



ENGINEERING ORDER

DRAWING NO: 135-8051

SHEET 1 OF 17

1. DRAWING TITLE Repair of damaged skin & stringers		2. PROGRAM	3. JOB NO.
4. TYPE OF DRAWING RELEASE DER Review	5. CONTRACT NO.	6. CURRENT REV NC	7. UNINCORP'D ECO

8A. REASON FOR CHANGE - CATEGORY		9. CHANGE AFFECTS		10. CHANGE EFFECTIVITY	
<input type="checkbox"/> CLARIFY DRAWING	<input type="checkbox"/> PRODUCT IMPROVEMENT	<input type="checkbox"/> PERFORMANCE	<input type="checkbox"/> COST	N/A	<input type="checkbox"/>
<input type="checkbox"/> FINALIZE DRAWING	<input type="checkbox"/> COST REDUCTION	<input type="checkbox"/> RELIABILITY	<input type="checkbox"/> SCHEDULE	ALL	<input type="checkbox"/>
<input type="checkbox"/> ADD. TO PART TAB.	<input type="checkbox"/> PRODUCIBILITY IMPMT.	<input type="checkbox"/> WEIGHT/BALANCE	<input type="checkbox"/> CAD MODEL	SERIAL NO.	23803
<input type="checkbox"/> ADD. OF ALT. PART(S)	<input type="checkbox"/> DESIGN CHANGE	<input type="checkbox"/> INTERFACE	<input type="checkbox"/> N/A	A/C TYPE	B767-241
<input type="checkbox"/> CORR. DWG ERROR	<input type="checkbox"/> SPECIFICATION CHANGE	<input type="checkbox"/> MANUFACTURABILITY	<input type="checkbox"/> OTHER:	MFG.	Boeing
<input type="checkbox"/> CORR. DESIGN ERROR	<input checked="" type="checkbox"/> OTHER: REPAIR	<input type="checkbox"/> SAFETY		DATE:	01/27/14
<input type="checkbox"/> CUSTOMER REQUEST		<input type="checkbox"/> INTERCHANGEABILITY		REG. NO.	N768QT

8B. REASON FOR CHANGE - DESCRIPTION:

During maintenance operations, a work platform pierced a section of skin in the unpressurised tail section aft of the aft pressure bulkhead (Figures 1,2). The impact occurred on the left side of the aircraft between frames 1629 and 1654.5. The frames were not damaged. The aircraft's skin and several stringers were broken or otherwise damaged and portions of those components must be replaced.

11. DESCRIPTION OF CHANGE(S):

Remove damaged skin and stringers of LH fuselage skin and stringers S-20 through S-25 between FS 1654.5 and FS 1678 (Figure 3). Repair damaged stringers using aftermarket repair components and replacement parts. Repair skin by fabricating filler shims and adding an exterior doubler.

REFERENCES:

Boeing 767-200 Structural Repair Manual 51-, 53-

12. DISPOSITION OF PARTS AND MATERIALS				13. CHANGE CLASSIFICATION	
<input type="checkbox"/> N/A					
<input type="checkbox"/> PO CHANGE REQD:		USE AS IS	REWORK	SCRAP	
<input type="checkbox"/> NO PARTS BUILT TO DATE		IN PROCESS	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> ALL PARTS CONFORM		COMPLETED	<input type="checkbox"/>	<input type="checkbox"/>	
<input checked="" type="checkbox"/> OTHER JMT fabricated + purchased repair parts		IN STOCK	<input type="checkbox"/>	<input type="checkbox"/>	
		ASSY INTO NHA	<input type="checkbox"/>	<input type="checkbox"/>	

14. APPROVALS							
RESPONSIBILITY	INIT	NAME (PRINT)	DATE	RESPONSIBILITY	INIT	NAME (PRINT)	DATE
ORIGINATOR							
Draftsman	JAG	Jon Genova	01/27/14				
Check	SLM	Stan Mounce	01/31/14				
DER	VR	Venkat Ramachandran	02/03/14				

15. DISTRIBUTION								
NAME (PRINT)	LOCATION	QTY	NAME (PRINT)	LOCATION	QTY	NAME (PRINT)	LOCATION	QTY



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General Procedure

1. Cut and remove the damaged portion of the skin.
2. Cut and remove the damaged stringers.
3. Fabricate fillers from 7075-T6 sheet to match depth of chem milled sections.
4. Fabricate exterior doubler from 0.063 inch thick 7075-T6 sheet.
5. Assemble and pre-drill all repair components. Disassemble and deburr.
6. Chemical conversion coat and prime.
7. Paint replacement stringers and stringer repair splices.
8. Install repair components using solid fasteners.
9. Fay edge seal around exterior doubler using BMS 5-95 sealant.
10. Apply exterior finish to repair area.

* Detailed step-by-step procedure and checklist begins on sheet 16 of 17

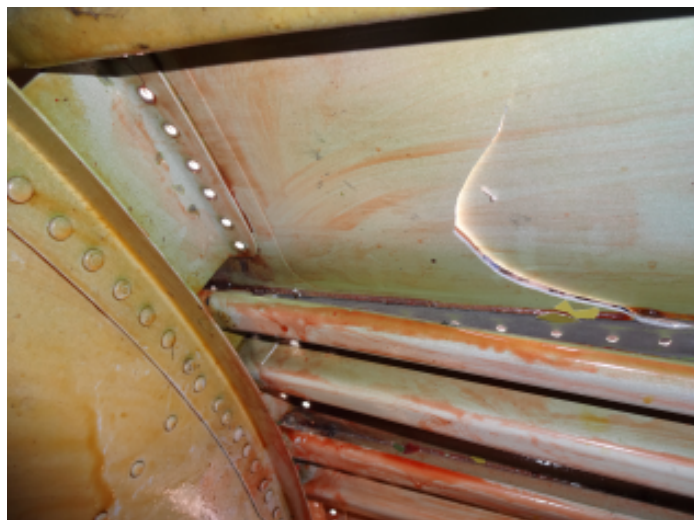
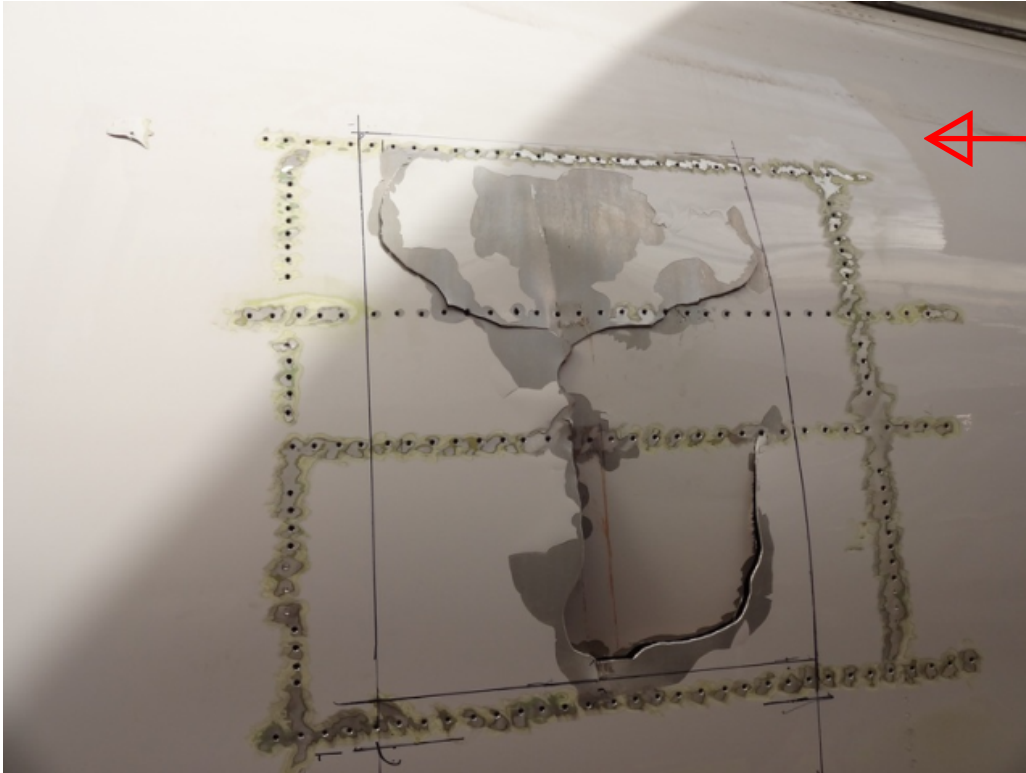


Figure 1. Photos of damage



FWD



FWD

Figure 2. Photos of damage

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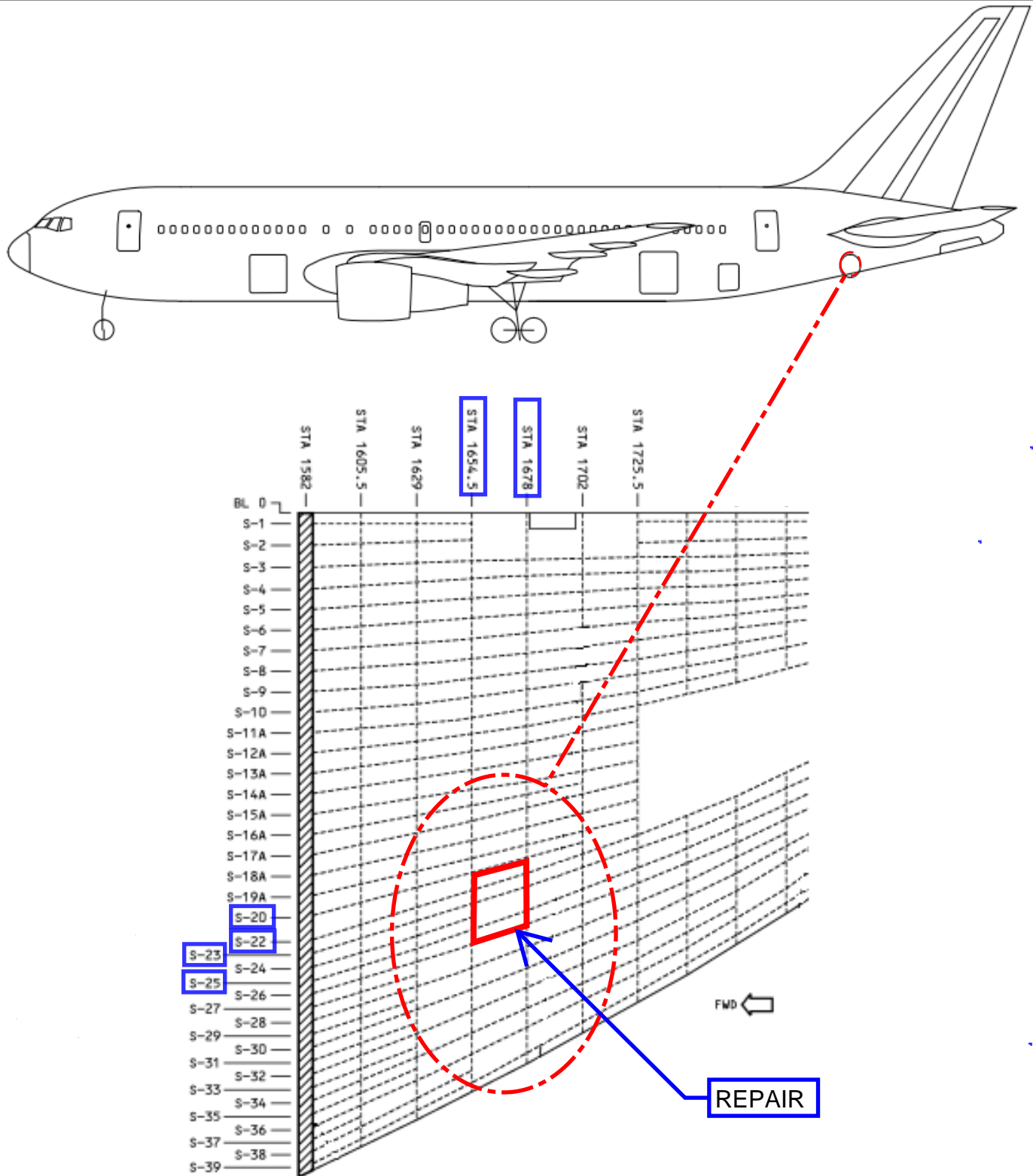


Figure 3. Repair location

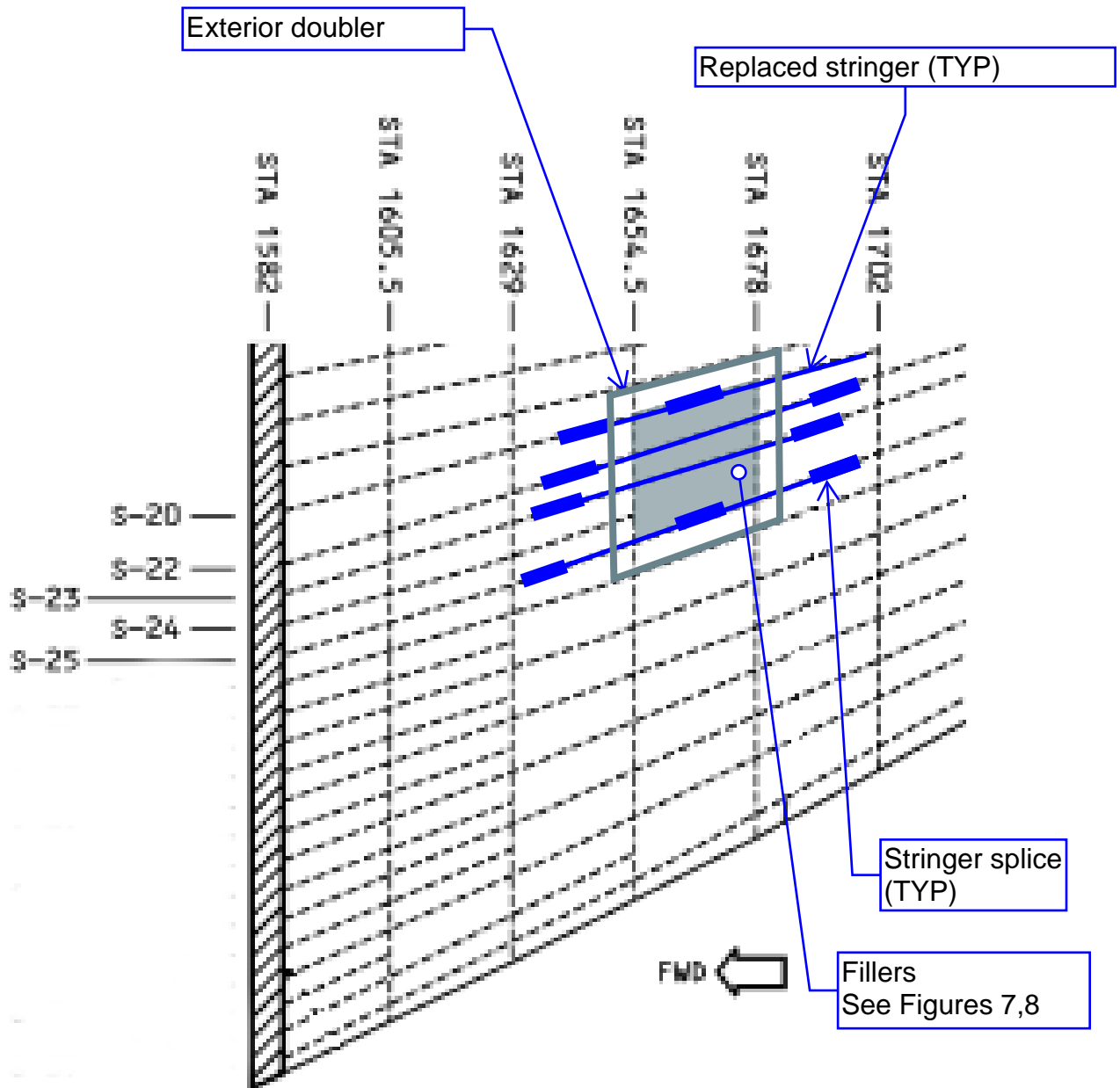
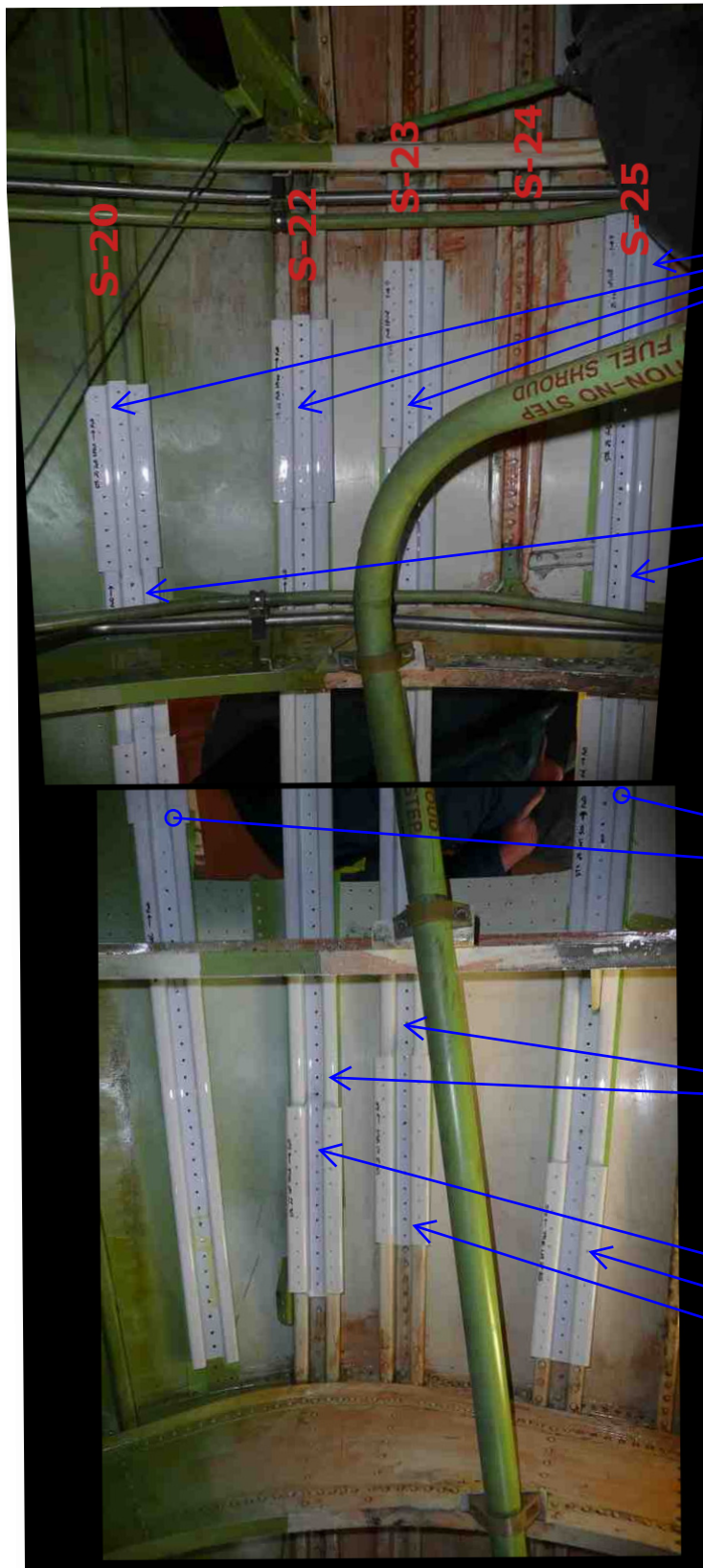


Figure 4. Repair area detail showing overall repair scheme



SPLICE
PREMIER P/N
BAC1498-132

HAT CHANNEL
PREMIER P/N
BAC1498-142
(S-25, S-20)

SPLICE
PREMIER P/N
BAC1498-132

HAT CHANNEL
PREMIER P/N
BAC1498-143
(S-22, S-23)

SPLICE
PREMIER P/N
BAC1498-132

Figure 5. Repair area detail showing stringer repairs.

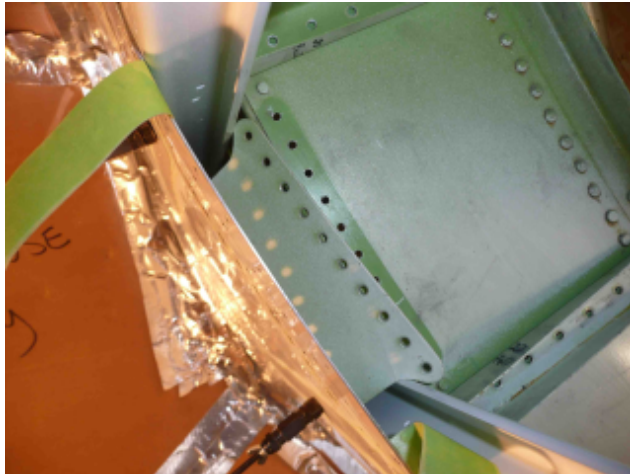


Figure 6. Shear tie removal (left) and re-installation (right)

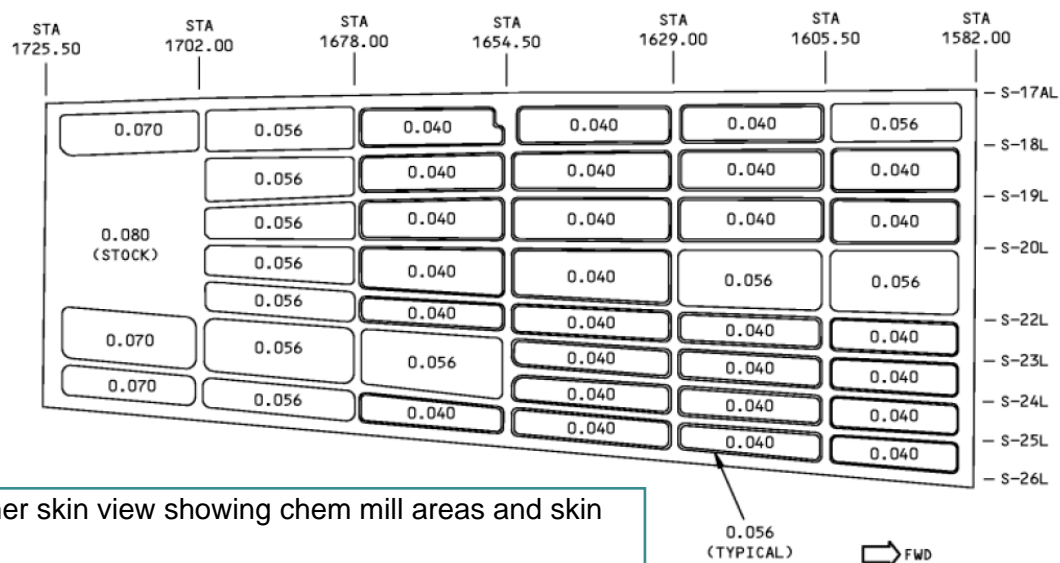


Figure 7. Inner skin view showing chem mill areas and skin thickness.



Figure 8. Showing filler panels fabricated to match skin thickness.

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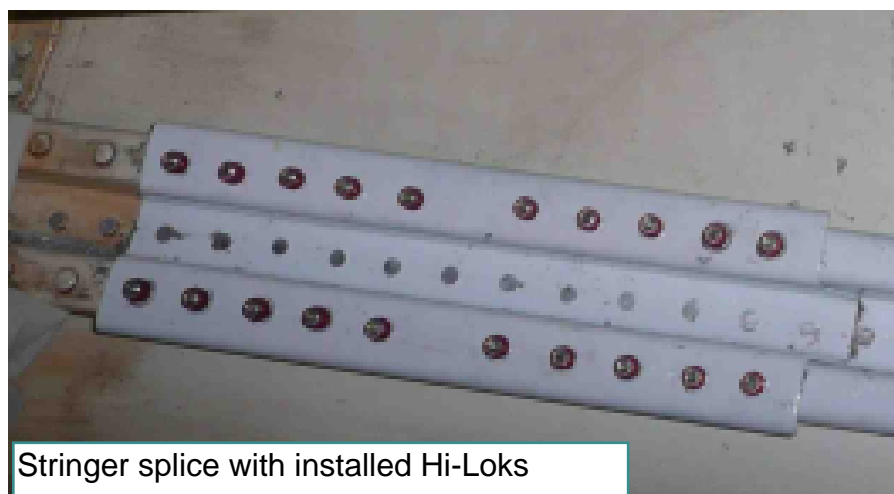
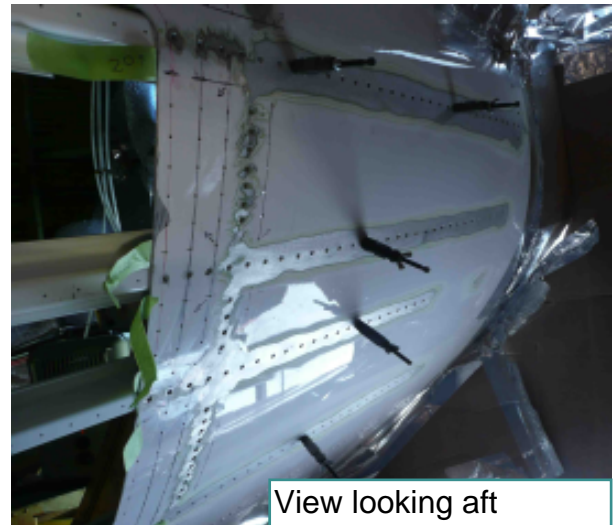
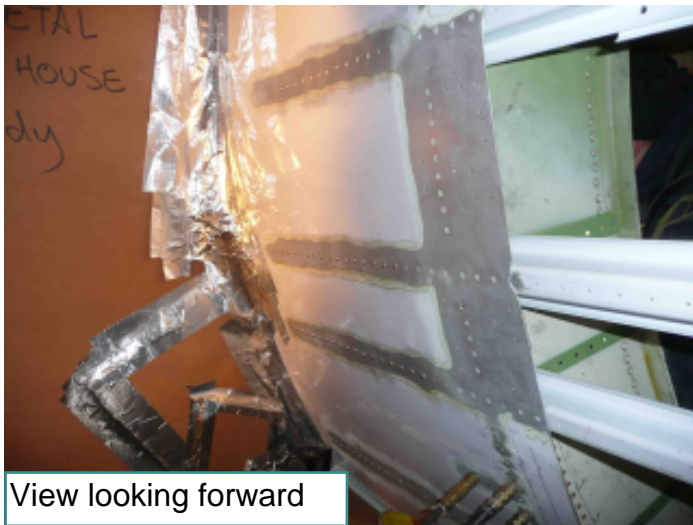


Figure 9. Fastener replacement and stringer repair.

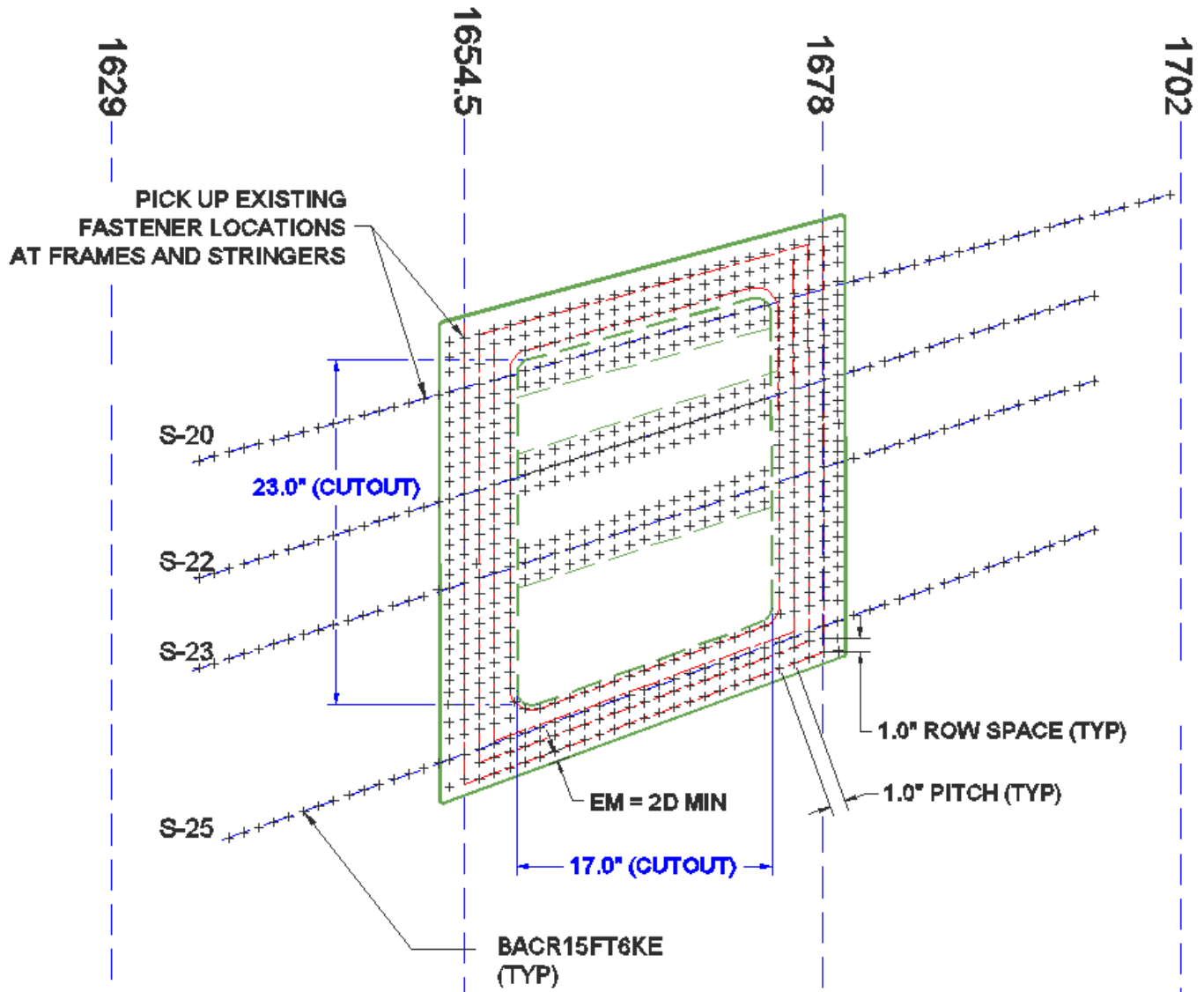
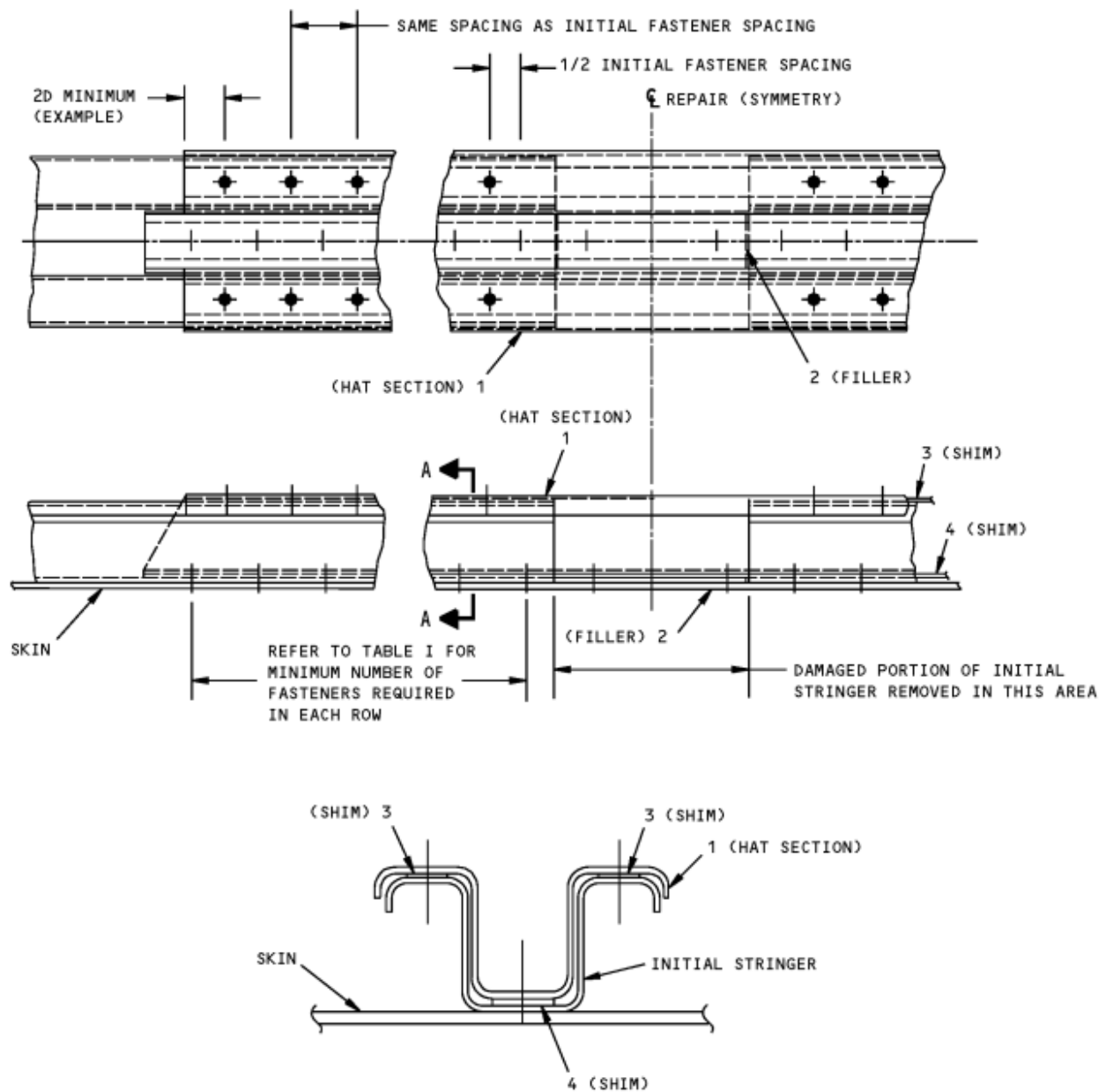


Figure 10. Fastener installation and repair dimensions

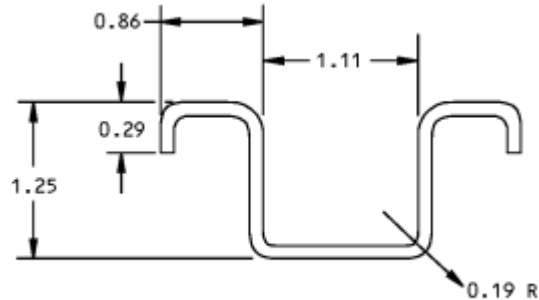


SECTION A-A

DETAIL III

Fuselage Stringer Repair S-21 thru S-39

Figure 11. Stringer repair topology



TYPE I

Purchased Parts

BAC1498-142 .050 thick stringer
 BAC1498-143 .056 thick stringer
 BAC1498-132 .063 thick stringer splice



INITIAL SECTION GAGE	INITIAL SECTION	REPAIR SECTION		MATERIAL
		DETAIL III	DETAIL IV	
0.050	BAC1498-142	BAC1498-132		Clad 7075-T6
	TYPE I 			
0.056	BAC1498-143	BAC1498-132		Clad 7075-T6
	TYPE I 			

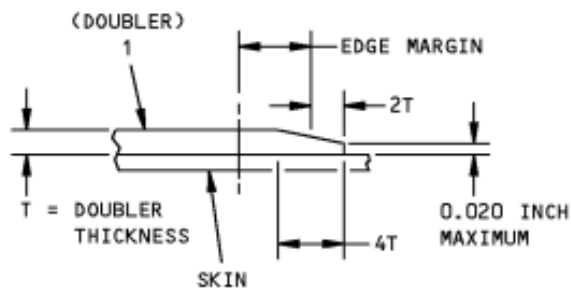
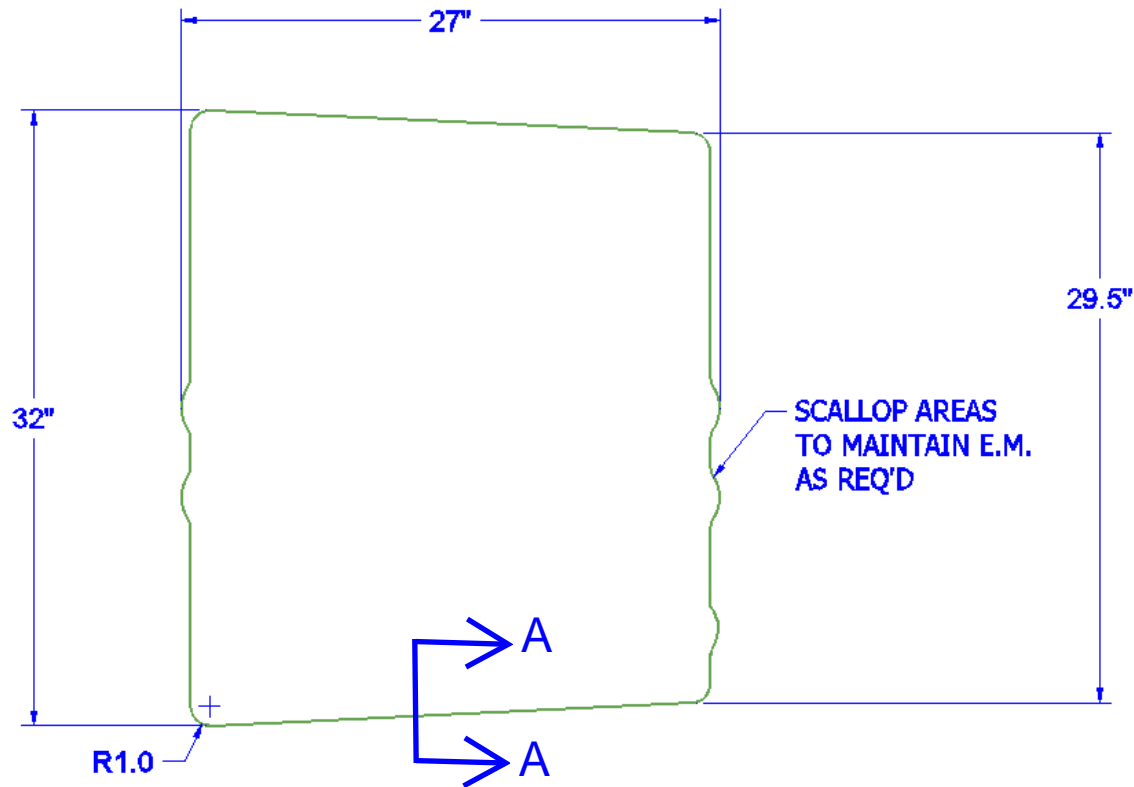
Figure 12. Stringer replacement parts

Fasteners Used

BACR15FT6KE-*C solid rivet

BACB30FM6-3 Hi-Lok with HL70-6 collar

* Alternate to HL70-6 collars, MS21042-3 hex self-locking nut or equivalent (requires one to two AN960-10 or equivalent washers under the nut).



ROTATED 90° COUNTER CLOCKWISE
SECTION A-A

Skin doubler

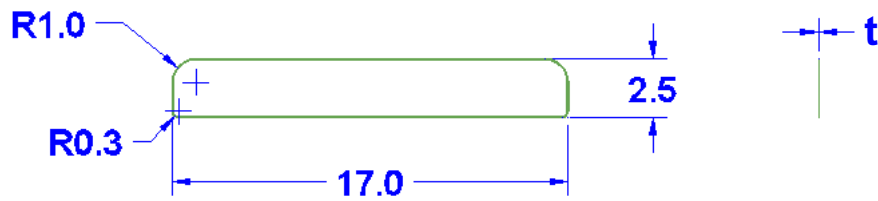
Material: Alclad aluminum 7075-T6

Thickness .063 inch

Figure 13. Doubler dimensions with detail showing edge chamfer

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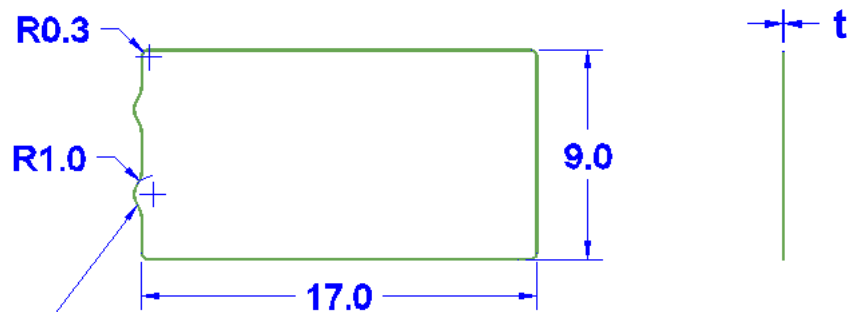
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Filler

Material: Alclad aluminum 7075-T6

Thickness .063 inch



SCALLOP AREAS
TO MAINTAIN E.M.
AS REQ'D

Filler

Material: Alclad aluminum 7075-T6

Thickness .063 inch

Figure 14. Filler panel dimensions

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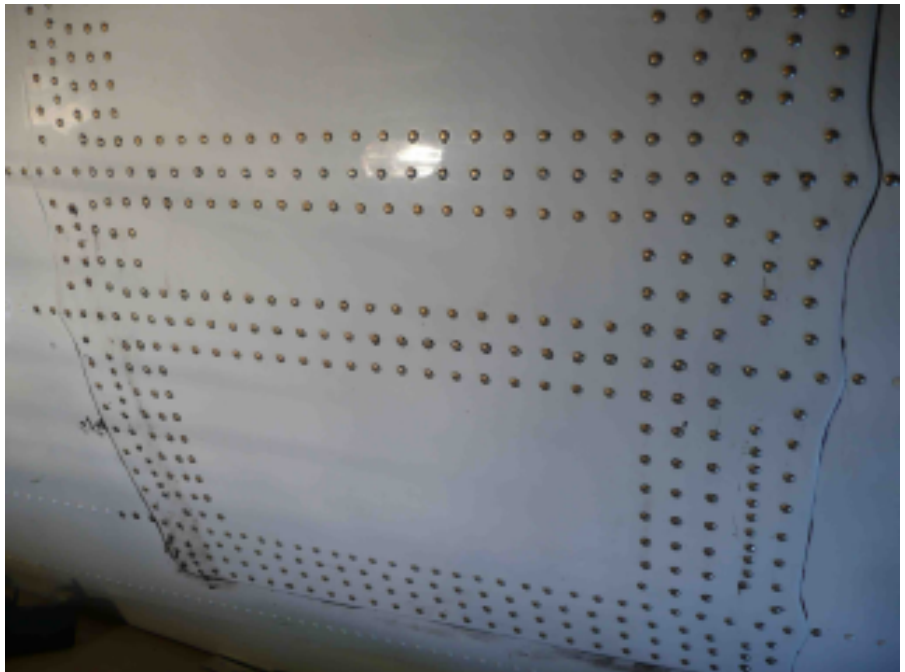
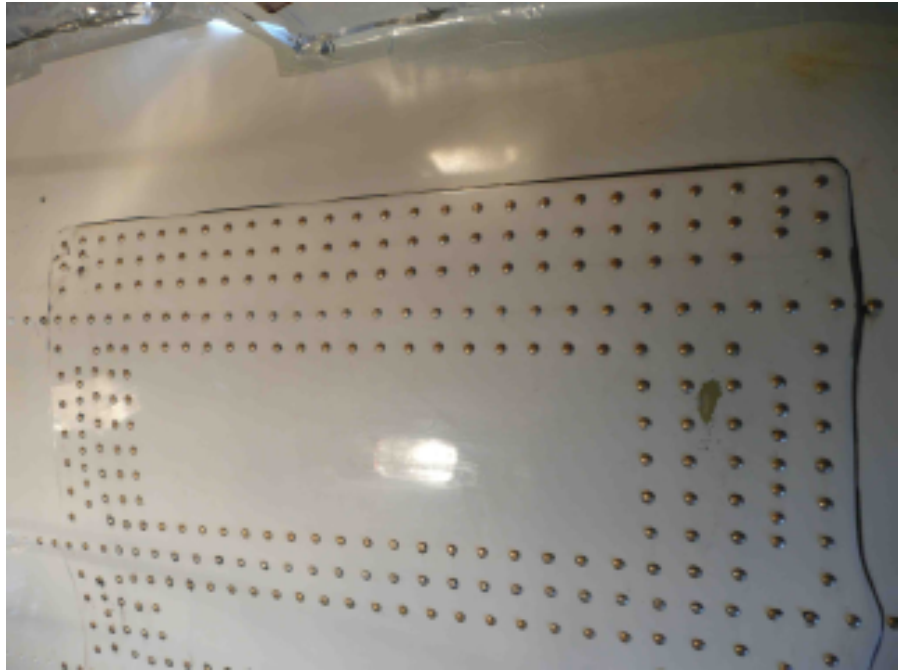


Figure 15. Completed repair



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1. Carefully cut and remove the damaged portion of the skin. Make the cut a shape with the sides either parallel or perpendicular to the stringers. Make the corner radii a minimum of 1.0 inch. Do not gouge, scratch, or buckle the structure adjacent to the repair. Remove all burrs and sharp edges. Maintain 125 microinches Ra roughness or smoother on the edges of the cutout.

1	MECH	DATE	QA.	DATE

2. Perform a High Frequency Eddy Current (HFEC) inspection at the surface of trimmed skin areas to make sure there is no more damage. Refer to NDT Part 6, 51-00-01 or NDT Part 6, 51-00-19.

2	MECH	DATE	QA.	DATE

3. Carefully cut and remove the damaged portion of stringers S-20L, S-22L, S-23L, S-25L between FS 1629 and FS 1707. Do not cut into the skin, and do not cut into the reinforcement radius fillers. It is acceptable to remove frame shear ties as required in order to extract the damaged stringers.

3	MECH	DATE	QA.	DATE

4. Remove all nicks, burrs, scratches, gouges, and sharp edges from initial stringers and replacement parts.

4	MECH	DATE	QA.	DATE

5. Fabricate stringer-to-doubler shims from 7075-T6 sheet, accounting for the depth of chem milled areas per Figure 7 and Figure 8.

5	MECH	DATE	QA.	DATE

6. Fabricate exterior doubler from 0.063 inch thick 7075-T6 sheet per Figure 10.

6	MECH	DATE	QA.	DATE

7. Assemble and pre-drill all repair components. Maintain minimum 2D edge margin, 1.0 inch pitch, 1.0 inch row spacing for fasteners. Disassemble and deburr in preparation for chem treat and prime.

7	MECH	DATE	QA.	DATE



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DRAWING NO: 135-8051 PROCEDURE CHECKLIST

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8. Apply chemical conversion coating to the bare surfaces of skin cutout, stringers, and fabricated parts. Apply one coat of BMS 10-11, type 1 primer (or equivalent) to the bare surfaces of skin cutout, stringers, and fabricated parts.

8	MECH	DATE	QA.	DATE

9. Paint replacement stringers and stringer repair splices with urethane topcoat per AMM 51-21.

9	MECH	DATE	QA.	DATE

10. Install repair components using solid fasteners:

* Use BACR15FT6KE-8C to join skin, doublers, stringers, splices, and frame shear ties.

* Install BACB30FM6-3 Hi-Locks using HL70-6 collars through stringer splice flanges. Alternate to HL70-6 collars, use MS21042-3 hex self-locking nut or equivalent (requires one to two AN960-10 or equivalent washers under the nut).

See Figures 9 and 10 for rivet pattern, row spacing, and pitch. Install the repair parts with BMS 5-95 sealant between the mating surfaces.

10	MECH	DATE	QA.	DATE

11. Fay edge seal around exterior doubler using BMS 5-95 sealant.

11	MECH	DATE	QA.	DATE

12. Apply exterior finish to repair area per AMM 51-21.

12	MECH	DATE	QA.	DATE