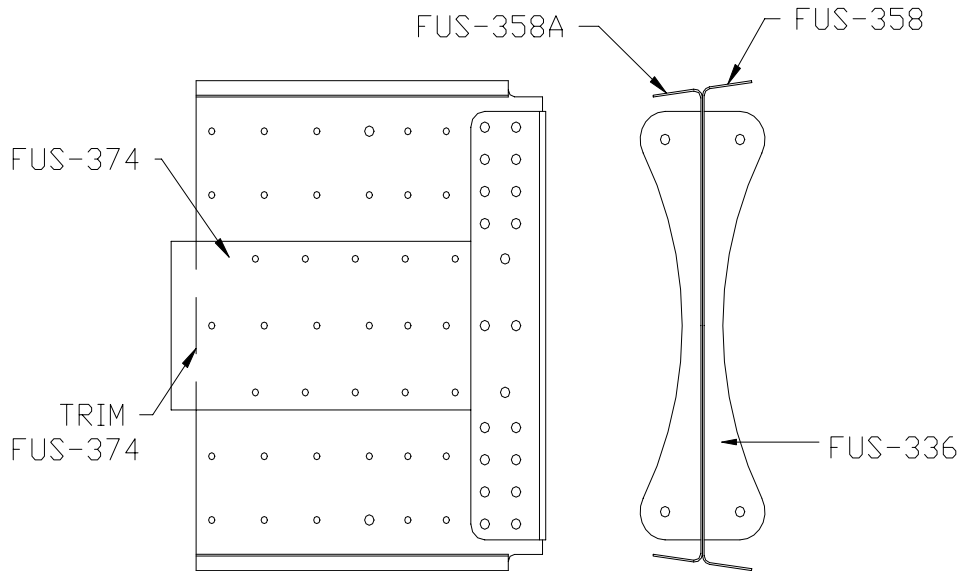


FIGURE 26

92) Drill out the 1/4" holes in the two FUS-360 tail spring anchors to 5/16". Cleco them over the packer and FUS-336 stab mount bracket. Use a 5/16" bolt for alignment as in Figure 27. Drill to #11.

93) Cut a piece of RAWST-5 3/4" x 3/4" x 1/8" angle to 8" long. Center on the bottom of the wide side of the FUS-358 assembly. Drill the five holes to #11. Then rivet a cable guide(RG-1) to the angle with 1/8" rivets. Use the holes in RG-1 as a guide to drill three #30 holes in the angle. Back drill the cable hole in the angle(NOT THE GUIDE) to 1/4". Figure 28

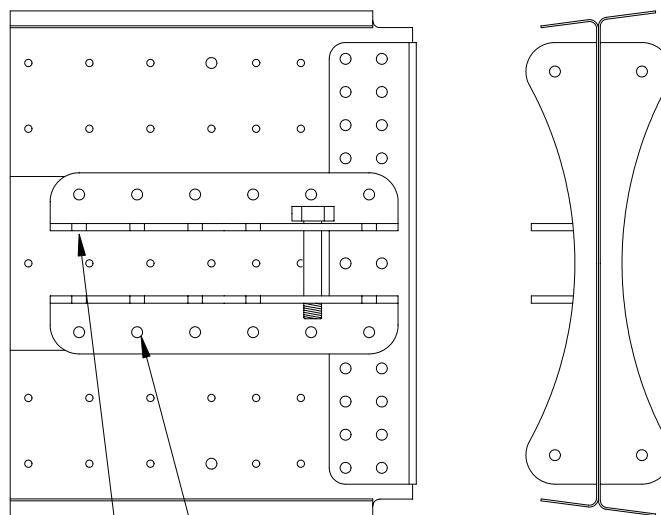


FIGURE 27

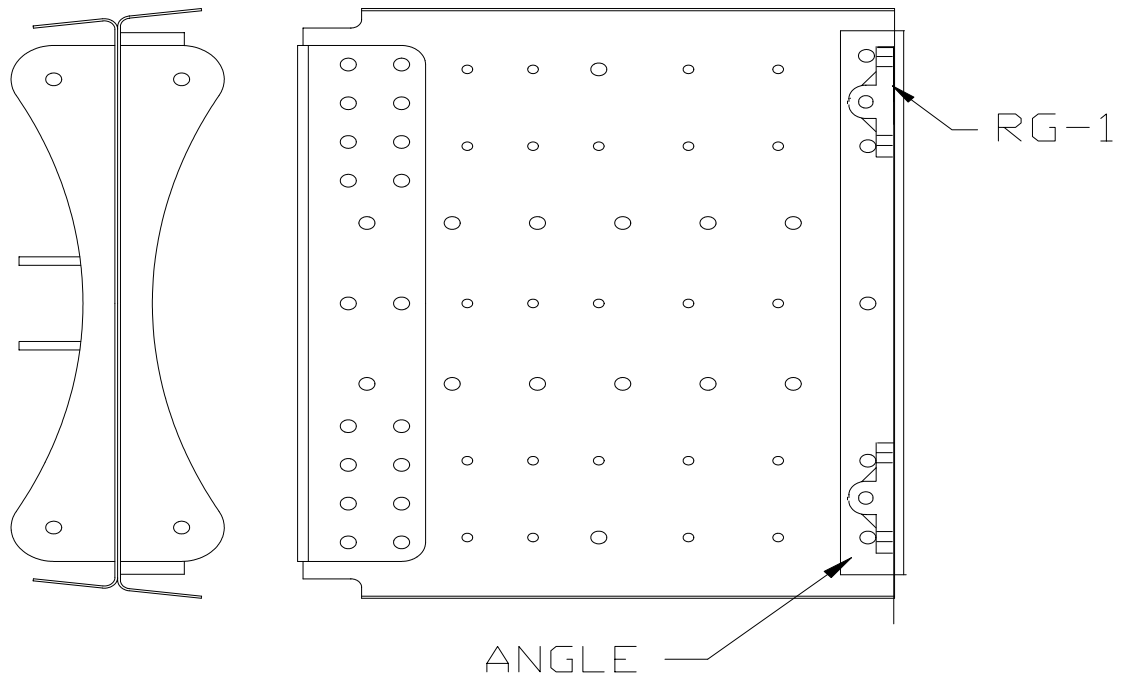
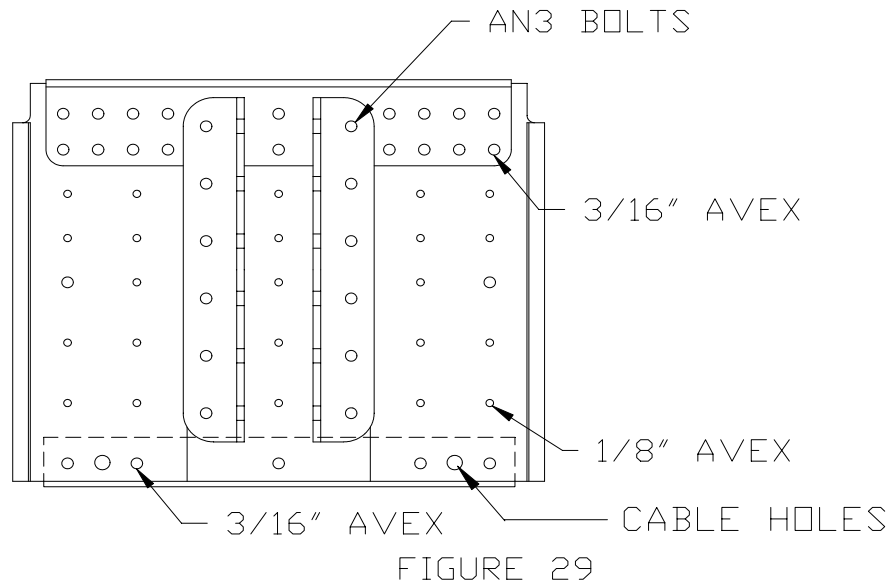
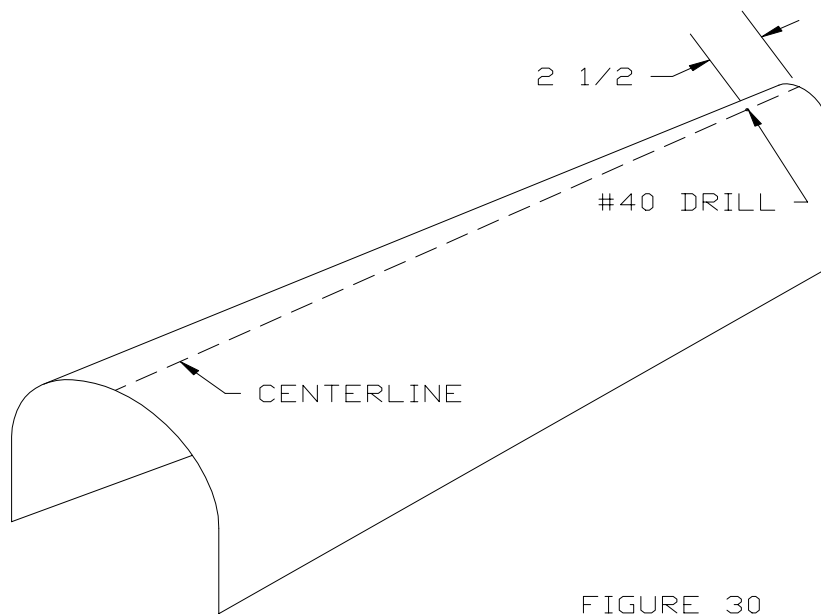


FIGURE 28

- 94) Rivet and bolt the assembly together with the appropriate avex rivets and bolts. Figure 29
- 95) Cleco the FUS-359 and FUS-358 assemblies to the bottom of the FUS-344 horizontal bulkhead. The prepunched holes in the bulkhead will align with the holes in the front and rear mounting brackets.
- 96) Ensure the assemblies are vertical and backdrill through the FUS-357 fuselage rear panel.
- 97) Rivet the assemblies in place with 1/8" avex rivets.
- 98) Bolt the two FUS-370 front stab mounts and the two FUS-371 rear stab mounts in place with the An4 bolts. The rear mounts are adjustable and should not be tightening until after the stab is installed.
- Note:** You should make up a spacer from scrap material for under the stab mounts in order that they sit flat.



99) Draw a centerline down FUS-422 tail wrap. Measure 2 1/2" in from the narrow end. Drill a #40 hole. Figure 30



100) Drill a #40 hole in the center of the center tab of FUS-438 spar doubler. 101) Slide the FUS-422 tail wrap under the corner wraps and cleco to the FUS-438 spar doubler. Figure 31.

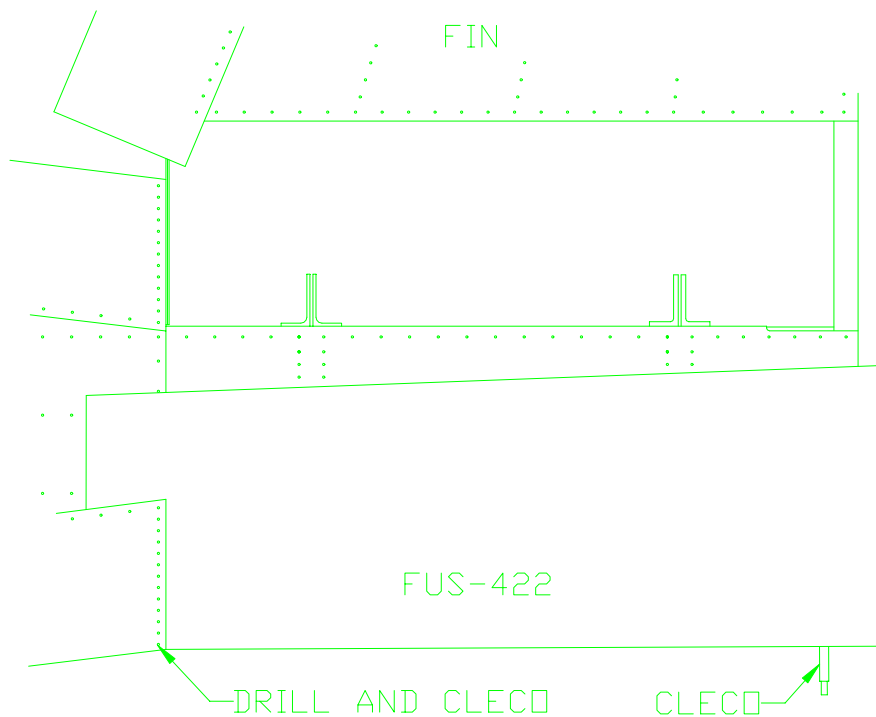


FIGURE 31

- 102) Drill one hole at the bottom of the FUS-422 tail wrap at bulkhead "G" to maintain alignment.
- 103) Hold one side of tail wrap tight against the FUS-357 fuselage rear panel. Backdrill through the corner wrap and fuselage rear panel. Repeat for other side.
- 104) Cleco both sides and mark for trimming at spar and spar doubler. Remove.
- 105) Trim to final shape. Use 5/16" for all edge distances. From the spar to the spar doubler trim on an angle. Figure 32.

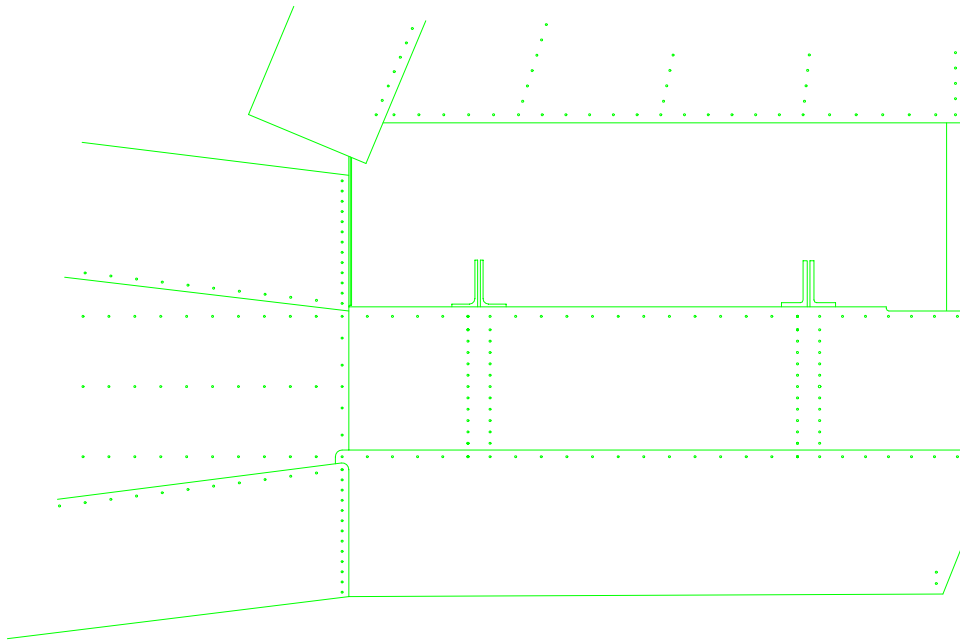


FIGURE 32

106) Replace the tail wrap and drill one hole in each tab of the spar doubler. Do not rivet at this time.

FIN SPAR CAP INSTALLATION

107) From RAWST-10 cut two pieces 31" x 3 1/4". These will become internal spar caps for the rear fin spar.

108) Slide one spar cap behind a fin skin FUS-357 fuselage rear panel and FUS-922 tail wrap. Figure 33.

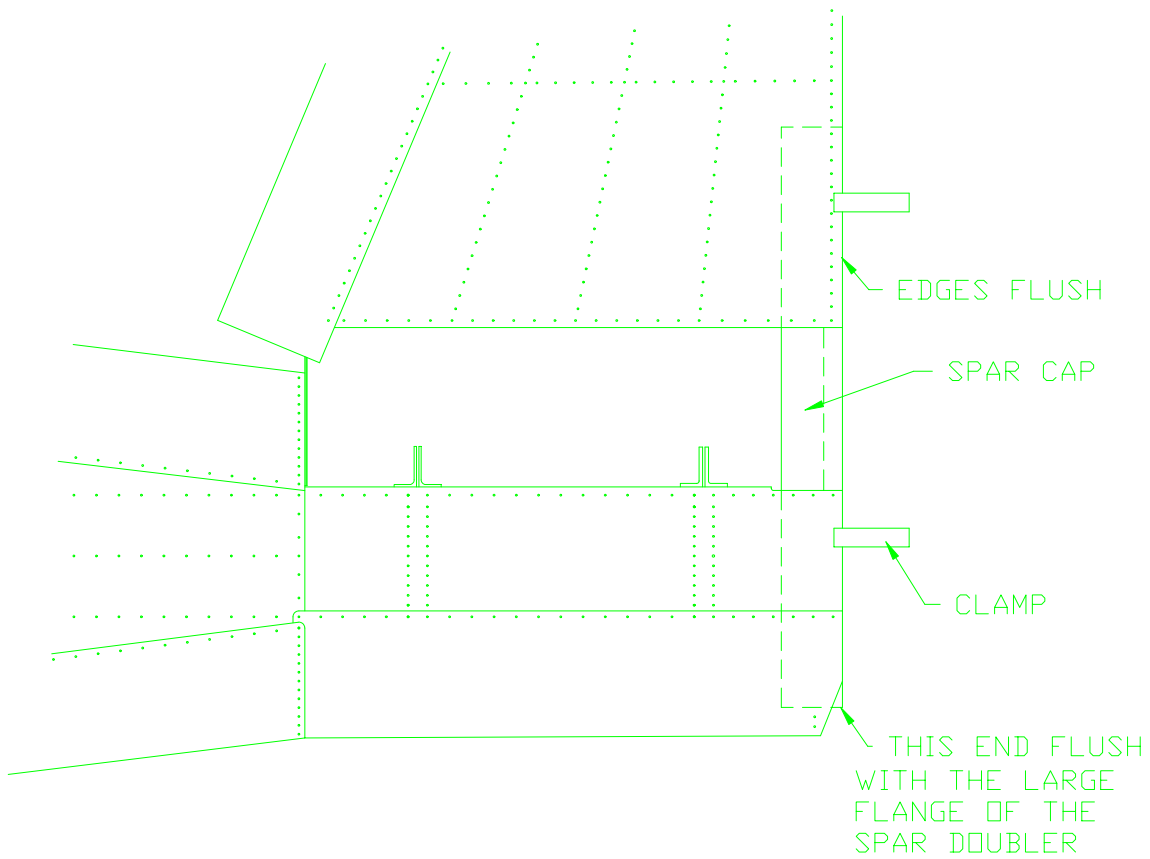


FIGURE 33

109) Backdrill into the spar cap.

110) Add extra holes as in Figure 34 Notice there are no holes in the lower hinge area. The rudder stops and cut outs will go in this area.

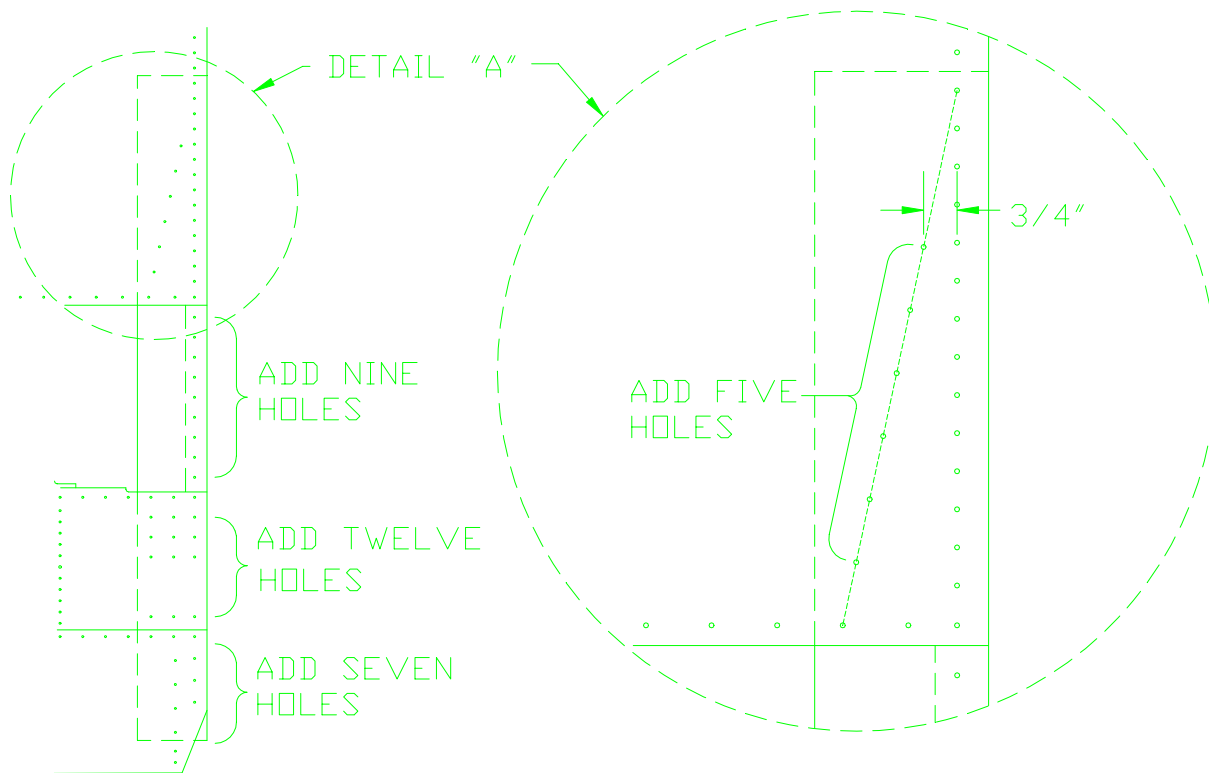


FIGURE 34

- 111) Remove the spar cap.
- 112) From RAWST-10 cut two pieces 23" x 2". These will become external spar caps.
- 113) Position the external spar cap under the internal spar as in Figure 35. Drill.

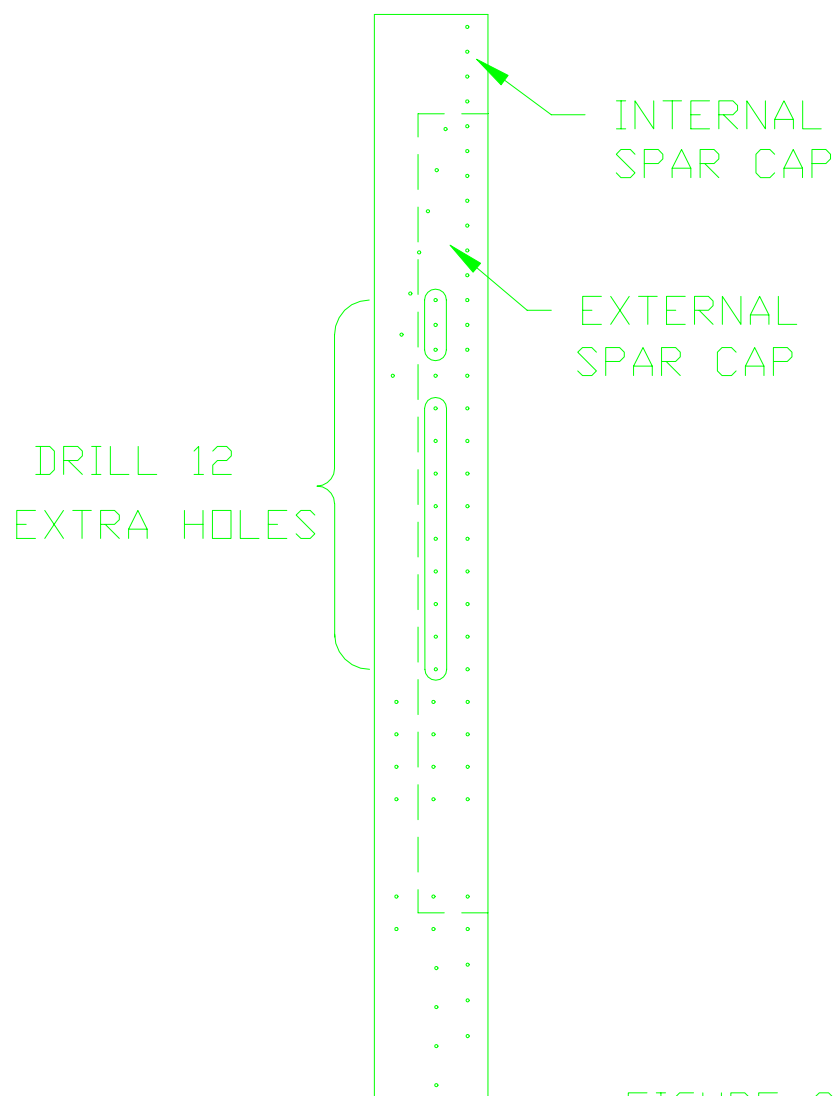


FIGURE 35

114) Drill the twelve extra holes shown in Figure 34.

115) Trim the spar caps as in Figure 36.

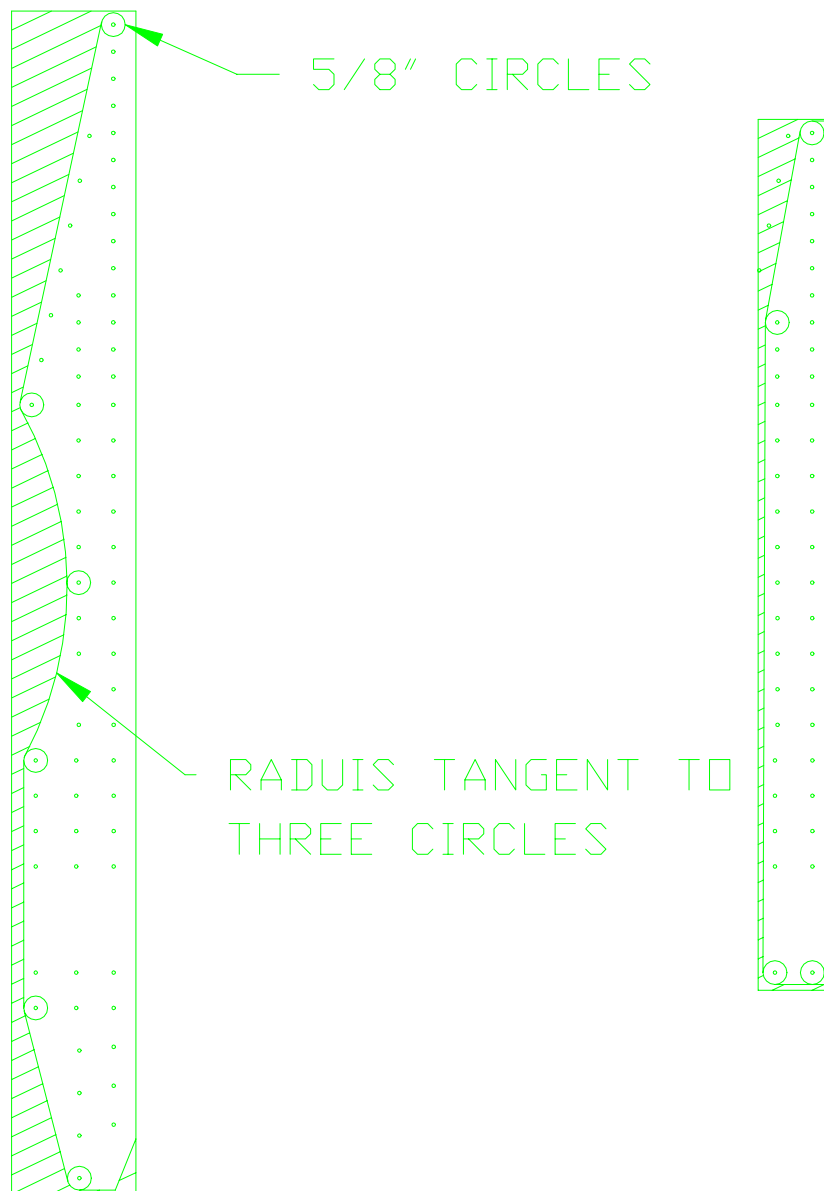


FIGURE 36

- 116) Repeat for other side.
- 117) After both sides are done, install with clecos.
- 118) Install the rudder.
- 119) Trim the spar caps and fin spar at the rudder horn location to allow 25° plus of rudder travel in each direction. Figure 37. The dimensions giving in Figure 37 are approximations.

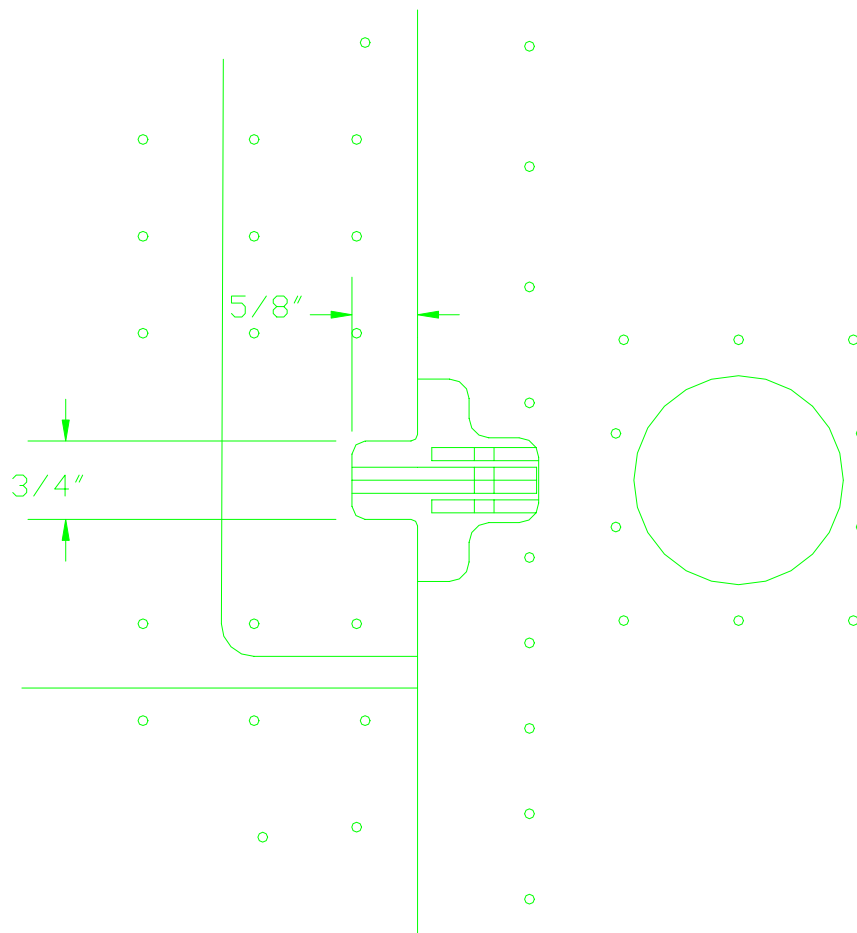


FIGURE 37

- 120) Rivet the spar caps and tailwrap in place with the appropriate 1/8 avex rivets.
- 121) Trim one leg of each RU-404 elevator/rudder stop support to 1". Drill a #11 hole in the center of the trimmed leg.
- 122) Drill and countersink a hole in the center of each EL-410 elevator/rudder stop
- 123) Bolt together as in figure 38.

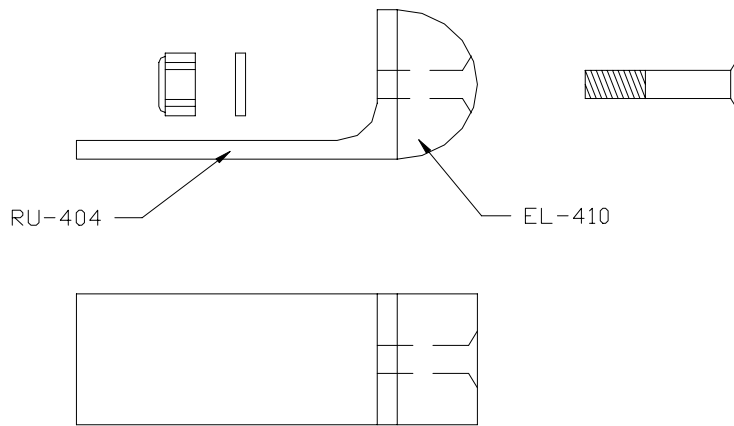


FIGURE 38

124) Position the stop to allow 25° of rudder deflection, or as close to this as possible without interference between the rudder and elevator. Figure 39. This must be done with the elevator in place. Use a .032" packer to level with the fin spar and two 3/16" avex rivets to install.

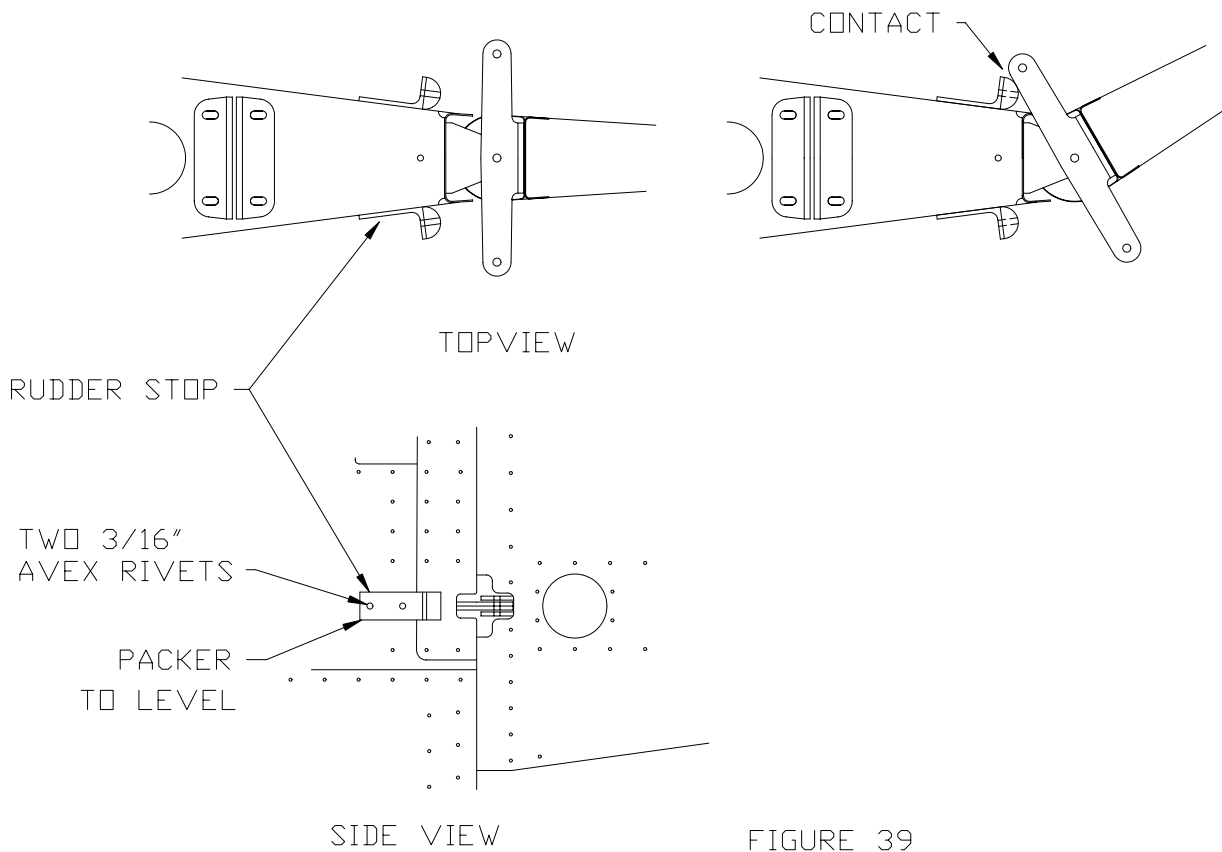


FIGURE 39