FORWARD FUSELAGE SIDES & REAR TOP SKINS WORK REPORT

Step No.	Check	Parts / Tools	Qty
Preparations.			
1	[ ]	6F5-3 Upper Front Longerons	2
2	[ ]	6F5-5 Heel Support	1
3	[ ]	6F5-2 Front Floor Skin	1
3	[ ]	Firewall assembly	1
5	[ ]	6F12-2 Gusset	2
6	[ ]	6F13-6 Baggage Bottom Stiffener	1
6	[ ]	6F6-3 Rear Pick Up Channel	2
Torque tube			
7	[ ]	6V12-4 Belt Attachment Doubler Plate	2
7	[ ]	6F16-1 Arm Rest Sides	2
9	[ ]	6V12-2 Rear Bearing	1
9	[ ]	1/8" Plastic Bearing Material	2
12	[ ]	6V13-3 Torque Tube (welded)	1
12	[ ]	6V13-2 Stop Ring	1
13	[ ]	6V13-1 Control Column (welded)	1
14	[ ]	6V13-4 Channel	1
15	[ ]	6V12-7 Bent Strip	1
Connect the Firewall & Rear Fuselage assemblies to the Center Wing Section			
23	[ ]	6F13-1 Baggage Floor	1
23	[ ]	L Angles	8
24	[ ]	6F6-1 Main Upright	2
25	[ ]	6F5-1 Fuselage Side Skin	2
27	[ ]	6F6-2 Gusset	2
31	[ ]	6F9-1 Gusset	2
32	[ ]	6F9-2 Gusset	1
34	[ ]	6F13-4 Corner Stiffener	1
35	[ ]	6F13-3 Seat Back Side Channel	2
36	[ ]	6F13-2 Center Seat Back Channel	1
Rear top skins			
37	[ ]	6F11-3 B4 Bulkhead	1
37	[ ]	6F11-1 B6 Bulkhead	1
37	[ ]	6F11-2 B5 Bulkhead	1
40	[ ]	6F14-1 Rear Top Skin	1
41	[ ]	6F12-1 B3 Tube Frame	1
42	[ ]	6F14-2 Middle Top Skin	1
43	[ ]	6E1-2 B2 Tube Frame	1
44	[ ]	6E1-3 Gusset	2

SIGNATURES: Builder _____ Date _____.

Inspected by _____ Date _____.

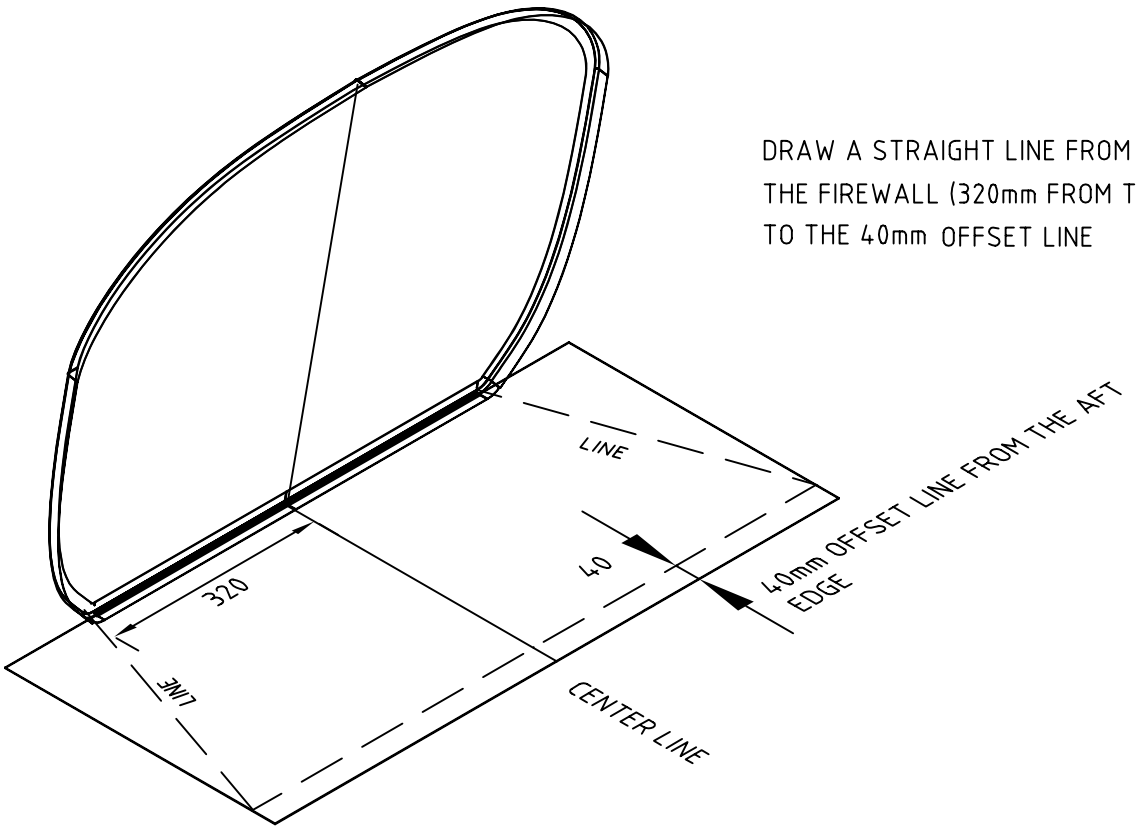
1. Bend the Upper Front Longerons 6F5-3 using the plywood template as a guide.
   REFERENCE: 6-F-5
   LAYOUT: a) Line up the end of the Longeron flush with the front of the template. Determine if it will be a right or left side and mark the front of the Longeron accordingly.
   b) Use a marker to Mark the beginning of the curvature on the Longeron. (station 1332)
   c) "Walk" (bend) the Longeron around the curvature to make point A on the Longeron. The Extrusion is bent between these two marks.

   BENDING:
   1) A smooth buckle free curvature is obtained when the Extrusion is bent in many small increments over a given distance. An alternative method to bending it in the vise is to form the Longeron over a radius block: trace and cut-out a French curve (or draw a free hand curve) on a 2"x6" board. With the board secured in a vise, cap the extrusion over the edge of the board and proceed to bend the extrusion by pushing down (with one hand on either side). Start at the first mark and move the Extrusion in 1/2" increments.
   2) Stretching one flange at a time will inevitably cause distortion; check the ends of the Extrusion above the table when it is held down at the middle (top flange is flat on the table). To straighten, position the top flange on the board and push down moving the extrusion once again in 1/2" increments.
   3) In this way the Extrusion is bent back and forth as many as four to six times until it is flat and follows the shape of the template.

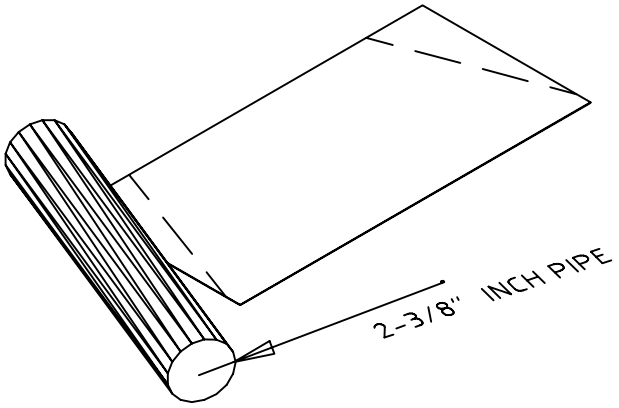
2. Cut the tapered ends of the Heel Support 6F5-5 as shown on drawing 6-F-5

3. Roll the Front Floor Skin 6F5-2 around a 2-3/8" pipe to fit the Firewall.
   REFERENCE: 6F9, page FF-3
   LAYOUT: a) Make a pencil mark at 40mm from the aft edge along the side of the Floor Skin (on both sides) – this line corresponds to the bend tangent point of the 10mm radius in the leading edge cutout – check by positioning the Floor Skin on a 30mm overlap with the Nose Skin.
   b) Center the Firewall along the front edge of the Floor Skin and mark the ends of the straight section of the Firewall on the Floor Skin.
   c) Connect the 40mm mark with the edge of the Firewall. This will be the bent tangent line or beginning of curve.

ROLLING: Position a 2-3/8" tube on the tangent bent line. Keep the tube parallel with the line and roll it towards the nearest corner. Without moving the tube, pick up the sheet with your fingers and press it firmly on the tube and roll it back towards the tangent line. A tighter curvature can be added to the middle and rear by pushing the edge of the skin around a 1-1/4" diameter pipe. To finish the bend, holding a 3/4" tube along the aft side, gently hammer the edge of the skin using a rubber mallet.



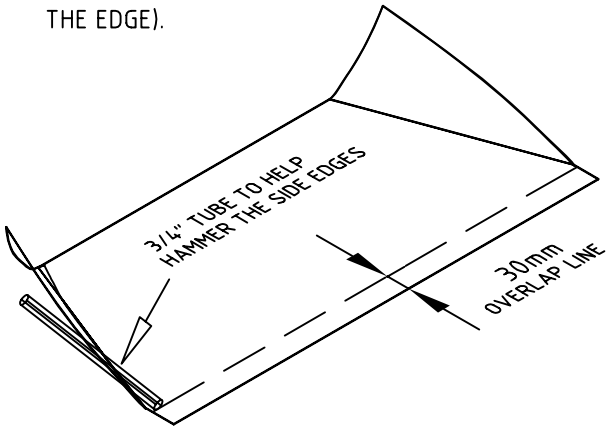
DRAW A STRAIGHT LINE FROM
THE FIREWALL (320mm FROM THE CENTER LINE)
TO THE 40mm OFFSET LINE



ALIGN THE TUBE ON THE LINE; ROLL THE TUBE AWAY FROM THE LINE TO PICK UP THE CORNER OF THE SHEET WITH YOUR FINGERS. HOLD THE SHEET FIRMLY ON THE TUBE AND ROLL BACK TO THE LINE.

USE A 1-/14" DIAMETER PIPE TO HELP FORM A TIGHTER RADIUS AT THE REAR.

ADD ADDITIONAL CURVATURE TO THE SIDES ON APPROXIMATELY 50 TO 100mm FORWARD OF THE 30mm OFFSET LINE. SUPPORT THE INSIDE OF THE SKIN WITH A 3/4" TUBE, THEN USE A PLASTIC HAMMER TO FORM THE EDGE OF THE SKIN AROUND THE TUBE (HOLD THE TUBE PARALLEL TO THE LINE LETTING IT OVERHANG THE EDGE).



TRAPEZOID ROLLED SIDES FLATTEN OUT AT THE 30mm OVERLAP LINE

ROLLING THE SIDES OF THE FRONT FLOOR SKIN 6F5-2 TO FIT THE FIREWALL AND THE NOSE SKIN OPENING

SEQUENCE: FF-3

4. Cleco the Firewall assembly to the Front Floor Skin 6F5-1 with one hole on the aircraft center line.
   REFERENCE: 6-F-9
   PRE-DRILL: A hole on the aircraft center through the bottom flange of the Firewall.
   BACK-DRILL: Position the Firewall along the front edge of the Floor Skin (flush at the Engine Mount Fitting) and back drill the center hole through the Firewall flange.

5. Cut the Gusset 6F12-2 in accordance with the drawings (6-F-12)

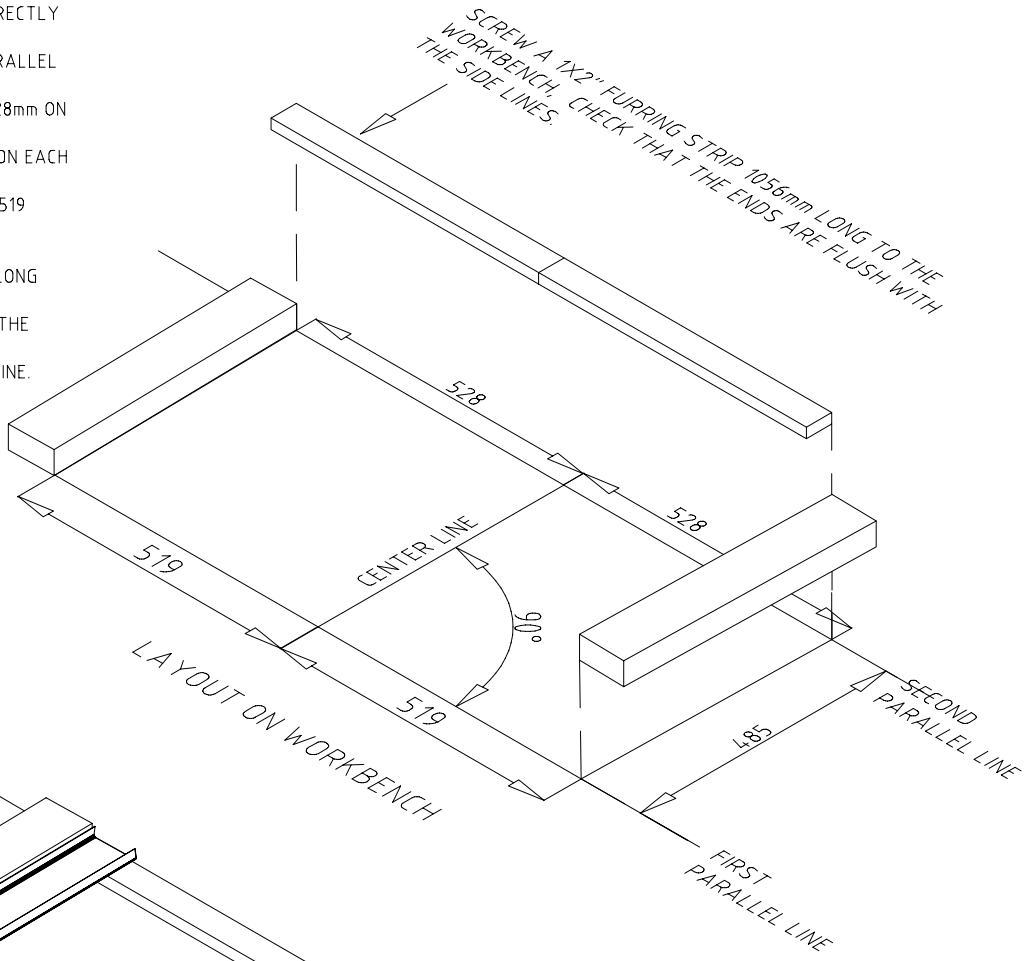
6. Cleco the Gusset 6F12-2 in between the Baggage Bottom Stiffener 6F13-6 and the Rear Pick Up Channel 6F6-3
   REFERENCE: 6-F-6, 6-F-12
   LAYOUT: On the workbench, mark two parallel lines 485mm apart. Mark the aircraft center line perpendicular to the lines; the first parallel line is 1056mm long and the second parallel line is 1038mm long. Connect the ends of the two parallel lines with a side line (fuselage sides).
   SUGGESTION: Screw a piece of 2x4 along each of the side lines. Saw a length of 1x2 at 1056mm to fit along the parallel line, screw the 1x2 into the workbench along the parallel line.
   POSITION: Place the Baggage Floor Stiffener along the 1038 parallel line with the flange facing down. Lay the two Rear Pick-Up Channels (flanges up) on top of the Stiffener and the 1x2 board with the side flange against the 2x4 board. For additional support Cleco the Channel to the 1x2 in the middle of the overlap with the 1x2"
   CHECK: The top of the Channel is flush with the top of the Stiffener.
   PITCH: Layout the rivet pattern in the Gusset 6F12-2 before drilling the Channel and Stiffener. 7 rivets in 6F12-2: 5 in the Stiffener 6F13-6 (there is space enough for 9 holes!) and 2 below.
   DRILL & CLECO: With #30
   CUT: Cut the corners in the Channel and Stiffener to Clear the Longerons 6F5-3 below the 90 degree cutout on the Gusset 6F12-2
   COMMENT: Wait to rivet the Gusset until after the Baggage Floor is installed.

7. Cleco the Seat Belt Doubler Plate 6V12-4 to the Arm Rest Side 6F16-1
   REFERENCE: 6-V-12
   CHECK: The Arm Rest Sides fit inside the Seat Panel!
   LAYOUT: Plan for a rivet at the ends of the L Angles!
   DRILL: The 1/4" hole.

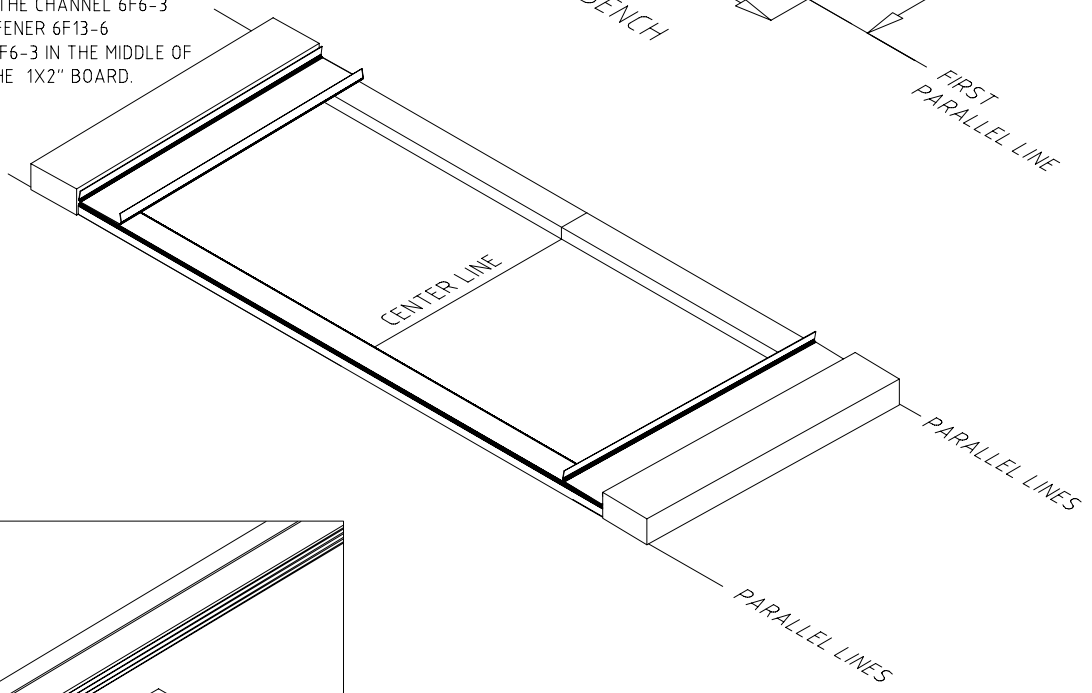
8. Cleco the Arm Rest Side 6F16-1 to the L Angles (with the Doubler Plate removed).
   REFERENCE: 6-V-12, 6-F-16
   CLAMP & CLECO: With #30

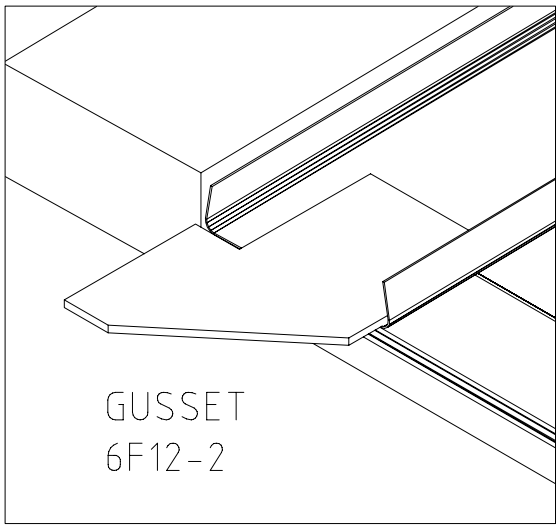
1) LAYOUT TWO PARALLEL LINES 485mm APART DIRECTLY ON THE TOP SURFACE OF THE WORKBENCH.
2) MARK A CENTER LINE AT 90DEGREES TO THE PARALLEL LINES
3) FROM EACH SIDE OF THE CENTER LINE LAYOUT 528mm ON THE FIRST PARALLEL LINE
4) ON THE SECOND PARALLEL LINE LAYOUT 519mm ON EACH SIDE OF THE CENTER LINE.
5) SIDE LINES: CONNECT THE ENDS OF THE 528 AND 519 PARALLEL LINES.

6) SCREW A 2X4" BOARD INTO THE WORKBENCH ALONG THE SIDE LINES.
7) SAW A 1X2 TO FIT INBETWEEN THE 2X4" ALONG THE 1056mm LINE.
8) SCREW THE 1X2 ALONG THE SECOND PARALLEL LINE.



9) POSITION THE TOP FLANGE OF 6F13-6 ALONG THE FIRST PARALLEL LINE WITH THE FLANGES POINTING DOWN
10) LAY 6F6-3 ON TOP OF THE 1X2 AND 6F13-6 WITH THE SIDE FLANGE AGAINST THE 2X4" BOARD.
11) ALIGN THE TOP OF THE CHANNEL 6F6-3 FLUSH WITH THE STIFFENER 6F13-6
12) DRILL AND CLECO 6F6-3 IN THE MIDDLE OF THE OVERLAP WITH THE 1X2" BOARD.





USE THE GUSSET 6F12-2 TO LAYOUT THE RIVET PITCH TO DRILL 6F6-3 TO 6F13-6.
RIVET WITH THE GUSSET POSTIONED IN BETWEEN THE CHANNEL AND THE STIFFENER.

CLECO THE BAGGAGE BOTTOM STIFFENER 6F13-6 TO THE REAR PICK UP CHANNELS 6F6-3

SEQUENCE: FF-6

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9. Drill the Rear Bearing 6V12-2 for the Torque Tube.
   REFERENCE: 6-V-12, 6-V-13
   LAYOUT: 1-1/8" hole. Position the two Plastic Fairlead.
   NOTE: The Bent Strip 6V12-7 is installed later (it is riveted to support the Rear Bearing to the Channel 6V13-4).
   OPTION: Extra bearing surface for the Rear Bearing: use a larger piece (100x115) of Plastic Bearing material, drill the 1-1/8" for the Torque tube in the Plastic Bearing Material (replaces the two pieces 70x40 and 110x45).

10. Rivet the Rear Bearing 6V12-2 to the Rear Bearing Channel 6V12-6
    REFERENCE: 6-V-12
    CLAMP: Centered on the aircraft center line.

11. Connect the Control Cables to the Stick 6V13-1
    REFERENCE: 6-V-14, 6-F-15

12. Slide the Torque Tube 6V13-3 in place and carefully bolt the Front Bearing 6V13-2
    REFERENCE: 6-V-13
    PRE-DRILL: Pre-drill the Front Bearing 6V13-2 at the front end of the Torque Tube.

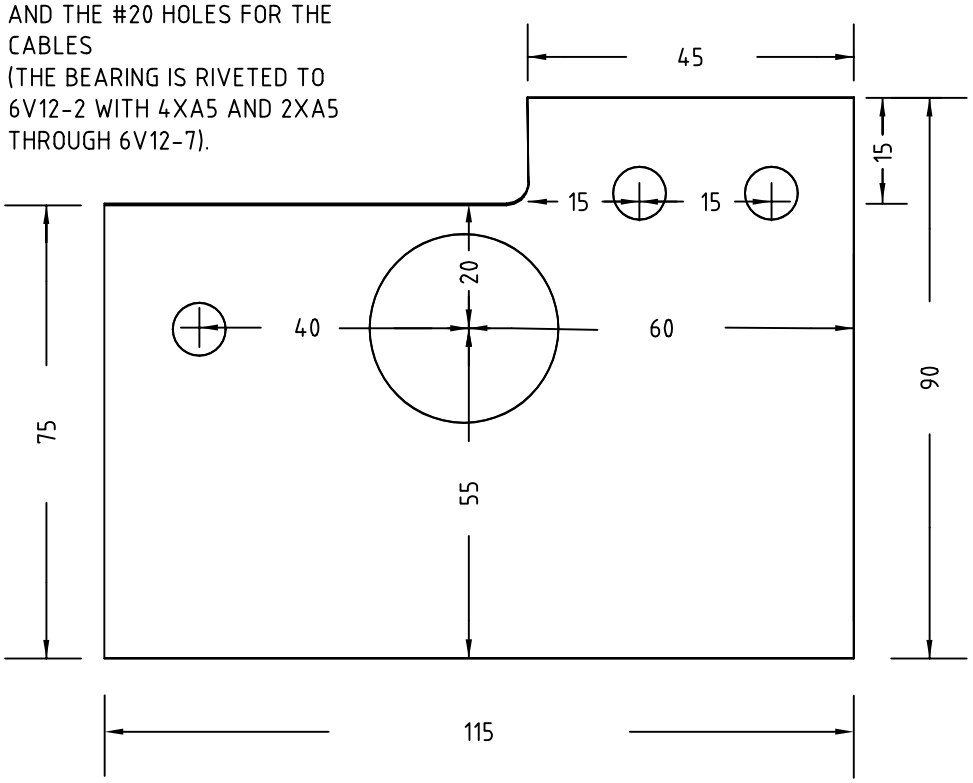
13. Bolt the Control Stick 6V13-1 to the Torque Tube 6V13-3
    NOTE: Lubricate the bushing.

14. Rivet the Channel 6V13-4 across the Seat Back Channel 6V12-5 and the Rear Zee
    REFERENCE: 6-V-12, 6-V-13
    NOTE: The Channel is on an angle to the center line.
    PITCH: 2 A4 (see top right diagram on 6V13).
    CHECK: Clearance of Torque Tube.

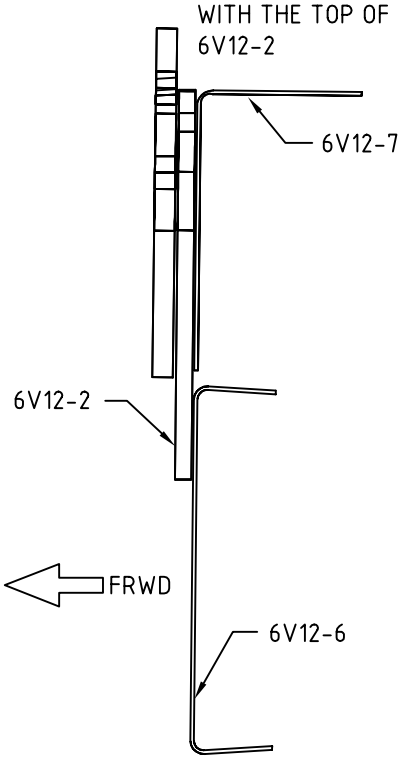
15. Rivet the Bent Strip 6V12-7 between the Rear Bearing 6V12-2 and the Channel 6V13-4
    REFERENCE: 6-V-12
    LAYOUT: The Rear Bearing is vertical (parallel to the Main Spar).
    RIVET: 2 A4 (see middle right diagram on 6-V-13). Install the Firewall and Rear Fuselage to the Center Wing Section.

16. Adjust the height of the work bench to 23" (floor to top surface) to make it easier to reach inside and over the top. Position the Center Section Assembly across the workbench with the Gear Slides overhanging the sides.
    LEVEL: Level the Spars. Support the aft end of the wing with spacers to bring the bottom of the wing parallel with the workbench.
    CHECK: The Spar must be vertical.

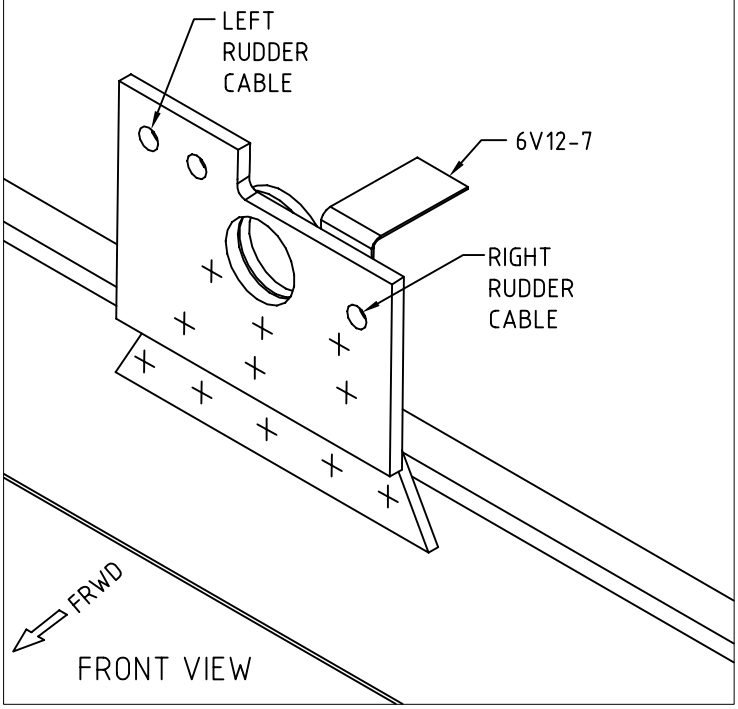
ONE PIECE PLASTIC BEARING WITH
1-1/8" HOLE FOR THE TORQUE TUBE
AND THE #20 HOLES FOR THE
CABLES
(THE BEARING IS RIVETED TO
6V12-2 WITH 4XA5 AND 2XA5
THROUGH 6V12-7).



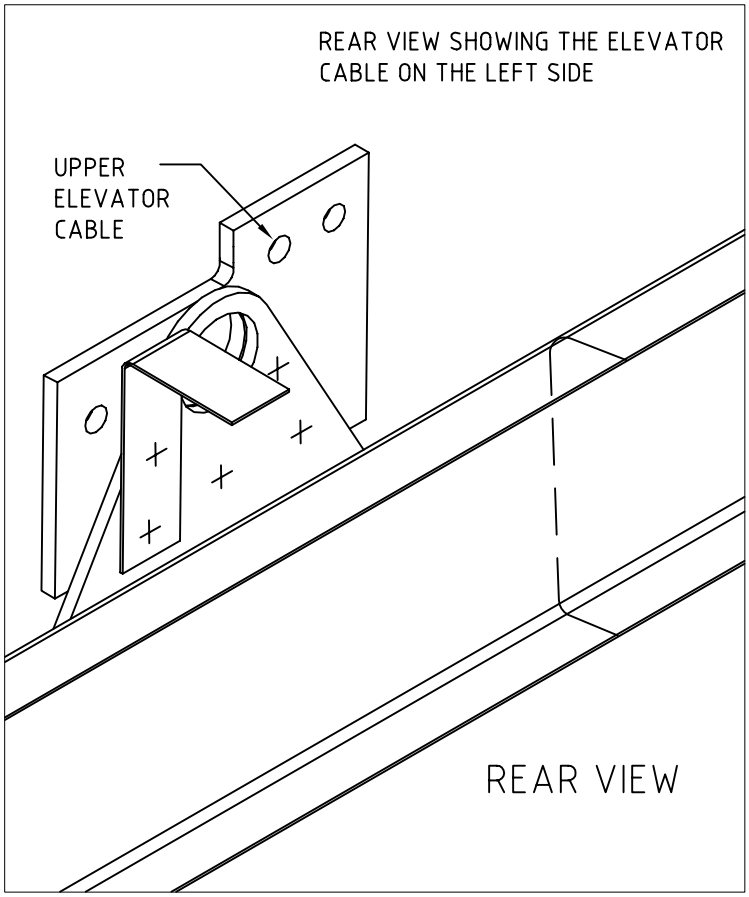
THE TOP FLANGE
OF 6V12-7 IS EVEN
WITH THE TOP OF
6V12-2



NOTE: THE RUDDER CABLE TERMINOLOGY LEFT/RIGHT
REFERS TO THEIR POSITION ON THE RUDDER HORN.
SEE DRAWING 6F15



REAR VIEW SHOWING THE ELEVATOR
CABLE ON THE LEFT SIDE



PLASTIC BEARING MATERIAL (6V12)

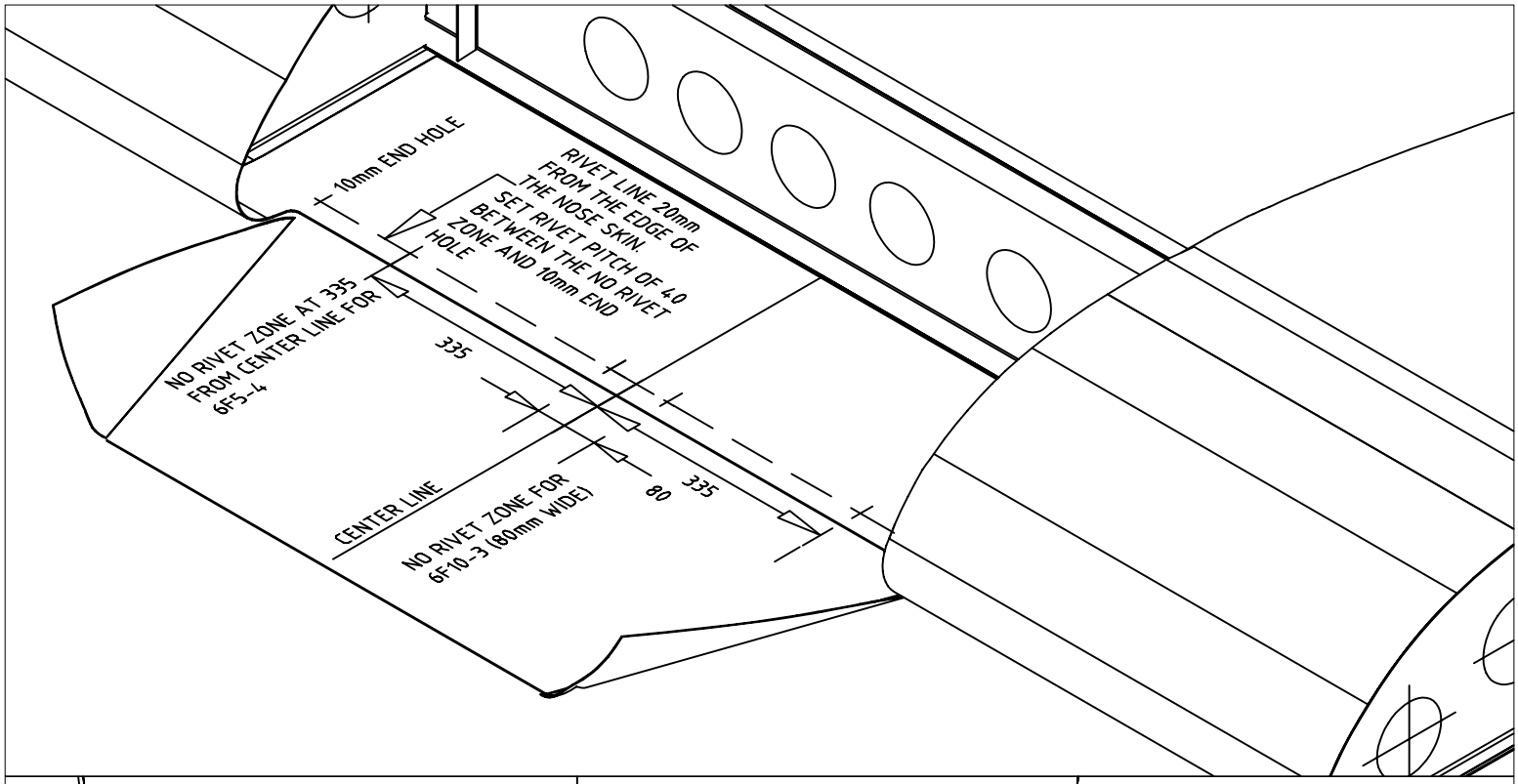
SEQUENCE: FF-9

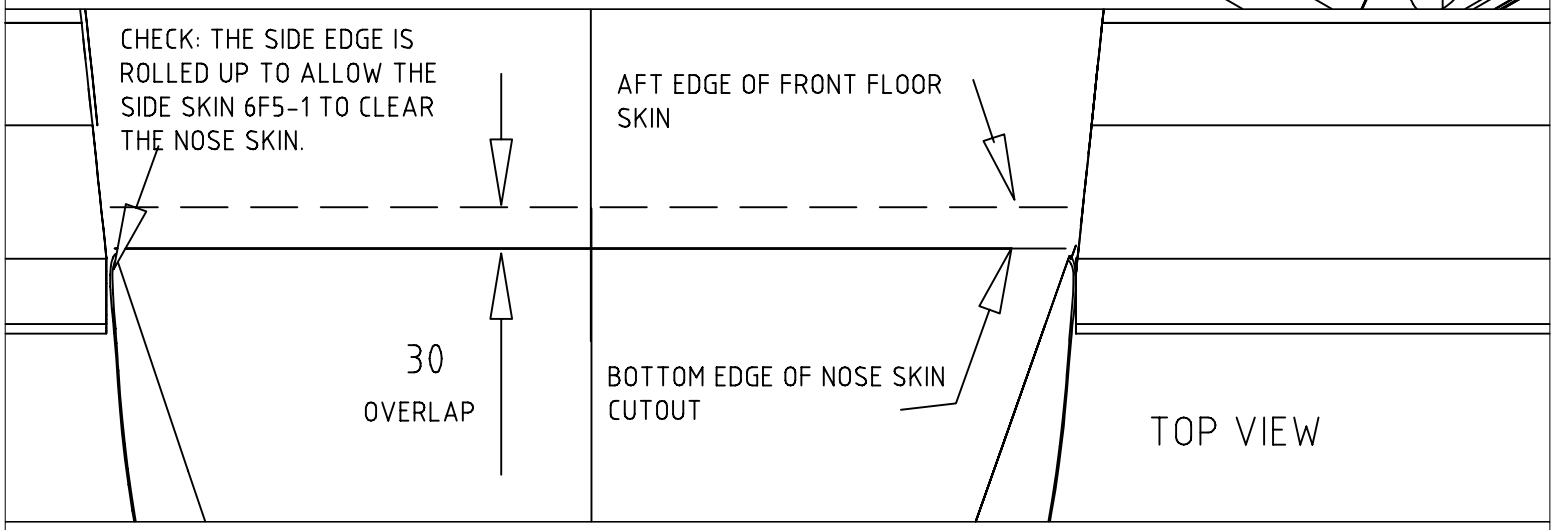
17. Slide the Front Floor Skin 6F5-2 underneath the leading edge Nose Skin 6V11-3
    REFERENCE: Drawing 6-F-9
    NOTE: There are two parallel rivet lines through the overlap: the aft line through 6F5-2 and 6V11-3 and the forward line through 6F5-2, 6V11-3 and through the Heel Support 6F5-5
    LAYOUT: Mark the overlap with a 30mm offset line along the aft edge of the Front Floor Skin.
    OVERLAP: The Floor Skin overlaps on the outside of the Nose Skin.
    CHECK: a) The front edge of 6F5-2 is parallel with the Spar: 740mm from the front face of the Spar cap to the front edge of 6F5-2; see Manual page 25
    b) The Floor Skin is centered along the longitudinal axis (aircraft center line).

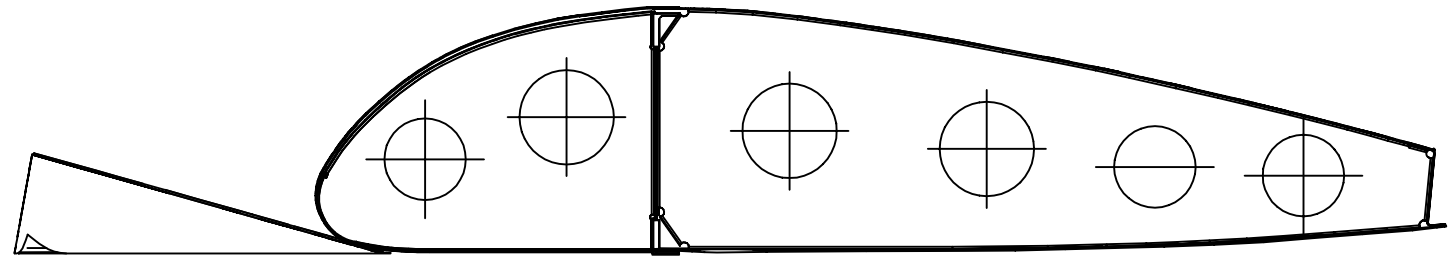
    DRILL: Mark the "no rivet zone" on each side for 6F5-4 and in the middle for 6F9-3. Drill the aft rivet line with #40 pilot holes.

18. Cleco the Heel Support 6F5-5 to the Floor.
    REFERENCE: 6-F-5, 6-F-9
    SUGGESTION: Hold the Heel Support against the Clecos in the aft rivet line of the overlap of 6F5-2 with 6V11-3
    CHECK: Center on the aircraft center line.
    DRILL: With #40 pilot holes in between the "no rivet zone" for 6F5-4 and 6F10-3

19. Cleco the Firewall assembly to the front of the Floor Skin.
    SUGGESTION: Make a jig to hold the firewall at 80 degrees to the floor Skin: two large triangles with a base to fit in between the bottom of the Firewall and the Spar, the front of the triangle along the Firewall and the third side is a brace to the base. The
    Angle between the base and the first side is 80 degrees.
    CLECO: Cleco the Firewall to the Floor Skin through the hole on the aircraft center line.
    CHECK: The Firewall is parallel to the Main Spar and level.
    PITCH: A4 pitch 40 between the no rivet zone for 6F5-5 (80mm wide) and 6F7-2 into the bottom flange of the Firewall and the Floor Skin.







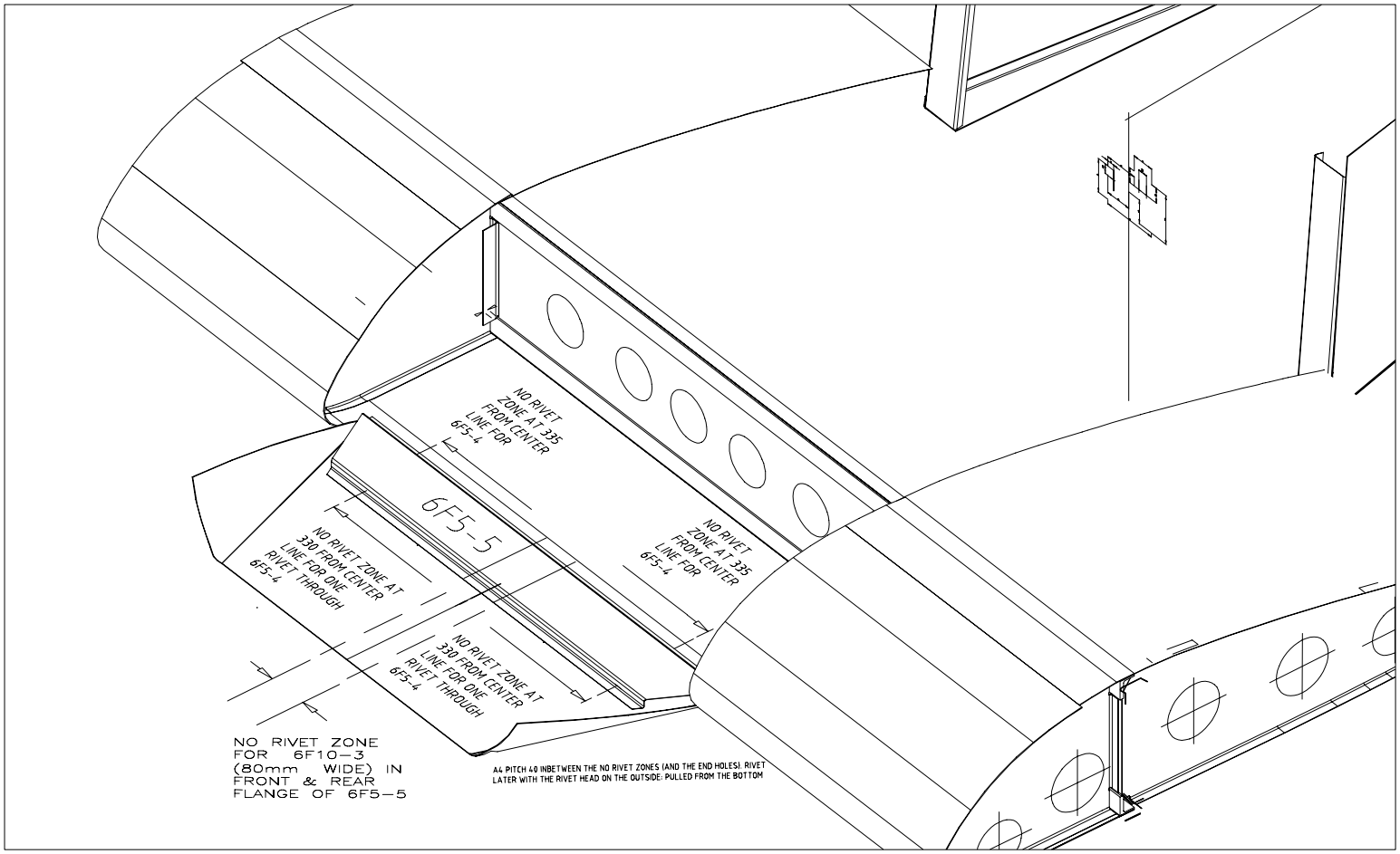
740

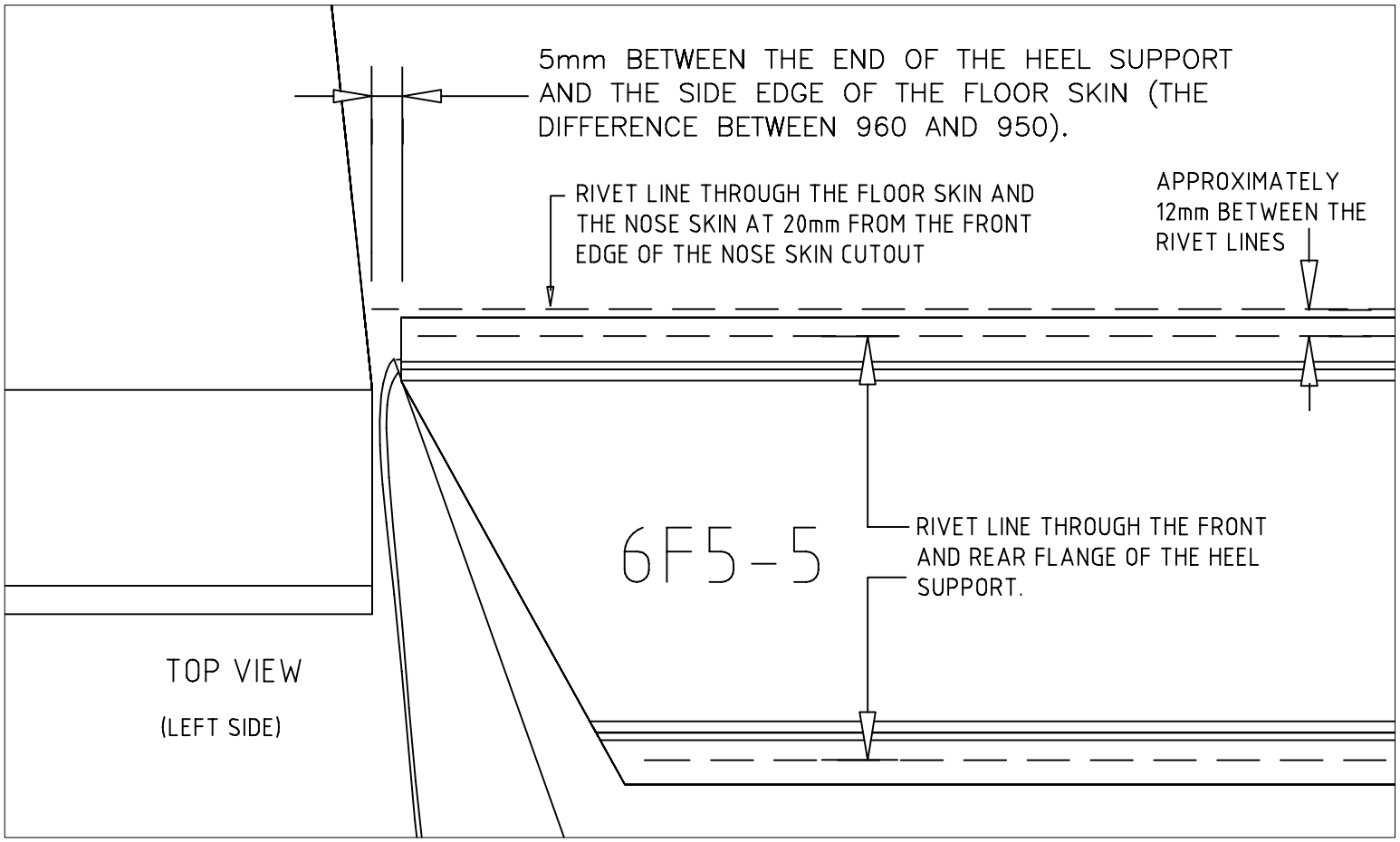
(MEASURED FROM THE SPAR CAP)

THE FRONT FLOOR SKIN OVERLAPS ON THE OUTSIDE OF THE CENTER WING NOSE SKIN

POSITION OF THE FRONT FLOOR SKIN 6F5-2 TO THE NOSE SKIN WITH A CLECO ON THE AIRCRAFT CENTER LINE.

SEQUENCE: FF-17





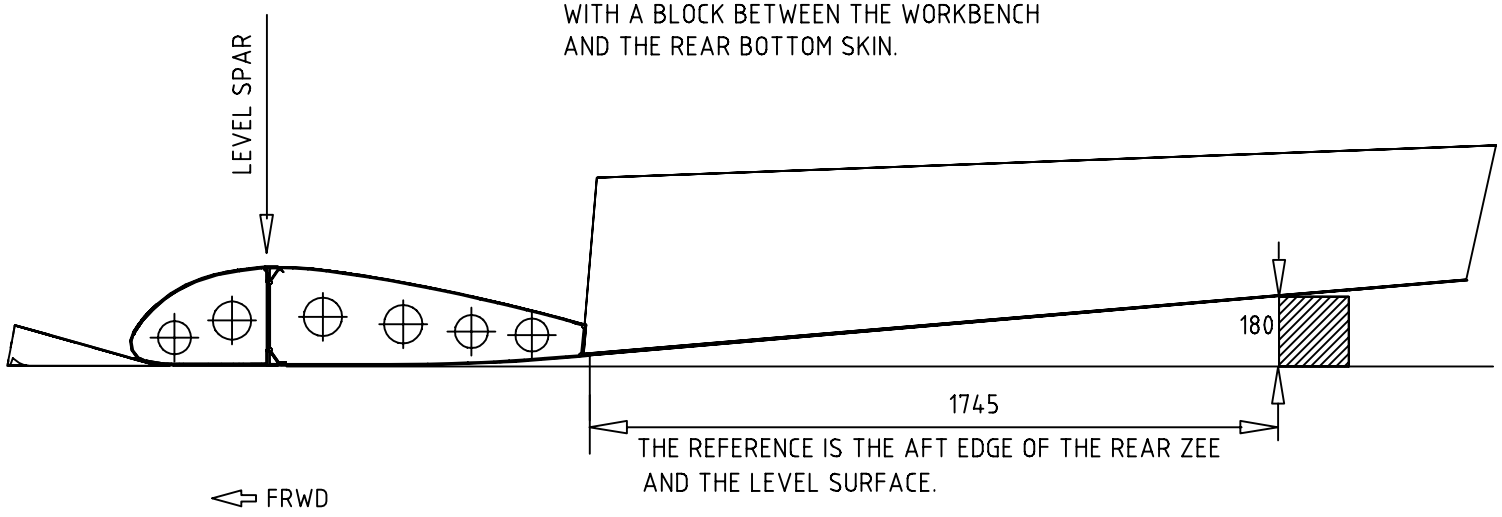
POSITION THE HEEL SUPPORT 6F5-5 TO OVERLAP ON TOP OF THE NOSE SKIN BY APPROXIMATELY 18mm

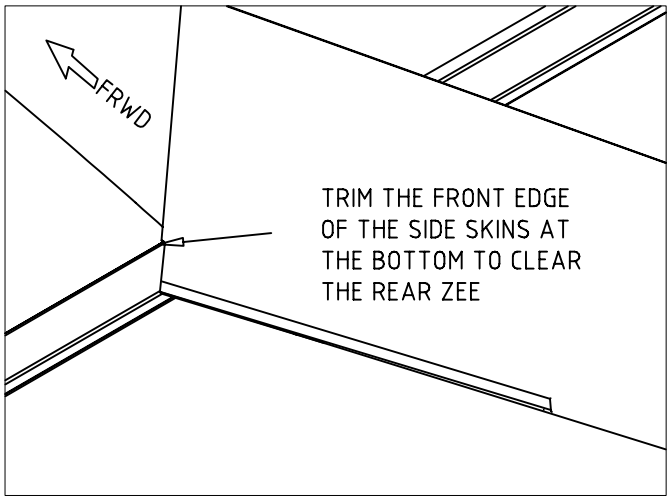
SEQUENCE: FF-18

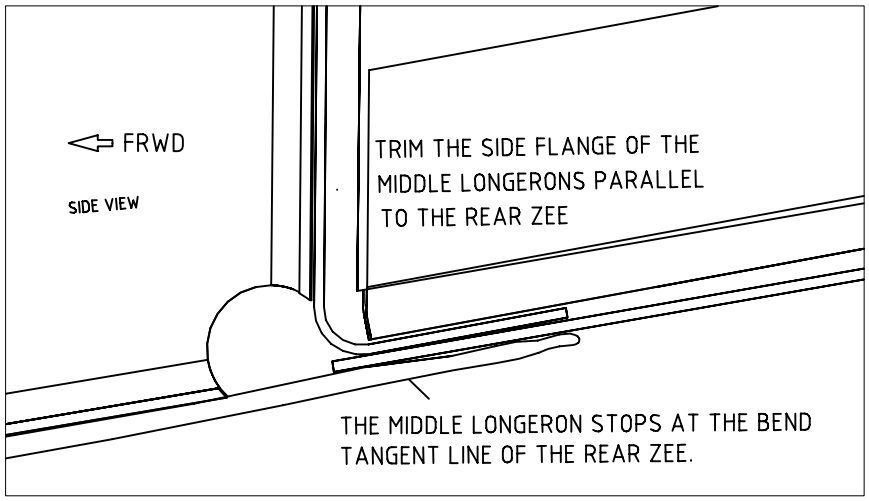
20. A. Connect the Rear Fuselage assembly to the Center Wing Section.
REFERENCE: 6-F-1, 6-F-10
NOTE: The angle between the Rear Fuselage and the Center Section is determined by the Rear Zee bottom flange 6V7-1
OVERLAP: Slide the Bottom Skin 6F10-1 in-between the Center Wing Bottom Skin 6V11-2 and the Rear Zee 6V7-1. The Longeron Doubler overlaps on top of the Rear Zee bottom flange.
SUPPORT: The Fuselage assembly is raised and supported by a 180mm spacer set at 1745mm from aft edge of the bottom flange of the Rear Zee 6V7-1
CHECK: a) The Fuselage is centered: left and right on the Center Wing Section.
b) The end of the Fuselage is equal distance between the Left and Right O/B end of the Center Wing Section.
c) The front edge of the Bottom Skin is visible from the front side of the Rear Zee.
d) Check for clearance between the front edge of the Side Skins and the Rear edge; if necessary trim the Skin to clear the Rear Zee.
e) The front edge of the Longeron Doubler stops at the bent tangent line of the Rear Zee bottom flange.
BACK-DRILL & CLECO: With #30 pilot holes (use a long drill bit to keep the drill chuck clear of the Rear Zee web).
DRILL: Wait to drill the 5 holes in 6F1-5 until after the Lower Front Longeron 6F5-4 is positioned underneath the fuselage (installed much later when the aircraft is on its wheels!).

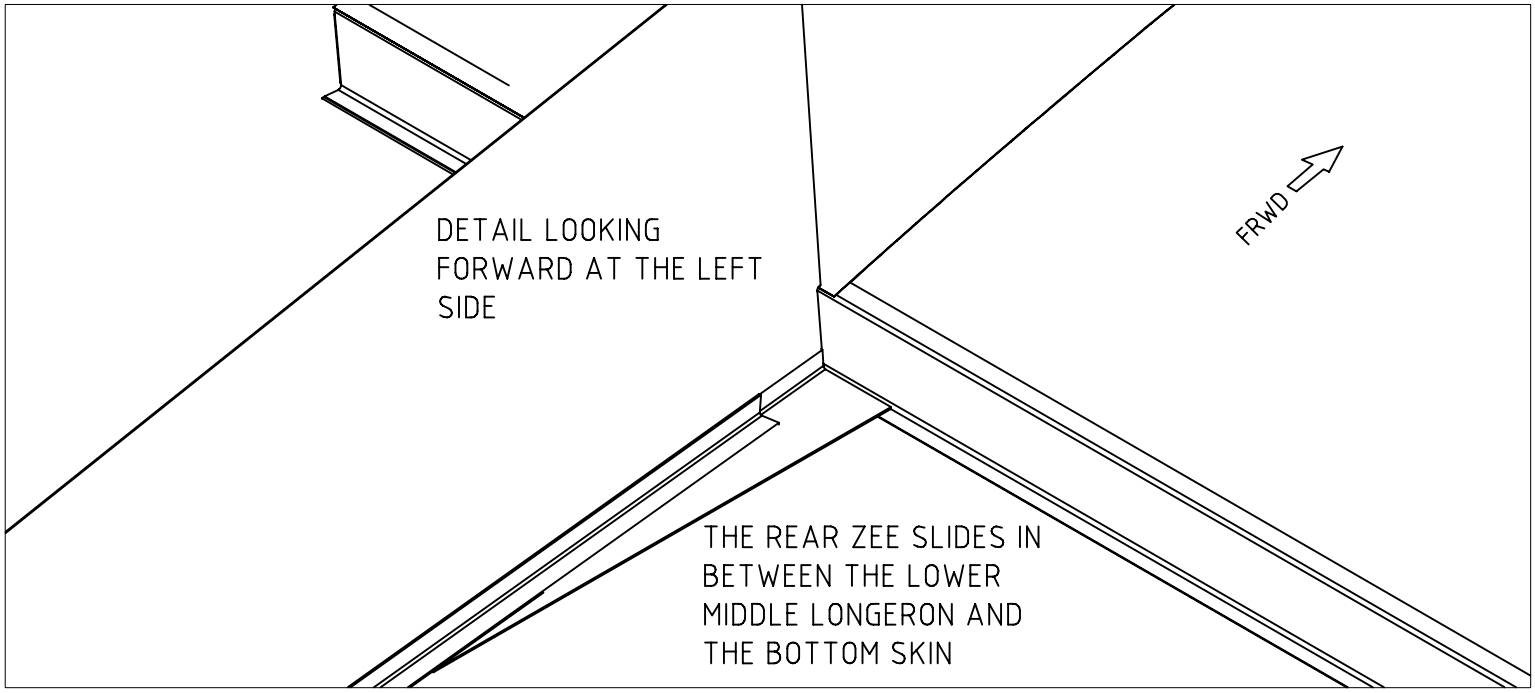
20B. Set up a reference string line along the aircraft center line from the Firewall to the end of the Rear Panel 6F2-6
DRILL: Drill a small pilot hole in the Firewall assembly at the intersection of the aircraft center line and the line joining the bottom side of the left and right Engine Mount fitting 6F7-2
SUGGESTION: Clamp the Rear Panel 6F2-6 to the Rear Longeron 6F1-3 to keep the string from distorting the end.
REFERENCE STRING LINE: Insert a string through the pilot hole in the Firewall and tie a knot. Pull the sting the length of the fuselage over the Rear Horizontal Tail frame and the Rear Top Panel. Tie a weight (a hammer) at the end of the String to hang between the floor and the Bottom Skin.
CHECK: The reference string line is tight and under tension. Position the String on the aircraft center line as marked on the Rear Panel 6F2-6

SUPPORT THE REAR FUSELAGE SECTION
WITH A BLOCK BETWEEN THE WORKBENCH
AND THE REAR BOTTOM SKIN.



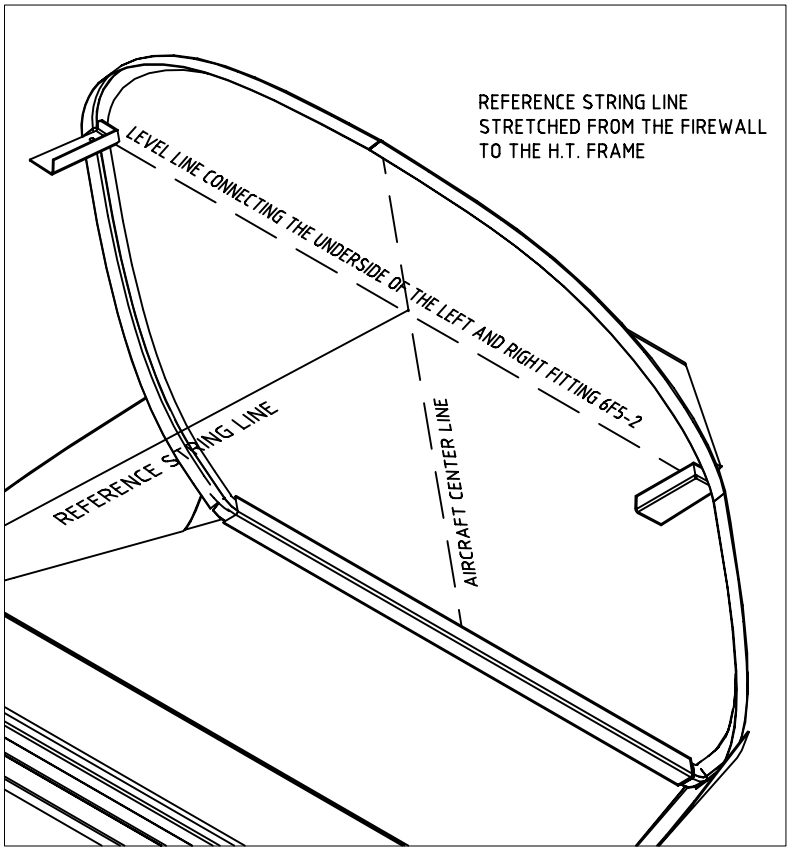


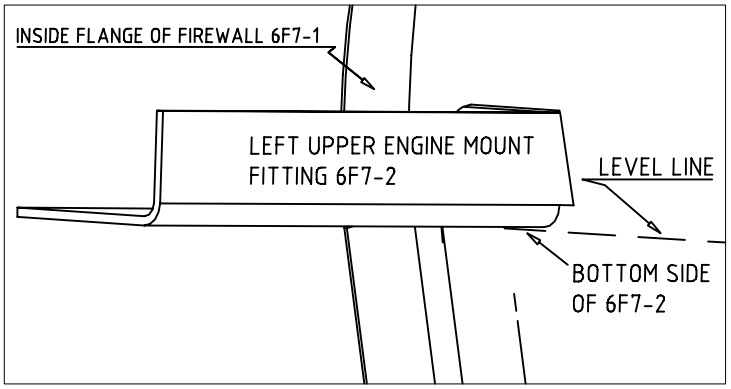


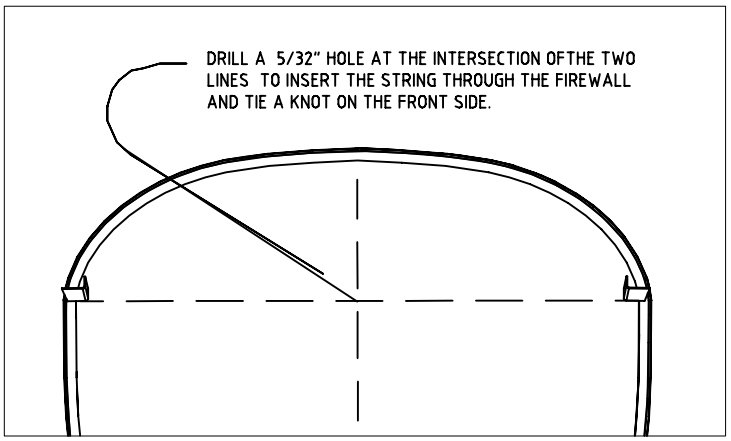


CLECO THE REAR FUSELAGE TO THE REAR ZEE OF THE WING CENTER SECTION.

SEQUENCE: FF-20A

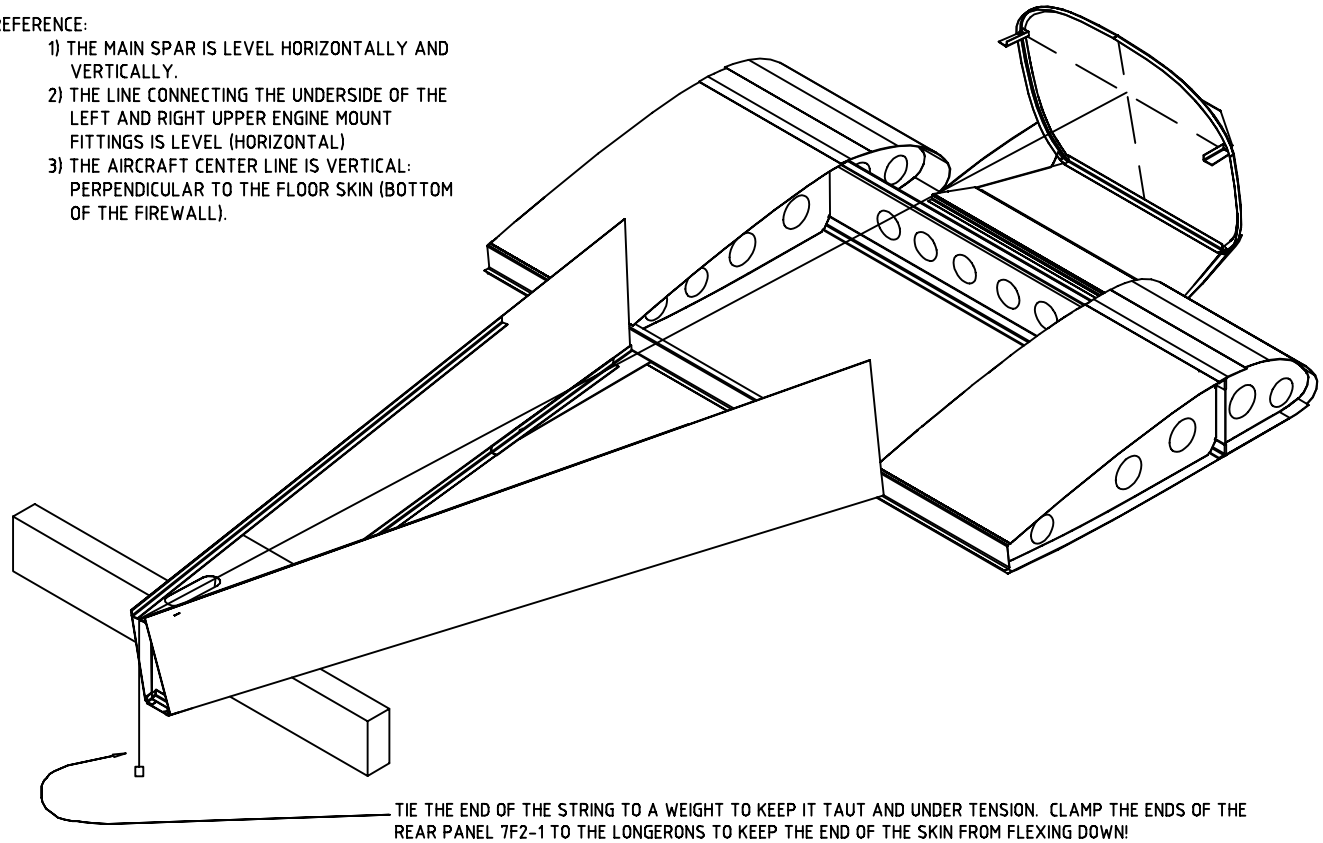






LEVEL REFERENCE:

1) THE MAIN SPAR IS LEVEL HORIZONTALLY AND VERTICALLY.
2) THE LINE CONNECTING THE UNDERSIDE OF THE LEFT AND RIGHT UPPER ENGINE MOUNT FITTINGS IS LEVEL (HORIZONTAL)
3) THE AIRCRAFT CENTER LINE IS VERTICAL: PERPENDICULAR TO THE FLOOR SKIN (BOTTOM OF THE FIREWALL).



TIE THE END OF THE STRING TO A WEIGHT TO KEEP IT TAUT AND UNDER TENSION. CLAMP THE ENDS OF THE REAR PANEL 7F2-1 TO THE LONGERONS TO KEEP THE END OF THE SKIN FROM FLEXING DOWN!

CHECK THAT THE STRING IS CENTERED OVER THE AIRCRAFT CENTER LINE THROUGHOUT.

PULL A STRING ALONG THE AIRCARFT CENTER LINE TO MARK THE TOP OF THE UPPER FRONT LONGERONS.

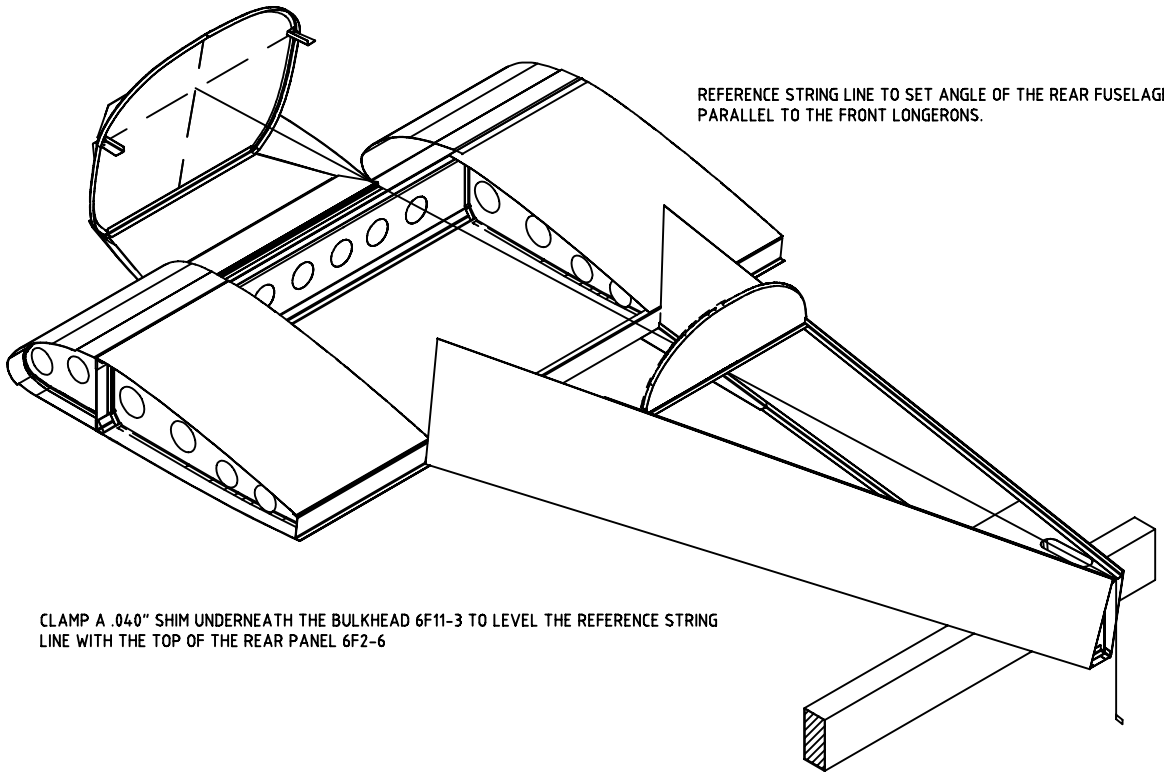
SEQUENCE: FF-20B

ZENITH AIRCRAFT COMPANY, NH 01/01

20C. Clamp the Bulkhead 6F11-3 flush with the ends of the front Longerons 6F5-3
CUT: Trim the left and right aft corner of the bottom flange of the Bulkhead to clear the bend radius of the Longeron. Also check for clearance between the top flange of the Longeron and the bottom cutout on the side flange of the Bulkhead. If necessary use a round file (a 7/32" chain saw file) to elongate the corner relief hole.
SHIM: Clamp a .040" piece of aluminum to the underside of the bottom flange of the Bulkhead. The Shim is level with the Longerons.
CHECK: The Reference String Line touches the .040" shim clamped to the Bulkhead. Adjust by raising or lowering the rear fuselage assembly and re-adjusting the position of the Spacer Block between the Bottom Skin and the workbench.
NOTE: The Rear and Front Longerons are parallel: the Rear Longeron overlaps on top of the Front Longerons as shown in the Longeron Splice detail on drawing 6-F-6

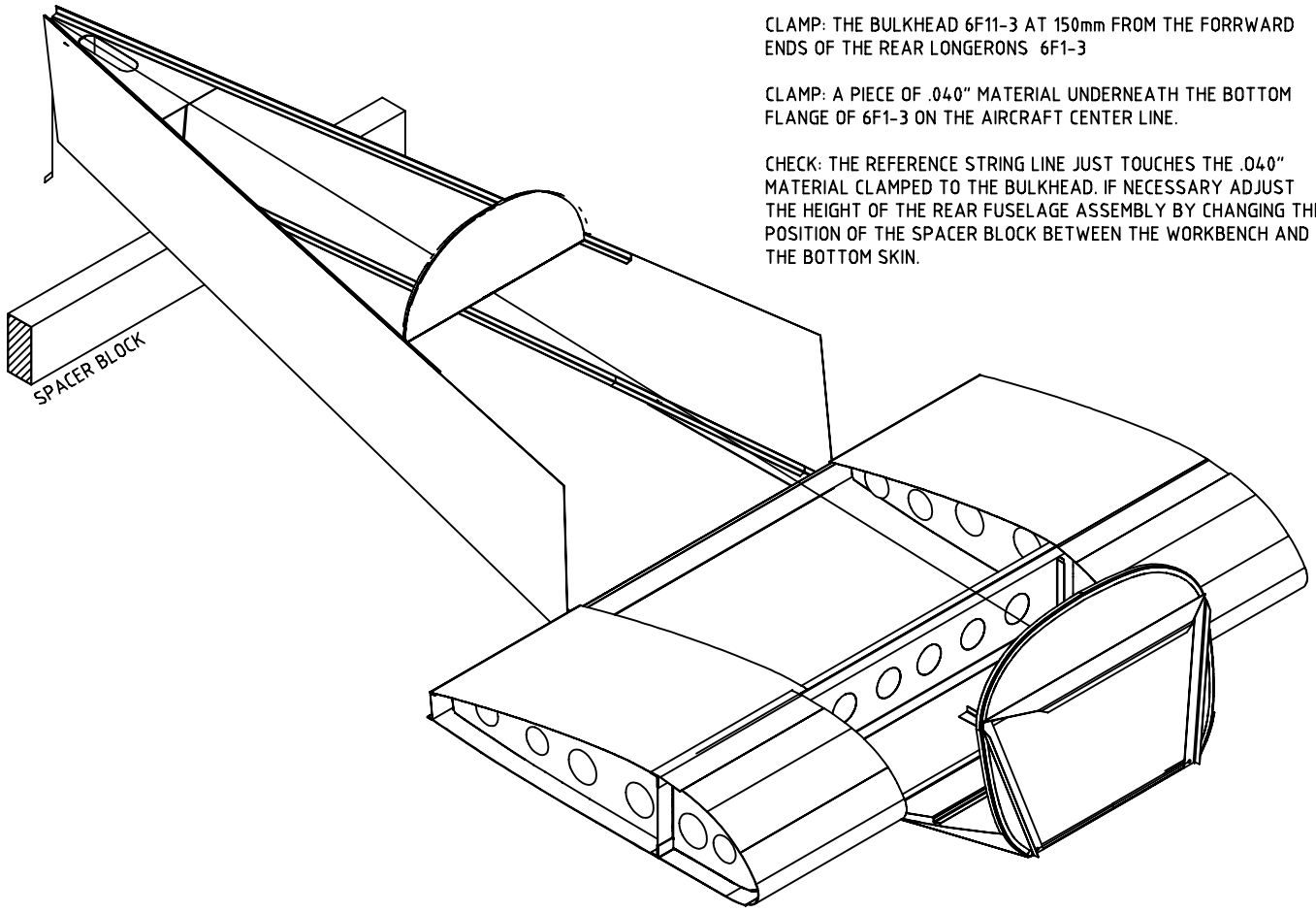
21. Cleco the Rear Pick Up Channel assembly (6F6-3, 6F13-6 & 6F12-2) to the Rear Zee
REFERENCE: 6-F-6
CUT: Snip the bottom aft corner of the side flanges of 6F6-3 to clear the bottom flange of the Rear Zee, if necessary trim the length of the Rear Pick Up Channels for the assembly to fit underneath the Reference String Line.
POSITION: The top of the Baggage Bottom Stiffener 6F13-6 is level and just touches the Reference String Line. 6F13-6 fits on the inside of the Lower Middle Longeron 6F1-5
LAYOUT: Trace the top of the Rear Zee on the Channel.
PRE-DRILL: 8 #40 pilot holes in two parallel rows on the overlap of 6F6-3 with 6V7-1
CLAMP: The Rear Pick Up Channels to the Rear Zee.
CHECK: a) The Baggage Bottom Stiffener is level and just touches the string.
b) The Reference String is on the aircraft center line as marked on 6F13-6
DRILL/CLECO: 6F6-3 to 6V7-1 with #30 holes.

22. Clamp the formed Upper Front Longerons 6F5-3 underneath the Rear Longeron 6F6-2 and to the Upper Engine Mount Fittings 6F7-2 at the front.
REFERENCE: 6-F-6, 6-F-7, 6-F-9
FILE: Radius on the front outer corner of the Longeron (vertical flange) to fit snugly against the Firewall side flange.
CLAMP a) Clamp the front of the Longeron underneath the Upper Engine Mount Fitting 6F7-3
b) Use a second clamp to Clamp the Longeron to the Firewall flange.
b) Remove the Bulkhead and Clamp the two Longerons together (front and back).
CHECK: The overlap of the two Longerons is approximately 150mm.
DRILL & CLECO: The Upper Engine Mount Fitting with 2 #40



REFERENCE STRING LINE TO SET ANGLE OF THE REAR FUSELAGE PARALLEL TO THE FRONT LONGERONS.

CLAMP A .040" SHIM UNDERNEATH THE BULKHEAD 6F11-3 TO LEVEL THE REFERENCE STRING LINE WITH THE TOP OF THE REAR PANEL 6F2-6



CLAMP: THE BULKHEAD 6F11-3 AT 150mm FROM THE FORRWARD ENDS OF THE REAR LONGERONS 6F1-3

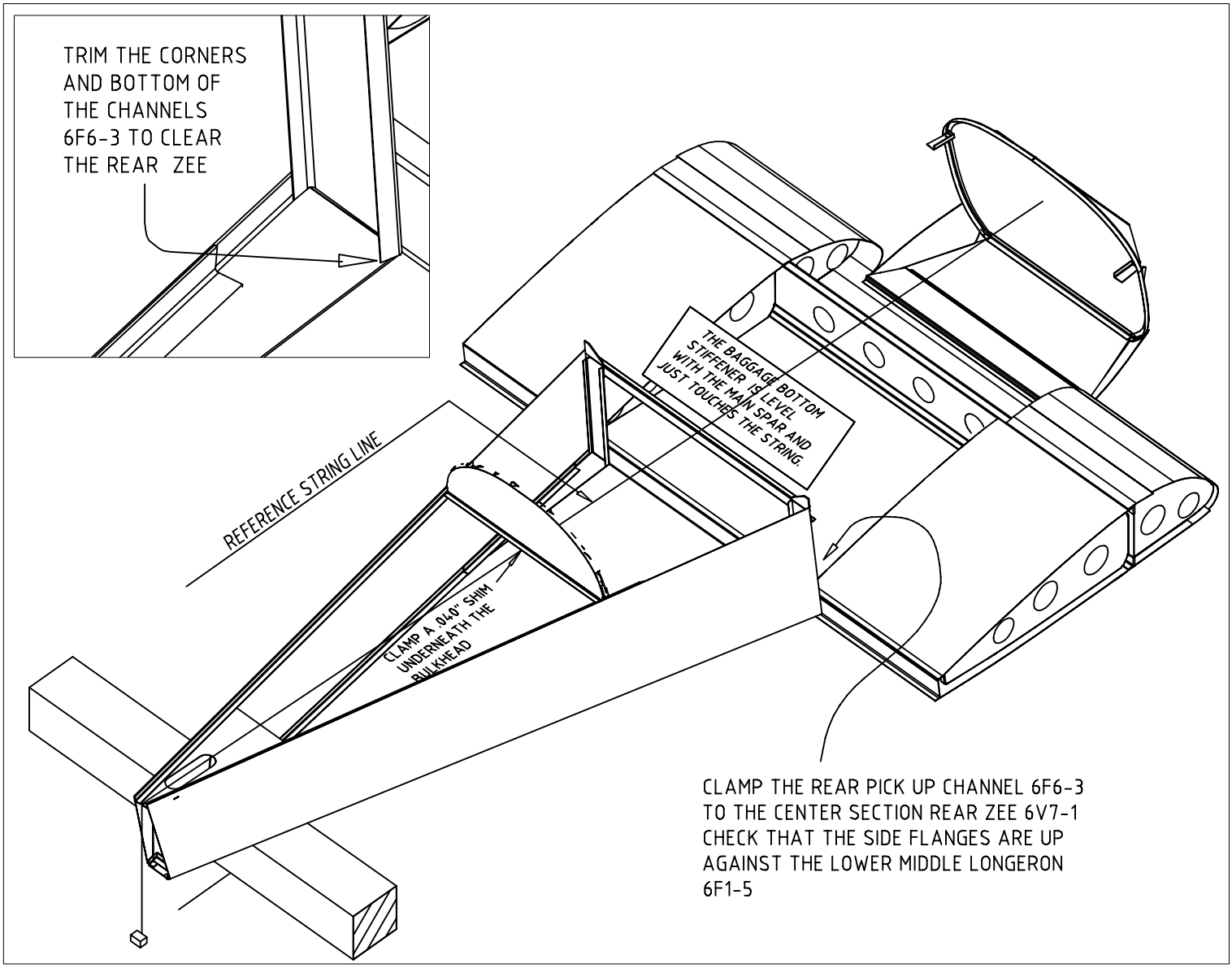
CLAMP: A PIECE OF .040" MATERIAL UNDERNEATH THE BOTTOM FLANGE OF 6F1-3 ON THE AIRCRAFT CENTER LINE.

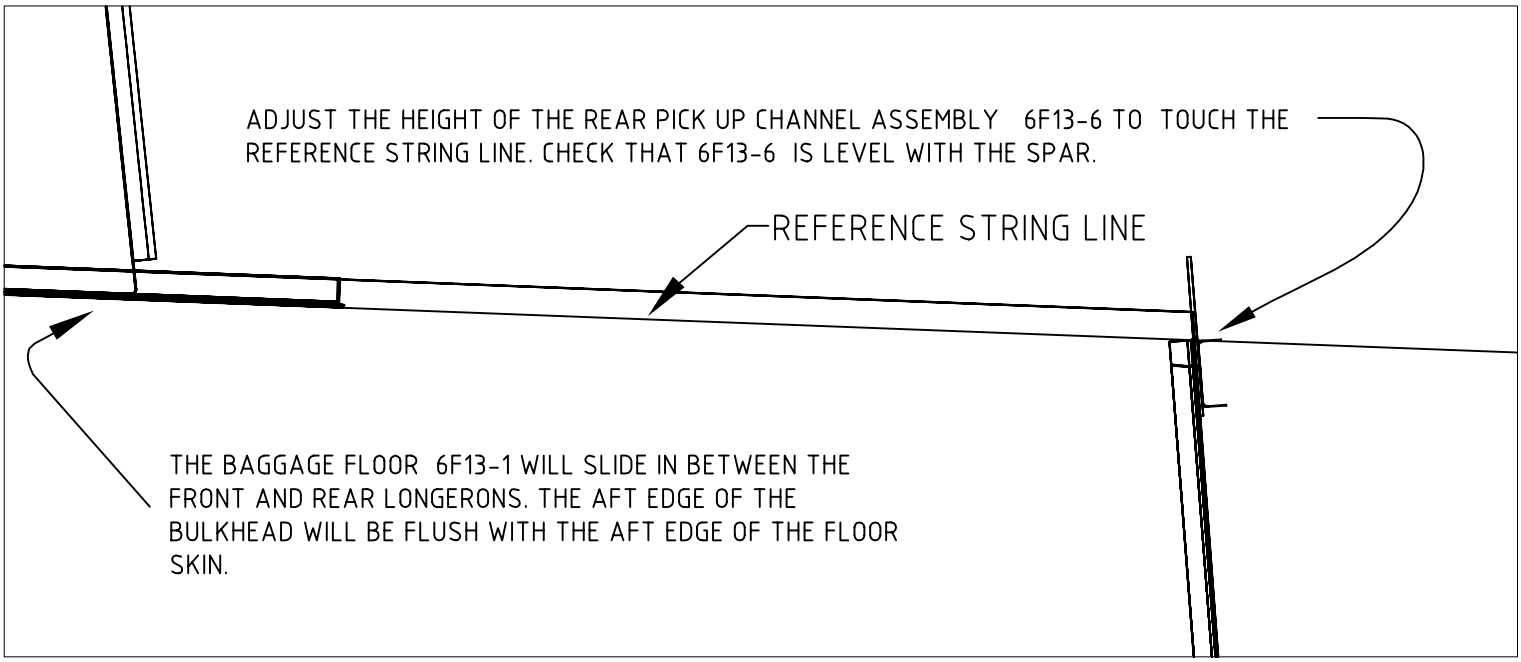
CHECK: THE REFERENCE STRING LINE JUST TOUCHES THE .040" MATERIAL CLAMPED TO THE BULKHEAD. IF NECESSARY ADJUST THE HEIGHT OF THE REAR FUSELAGE ASSEMBLY BY CHANGING THE POSITION OF THE SPACER BLOCK BETWEEN THE WORKBENCH AND THE BOTTOM SKIN.

CLAMP THE BULKHEAD 6F11-3 ON TOP OF THE REAR LONGERON 6F1-3

SEQUENCE: FF-20C

ZENITH AIRCRAFT COMPANY, NH 01/01

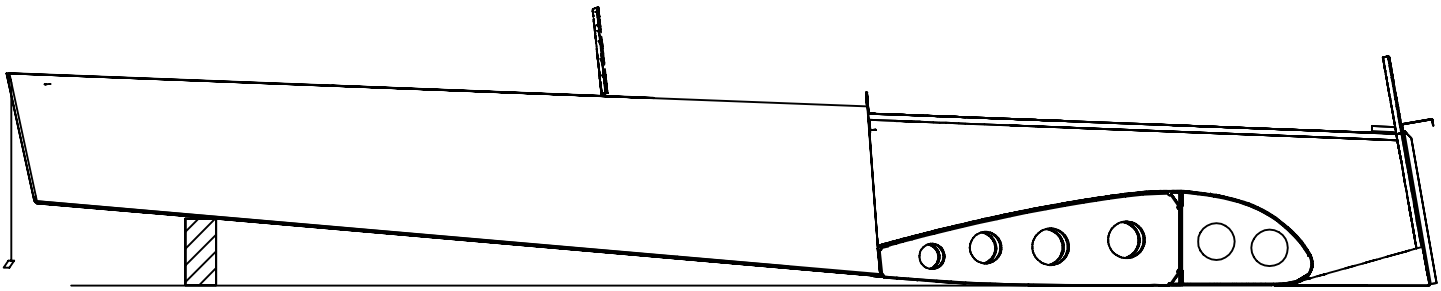


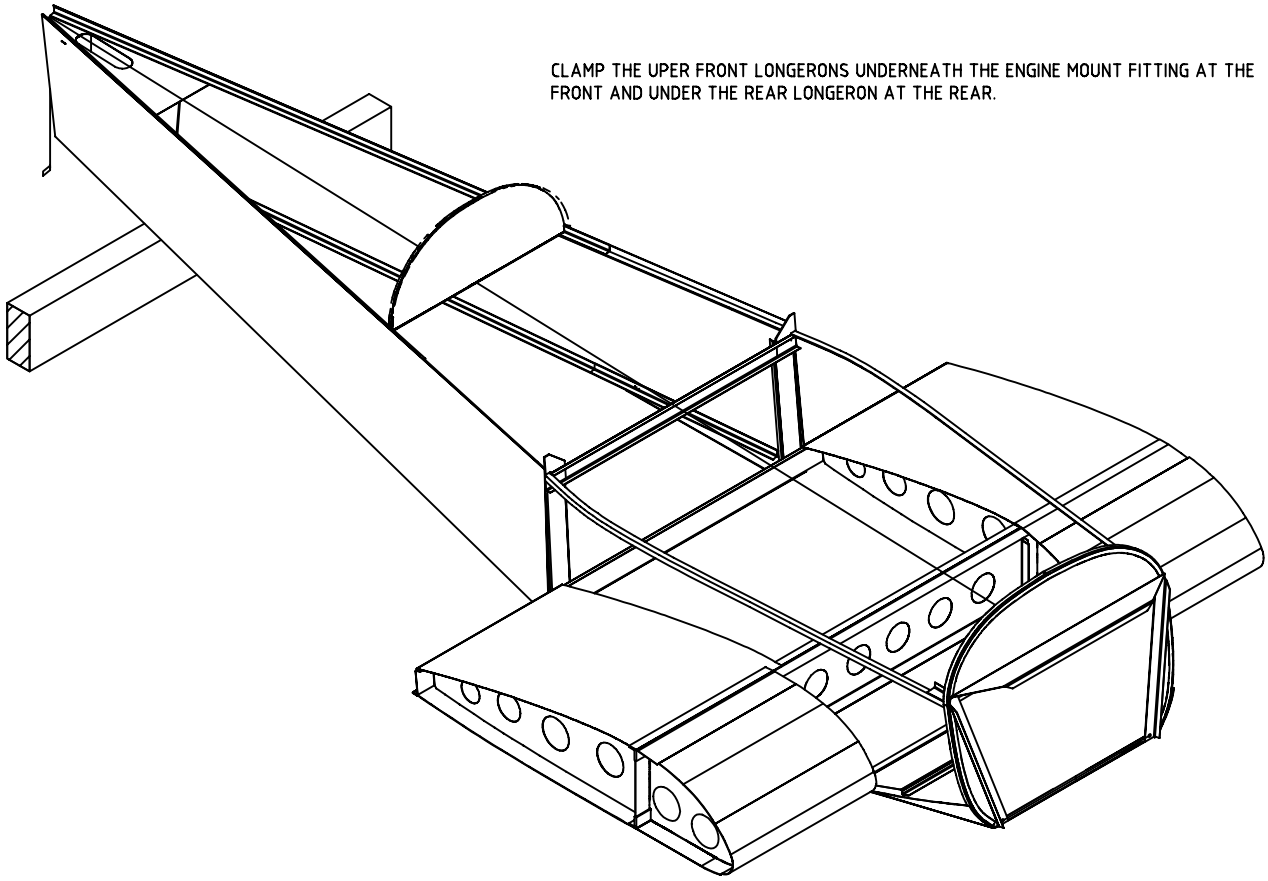


POSITION THE BAGGAGE BOTTOM STIFFENER ASSEMBLY 6F13-6 JUST TOUCHES THE REFERENCE STRING LINE.

SEQUENCE: FF-21

THE LONGERONS AND THE TOP OF THE REAR FUSELAGE ARE PARALLEL
REFERENCE: UPPER RIGHT DIAGRAM ON DRAWING 6F6





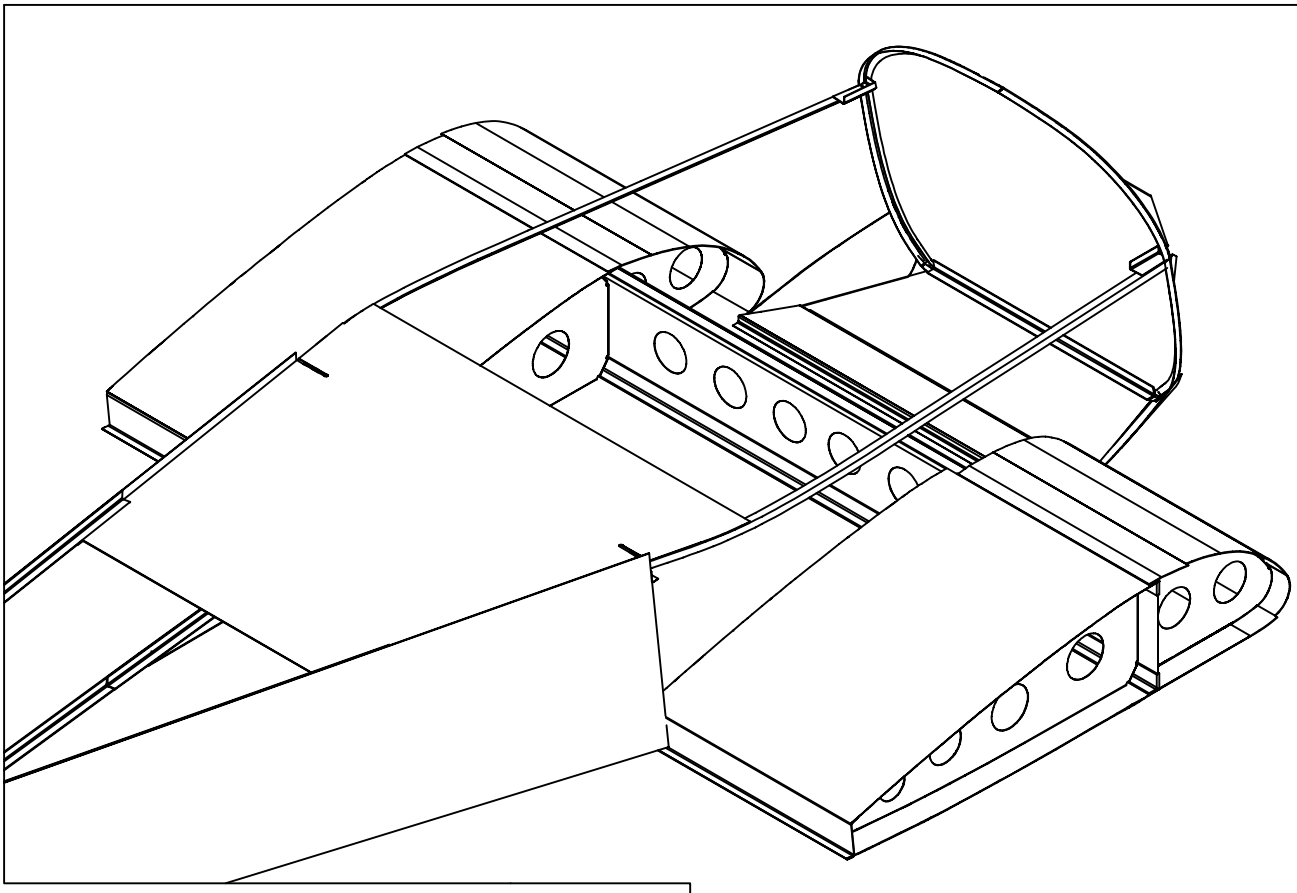
CLAMP THE UPER FRONT LONGERONS UNDERNEATH THE ENGINE MOUNT FITTING AT THE FRONT AND UNDER THE REAR LONGERON AT THE REAR.

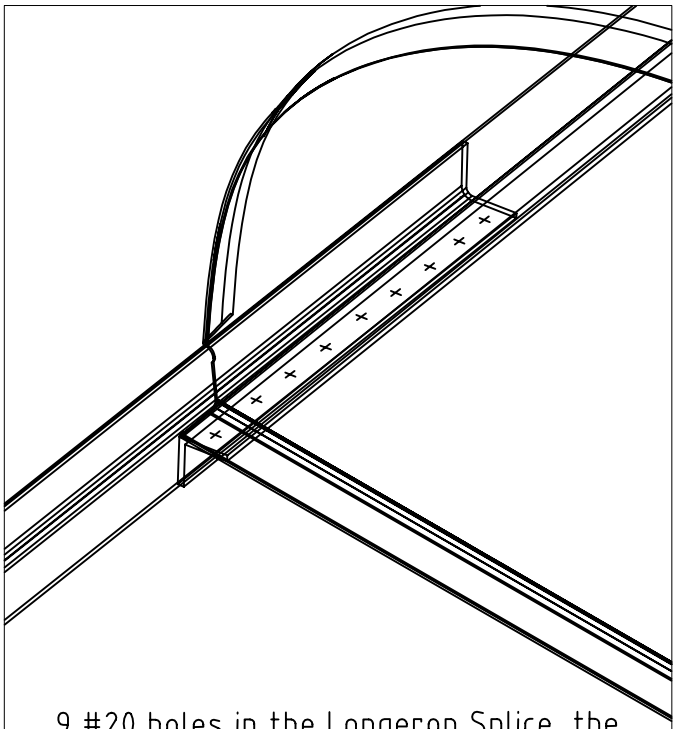
CLAMP THE UPPER FRONT LONGERONS 6F5-3 LEVEL WITH THE REFERENCE STRING LINE.

SEQUENCE: FF-22

23. Clamp the Baggage Floor 6F13-1 flush with the aft end of the Upper Front Longeron 6F5-3
REFERENCE: 6-F-6, 6-F-13, 6-F-14
POSITION: The Baggage Floor Fits inbetween the Front and Rear Longeron. Bulkhead 6F11-3 is installed flush with the aft edge of the Baggage Floor.
CLAMP: The sides of the Baggage Floor against the Fuselage Skins along the straight section of the Longerons.
TRACE: Trace the curvature of the fuselage on 6F13-1 and trim.
CHECK: The width of the fuselage at the shoulders is approximately 44" (1125mm).
CUT: Use a round file (7/32" chain saw file) to "saw" the slot to clear Gusset 6F12-2 at approximately 790mm from the aft edge (measured along the sides as per drawing 6-F-14).
L ANGLES: Drill/Cleco the two reinforcement L Angles to the underside of the Baggage Floor at 300mm from 6F13-3, the second angle at 250mm from the first.
NOTE: The ends of the L Angles are approximately 20mm from the edge of the skin to clear the Longerons 6F5-3. Also add the two shorter L Angles in front of 6F13-6 to the edge of the Baggage Floor skin.
DRILL & CLECO: a) Along the sides with #30 (pitch 40 in extrusion), Wait to drill the front end hole, it is best to drill it through the Corner Stiffener 6F13-4
b) Through the Stiffener 6F13-6 with #40 (pitch 40).
c) 9 A5 in the Longeron splice
d) A4 Pitch 40 through the aft flange of the Bulkhead and the end of the Baggage Floor.
CHECK: The width of the Bulkhead is flush with the fuselage sides.

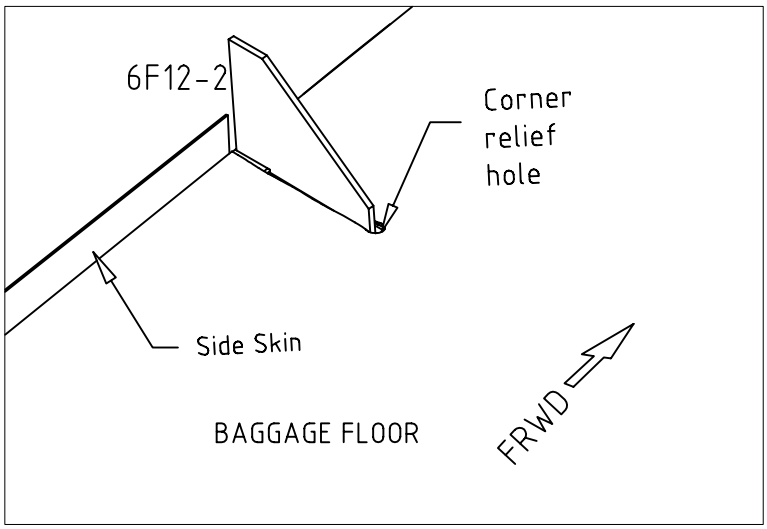
24. Pre-drill the Main Upright 6F6-1with #40 pilot holes.
LAYOUT: Hold the Main Upright against the Wing Pick Up 6V4-3 to mark the position of the two end holes 10mm in from the ends of 6V4-3. Divide the distance between the two end holes for two more holes.
CHECK: Hold the head of an AN3 bolt on the center line of the Upright to check that the bolt will clear the side flange!
DRILL: Pre-drill the 4 holes with #40 pilot holes.





9 #20 holes in the Longeron Splice, the last hole is through the Bulkhead.

Remove the Bulkhead and the two Gussets to clamp the Baggage Floor flush with the end of the Front Longerons. Clamp the straight section of the Front Longerons flush with the side of the Floor Skin (pull the Side Skin aside to insert the clamp over the Longeron). With a marker, trace the overhang of the Baggage Floor around the curved portion of the Longerons.



BAGGAGE FLOOR SKIN 6F13-1

SEQUENCE: FF-23

ZENITH AIRCRAFT COMPANY, NH 10/98

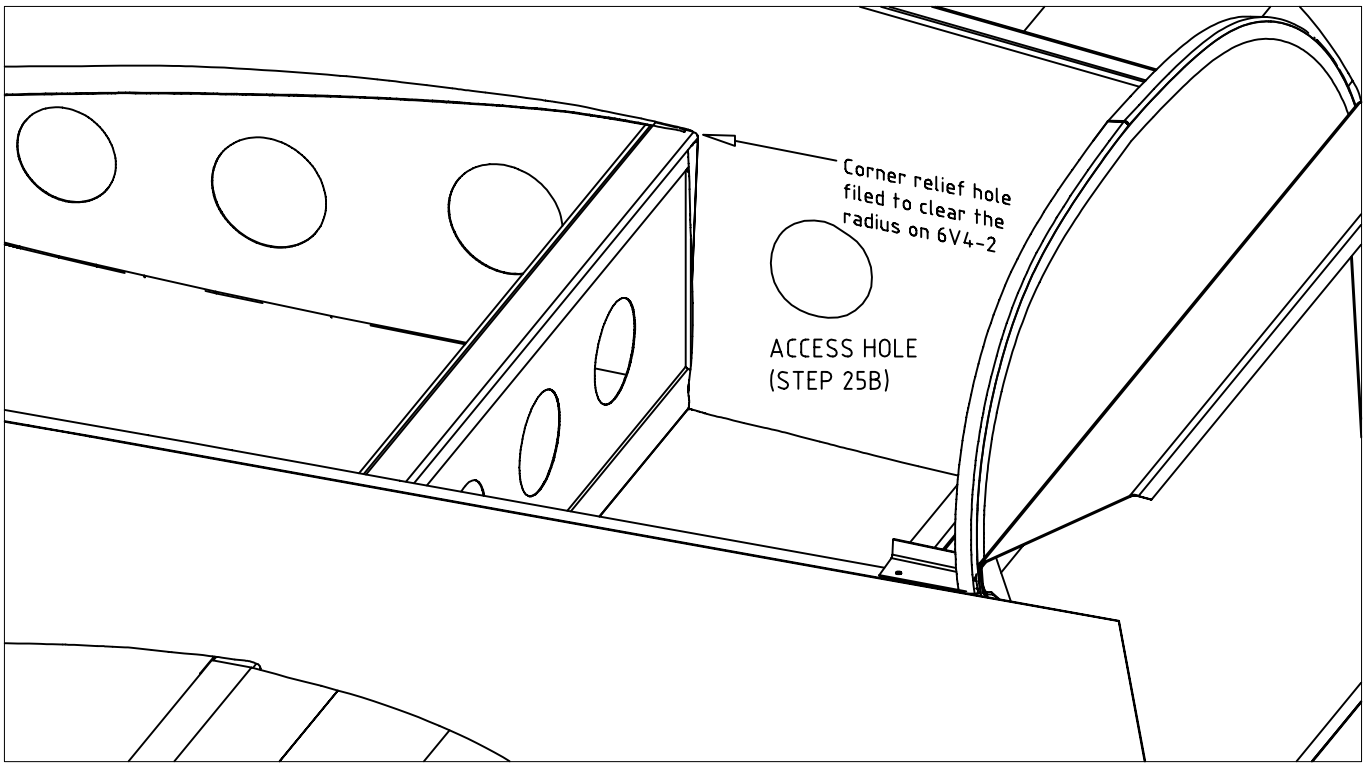
25. Clamp the Fuselage Side Skins 6F5-1 flush to the top of the Upper Front Longerons 6F5-3
REFERENCE: 6-F-5, 6-F-6
CUT: Trim and/or file the Side Skin to fit:
a) Over the Center Wing Top Skin 6V11-1
b) To clear the top and front radius of the Upper (Spar) Cap Doubler 6V4-2
b) To clear the front of the Main Spar (as shown on drawing 6F5-1)
c) At the bottom to clear the Center Wing Nose Skin 6V11-3.
SUGGESTION: Wait to trim the back and the front edges, also wait to trim the front bottom portion that overlaps with the side Floor Skin 6F5-2.
CORNER RELIEF HOLE: Use a round file to radius the corner relief hole at 6V4-2
CLAMP: Position the Side Skin against the Spar, clamp the top edge of the Skin flush with the top of the Longeron.
NOTE: The Side Skins extend past the Firewall to attach the fiberglass Engine Cowling, reference: 6-F-6, 6-F-9, E-2
CHECK: The distance between the top of the Main Spar to the top of the Longeron is approximately of 204mm

25B. FLY-CUT: The access hole (see drawing 6-F-5). Up 125 from the bottom edge, and over 105 from spar to maintain the same alignment as the lightening holes in the Nose Ribs!

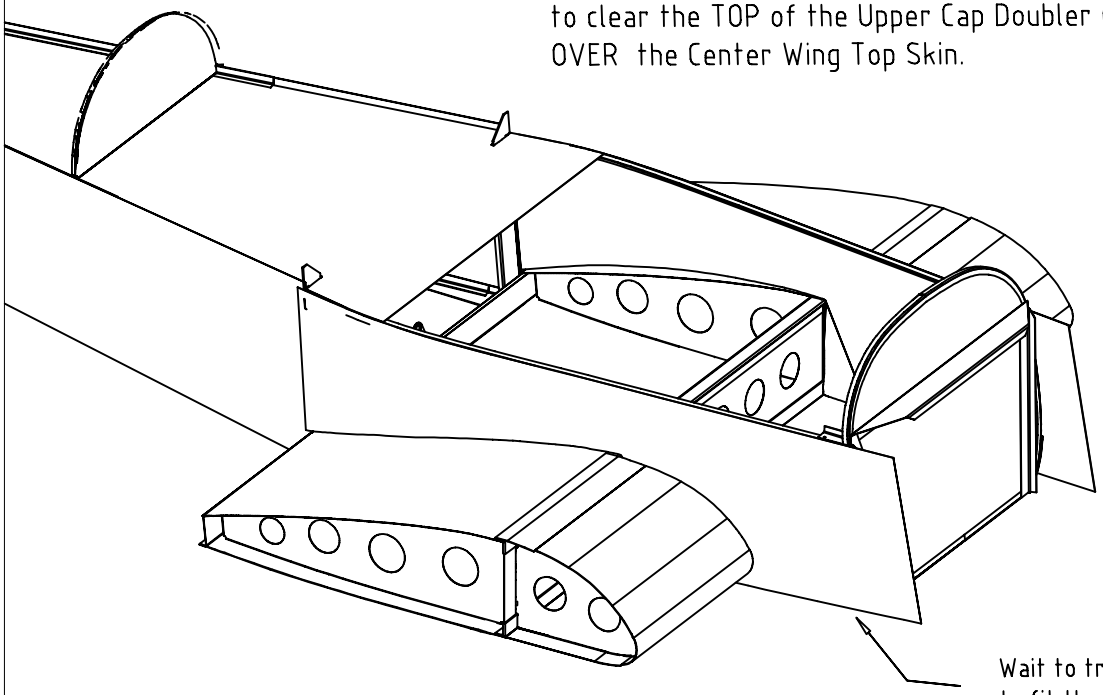
COMMENT: Trim the Nose Skin 6V8-3 to smooth out the transition between the first and second cut: from the point straight up from the bottom cutout make a mark approximately 60mm fore and aft, connect the line and cut: cutting off approximately 4mm in the middle.

26. Position Main Upright 6F6-1 to the Wing Pick Up 6V4-3
REFERENCE: 6-F-6
POSITION: a)The Fuselage Side Skins fit in between the Wing Pick Up and the Main Upright.
b) Hold the Upright against the Side Skin a few millimeters forward of the Upper (Spar) Cap Doubler 6V4-2.
c) Keep a small clearance between the top of the Upright and the bottom of the Longeron.
BACK-DRILL/CLECO: The upper hole.
CHECK: That the Main Upright 6F6-1 is parallel to the Spar or, with a square, hold it at 90 degrees to the Floor Skin. Back-drill and Cleco the bottom hole and the 2 middle holes.

27. Drill the Gusset 6F6-2 to the Main Upright 6F6-1
REFERENCE: 6F6-2
CLAMP: Clamp the Gusset to the Longeron to overlap on top of the Main Upright 6F6-1.
DRILL & CLECO: Drill and Cleco 2 #30 holes in the Gusset and Upright. Wait to drill the holes in the Longeron.



Cut the Side Skin to clear the FRONT of the Main Spar, the BOTTOM of the Nose Skin (up to the leading edge cutout), to clear the TOP of the Upper Cap Doubler 6V4-2 and OVER the Center Wing Top Skin.



28. Cleco the Fuselage Side Skin 6F5-1 to the Firewall side flange and along the side edge of the Floor Skin 6F5-1.
REFERENCE: 6-F-9
LAYOUT: a) Draw the center line of the Firewall flange from the inside of the cabin.
b) Mark the position of the 3 horizontal L Angles at 130, 220 and 300 from the top edge of the Side Skin (if necessary adjust to avoid the crimps).
c) Draw the rivet line along the side edge of the Floor Skin at 10mm from the edge. Layout a rivet pitch of 20
BEND EMPHASIS: Use a wood block (or plastic hammer) to help bend a well defined transition point along the front edge of the Floor Skin 6F5-1 where the firewall starts the side curvature. Check by pushing the Floor Skin firmly to the Firewall.
DRILL/CLECO: a) With a #30 bit, drill the 3 intersection holes with the horizontal L angles (drill from the inside out!).
b) Use a piece of 2x4" board from the leading edge to the firewall to push the Side Skin firmly against the firewall: check that the Floor Skin makes full contact with the Firewall flange. At the Firewall, drill the Side Skin and the Floor Skin through the flange.
c) Drill the side rivet line through the Floor Skin and Side Skin.
ROLL: Remove the Side Skin to roll and form the front bottom edge of the Side Skin: form the Skin over a pipe on the portion that overlaps with the Floor Skin, hammer the aft portion around a ¾" tube for a tighter radius. Add a slight bevel to the edge after the Skin is cut to fit.
DRILL/CLECO the bottom rivet line in the Side Skin to 6F5-2: Locate the front end hole of the rivet line between two crimps on the Firewall, draw a straight line to the bottom of the wing. A4 pitch 20. Drill from the outside in, finish drilling the line from the inside out.
REMEMBER: Plan for a no rivet zone 20mm around the Nose Skin for the Wing Root Fillet.
TRIM: Trim the bottom edge of the Side Skin at 10mm from the bottom rivet line.

29. Cleco the vertical L Angles to the Heel Support 6F5-5
REFERENCE: 6-F-9
CUT: Cut a length of L Angle to fit underneath the Longeron to the Floor Skin: approximately 442mm long.
QUANTITY: 2
POSITION: The L Angle overlaps on top of the vertical flange of the Heel Support, maintain the L Angle towards the Side Skin to keep the end of the Heel support out of the bend radius of the L Angle. If necessary gently close the end of the L Angle.
DRILL/CLECO: Drill and Cleco 1 #30 hole in the bottom of the L Angle into the vertical flange of the Heel Support.
CLAMP: The L angle is at 330mm from the front end of the Longeron 6F5-3.

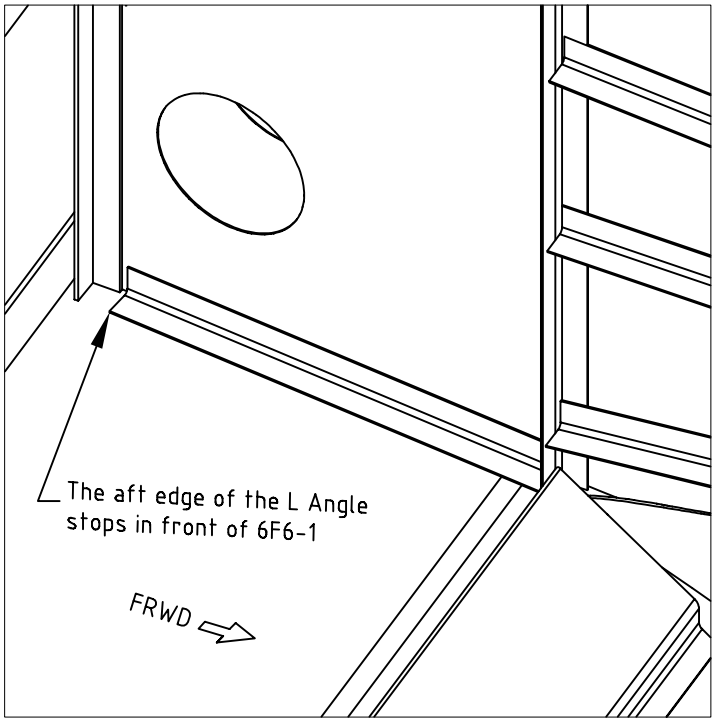
30. Install the 3 “horizontal” L Angles between the Firewall and the Vertical L Angle.
    REFERENCE: 6-F-9
    LAYOUT: Mark off the intersection of the “horizontal” L Angles along the center line of the Vertical L Angle at 140, 260 and 400mm from the top of the Side Skin.
    PRE-DRILL: Pre-drill the intersection holes along the center line of the vertical L Angle with #40 pilot holes.
    SUGGESTION: Mark a line into the radius of the vertical L Angle at the intersection holes, do the same on the Firewall: this will help position the horizontal L Angles.
    CUT: Trim the L Angles to fit
    BACK-DRILL/CLECO: Hold the L Angle and back drill through the intersection hole with a #30 drill bit.
    PITCH: Divide between the end holes for a pitch of 40, drill and Cleco with #30 holes.
    CRIMP: Gently crimp the horizontal flange of the 3 L Angles to help the Angles conform to the curvature of the fuselage
    Repeat for the other side.

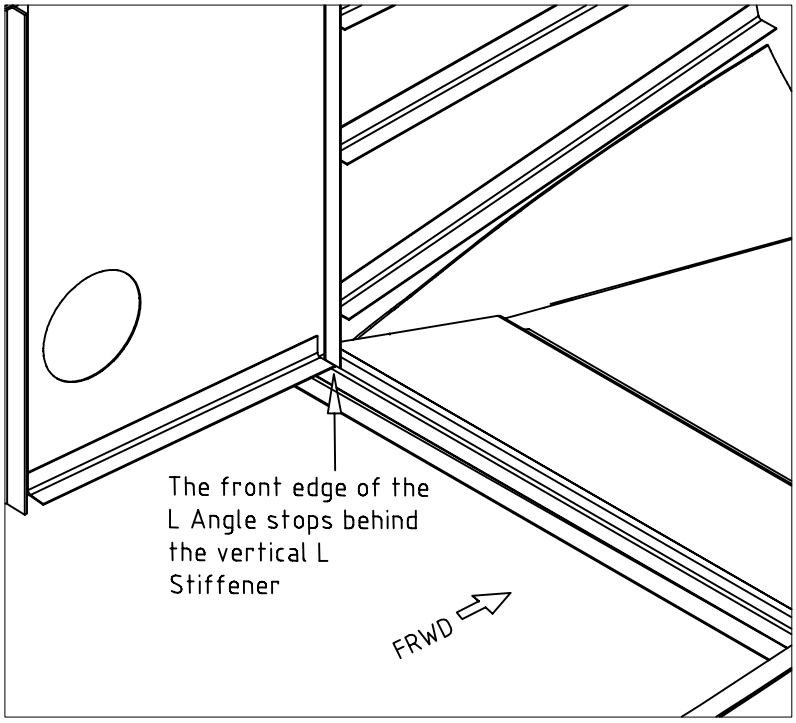
31. Cleco the Gusset 6F9-1 to the Heel Support 6F5-5 and to the vertical L Angle.
    REFERENCE: 6-F-9
32. Cleco the Rolled Gusset 6F9-2 to the Heel Support and to the Side Skin 6F5-1
    REFERENCE: 6-F-9
33. Trace the contour of the Side Skins on the Center Wing Top Skins 6V11-1
    COMMENT: This is an alternative to using Point A and the template shown on drawing 6F5
    LAYOUT: Hold the Side Skin firmly against the Rear Channels 6F6-3 and trace the Side Skin to mark on the Top Skin.
    SUGGESTION: Trace and cut one side to use as a template to mark the other side!

34. Cleco the Corner Stiffener 6F13-4 to the Baggage Floor.
    REFERENCE: 6-F-13 (sequence FF-34)
    TRIM: The corners of the Stiffener to clear the Longerons.
    NOTE: The Stiffener overlaps on top of the Baggage Floor.
    DRILL & CLECO: With #30 (pitch 40).

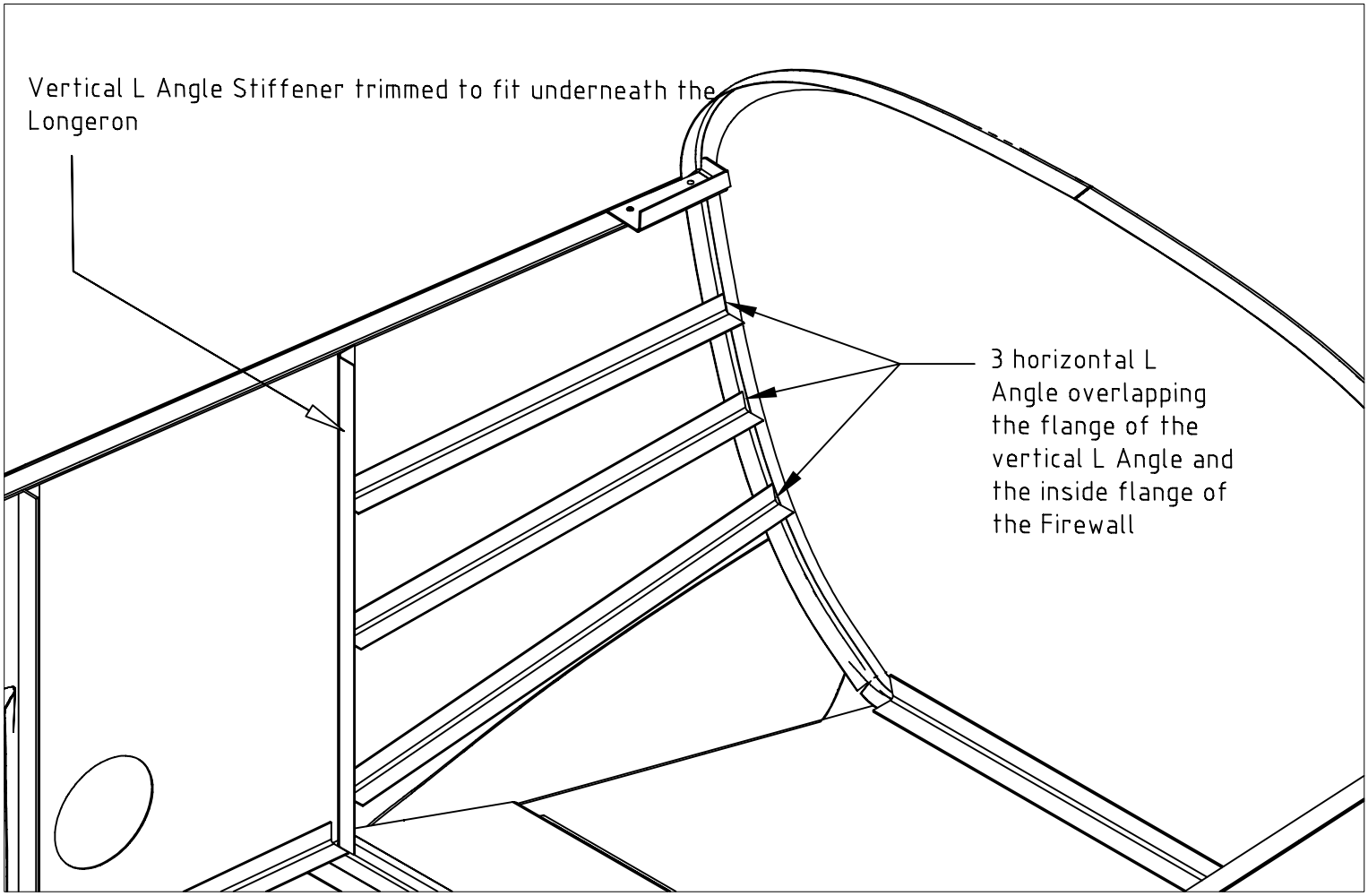
35. Cleco the Seat Back Side Channels 6F13-3
    REFERENCE: 6-F-13, 6-V-12
    CUT: The corner to clear the Longeron at the top and the bottom flanges.
    POSITION: Bottom: In-between the Seat Panel 6F12-1 and the Seat Back Channel 6F12-5
    Top: Behind the Corner Stiffener 6V13-4
    DRILL & CLECO: With #30

36. Install the Center Seat Back Channel 6F13-2
    NOTE: The top of the L Angles extend to the top of the cutout in the Channel 6F13-2
    TRIM: Cut the side flanges to insert the Channel between the Seat Panel 6V12-1 and the Seat Back Channel 6F12-5
    CHECK: When installed the top of the cutout is level with the top o f the Arm Rest Sides 6F16-1





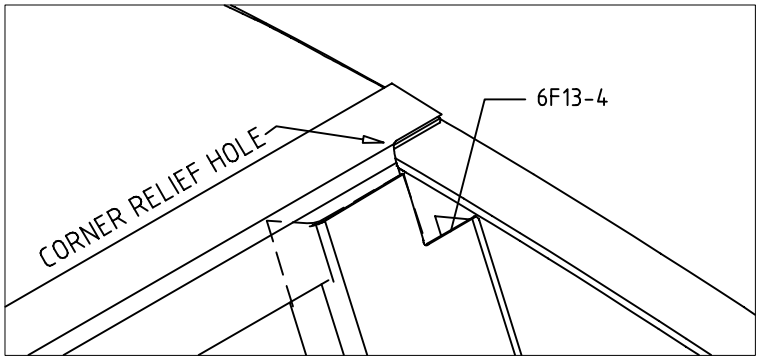
The L Angle Stiffener fits in the corner of the Side Skin with the Center Wing Bottom Skin.



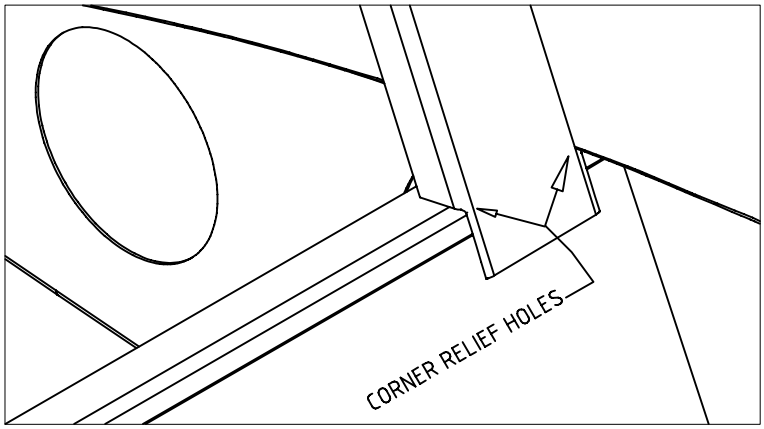
L ANGLE STIFFENERS ON THE FUSELAGE SIDE SKIN

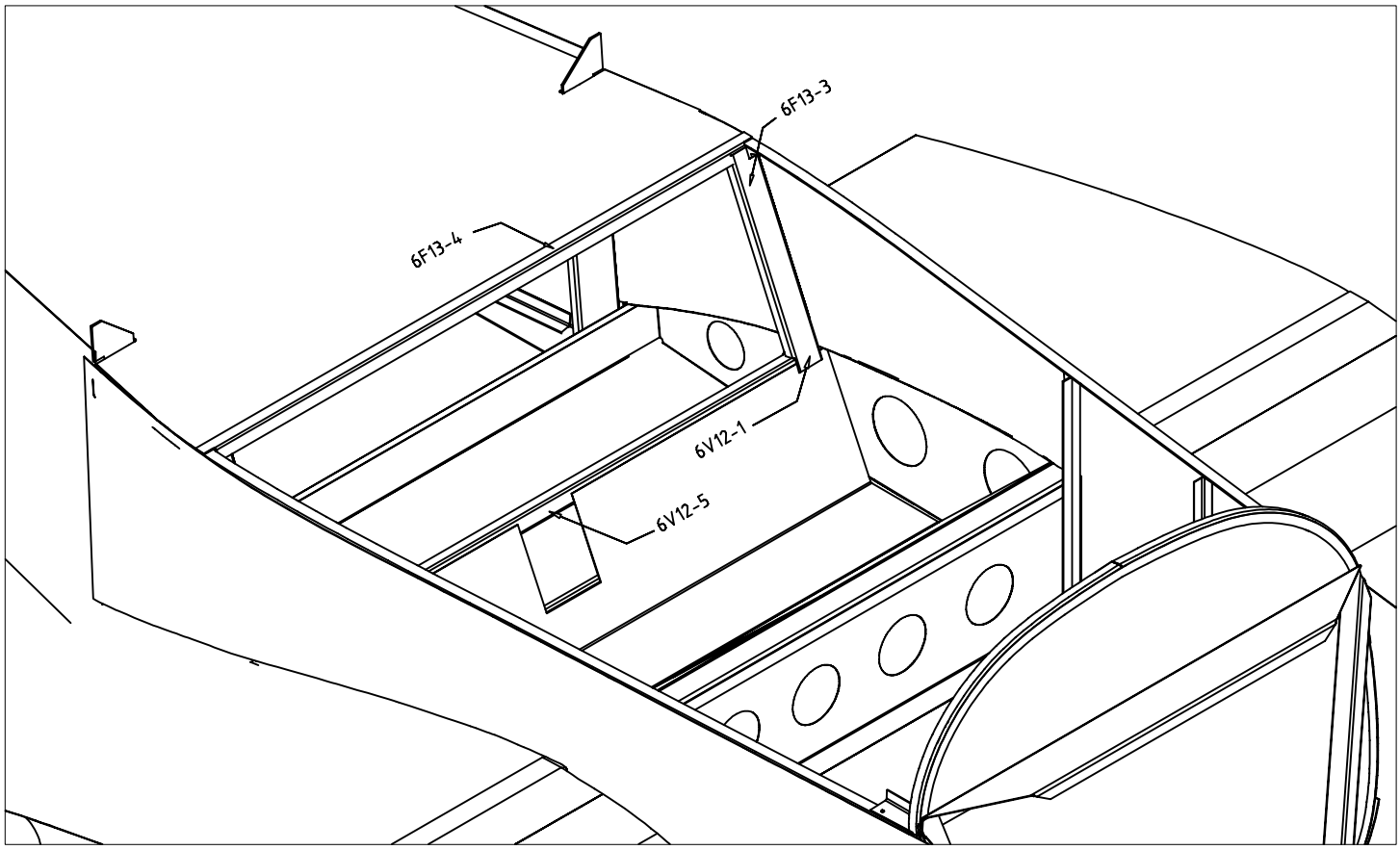
SEQUENCE: FF-30

Trim the Corner Stiffener 6F13-4 to clear the Longerons: snip the bottom flange and file a corner relief hole.



Trim the outside corner of the Seat Back Side Channel to clear the Longerons. Cut the bottom of the side flanges to slide the Seat Back Side 6F13-3 in between the Seat Panel 6V12-1 and Seat Back Channel 6V12-5





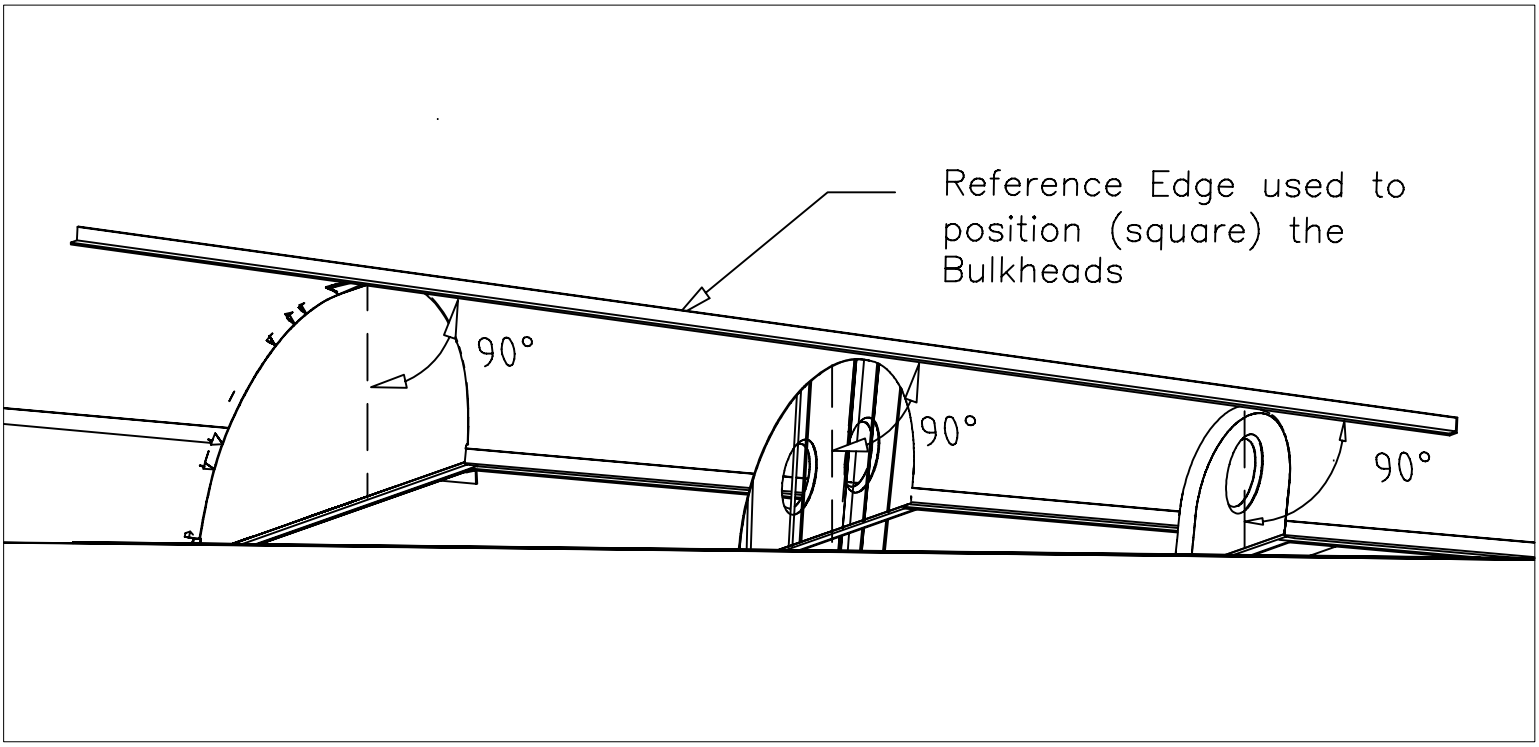
CORNER STIFFENER 6F13-4 SEAT BACK SIDE CHANNEL 6F13-3	SEQUENCE: FF-34 ZENITH AIRCRAFT COMPANY, NH 10/98

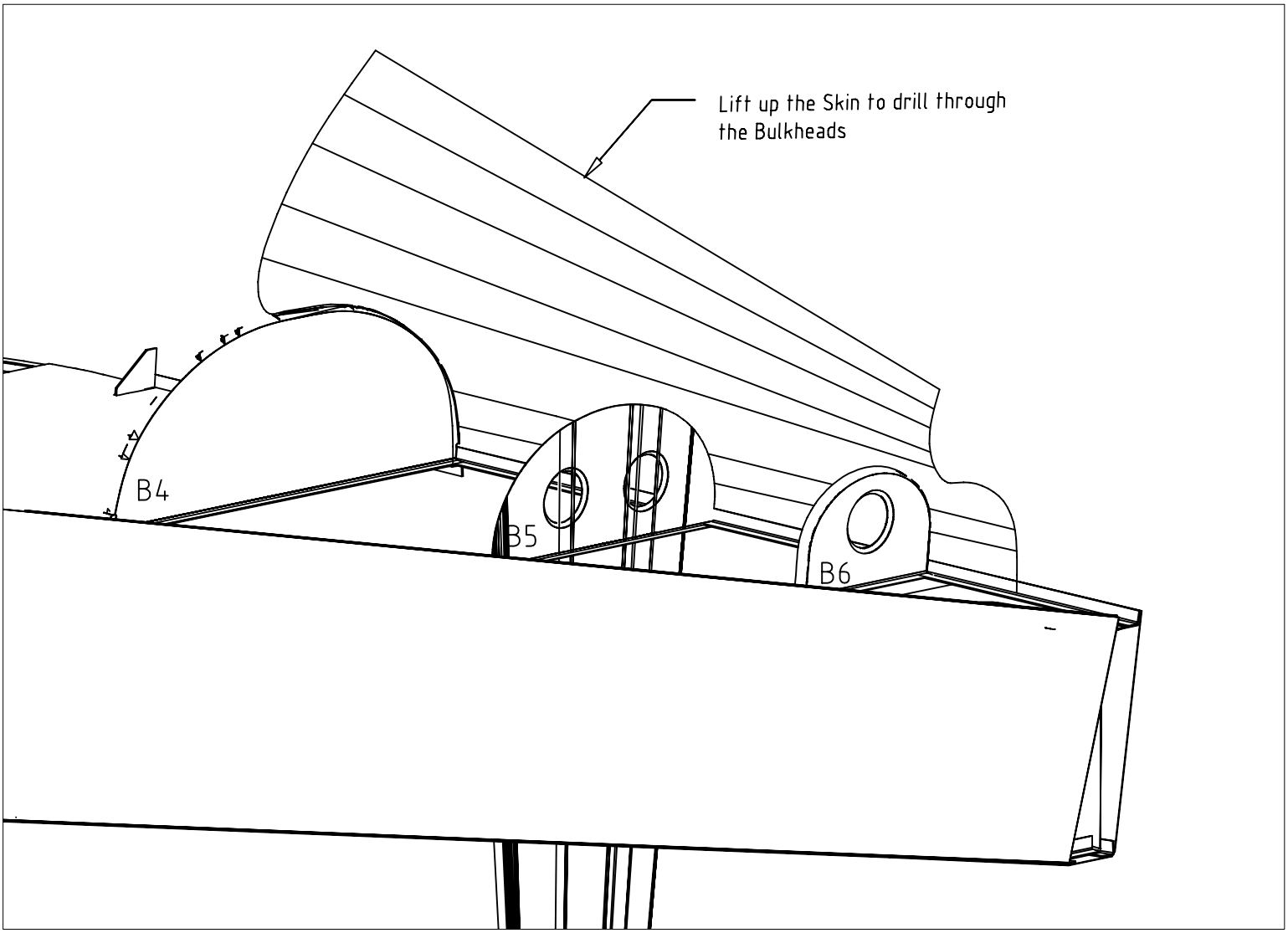
37. Pre-drill the Bulkheads B4, B5 and B6 on the flange center line with #40
    REFERENCE: 6-E-1
    LAYOUT: Accurately locate the hole on the aircraft center line and pre-drill with #30.
    COMMENT: Before drilling Bulkhead B6, check that a suitable angle drill including drill bit or adapter is available to back-drill the Skin from the inside flange. An alternative method is to drill B6 through the Rear Top Skin.

38. Cleco Bulkhead B6 6F11-1 flush with the front edge of Panel 6F2-6
    REFERENCE: 6-F-4, 6-F-14
    CHECK: The width of the Bulkhead is flush with the fuselage sides, the corner relief holes clear the top of the Longerons.
    DRILL & CLECO: With #30 (pitch 40)

39. Cleco the middle Bulkhead B5 6F11-2 to the Longerons 6F1-3
    REFERENCE: 6-F-11, 6-F-14
    PLASTIC BEARING MATERIAL (for the bottom elevator cable see 6-F-15): An alternative to the two slotted pieces, is to drill a single hole in the 70x35 plastic for the control cable.
    CLAMP: Position B5 at approximately 620mm from the front Bulkhead 6F11-3 measured along the fuselage sides from web to web.
    CHECK: Clamp a straight reference edge (extrusion 6F5-4) on the aircraft center line from B4 to B6, square the Bulkhead with the reference extrusion, check B5. Use a piece of tape from the extrusion to the fuselage to hold the Bulkhead square. Mark the aircraft center line on the reference edge (extrusion), this will be used to locate the aircraft center line on the Rear Top Skin.
    DRILL & CLECO: With one #30 in each Longeron.

40. Skinning the rear fuselage top is done in three stages; the Rear Top Skin 6F14-1 is installed first, the bent tube 6F12-1 is positioned next followed by the Middle Top Skin 6F14-2
    REFERENCE: 6-F-14, 6-E-1
    SUGGESTION: When back drilling the Bulkheads, work with an assistant to support the Skin.
    LAYOUT: Pre-drill three holes in the Rear Top Skin on the aircraft center line for Bulkheads B4, B5 and B6, use the reference extrusion used to square the Bulkheads.
    TOP CENTER HOLES. Cleco the Top Skin to the Bulkheads through the corresponding center holes.
    SET THE TOP SKIN AT 90 DEGREES TO THE BULKHEADS: To gain assess inside the rear fuselage, lift one side of the Rear Top Skin tape it open with a long piece of “Duct tape” taped to the other side. From the inside, use a square to set Bulkhead B5 at 90 degrees to the Top Skin. In this position, have an assistant tape the Skin to the fuselage Side Skin on its entire length .
    BACK DRILL THE SKIN FROM THE BULKHEADS: Back drill the Top Skin through the pre-drilled flanges.
    BOTTOM RIVET LINE THROUGH THE LONGERON 6F1-3. First mark the center line of the Longeron flange on the Fuselage Skin, tape the Rear Top Skin to overlap the Fuselage Side Skin to connect the two ends of the Longeron center line.





REAR TOP SKIN 6F14-1

SEQUENCE: FF-40

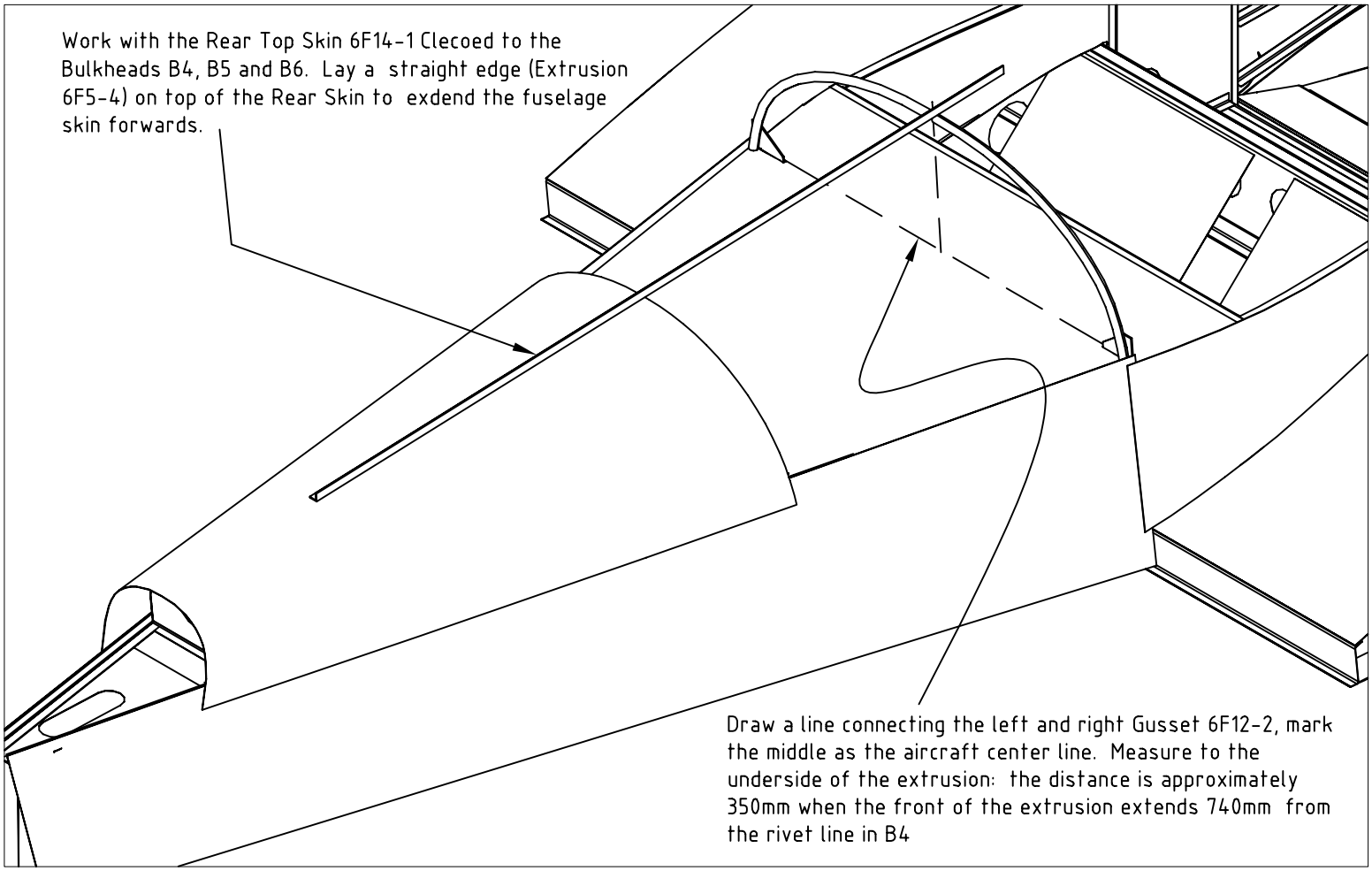
41. Cleco the Tube Frame 6F12-1 (B3) to the Gusset 6F12-2
REFERENCE: 6-F-12, 6-F-14
CUT: Hold a long straight bar on the aircraft center line and let it extend forward.
Cut the ends of the Tube Frame to fit between the Baggage Floor and the projection of the Rear Top Skin.
CLAMP: The Tube Frame on the back side of the Gusset 6F12-2
TRIM: Contour the Gusset 6F12-2 to the outside diameter of the Tube Frame.
CHECK: a) The width of the Tube Frame is flush with the fuselage Side Skin.
b) Also use the straight bar to check the projection of the Rear Top Skin along the sides of the Tube Frame.
c) Approximate distance from the Baggage Floor to the top (outside) is 350mm
DRILL & CLECO: 4 #20 holes.

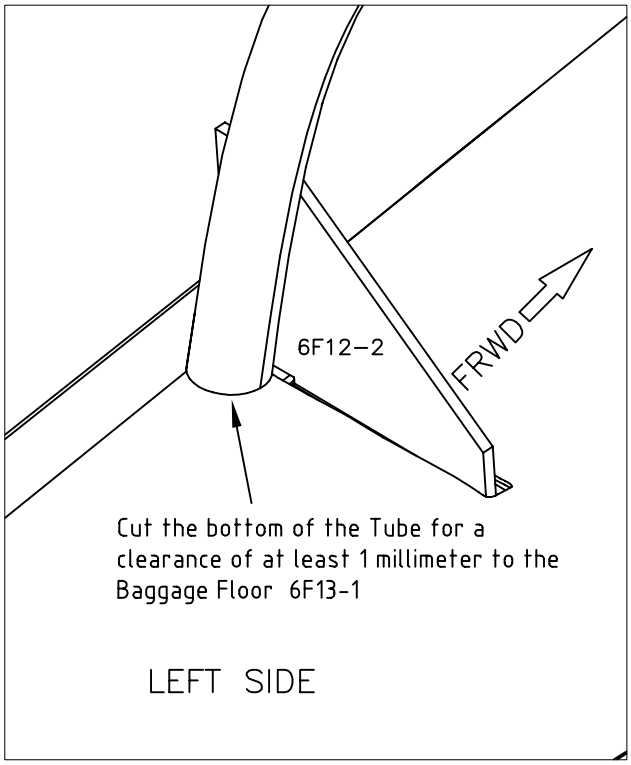
42. Cleco the Middle Top Skin 6F14-2 to B2 and B3
REFERENCE: 6-F-14, 6-E-1
LAYOUT: Allow sufficient overlap of the Middle Top Skin over the Rear Top Skin: at least 30mm on the aircraft center line.
a) Measure the distance between B3 and B4 as installed on the fuselage.
b) Pre-drill the holes on the aircraft centerline as measured above in the Skin and in B2
c) Remove the Clecos on B4 to Cleco the Middle Top Skin through the respective center holes. Tape both side of the Skin to the Fuselage Side Skin.
d) From the inside, trace both sides of the Tube Frame on the Skin 6F14-2
e) Remove the Skin and draw the rivet line midway between the two lines.
f) Pre-drill the Skin for the Tube Frame with #40 holes.
DRILL & CLECO: Cleco the Rear Top Skin on half the Bulkhead B4, Cleco the Middle Top Skin on the aircraft center line. Tape one side to the fuselage Side Skin and raise the opposite side to back drill through the Bulkhead B4 (reaching in over the side!). Repeat for the other side.

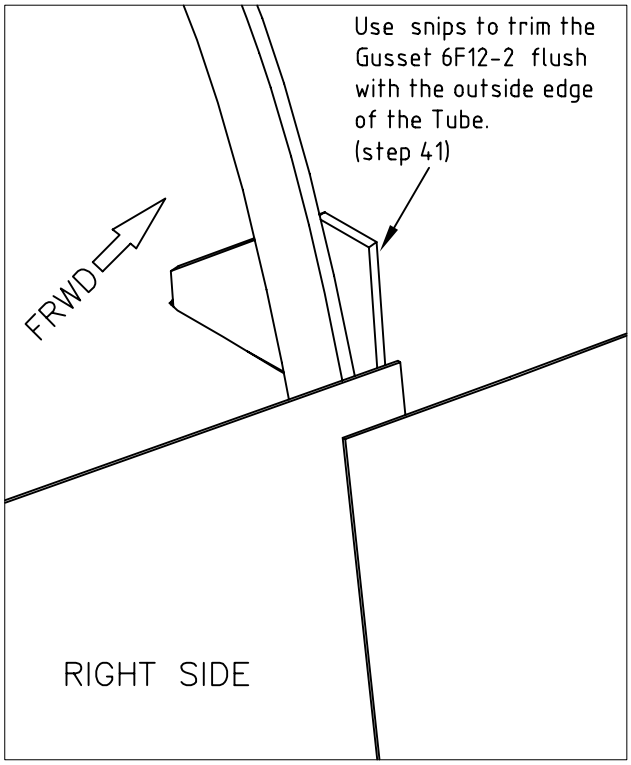
43. Position the Tube Frame 6E1-2 (B2) against B3 at the top and the Corner Stiffener 6F13-4 at the bottom.
REFERENCE: 6-F-14, 6-E-1
CUT: Cut and bend for an exact fit.
LAYOUT: Trace both sides of the Tube Frame on 6F14-2. Remove the Skin to center the rivet line and pre-drill pilot holes. Rough cut the skin 1/4" from the first line.
DRILL & CLECO: With #30

44. Install Gusset 6E1-3

45. Mark the position of the Instrument Bulkhead 6F12-4 at 483mm from the Firewall.
REFERENCE: 6-F-12
NOTE: Measured along the Extrusion.







TUBE FRAME 6F12-1

SEQUENCE: FF-41

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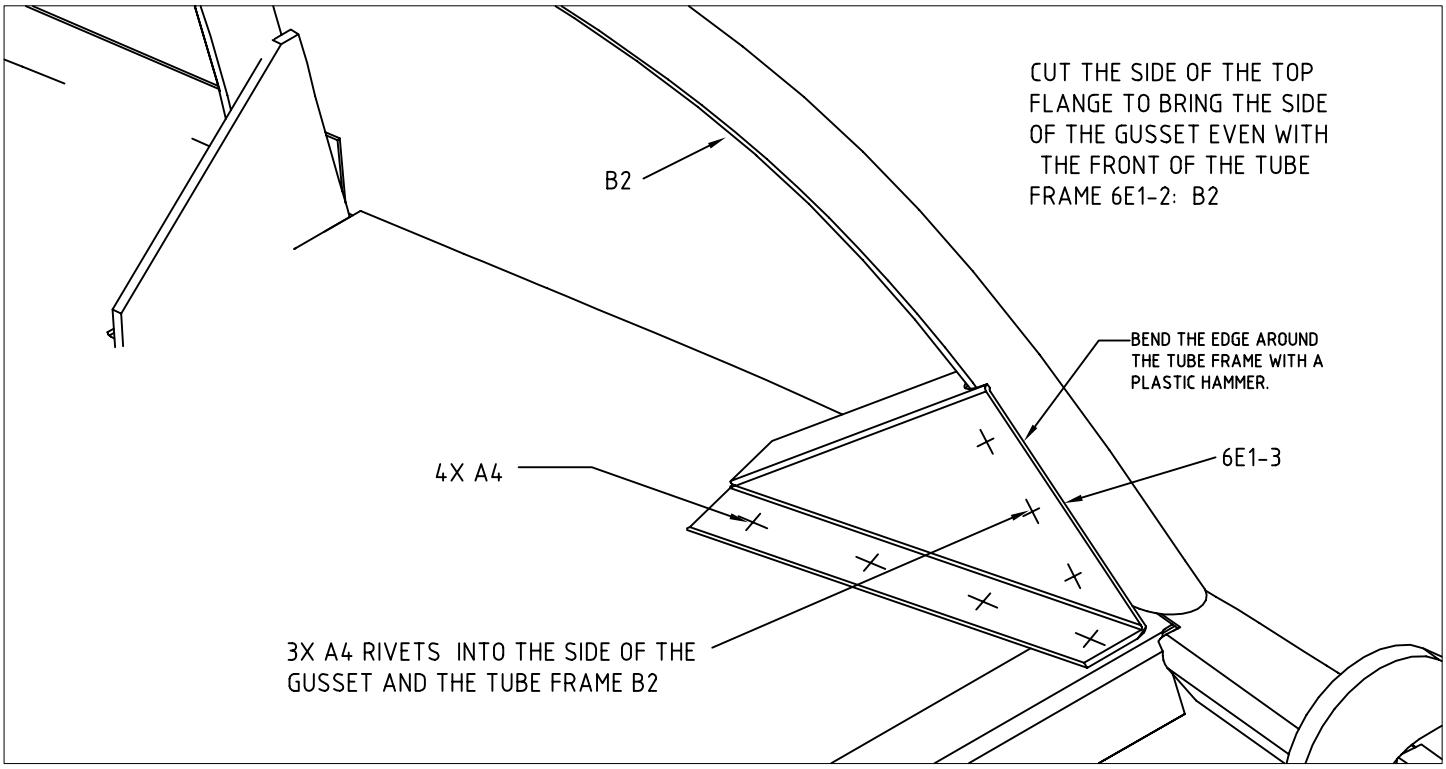
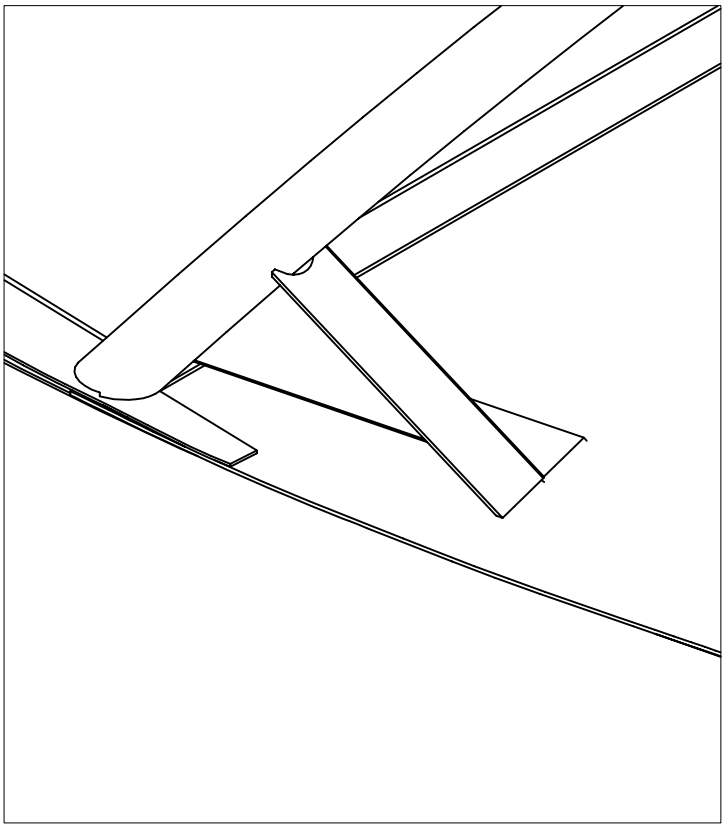
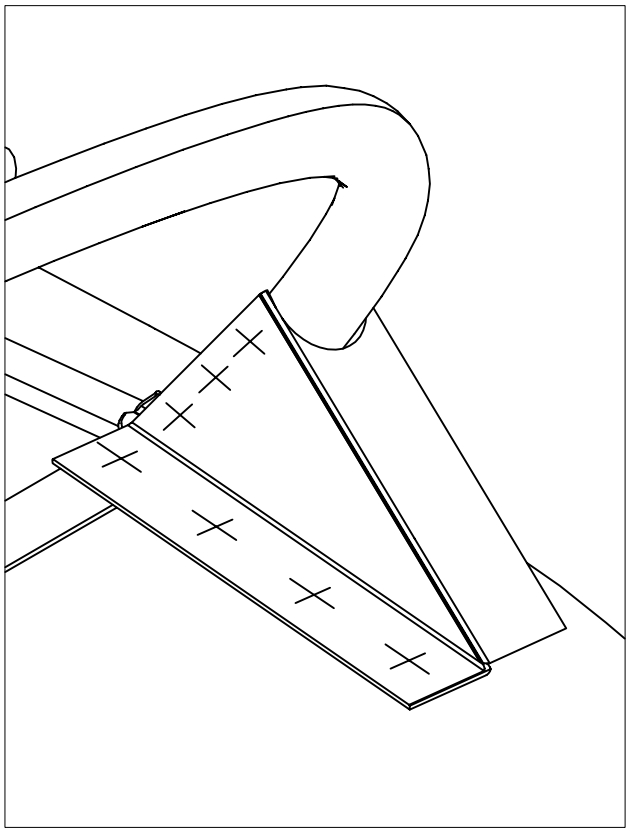


LEFT SIDE AS SEEN FROM THE FRONT.

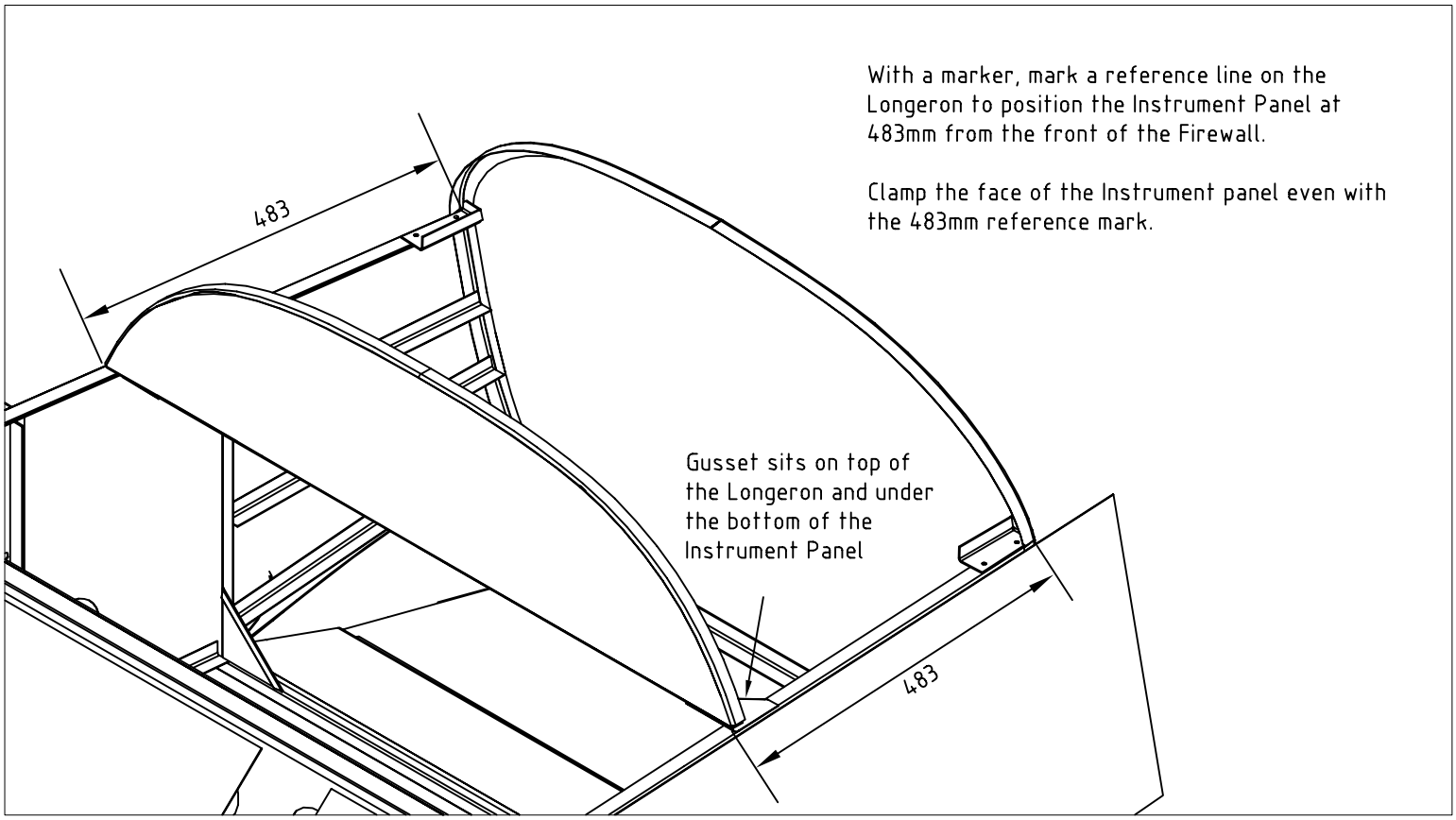


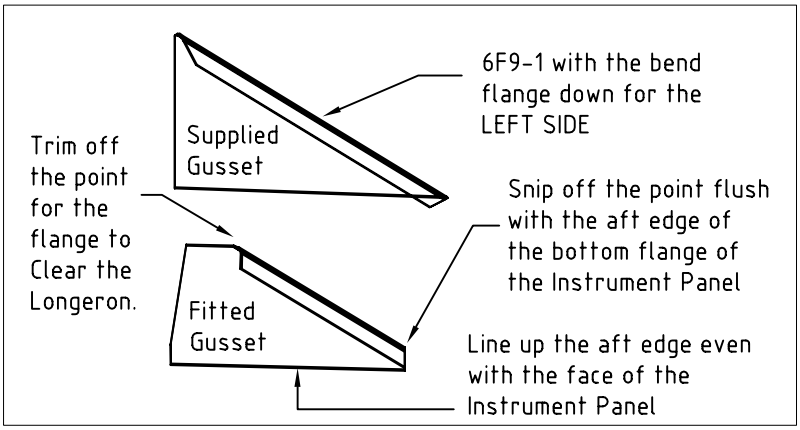
REAR VIEW, LOOKING ON THE LEFT SIDE WITH THE TOP SKIN REMOVED

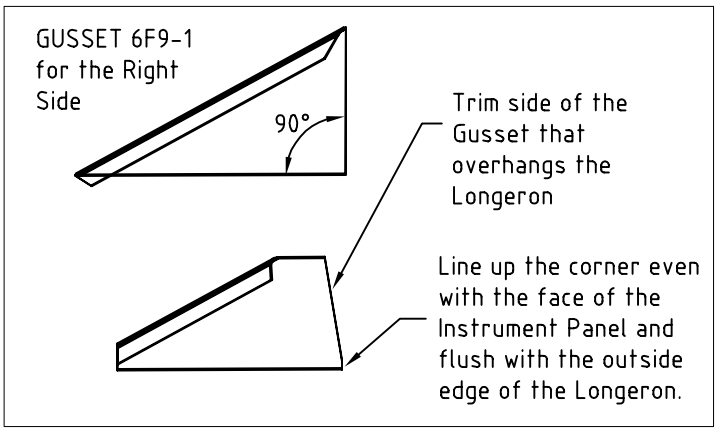


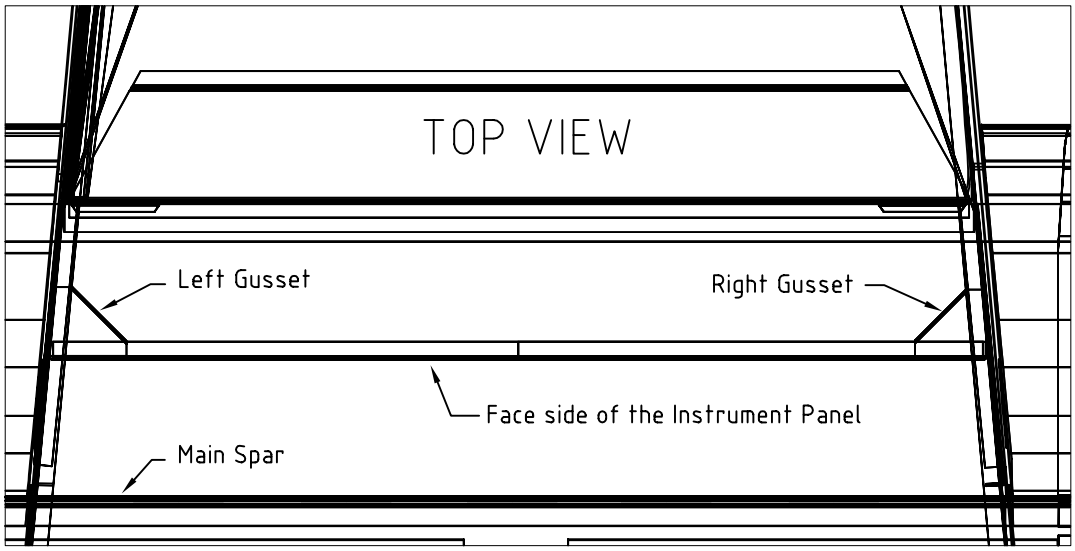
REAR VIEW, LOOKING FORWARD ON RIGHT SIDE OVER THE BAGGAGE FLOOR WITH THE TOP SKIN REMOVED.

GUSSET 6E1-3









Wait to drill the Gusset to the Longeron until after the Upper Fuselage Longeron Doubler 6F13-5 is positioned

INSTRUMENT BULKHEAD B1, 6F12-4
GUSSET 6F9-1

SEQUENCE: FF-45

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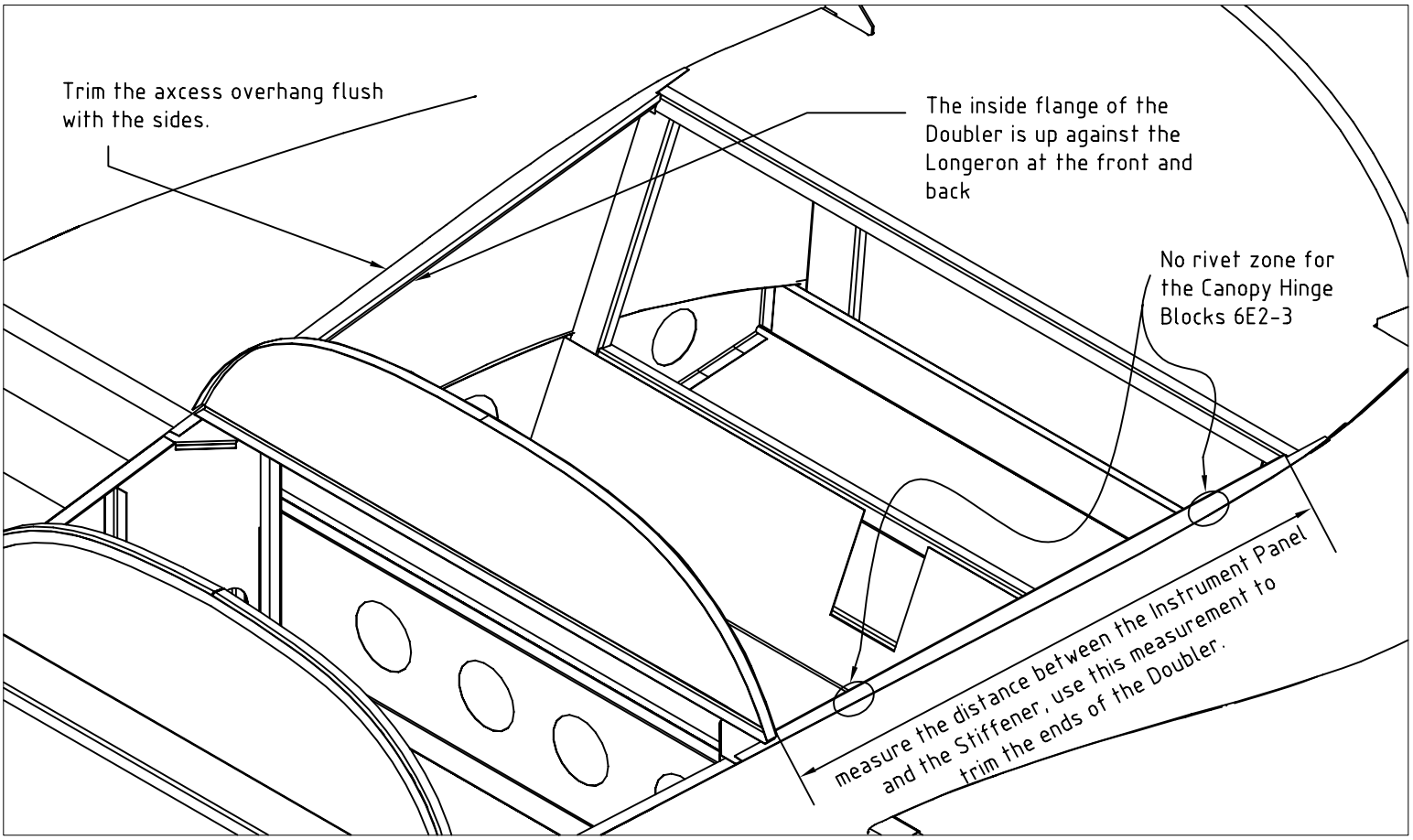
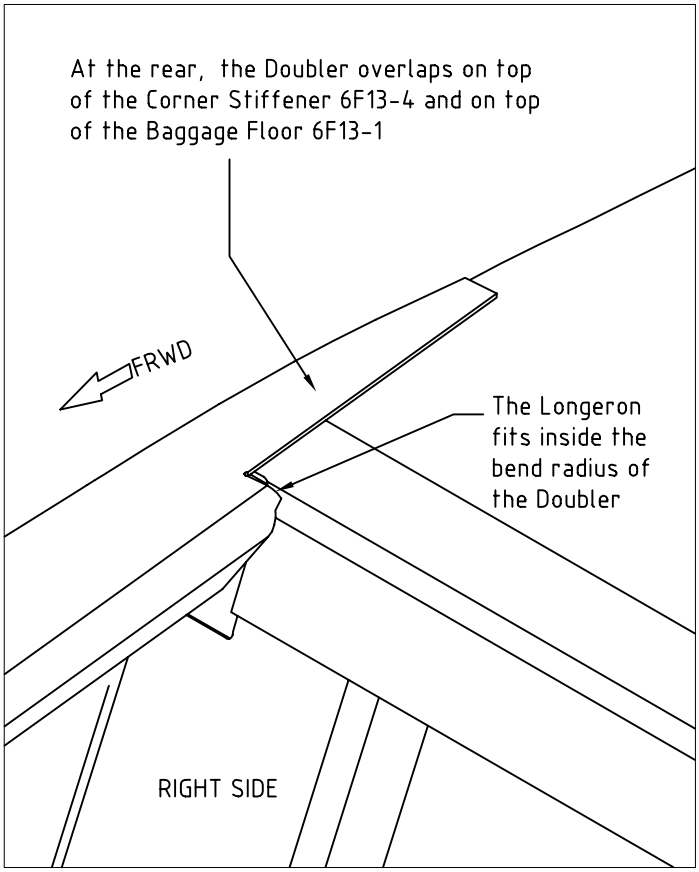
46. Cleco the Gusset 6F9-1 to the Longerons and to the Instrument Panel.
    REFERENCE: 6-F-13
    CUT: Trim the Gusset to fit the Longeron.
    PRE-DRILL: The Gusset with #40
    CLAMP: The Gusset and instrument Panel to the Longeron.
    IMPORTANT,: CHECK That the Rivet line is in middle of the extrusion flange!
    BACK-DRILL: With #30

47. Cleco the Forward Top Skin 6F16-4
    REFERENCE: 6-F-16
    LAYOUT: Distance between the Firewall and the Instrument Panel (measured on the aircraft center line) is 425mm.
    PRE-DRILL: a) With a marker, extend the position of the crimps on the face of the Firewall and Instrument Panel to their position onto the Top Skin.
    b) Drill and Cleco the Skin to the fuselage on the aircraft center line.
    c) Use a strap and a board to hold the skin against the fuselage sides.
    d) Trace the contour of the Firewall and Instrument Panel on the Skin.
    e) Remove the Skin and mark an off-set line to the contour line. This is the rivet line in the middle of the flange!
    f) Set the rivet pitch between the crimps.
    DRILL & CLECO: With #30

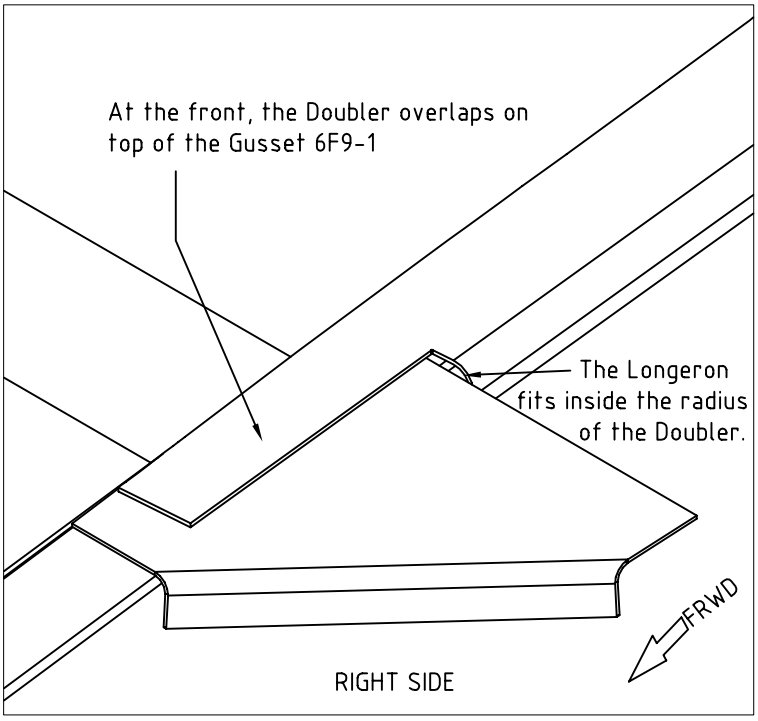
48. Cleco the Upper Fuselage Longeron Doubler 6F13-5 to overlap on top of the Corner Stiffener and the Baggage Floor.
    REFERENCE: 6-F-13
    TRIM: To fit the fuselage
    DRILL & CLECO: With #30

49. Cut the flange of the Upper Fuselage Longeron Doubler 6F13-5
    SUGGESTION: Trim to fit the Fuselage Side after the Baggage Floor is positioned.





SUGGESTION: Use the Gusset as a guide to drill the corner hole in the Instrument Panel. First Drill the Doubler to the Gusset, then clamp the Instrument Panel to the Gusset to drill the 3 holes in the bottom flange. Remove the Insturment Panel and Gusset to drill the Corner hole.



UPPER FUSELAGE LONGERON DOUBLER 6F13-5

SEQUENCE: FF-46

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50. Add the formed L angle between the Center Wing Top Skin and the Side Skin
51. REFERENCE: Bottom middle diagram on 6-F-6.

    NOTE: The L Angle overlaps on top of the Rear Zee and stops short for the Main Spar.

    SUGGESTION: When forming, alternate between hammering on the upper flange and side flange i.e. work to form both curvatures simultaneously!

    LAYOUT: Plan for a rivet through the Seat Back Channel 6V12-5. For a rivet pitch, extend the Rib rivet lines horizontally to the I/B edge of the Top Skin. Transfer the rivet pitch to the Side Skin (In the Side Skin, plan for a "no rivet zone" for the Rear Pick Up Channel 6F6-3

    DRILL & CLECO: With #30

    SUGGESTION: Since the rivet lines are in a tight corner, use a scrap piece of material to shield and protect the Skins from the drill chuck.
52. Add the Wing Root Fillet between the Nose Skin and the Fuselage Side Skins.
    MATERIAL: Alloy, 1100 soft aluminum

- end -

Zenith Aircraft Company:
ZAC Engineering/601 Manual/fuselage/fwd-fuse sides and rear top skins.doc