CHAPTER

55

STABILIZERS

CHAPTER 55
STABILIZERS

A = Added, R = Revised, O = Overflow, D = Deleted

55-EFFECTIVE PAGES

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55-EFFECTIVE PAGES

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A = Added, R = Revised, O = Overflow, D = Deleted

55-EFFECTIVE PAGES

CHAPTER 55
STABILIZERS

A = Added, R = Revised, O = Overflow, D = Deleted

55-EFFECTIVE PAGES

A = Added, R = Revised, O = Overflow, D = Deleted

55-EFFECTIVE PAGES

A = Added, R = Revised, O = Overflow, D = Deleted

55-EFFECTIVE PAGES

CHAPTER 55
STABILIZERS

55-CONTENTS

CHAPTER 55
STABILIZERS

55-CONTENTS

CHAPTER 55
STABILIZERS

55-CONTENTS

CHAPTER 55
STABILIZERS

55-CONTENTS

CHAPTER 55
STABILIZERS

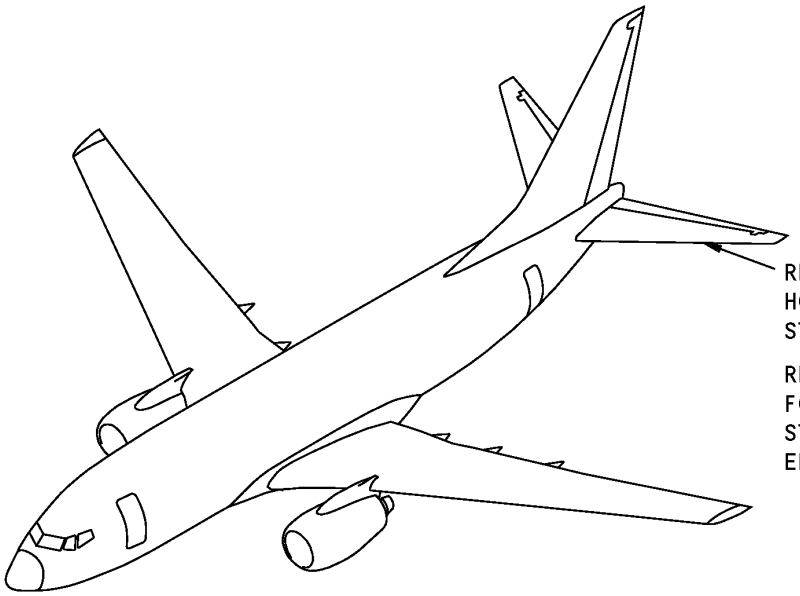
55-CONTENTS

CHAPTER 55
STABILIZERS

55-CONTENTS

CHAPTER 55
STABILIZERS

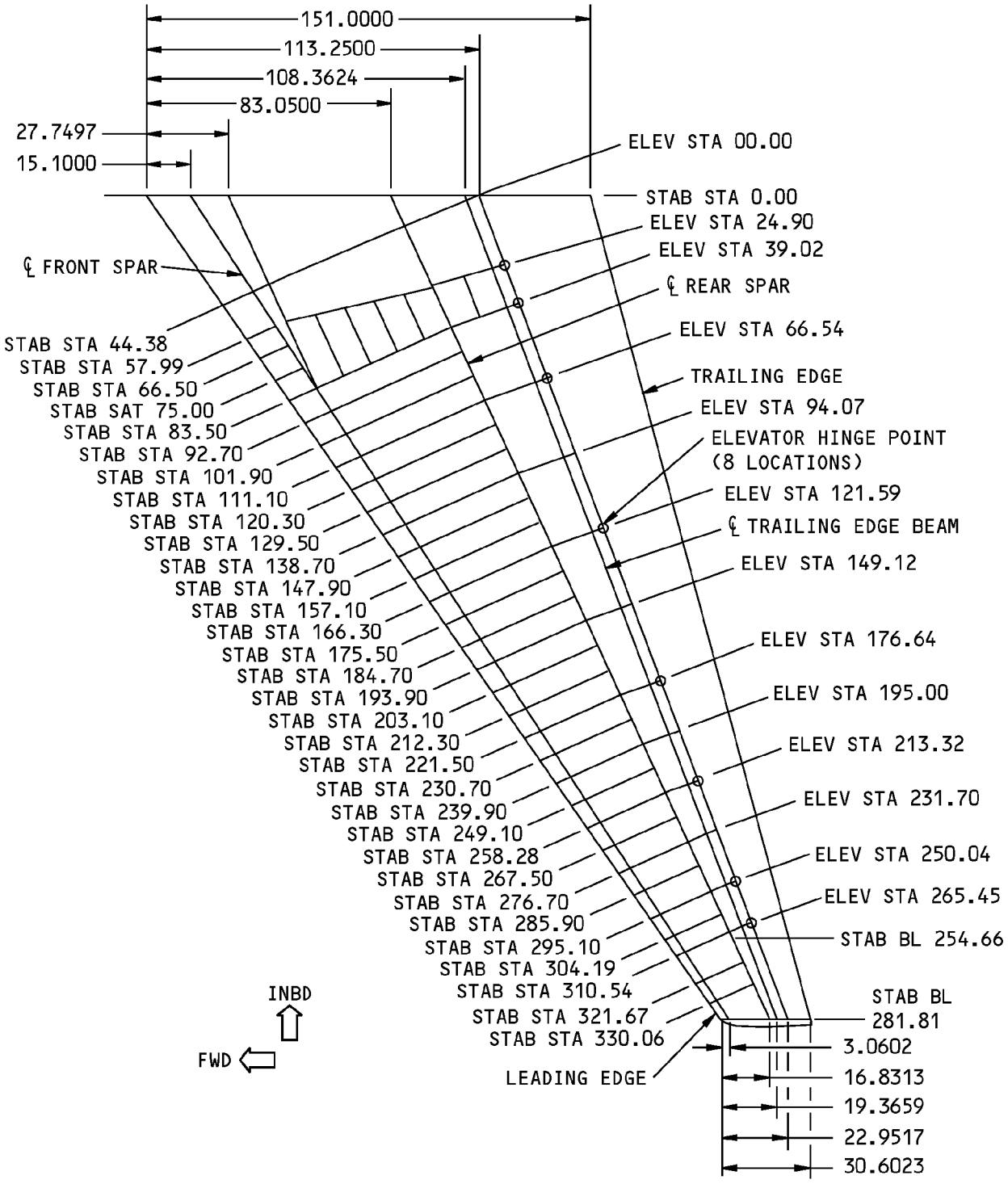
IDENTIFICATION GENERAL - HORIZONTAL STABILIZER STATION DIAGRAM



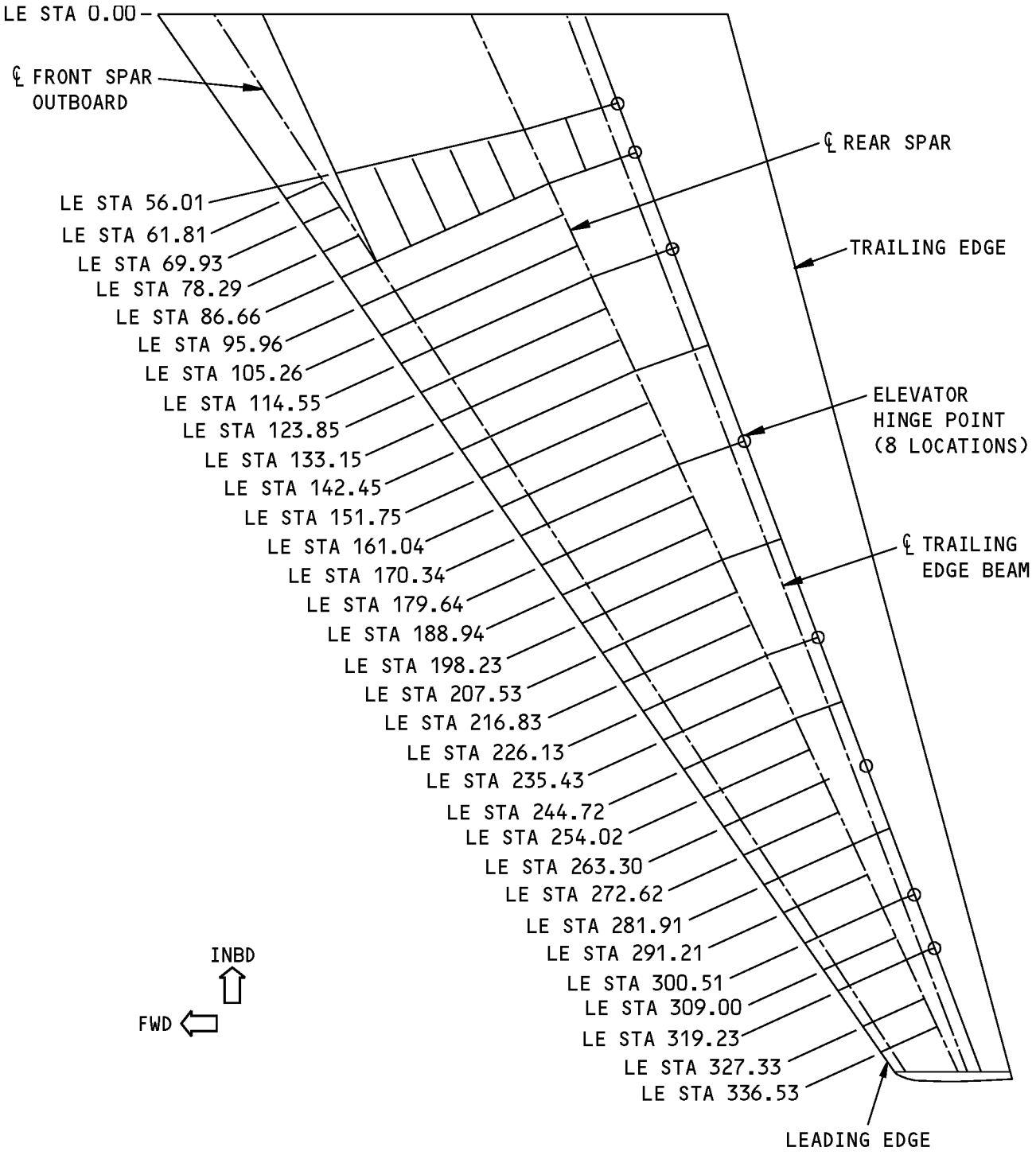
Horizontal Stabilizer Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
180A1540	Horizontal Tail Centerline Diagram



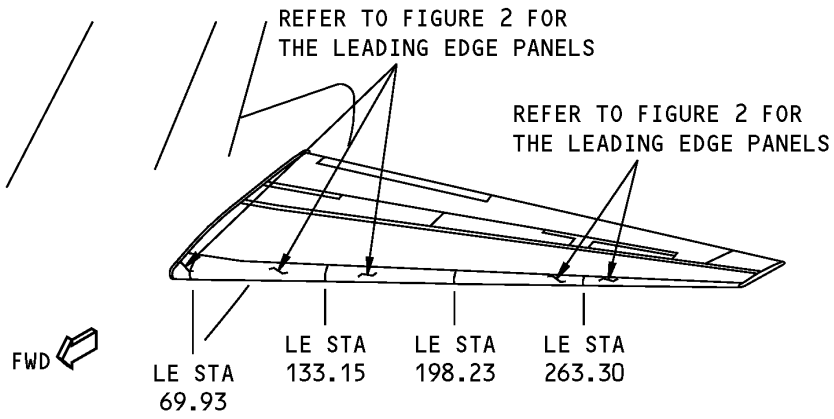
Horizontal Stabilizer Station Diagram
Figure 2



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Leading Edge Station Diagram
Figure 3

IDENTIFICATION 1 - HORIZONTAL STABILIZER LEADING EDGE SKIN



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

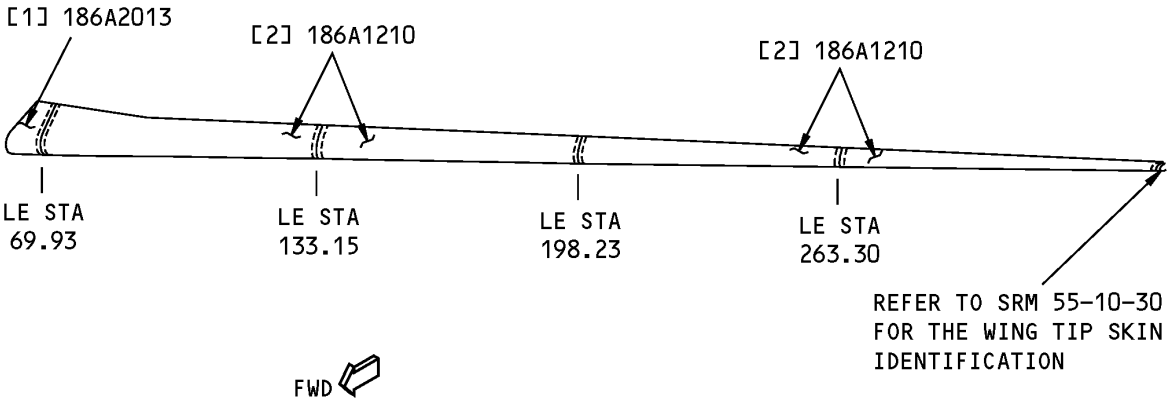
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Leading Edge Skin Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
186A1001	Leading Edge Assembly/Installation - REM, Horizontal Stabilizer
186A1200	Skin Assembly - REM LE, Horizontal Stabilizer
186A2001	LE Installation - Fixed, Horizontal Stabilizer



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

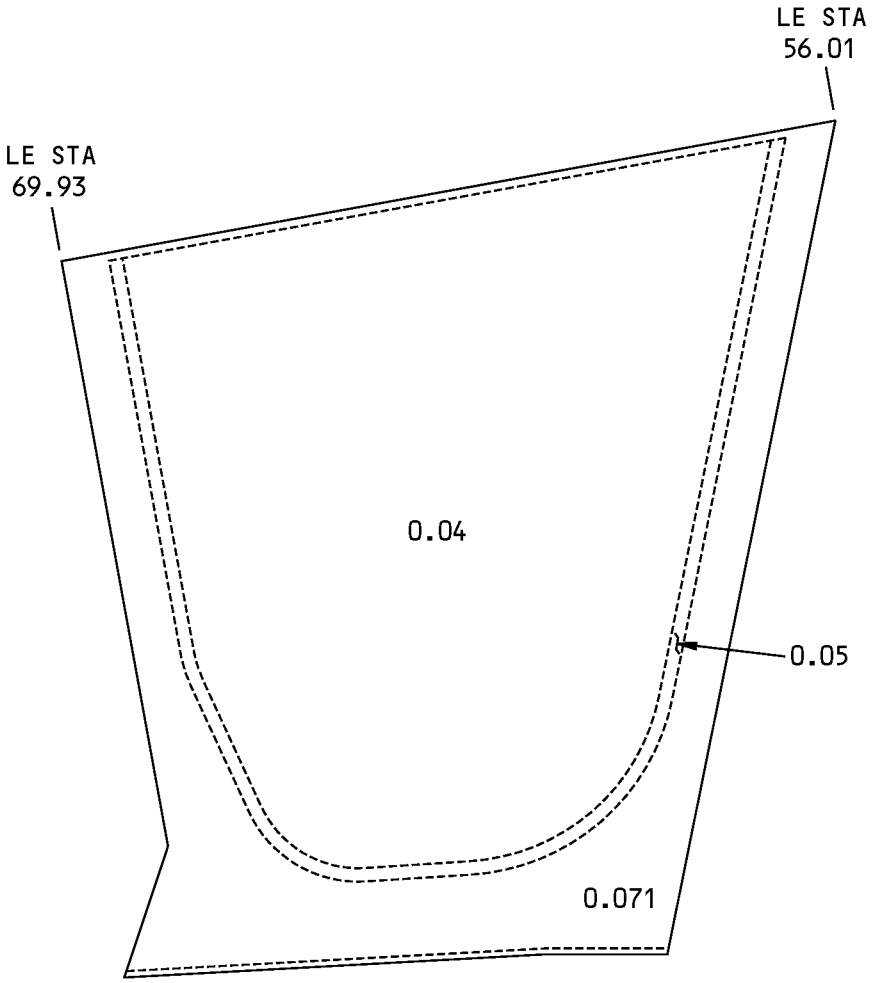
UPPER SURFACE IS SHOWN

Horizontal Stabilizer Leading Edge Skin Identification
Figure 2

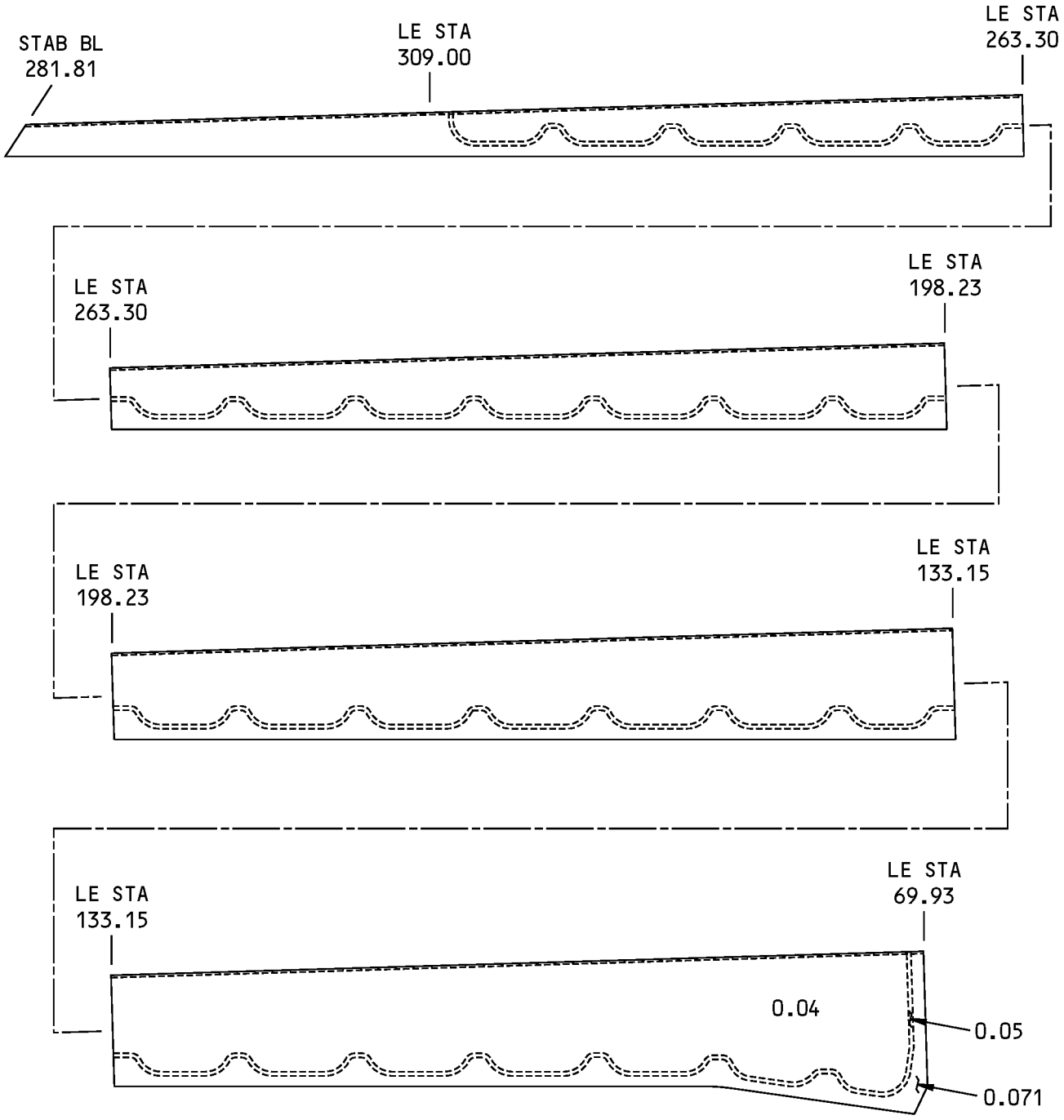
Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Fixed LE Panel Skin	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the different chem-mill thicknesses	
[2]	Removable LE Panel Skin	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-205/5. Refer to Figure 4 for the different chem-mill thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



Chem-Milled Areas of Figure 2, Item [1]
Figure 3

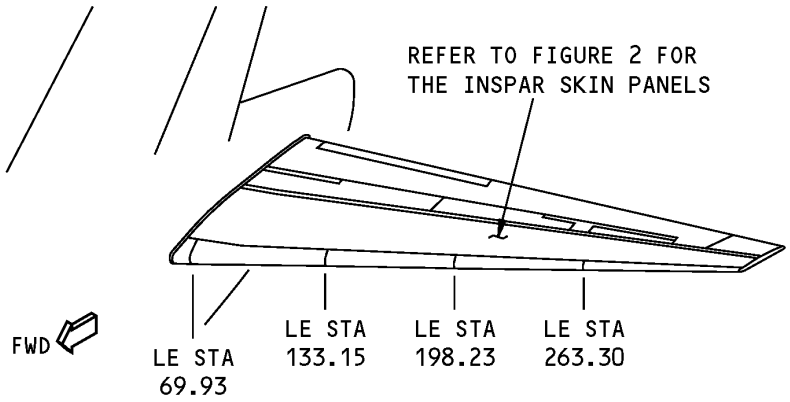


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Chem-Milled Areas of Figure 2, Item [2]
Figure 4

IDENTIFICATION 2 - HORIZONTAL STABILIZER UPPER INSPAR SKIN



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

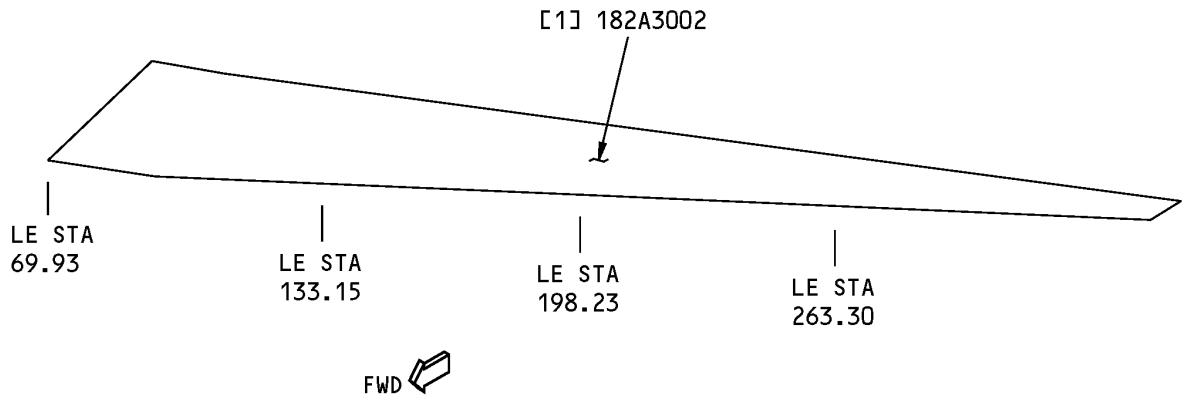
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Inspar Skin Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
182A3001	Skin, Upper-Inspar, Horizontal Stabilizer Installation



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

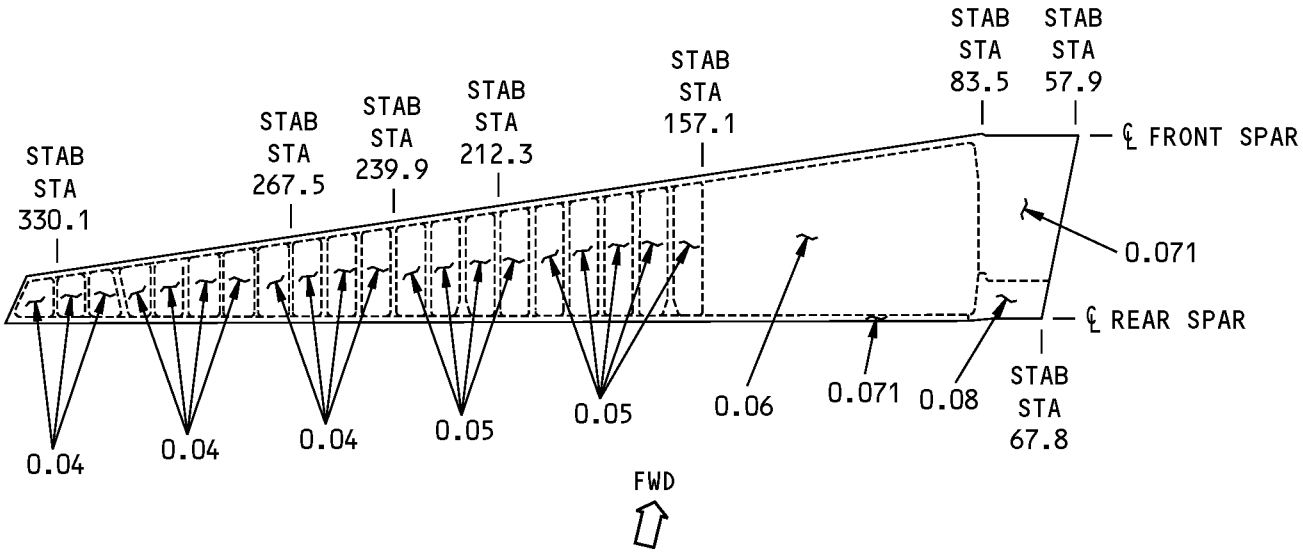
UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Inspar Skin Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Inspar Skin - Upper Panel	0.080 (2.03)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the different chem-mill thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches.

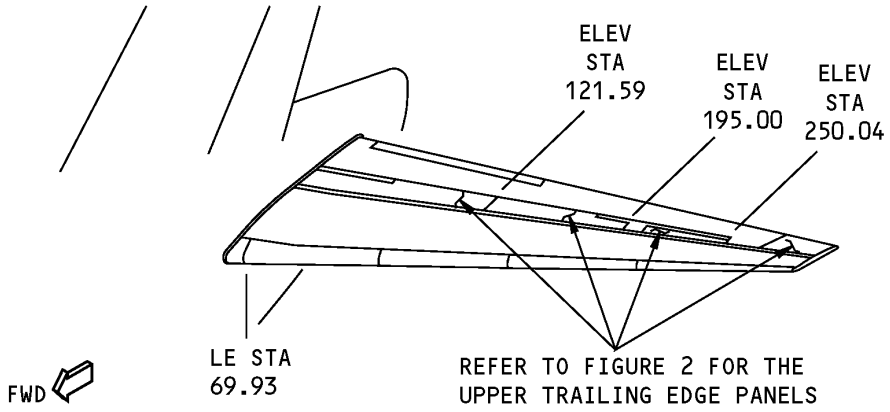


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Chem-Milled Areas of Figure 2, Item [1]
Figure 3

IDENTIFICATION 3 - UPPER PANEL ASSEMBLY - HORIZONTAL STABILIZER TRAILING EDGE



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

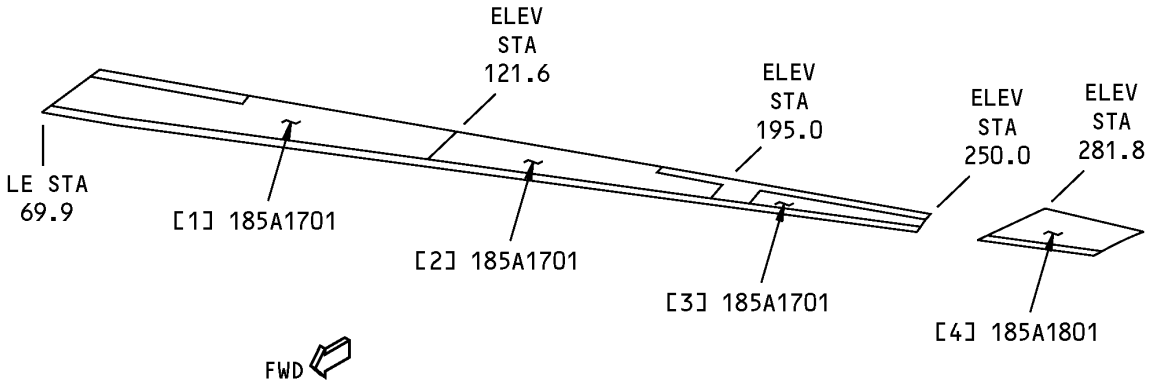
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Trailing Edge Panel Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A1700	Panel Installation - Trailing Edge, Horizontal Stabilizer
185A1800	Panel Installation - Outboard Trailing Edge, Horizontal Stabilizer



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

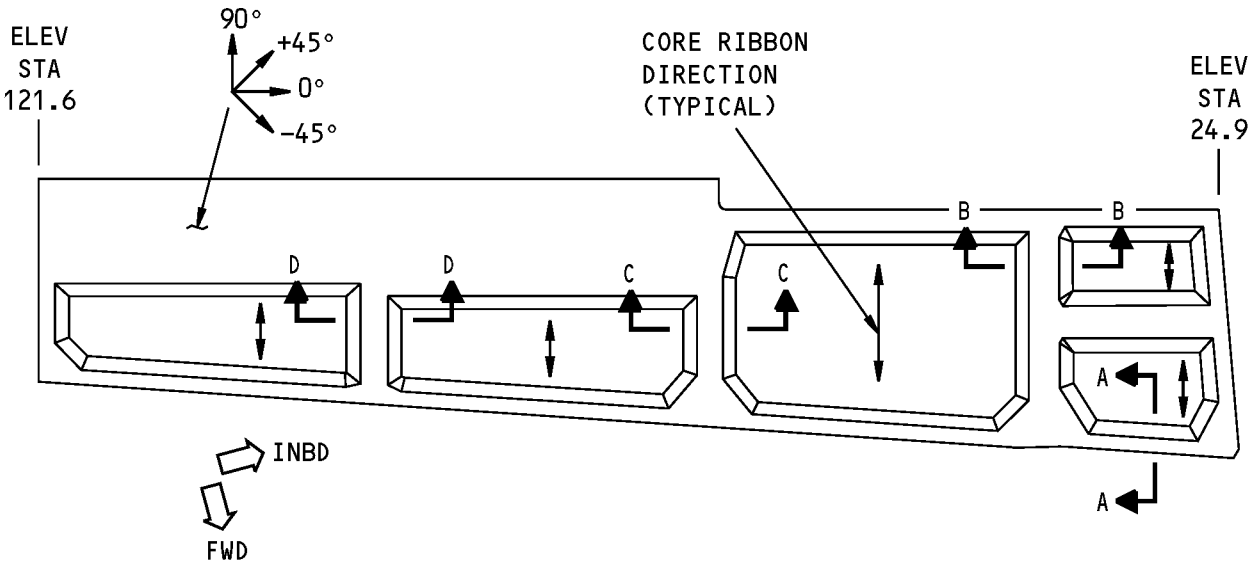
UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Trailing Edge Panel Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Upper Panel - Bonded Part		Glass Fiber Reinforced Plastic (GFRP) and Carbon Fiber Reinforced Plastic (CFRP) honeycomb sandwich	
	Skin		Refer to Figure 3.	
	Core	0.400 (1.02)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Upper Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 4.	
	Core	0.400 (1.02)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[3]	Upper Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 5.	
	Core	0.400 (1.02)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[4]	Upper Panel - Bonded Assembly		(GFRP) and (CFRP) honeycomb sandwich.	
	Skin		Refer to Figure 6.	
	Core	0.400 (1.02)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



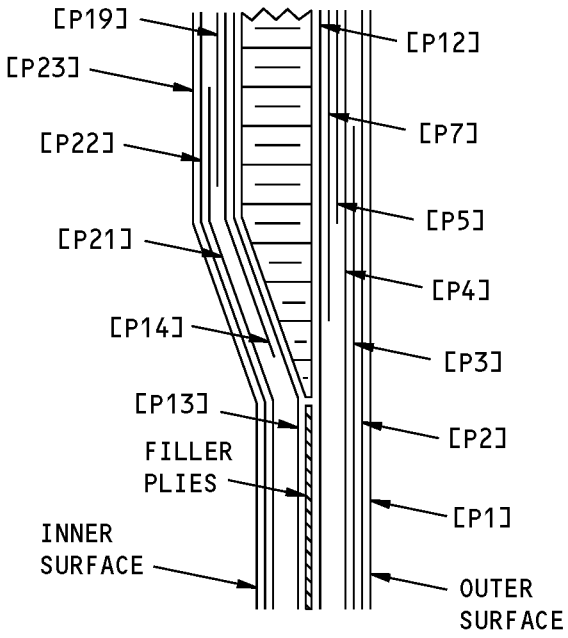
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

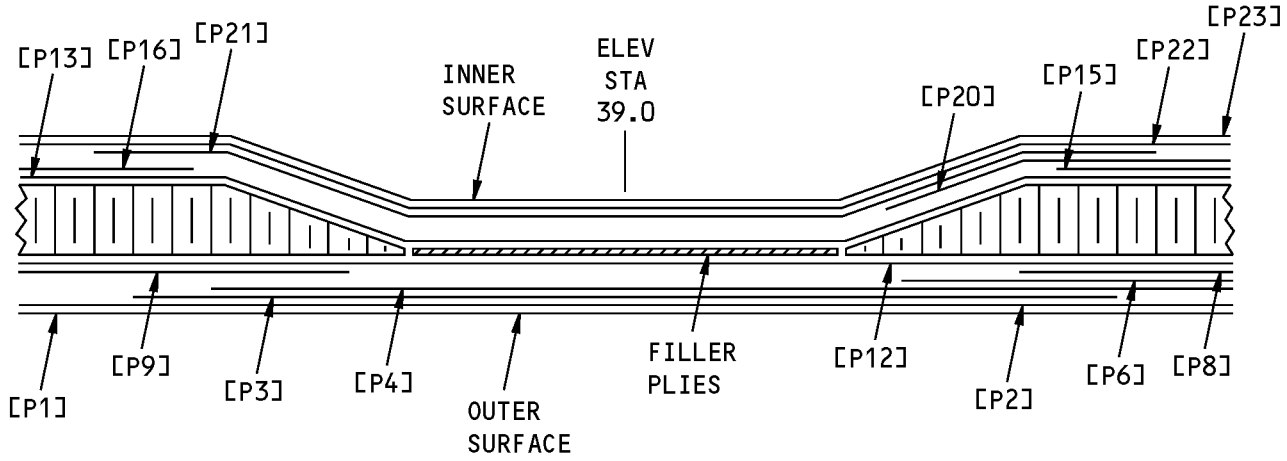
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A, B-B, C-C, AND D-D FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [1]
Figure 3 (Sheet 1 of 3)

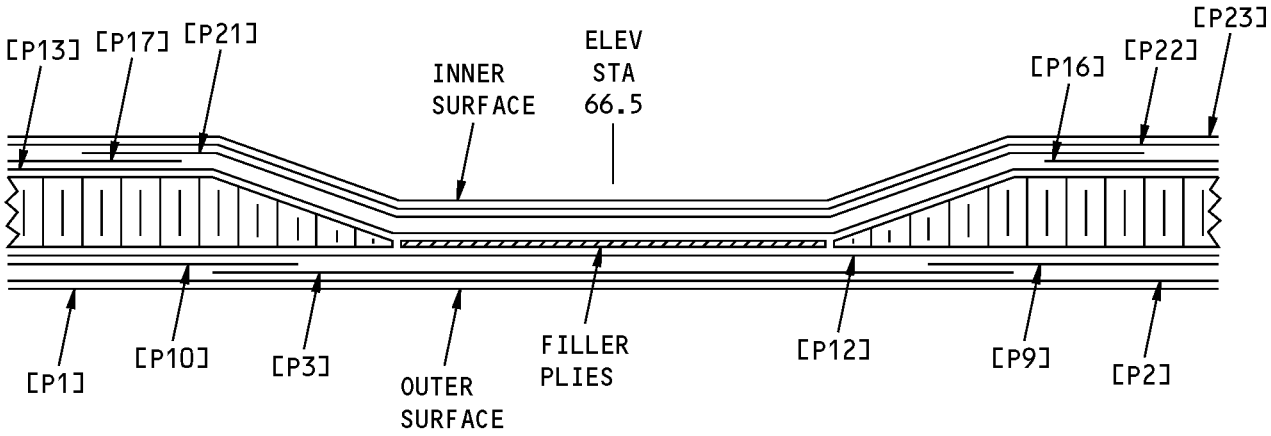


PLY LAYUP SEQUENCE
A–A

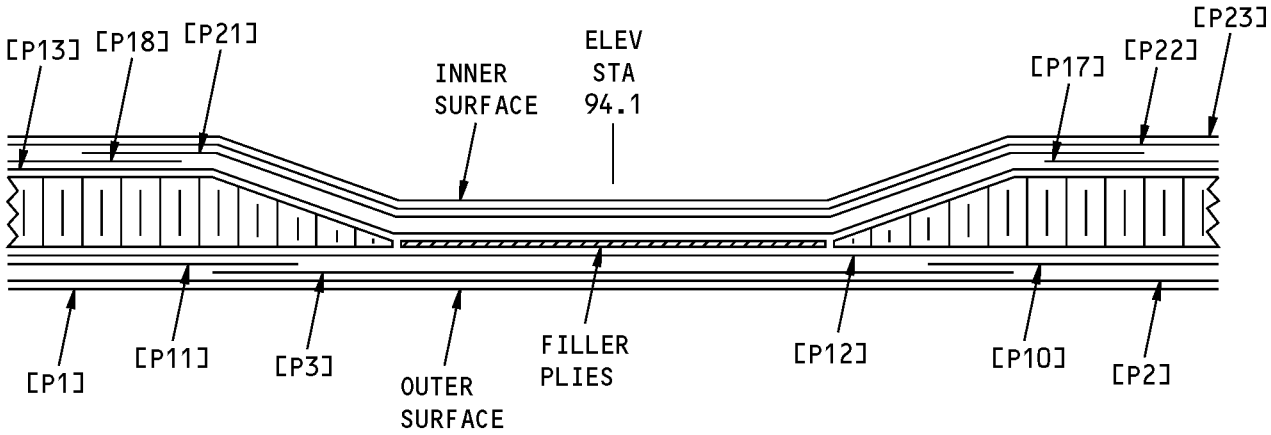


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [1]
Figure 3 (Sheet 2 of 3)



PLY LAYUP SEQUENCE
C–C

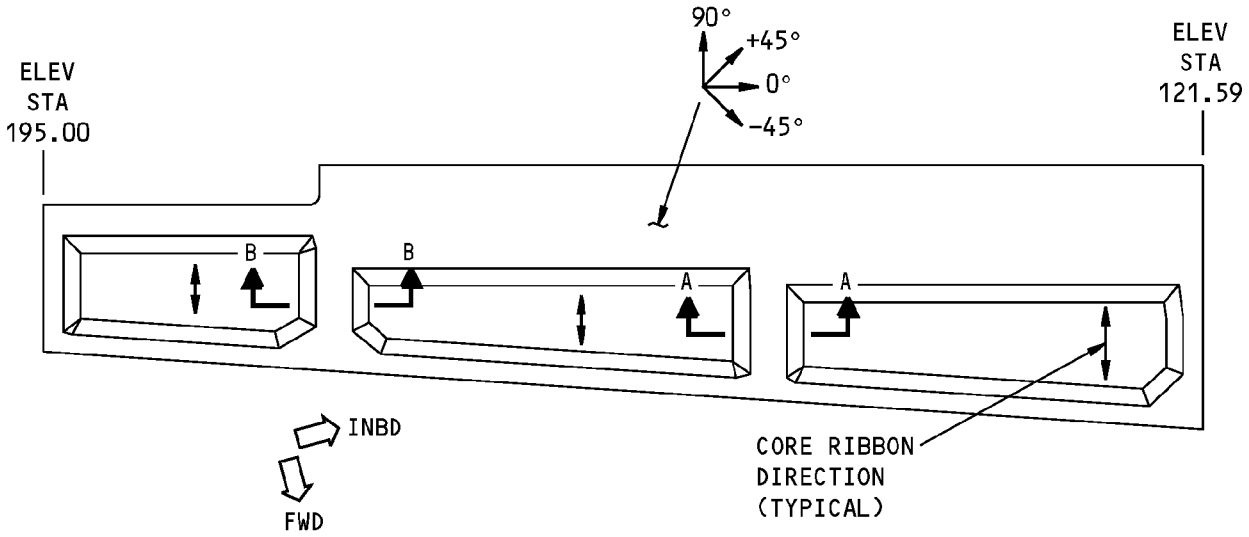


PLY LAYUP SEQUENCE
D–D

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [1]
Figure 3 (Sheet 3 of 3)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1	———	Surfacing film as given in BMS 8-341, Type II (METALBOND 1515-3M film adhesive) (Optional: Surfacing film as given in BMS 8-341, Type III (SYNSKIN HC9837.1 composite surfacing film)) (Optional: Toolside surface treatment)
P2, P22	+ or - 45 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4, P12, P13, P21	0 or 90 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P5, P6, P19, P20	0 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P7, P8, P9, P10, P11, P14, P15, P16, P17, P18	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P23	———	0.001 inch (0.025 mm) thick white bondable Tedlar film



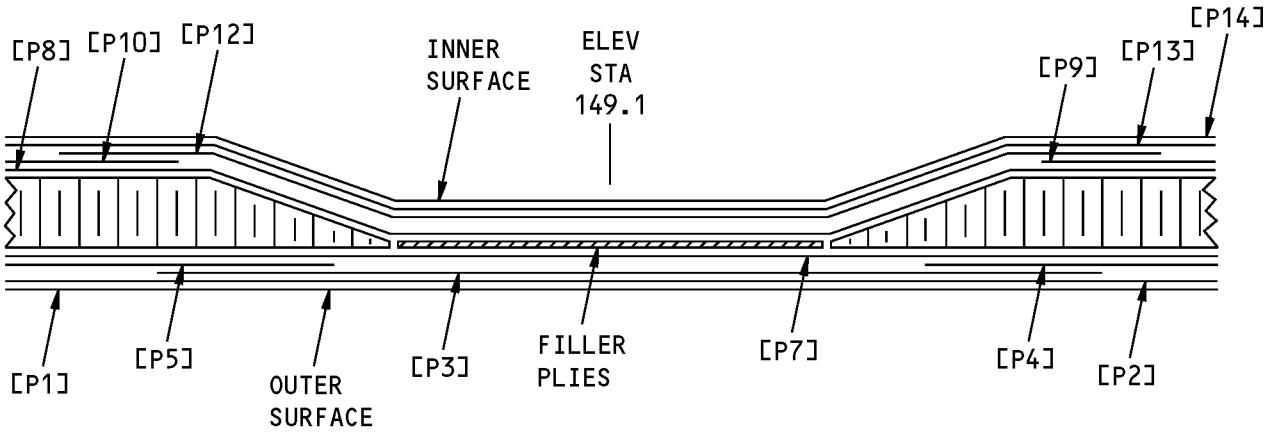
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

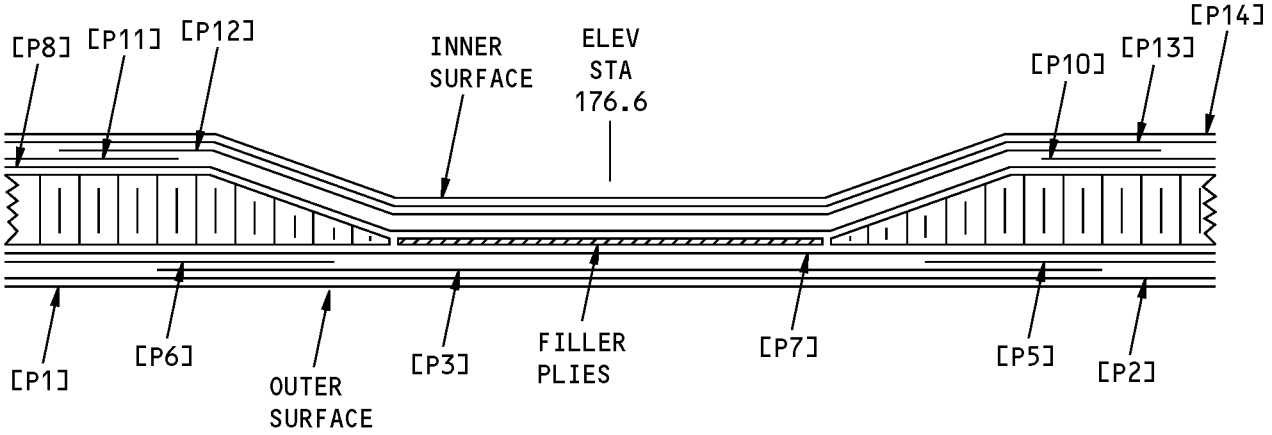
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [2]
Figure 4 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

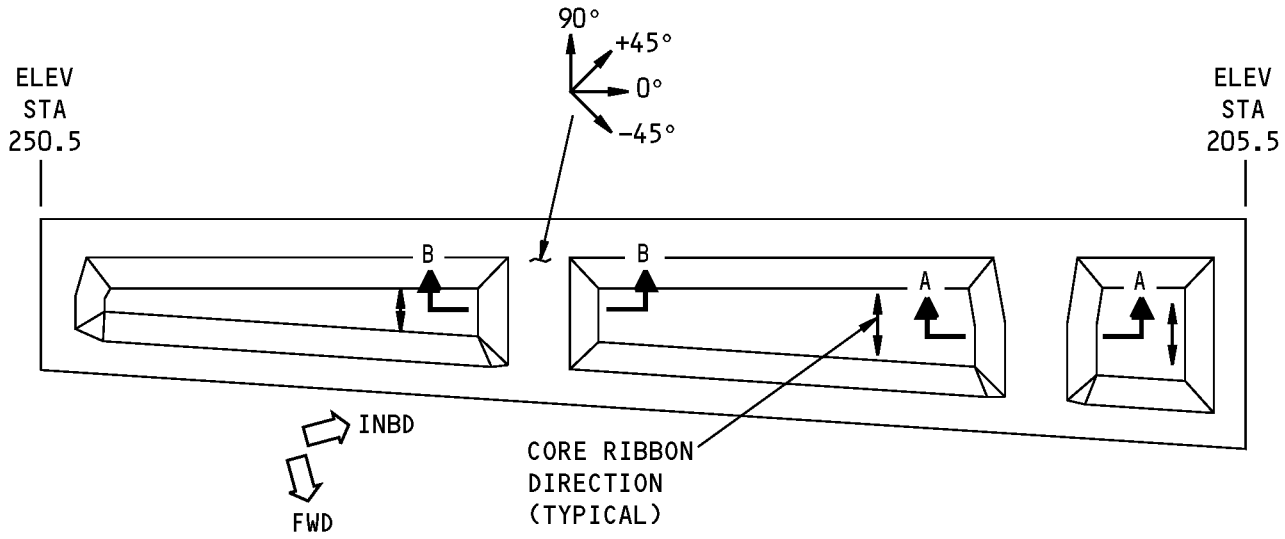


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [2]
Figure 4 (Sheet 2 of 2)

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, Item [2]		
PLY	**DIRECTION**	**MATERIAL**
P1	———	Surfacing film as given in BMS 8-341, Type II (METALBOND 1515-3M film adhesive) (Optional: Surfacing film as given in BMS 8-341, Type III (SYNSKIN HC9837.1 composite surfacing film)) (Optional: Toolside surface treatment)
P2, P13	+ or - 45 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P7, P8, P12	0 or 90 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P4, P5, P6, P9, P10, P11	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P14	- - - -	0.001 inch (0.025 mm) thick white bondable Tedlar film



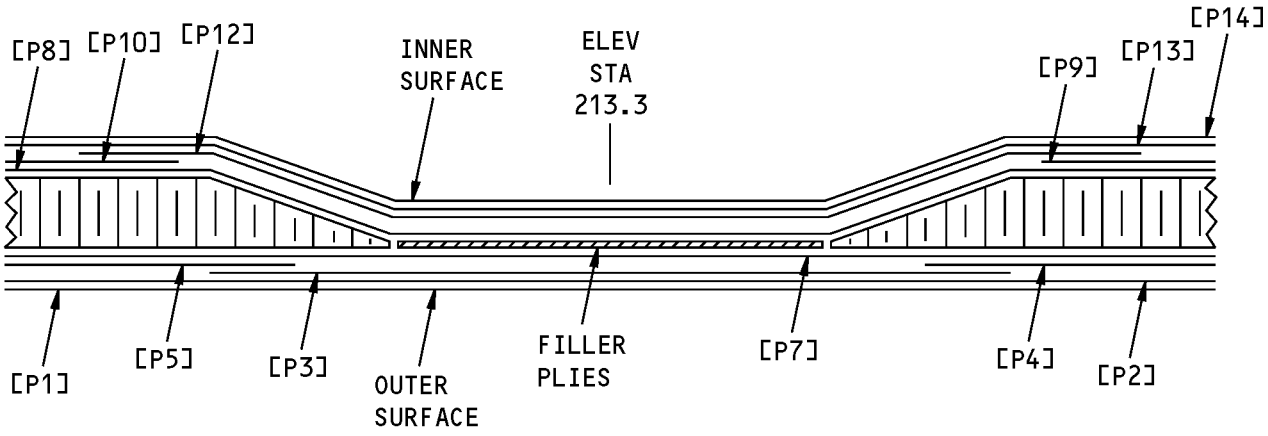
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

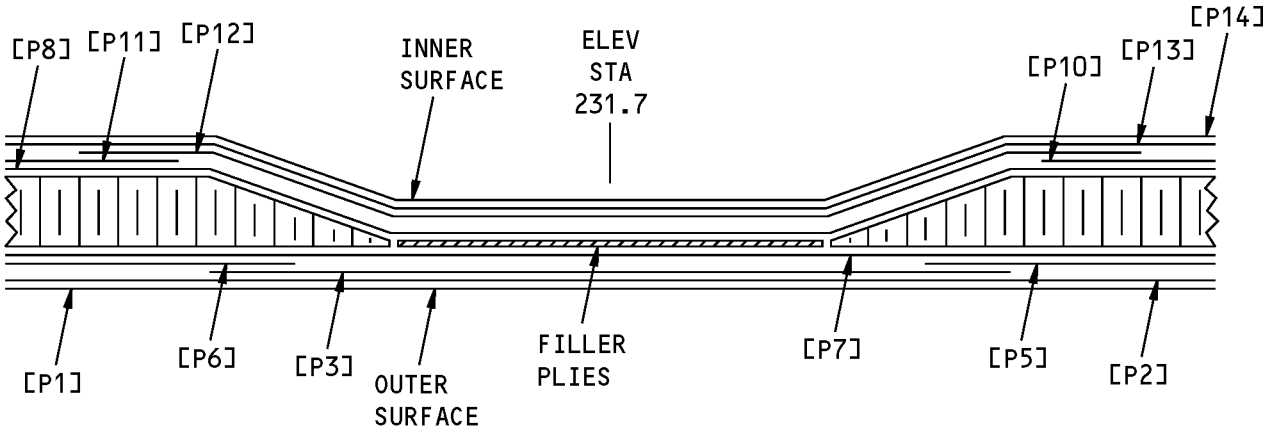
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [3]
Figure 5 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

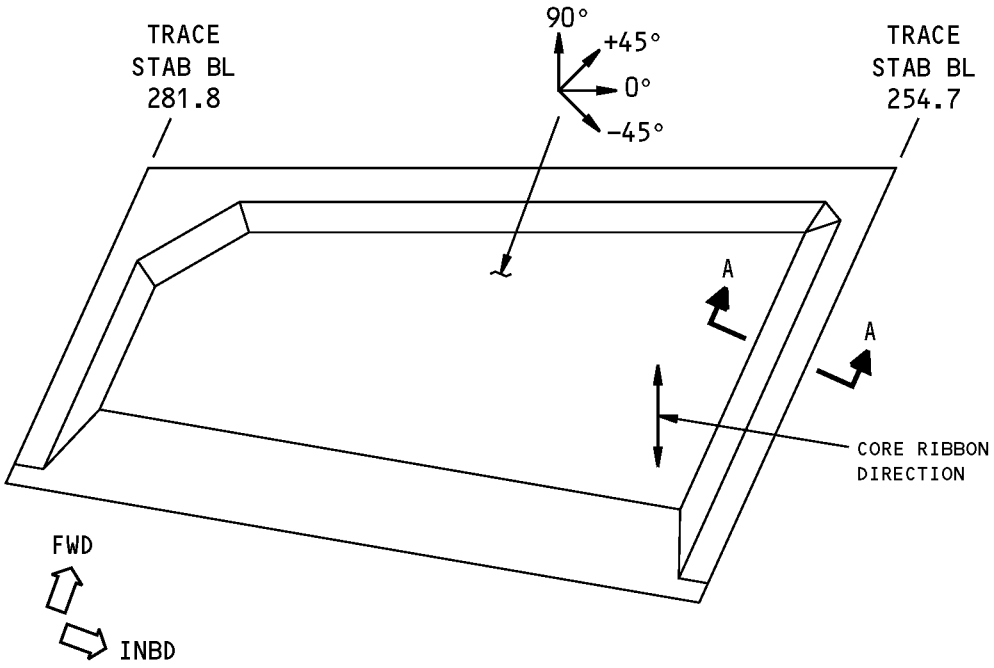


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [3]
Figure 5 (Sheet 2 of 2)

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, Item [3]		
PLY	**DIRECTION**	**MATERIAL**
P1	- - - -	Surfacing film as given in BMS 8-341, Type II (METALBOND 1515-3M film adhesive) (Optional: Surfacing film as given in BMS 8-341, Type III (SYNSKIN HC9837.1 composite surfacing film)) (Optional: Toolside surface treatment)
P2, P13	+ or - 45 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P7, P8, P12	0 or 90 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P4, P5, P6, P9, P10, P11	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P14	- - - -	0.001 inch (0.025 mm) thick white bondable Tedlar film



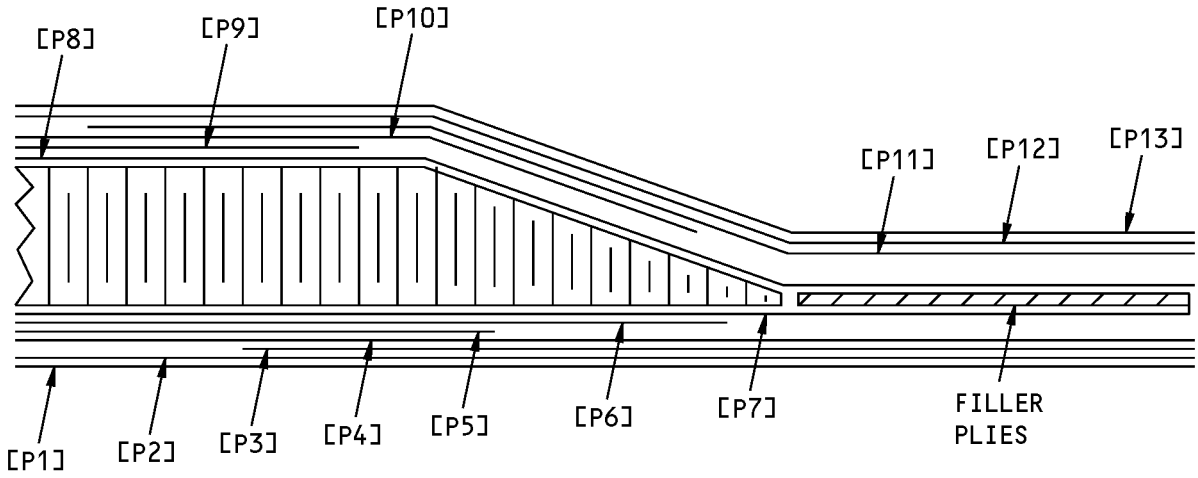
PLY LAYUP AND CORE RIBBON DIRECTION

A

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 6 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

**Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [4]
Figure 6 (Sheet 1 of 2)**



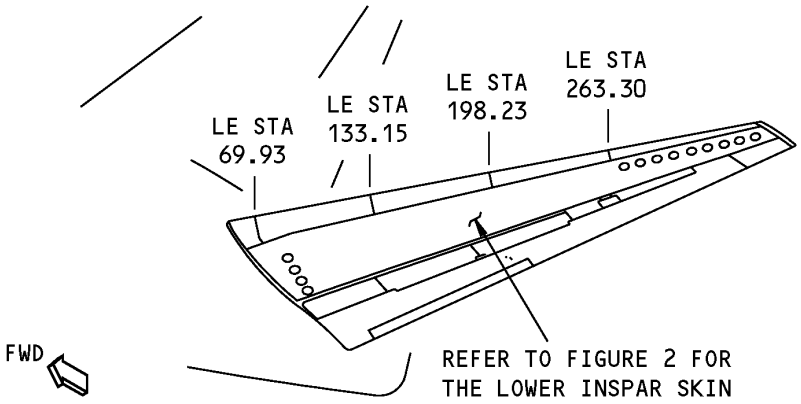
PLY LAYUP SEQUENCE
A–A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [4]
Figure 6 (Sheet 2 of 2)

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, Item [4]		
PLY	**DIRECTION**	**MATERIAL**
P1	- - - -	Surfacing film as given in BMS 8-341, Type II (METALBOND 1515-3M film adhesive) (Optional: Surfacing film as given in BMS 8-341, Type III (SYNSKIN HC9837.1 composite surfacing film)) (Optional: Toolside surface treatment)
P2, P12	+ or - 45 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4, P7, P8, P11	0 or 90 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P5, P10	0 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P6, P9	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P13	- - - -	0.001 inch (0.025 mm) thick white bondable Tedlar film

IDENTIFICATION 4 - HORIZONTAL STABILIZER LOWER INSPAR SKIN



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

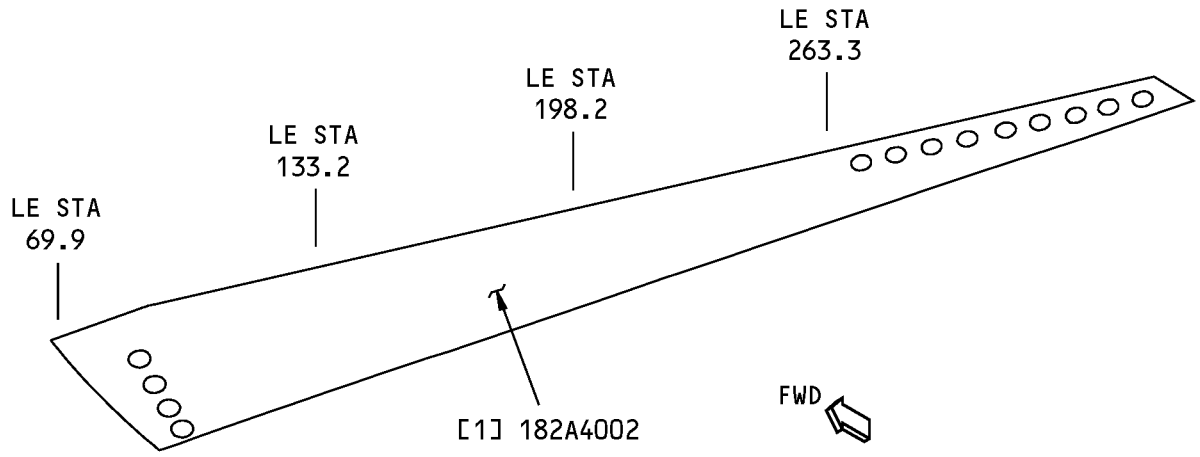
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Inspar Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
182A4001	Skin, Lower - Inspar, Horizontal Stabilizer Installation



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

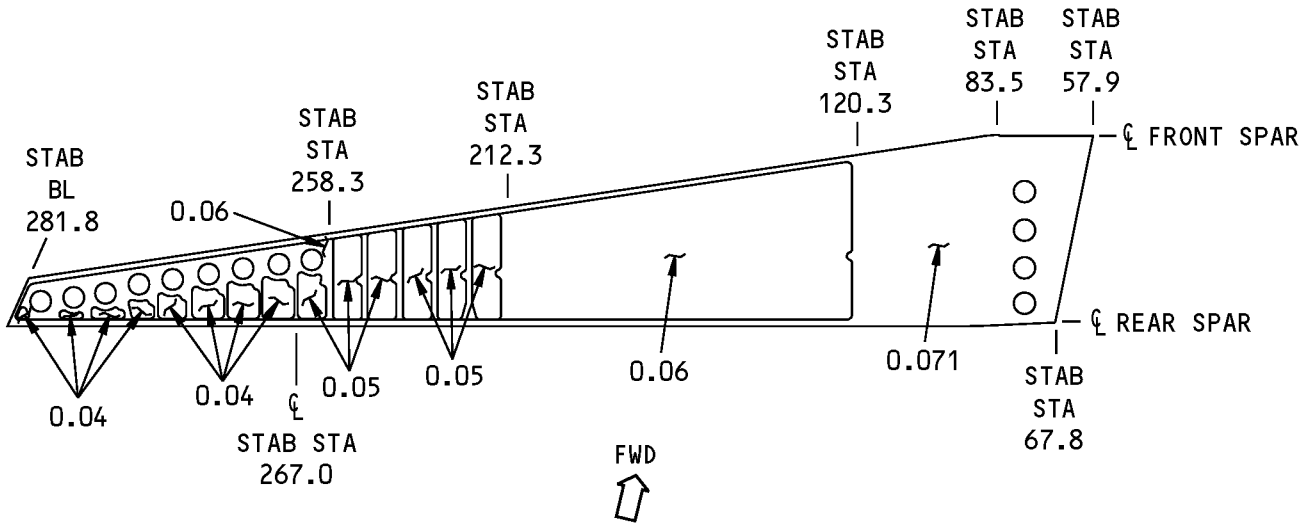
LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Inspar Skin Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Lower Skin assembly Inspar Skin - Lower Panel	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the different chem-mill thicknesses	
	Doubler	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5	
	Doubler	0.080 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5	
	Doubler (2)	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5	
	Doubler (3)	0.180 (4.57)	2024-T3 clad sheet as given in QQ-A-250/5	
	Doubler	0.625 (15.87)	7075-T7351 plate as given in QQ-A-250/12	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

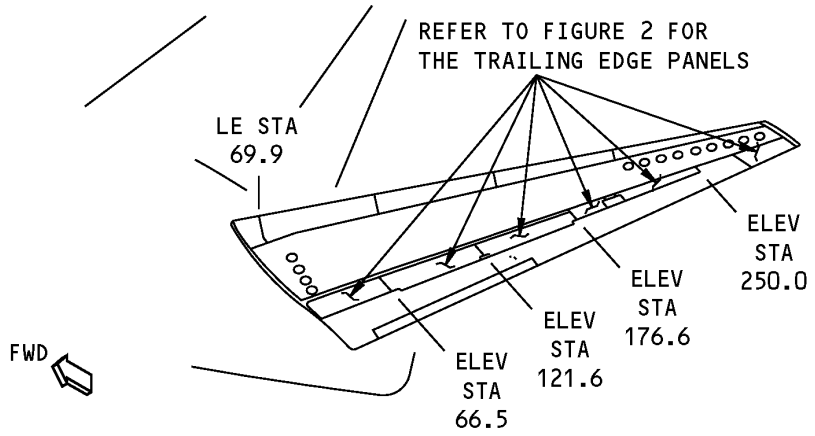


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Chem-Milled Areas of Figure 2, Item [1]
Figure 3

IDENTIFICATION 5 - LOWER PANEL ASSEMBLY - HORIZONTAL STABILIZER TRAILING EDGE



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

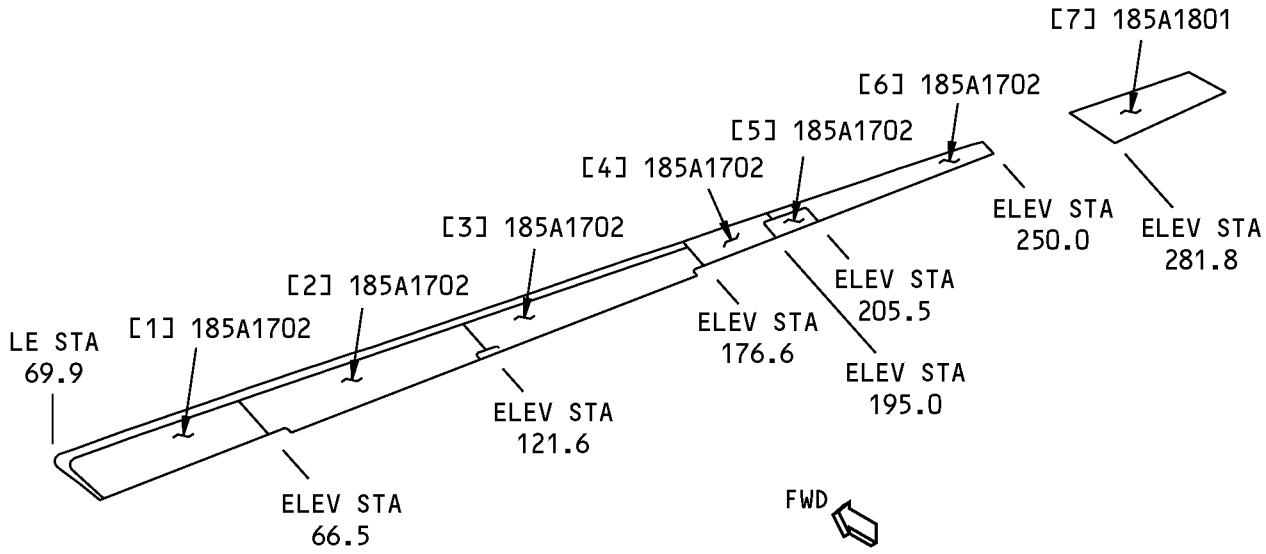
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Trailing Edge Panel Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A1700	Panel Installation - Trailing Edge, Horizontal Stabilizer
185A1711	Panel Installation - Trailing Edge, Horizontal Stabilizer Rework
185A1800	Panel Installation - Outboard Trailing Edge, Horizontal Stabilizer



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

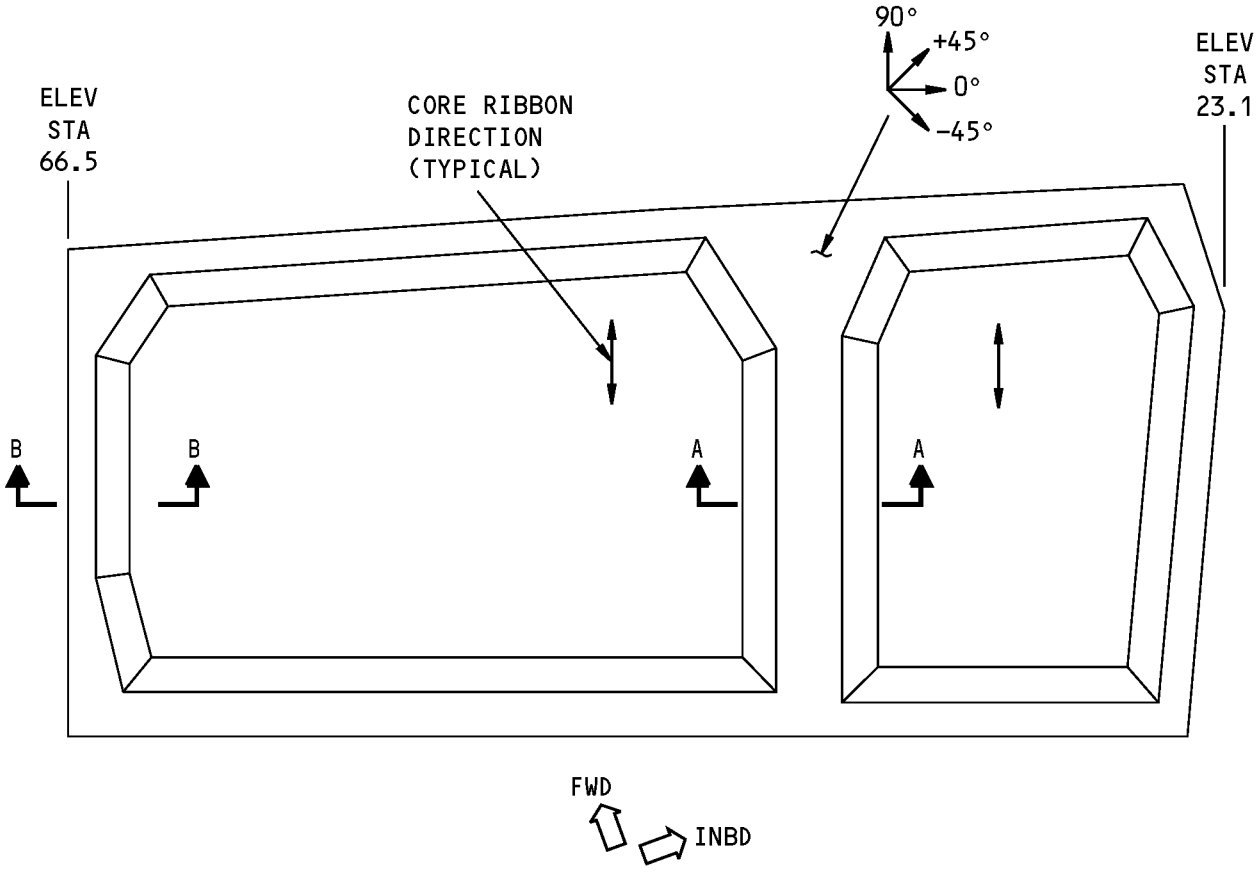
LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Trailing Edge Panel Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Lower Panel - Bonded Part		Glass Fiber Reinforced Plastic (GFRP) and Carbon Fiber Reinforced Plastic (CFRP) honeycomb sandwich	
	Skin		Refer to Figure 3	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Lower Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 4	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[3]	Lower Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 5	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[4]	Lower Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 6	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[5]	Lower Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 7	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[6]	Lower Panel - Bonded Part		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 8	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[7]	Lower Outboard Trailing Edge Panel - Bonded Assembly		GFRP and CFRP honeycomb sandwich	
	Skin		Refer to Figure 9	
	Core	0.400 (10.16)	Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



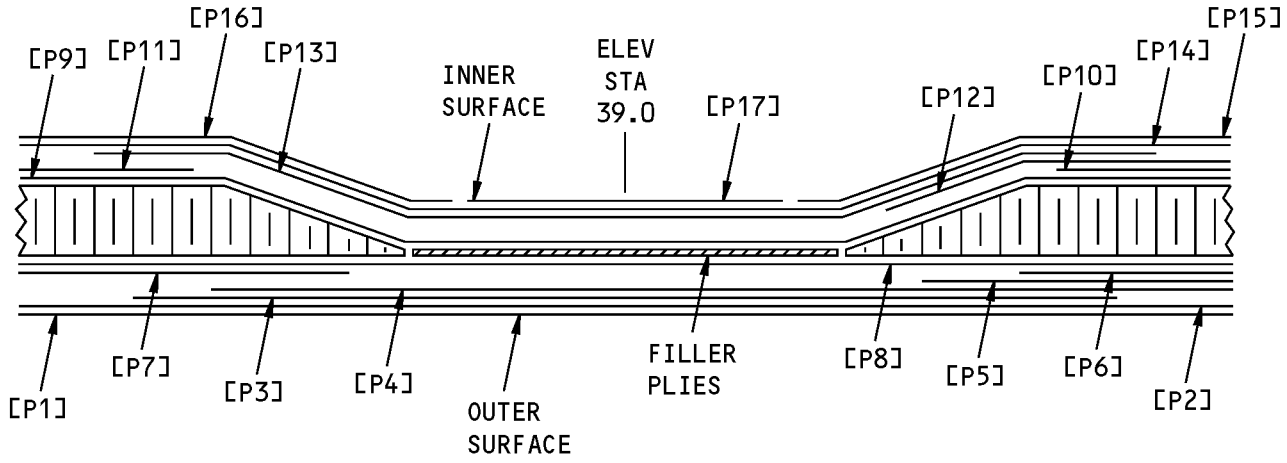
PLY LAYUP AND CORE RIBBON DIRECTION

A

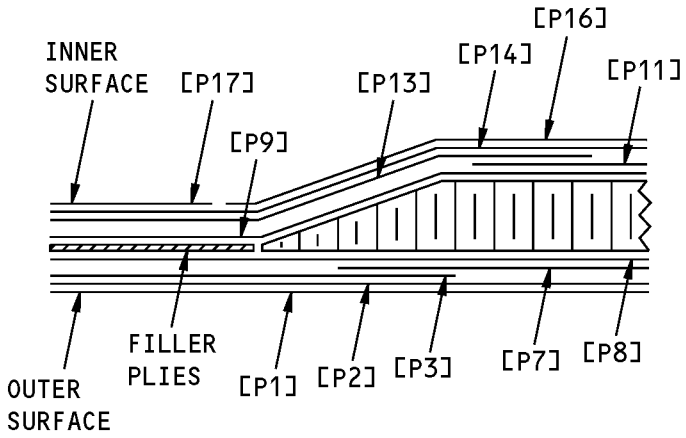
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [1]
Figure 3 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

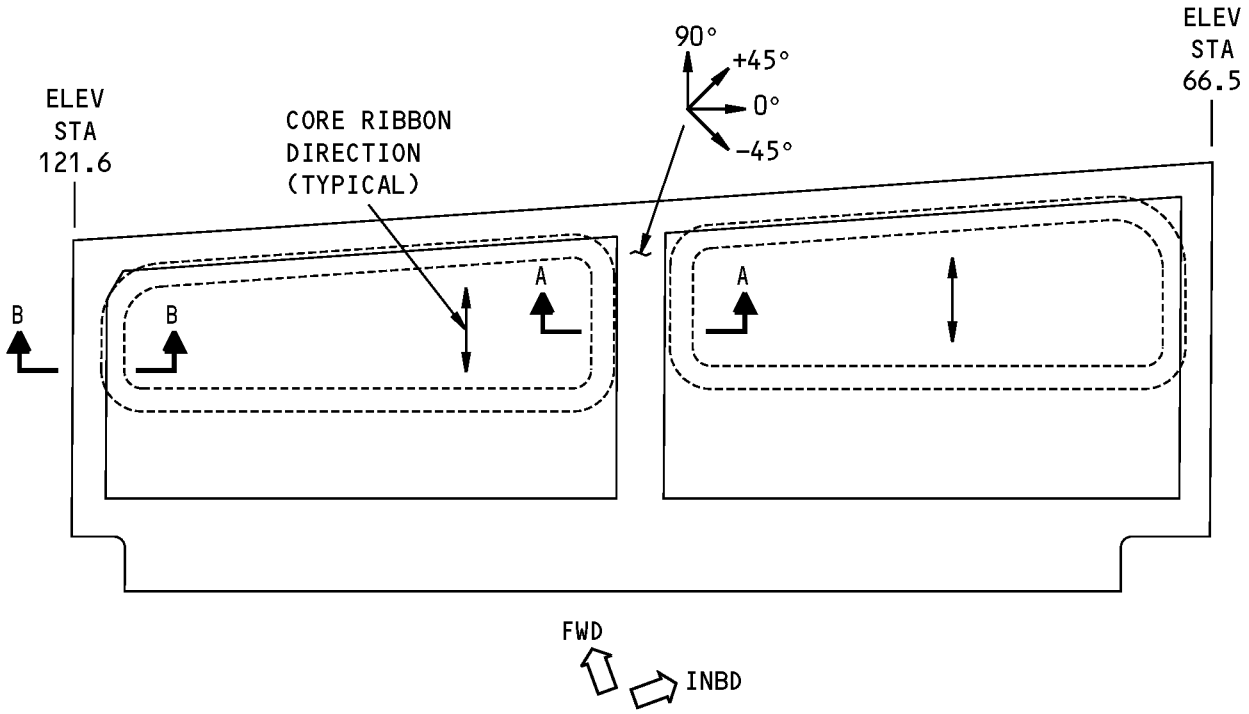


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [1]
Figure 3 (Sheet 2 of 2)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P14	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4, P8, P9, P13	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P5, P12	0 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P6, P7, P10, P11	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P15, P16	———	0.001 inch (0.025 mm) thick white bondable Tedlar film
P17	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86



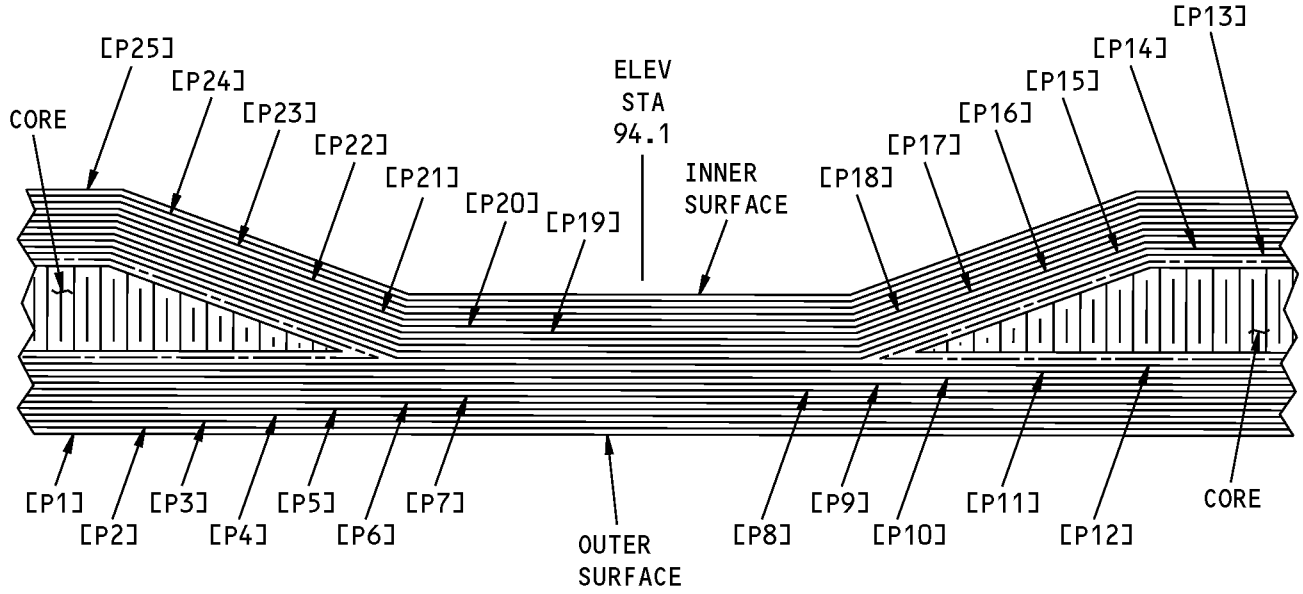
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

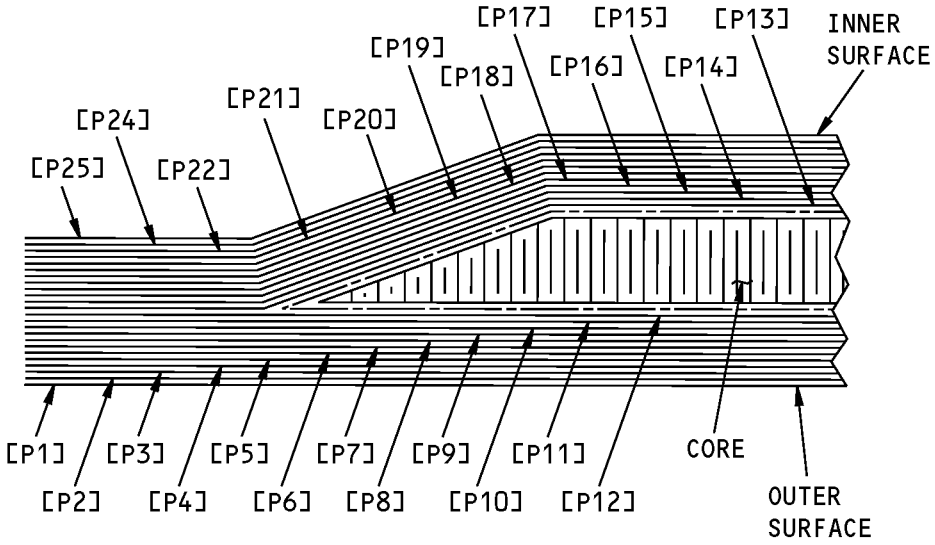
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Trailing Edge Panel, Figure 2, Item [2]
Figure 4 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

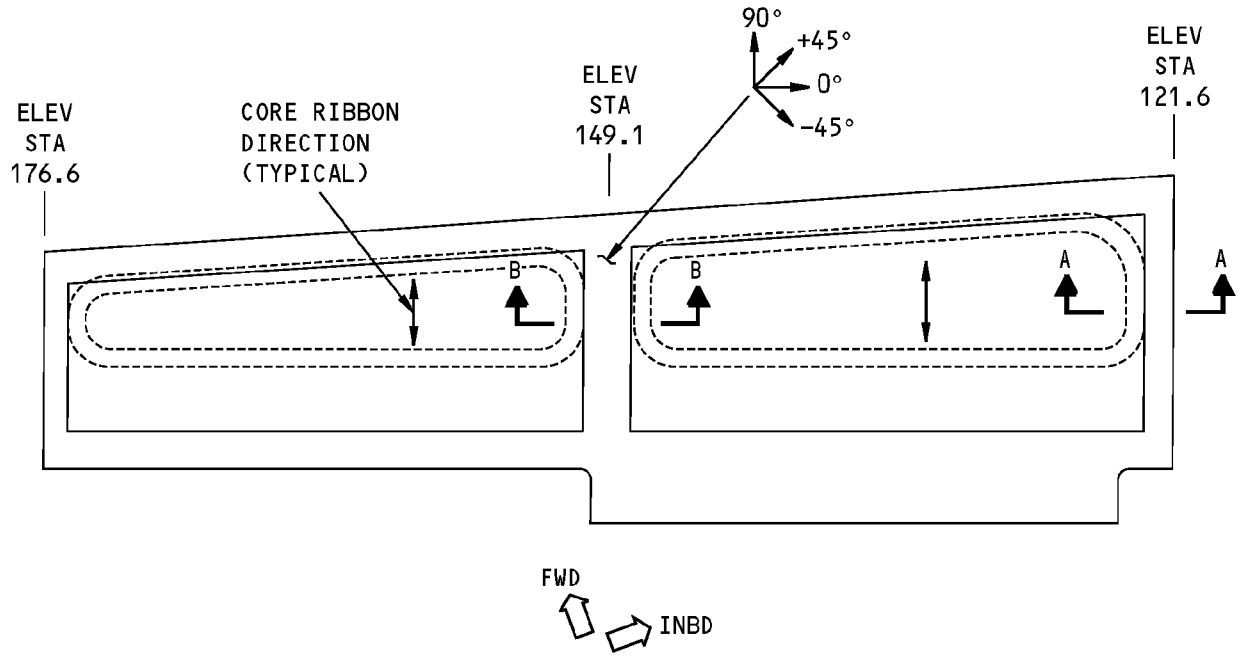


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Trailing Edge Panel, Figure 2, Item [2]
Figure 4 (Sheet 2 of 2)

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P23	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 120 or 1581
P3, P5, P6, P9, P10, P15, P16, P19, P20, P22	90 degrees	Unidirectional graphite tape as given in BMS 8-168, Type II, Class 1, Grade 190
P4, P7, P11, P14, P18, P21	0 or 90 degrees	Graphite fabric cloth as given in BMS 8-168, Type II, Class 2, Style 3K-70-PW
P8, P12, P13, P17	+ or - 45 degrees	Graphite fabric cloth as given in BMS 8-168, Type II, Class 2, Style 3K-70-PW
P24	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86
P25	———	0.001 inch (0.025 mm) thick white bondable Tedlar film



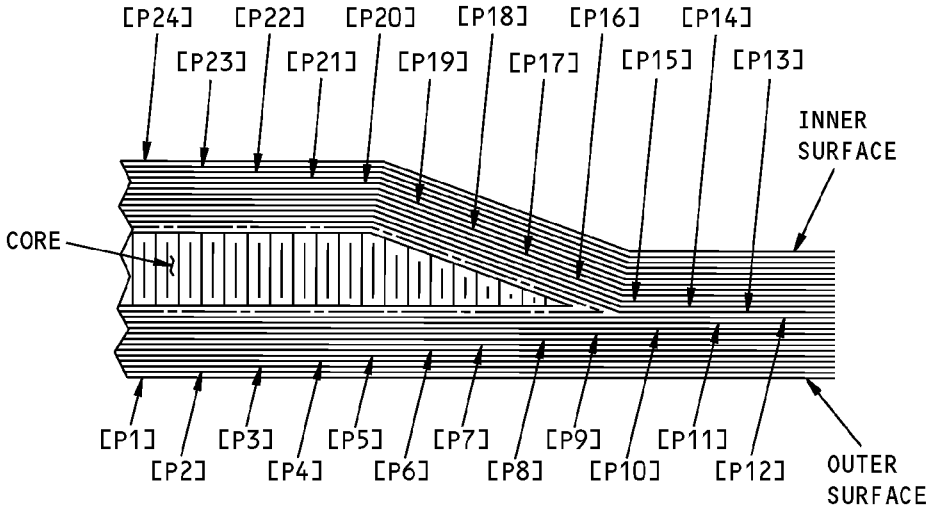
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

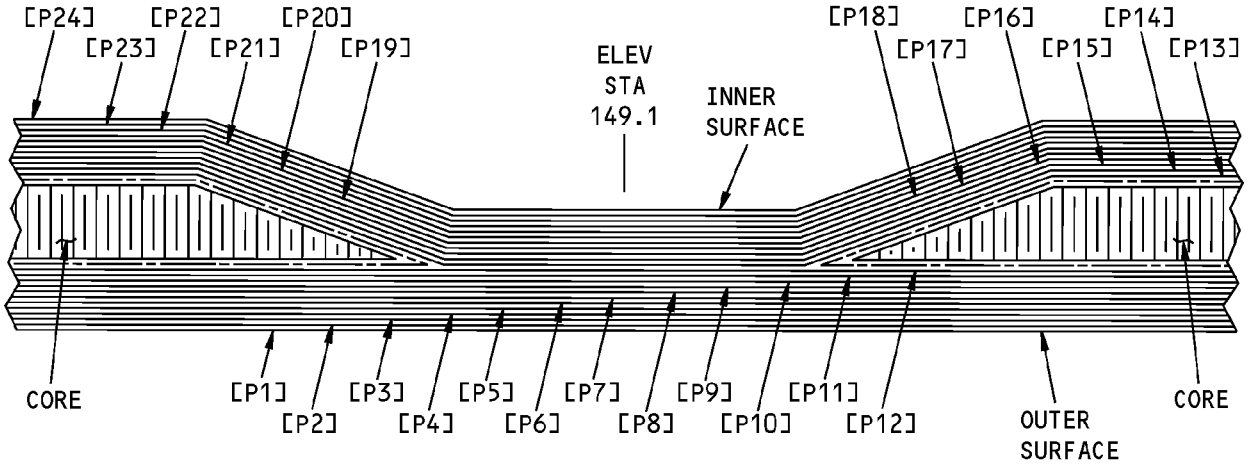
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Trailing Edge Panel, Figure 2, Item [3]
Figure 5 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

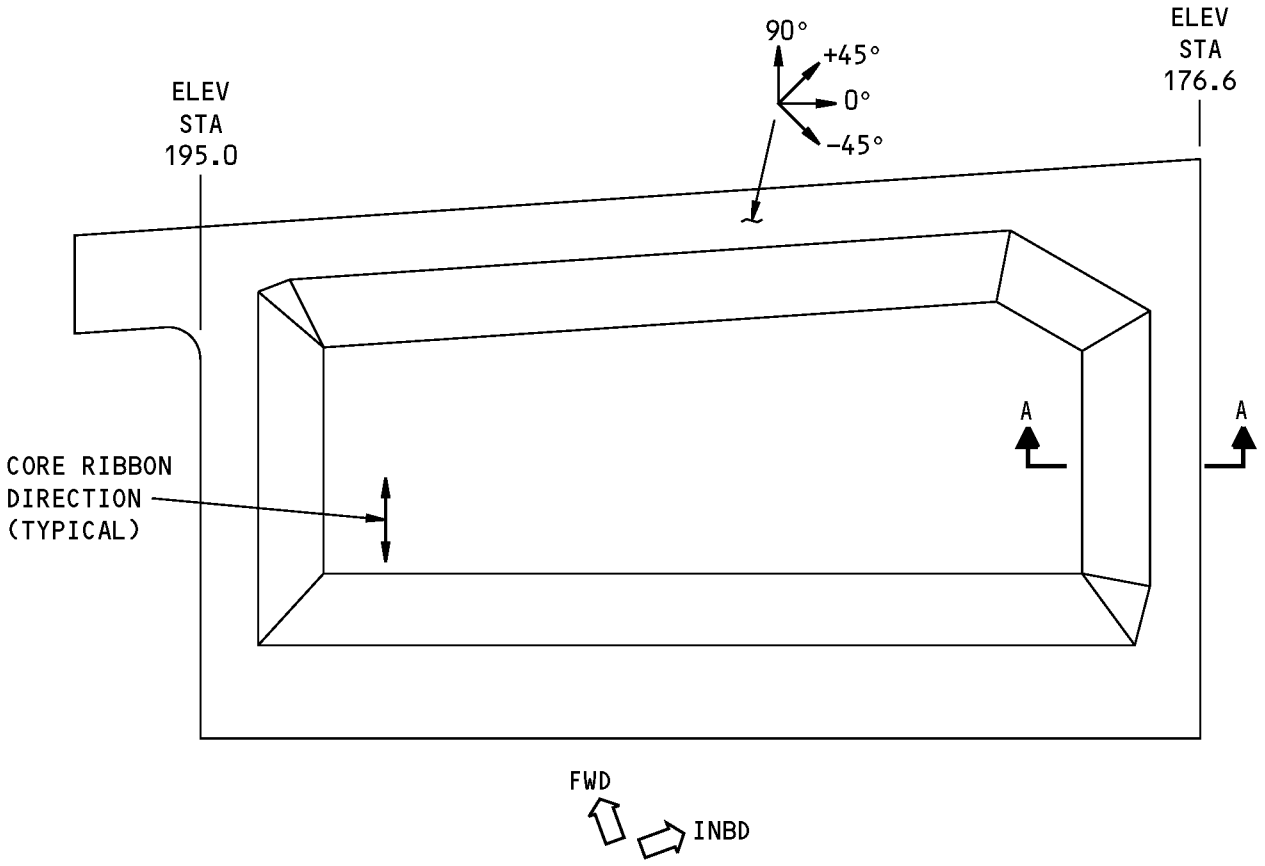


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Trailing Edge Panel, Figure 2, Item [3]
Figure 5 (Sheet 2 of 2)

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 5		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P23	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 120 or 1581
P3, P5, P6, P9, P10, P15, P16, P19, P20, P22	90 degrees	Unidirectional graphite tape as given in BMS 8-168, Type II, Class 1, Grade 190
P4, P7, P11, P14, P18, P21	0 or 90 degrees	Graphite fabric cloth as given in BMS 8-168, Type II, Class 2, Style 3K-70-PW
P8, P12, P13, P17	+ or - 45 degrees	Graphite fabric cloth as given in BMS 8-168, Type II, Class 2, Style 3K-70-PW
P24	———	0.001 inch (0.025 mm) thick white bondable Tedlar film
P25	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86



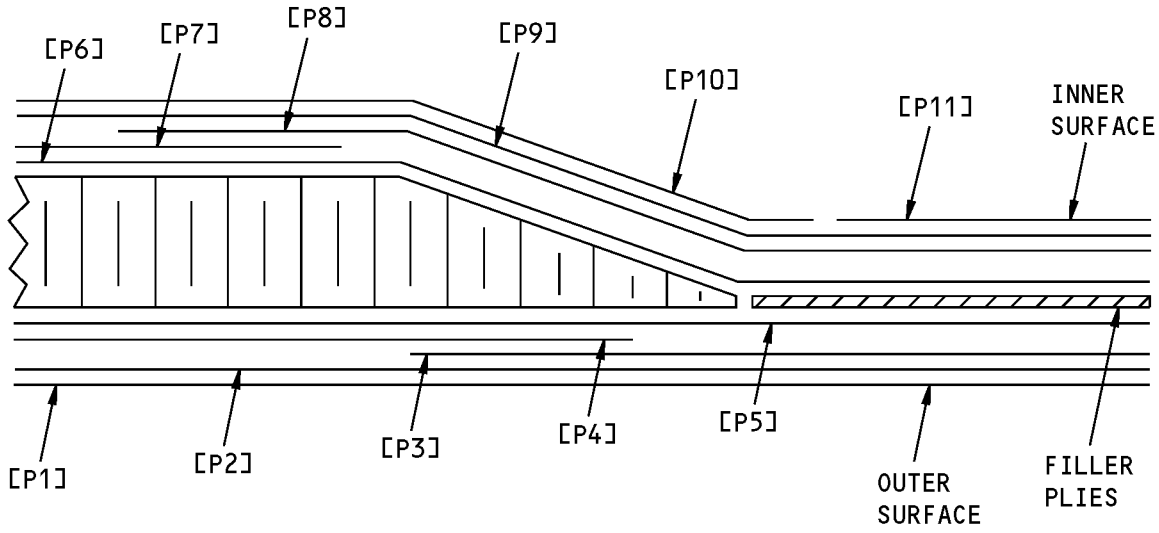
PLY LAYUP AND CORE RIBBON DIRECTION

A

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 6 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [4]
Figure 6 (Sheet 1 of 2)

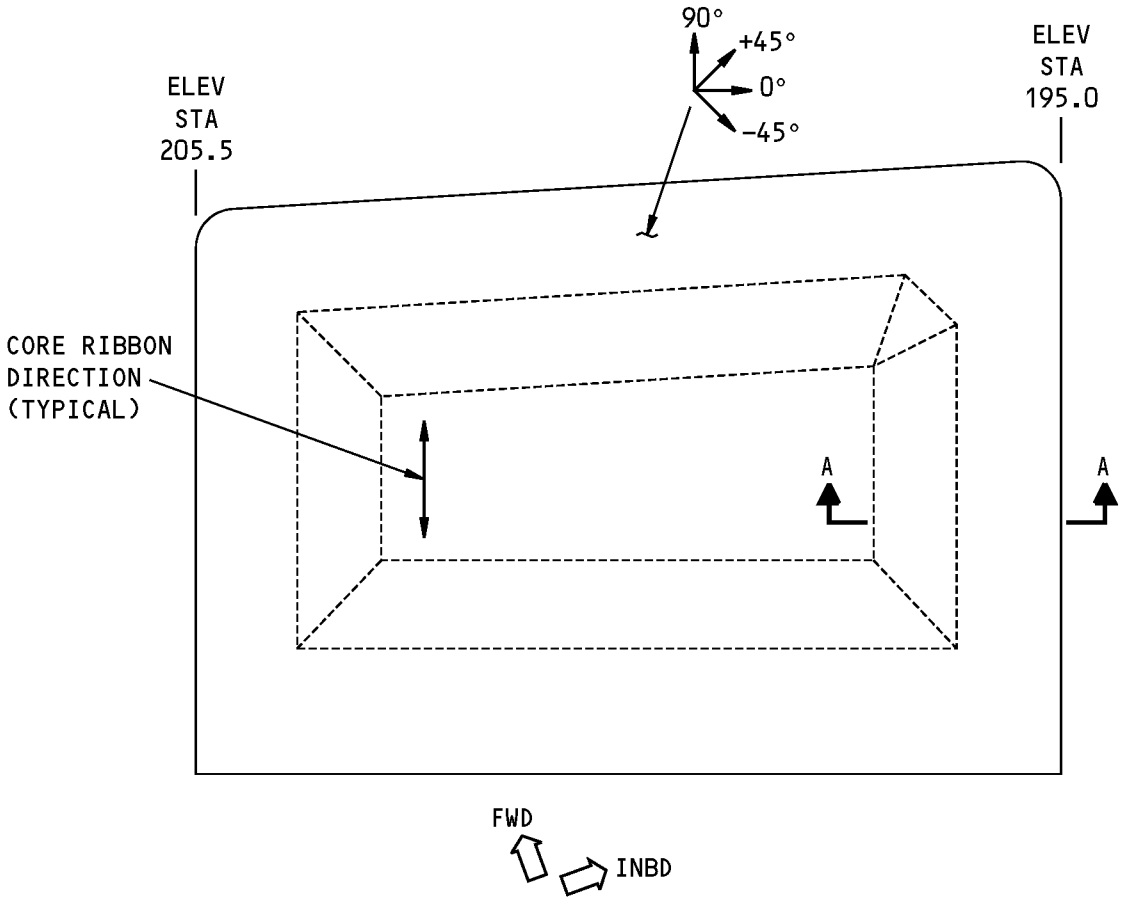


PLY LAYUP SEQUENCE
A-A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [4]
Figure 6 (Sheet 2 of 2)

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P9	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P5, P6, P8	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P4, P7	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P10	———	0.001 inch (0.025 mm) thick white bondable Tedlar film
P11	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86



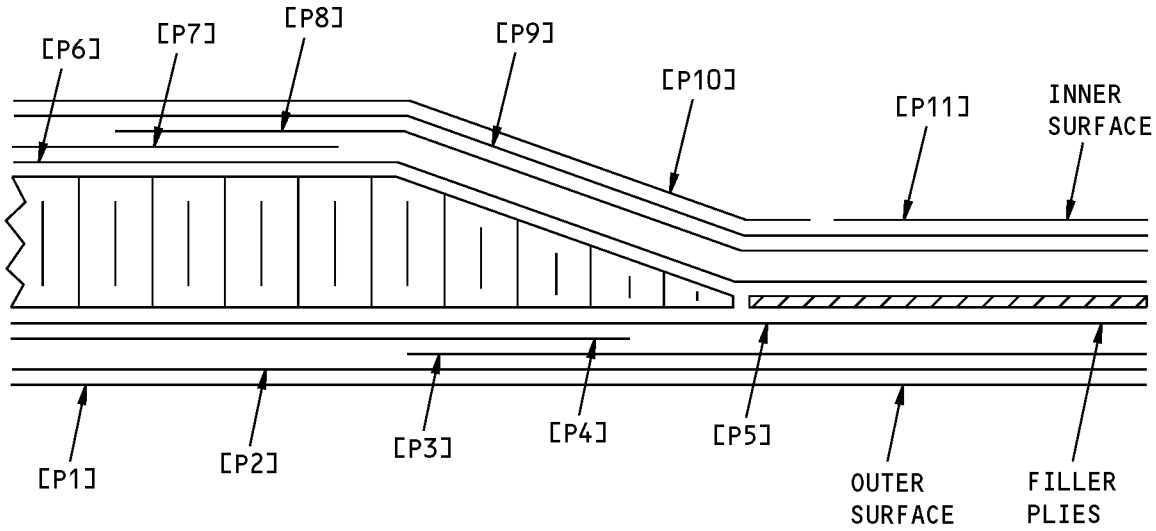
PLY LAYUP AND CORE RIBBON DIRECTION

A

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 7 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

**Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [5]
Figure 7 (Sheet 1 of 2)**

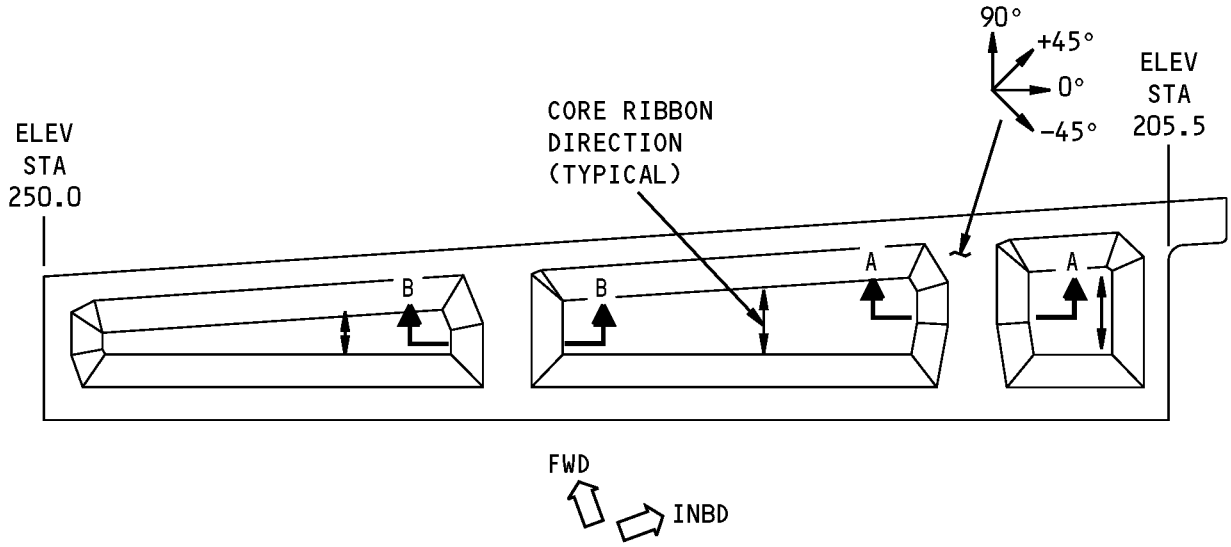


PLY LAYUP SEQUENCE
A-A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [5]
Figure 7 (Sheet 2 of 2)

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 7		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P9	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P5, P6, P8	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P4, P7	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P10	———	0.001 inch (0.025 mm) thick white bondable Tedlar film
P11	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86



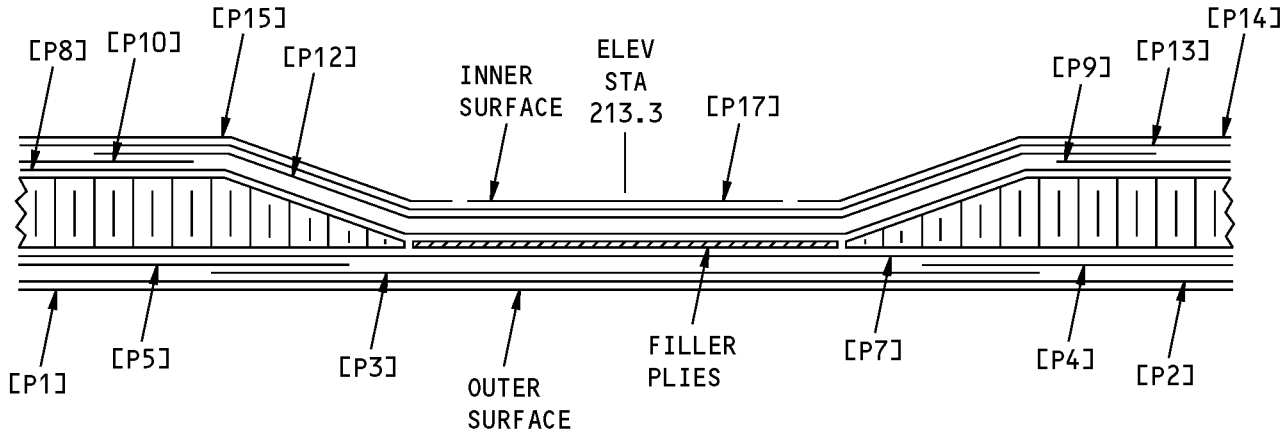
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

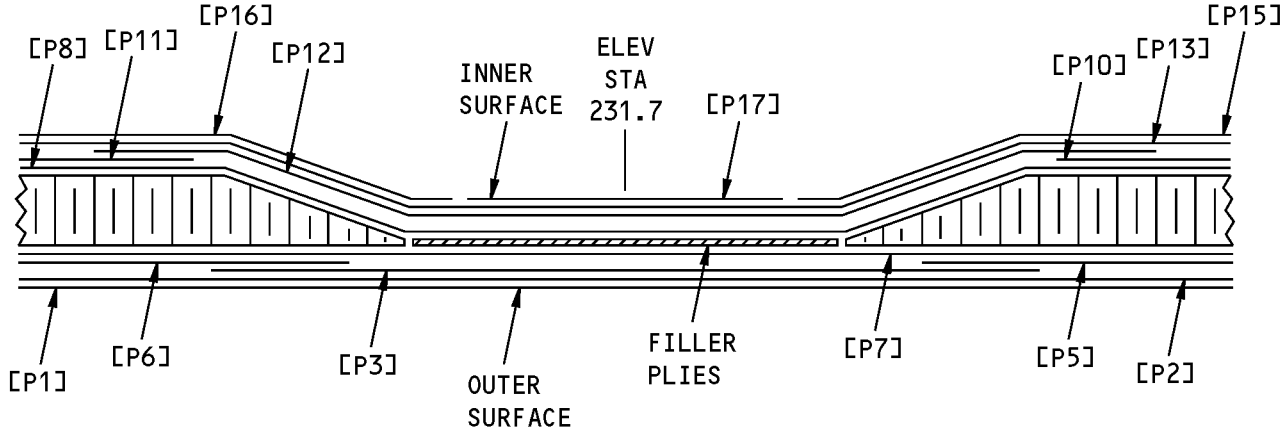
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 8 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [6]
Figure 8 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

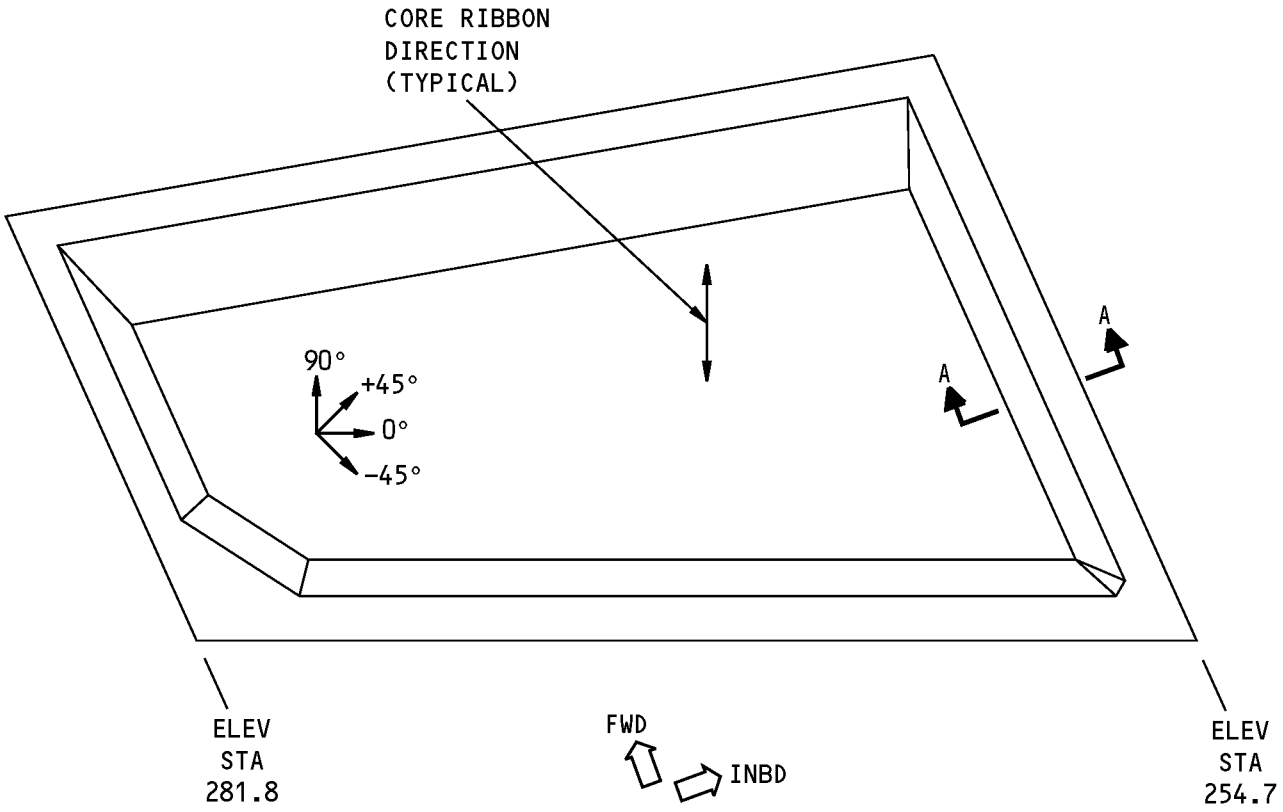


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [6]
Figure 8 (Sheet 2 of 2)

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 8		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P13	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P7, P8, P12	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P4, P5, P6, P9, P10, P11	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P14, P15, P16	———	0.001 inch (0.025 mm) thick white bondable Tedlar film
P17	———	0.001 inch (0.025 mm) thick teflon film as given in BMS 10-86



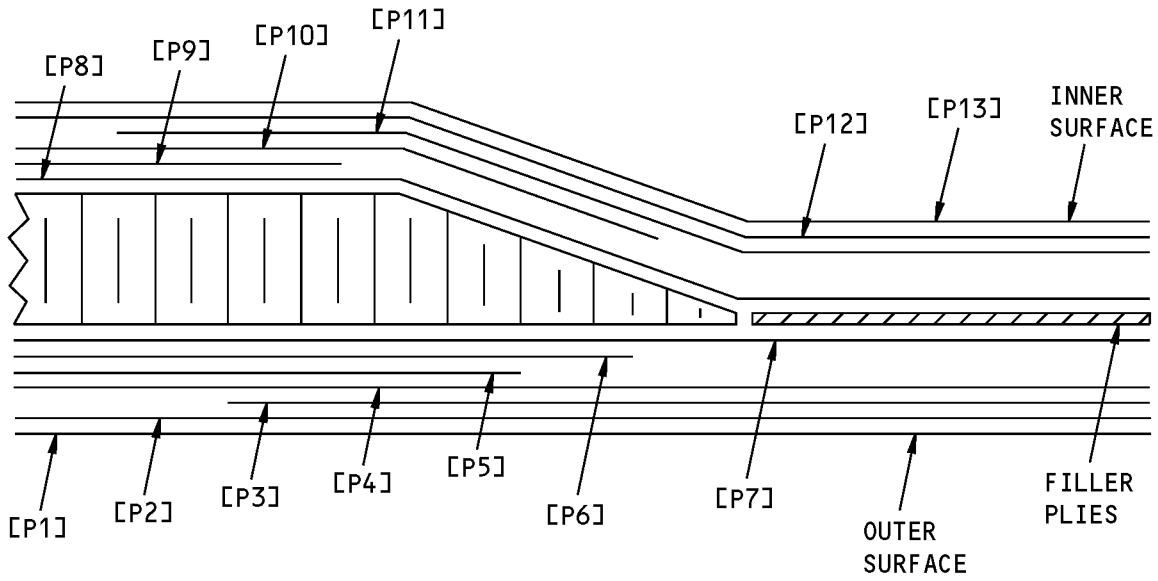
PLY LAYUP AND CORE RIBBON DIRECTION

A

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO THE ENGINEERING DRAWING FOR THE PLY LAYUP AT THE EDGES OF THE PANEL.
- REFER TO TABLE 9 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

**Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [7]
Figure 9 (Sheet 1 of 2)**



PLY LAYUP SEQUENCE
A–A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Trailing Edge Panel, Figure 2, Item [7]
Figure 9 (Sheet 2 of 2)

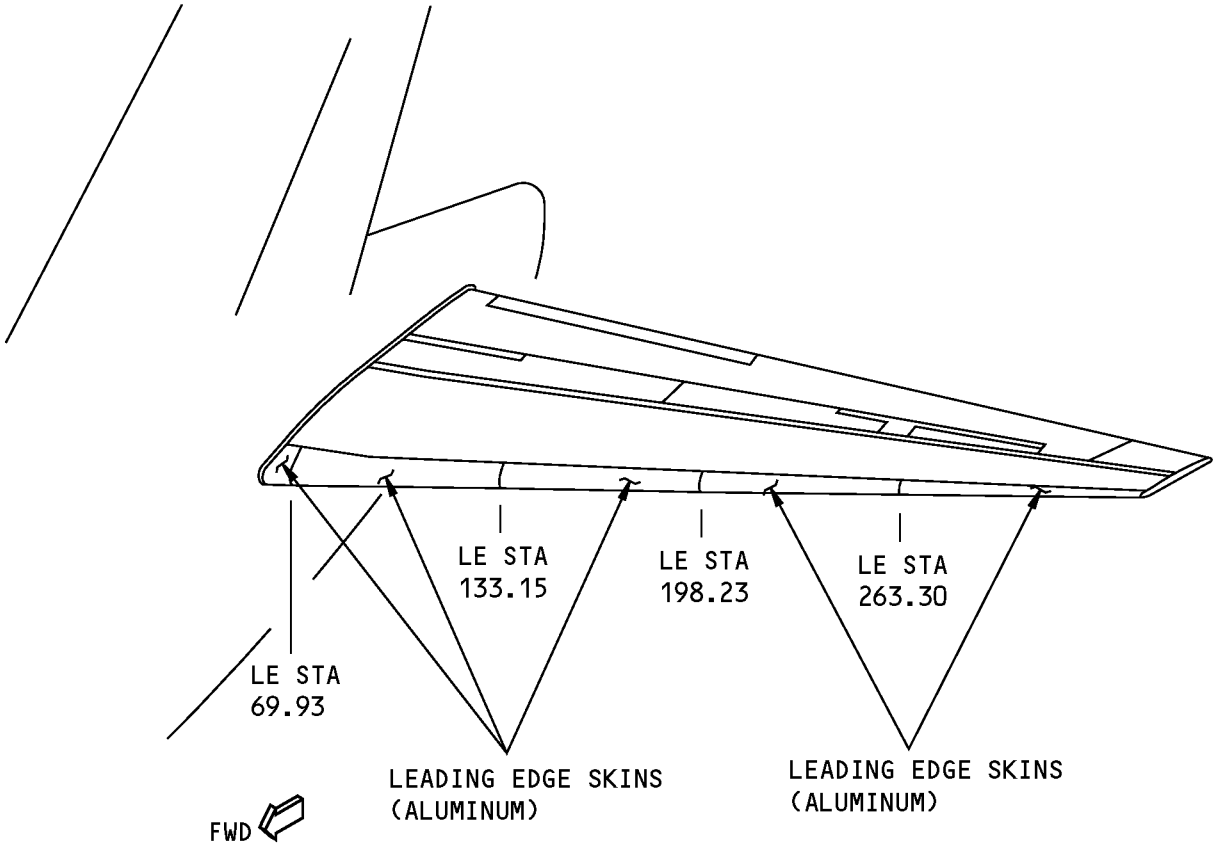
Table 9:

PLY MATERIAL AND DIRECTION FOR FIGURE 9		
PLY	**DIRECTION**	**MATERIAL**
P1	———	BMS 5-129, Type 2, Grade 5, is preferred. (Optional: BMS 8-341, Type II (METALBOND 1515-3M film adhesive) or Type III (SYNSKIN HC9837.1 composite surfacing film)). (Optional: Toolside surface treatment)
P2, P12	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4, P7, P8, P11	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P5, P10	0 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P6, P9	90 degrees	CFRP unidirectional tape as given in BMS 8-168, Type II, Class I, Grade 145
P13	———	0.001 inch (0.025 mm) thick white bondable Tedlar film

ALLOWABLE DAMAGE 1 - HORIZONTAL STABILIZER LEADING EDGE SKINS

1. Applicability

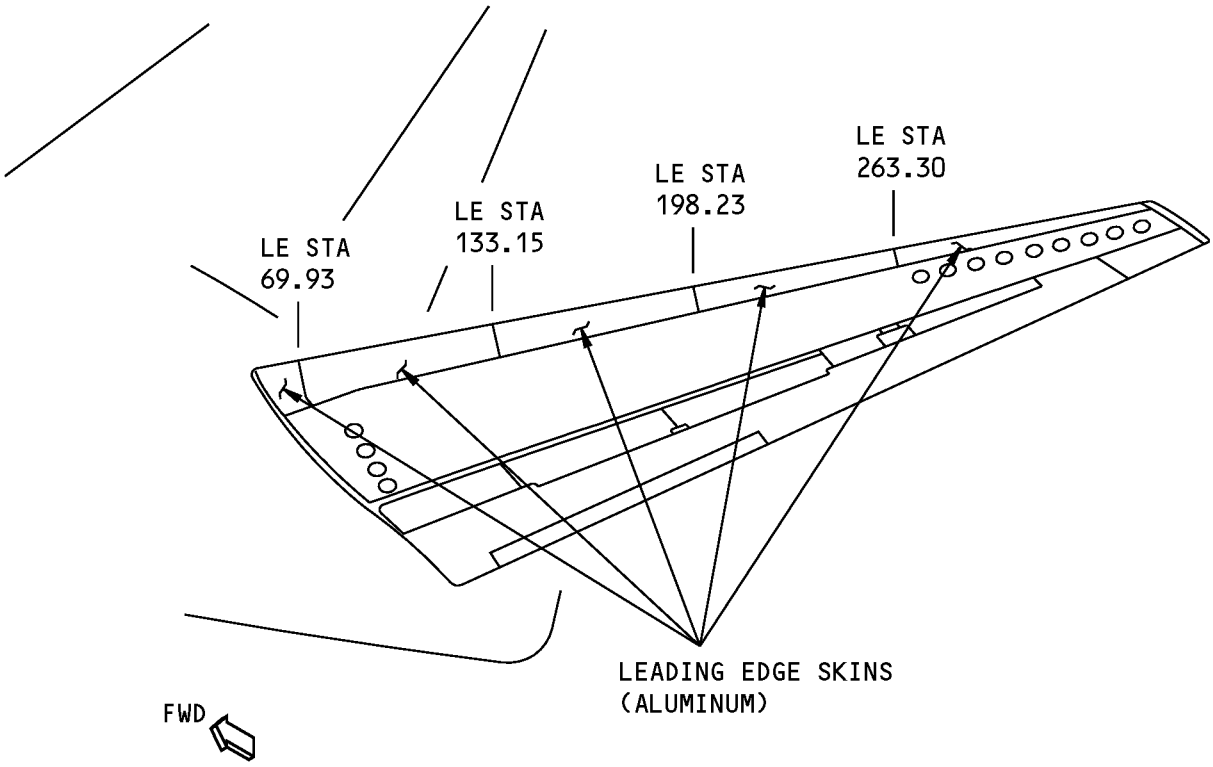
A. This subject gives the allowable damage limits for the horizontal stabilizer leading edge skins shown in Horizontal Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 1.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Leading Edge Skin Locations
Figure 101 (Sheet 1 of 2)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Leading Edge Skin Locations
Figure 101 (Sheet 2 of 2)

2. General

A. Remove the damaged material as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) If countersink rivets are removed to clean up the damage, then do the steps that follow:

(a) Install new rivets that have the same material and diameter as the initial rivets.

1) Use oversize rivets as necessary.

2) It is optional to install NAS1399D blind rivets.

3) If you install the NAS1399D blind rivets, make an inspection at each 400 flight hour interval.

4) Replace the blind rivets with solid rivets after no more than 5000 flight hours.

(b) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

1) The maximum head height that is permitted above the skin is 0.006 inch.

B. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

C. Apply two layers of BMS 10-79, Type II or III, primer to the reworked areas. Refer to SOPM 20-44-04.

D. Apply the decorative finish to the reworked areas as given in AMM PAGEBLOCK 51-21-99/701.

E. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-01	REPAIRS FOR MINOR DENTS IN METALLIC SHEET MATERIALS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Cracks:

(1) Damage is permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail A.

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, D, and E.

(a) Only one area of damage removal, as shown in Detail D, is permitted for each 15.0 square inches of panel.

C. Holes and Punctures are permitted if:

(1) They are a maximum of 0.25 inch in diameter

(2) There is not more than one hole or puncture for each 15.0 square inches of panel area

(3) The edge of the damage is a minimum of 1.00 inch away from the edge of a fastener hole, other damage, or the panel.

(4) They are filled with a 2117-T3 or 2117-T4 aluminum flush head rivet.

(a) If the head is above the skin, use the microshave flush procedure as specified in 51-10-01.

(b) It is optional to install a 2117-T3 or 2117-T4 aluminum protruding head rivet, or a NAS1399D blind rivet. Do the steps that follow when you install the blind rivets:

1) Make an inspection of blind rivets at each 400 flight hour interval.

2) Replace the blind rivets with solid rivets after no more than 5000 flight hours.

D. Dents:

(1) Dents are permitted for the general conditions of Paragraph 4.D.(2)/ALLOWABLE DAMAGE 1 and for the specified conditions of Paragraph 4.D.(3)/ALLOWABLE DAMAGE 1

(a) Refer to Definition of Dent Dimensions, Figure 103/ALLOWABLE DAMAGE 1 for the definitions of the dimensions for a dent.

(b) Refer to Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 for the relation of dent dimensions.

(c) Refer to Damage Size and Spacing Limits for Adjacent Dents, Figure 105/ALLOWABLE DAMAGE 1 for the definition of the dimensions for adjacent dents.

(d) Refer to Equivalent Length of Dents When the Depth is Large, Figure 106/ALLOWABLE DAMAGE 1 for the definition of the length if there is more than one dent in a bay.

(2) General Conditions:

(a) The edge of the damage is a minimum of 1.0 inch away from a hole.

(b) There are no pulled or loose fasteners or missing fastener locations.

(c) There are no sharp creases, gouges, or cracks.

(d) There is no damage to the structure that is below the skin panels.

(e) There are no dents at the rib chord locations.

(f) The conditions of Table 101/ALLOWABLE DAMAGE 1 are kept.

Table 101:

CONDITIONS FOR THE LOCATIONS AND QUANTITY OF DENTS	
DEPTH OF DENT (Y), INCH	LIMITS FOR PERMITTED DENTS
If (Y) is more than or equal to 0.50 but less than 1.0	There must be 5 bays that are not damaged on each side of the damaged bay. There must be no other damage in the damaged bay
If (Y) is more than or equal to 0.40 but less than 0.50	There must be 3 bays that are not damaged on each side of the damaged bay. There must be no other damage in the damaged bay
If (Y) is more than or equal to 0.30 but less than 0.40	There must be 2 bays that are not damaged on each side of the damaged bay

CONDITIONS FOR THE LOCATIONS AND QUANTITY OF DENTS	
If (Y) is more than or equal to 0.20 but less than 0.30	There must be 1 bay that is not damaged on each side of the damaged bay

(3) Specified Conditions:

(a) Dents are permitted in Area 1 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1.

1) For dents that are more than the limits shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 1, fill the dents as given in 51-70-01.

(b) Dents are permitted in Area 2 if you make an inspection of the damage after no more than 5000 flight hours. Refer to Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1.

NOTE: It is recommended that you remove or repair the damage after no more than 5000 flight hours or 18 months, that which occurs first.

1) For dents that are more than the limits shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 1, fill the dents as given in 51-70-01.

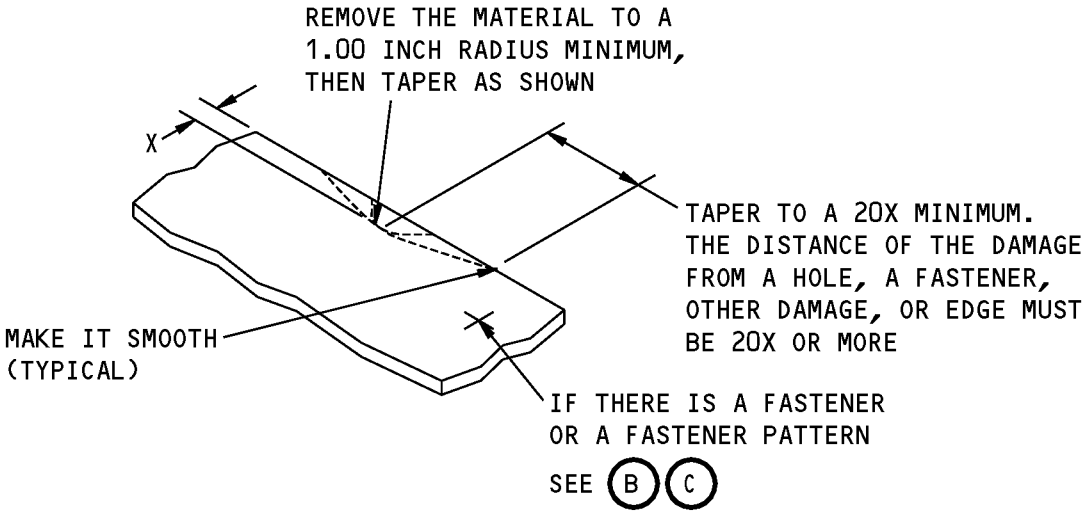
(c) Dents are permitted in Area 3 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 if you do the steps that follow:

1) Fill the dent as given in 51-70-01.
2) Seal the damage with 3M-436 aluminum foil tape (speed tape) or the equivalent.
3) Make a detailed visual inspection of the damage at each 400 flight hour interval. If there are cracks or the damage has become larger, repair the damage immediately.
4) Install a permanent repair after no more than 5000 flight hours or 18 months, that which occurs first.

(d) Dents are permitted in Area 4 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 if you do the steps that follow:

1) For dents with a depth less than 0.50 inch, fill the dent as given in 51-70-01.
2) For dents with a depth equal to or greater than 0.50 inch, do the steps that follow:
   a) Fill the dent as given in 51-70-01.
   b) Fill half of the depth of the dent with potting compound and permit it to fully cure.
   c) Fill the remaining depth of the dent and permit the compound to fully cure.

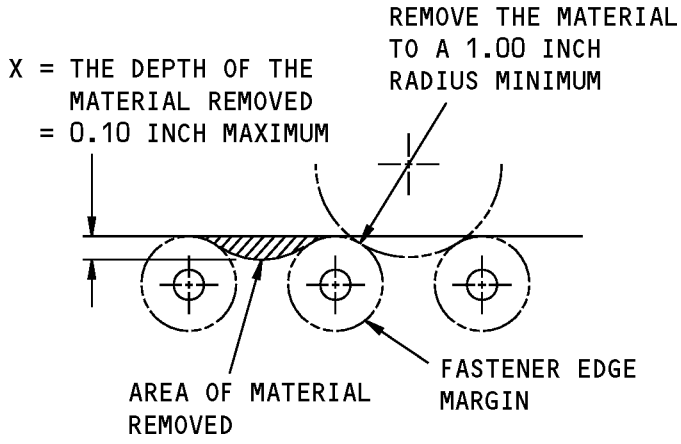
   NOTE: BMS 5-92 adhesive is the better alternative to the potting compounds given in 51-70-01.
3) Seal the damage with 3M-436 aluminum foil tape (speed tape) or the equivalent.
4) Make a general visual inspection of the potting compound each day after removal of the aluminum foil tape (speed tape). If there are cracks or the damage has become larger, repair the damage immediately.
5) Install an external doubler repair with blind fasteners or a permanent flush repair in 90 days. If you do a repair that has blind rivets, do the steps that follow:
   a) Make an inspection of blind fastener repairs at each 400 flight hour interval
   b) Replace the blind fastener repair with a permanent flush repair after no more than 5000 flight hours.



X = THE DEPTH OF THE MATERIAL REMOVED
= 0.10 INCH MAXIMUM

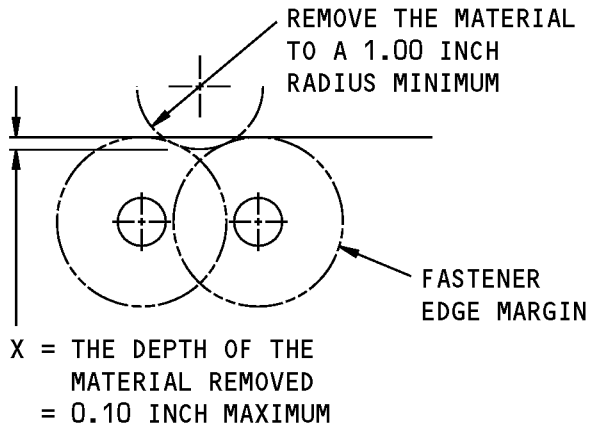
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

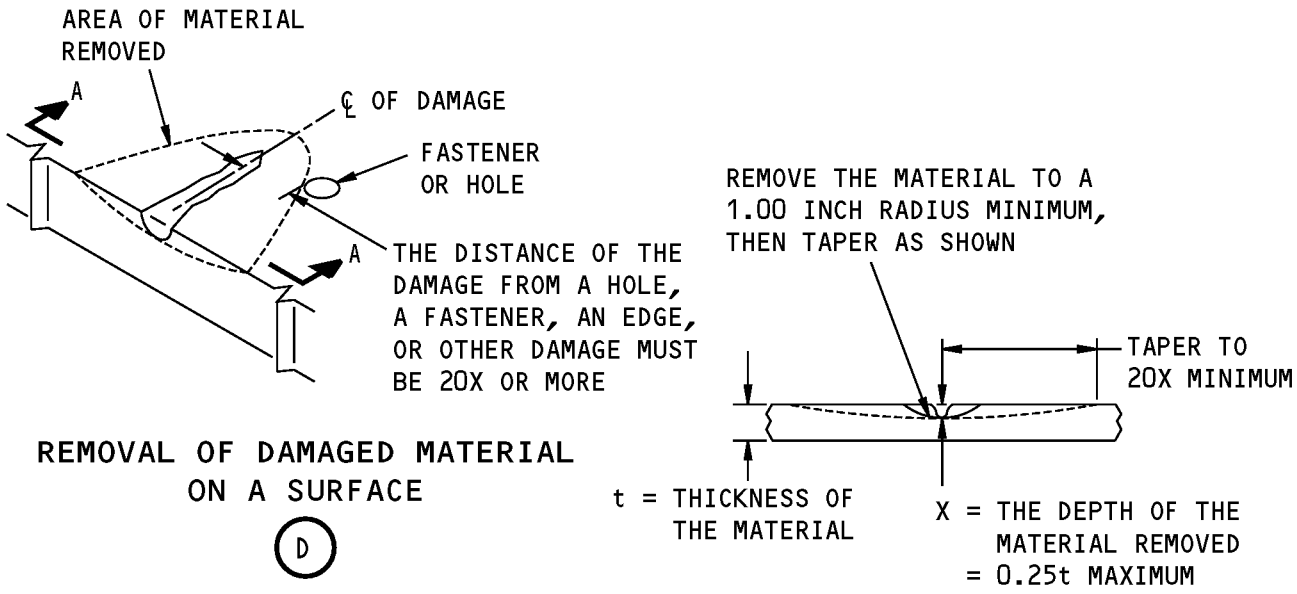
B

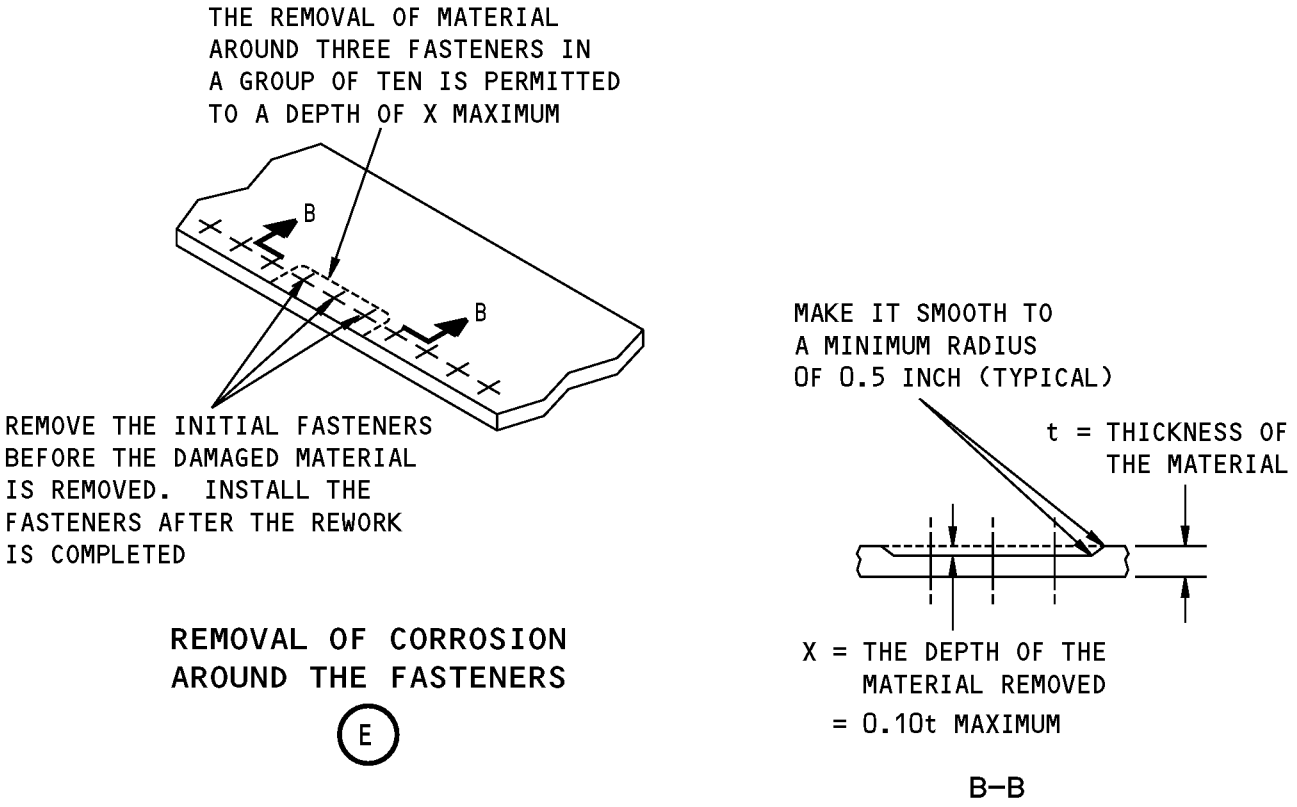


REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

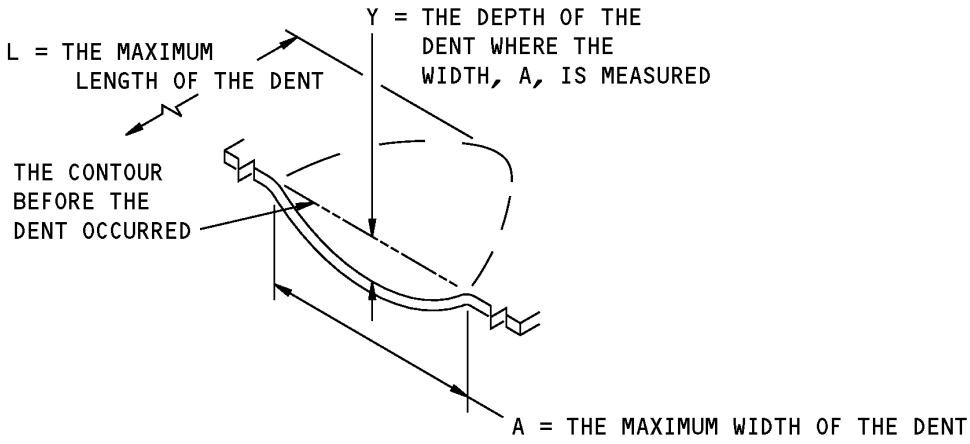
C

Allowable Damage Limits
Figure 102 (Sheet 1 of 2)

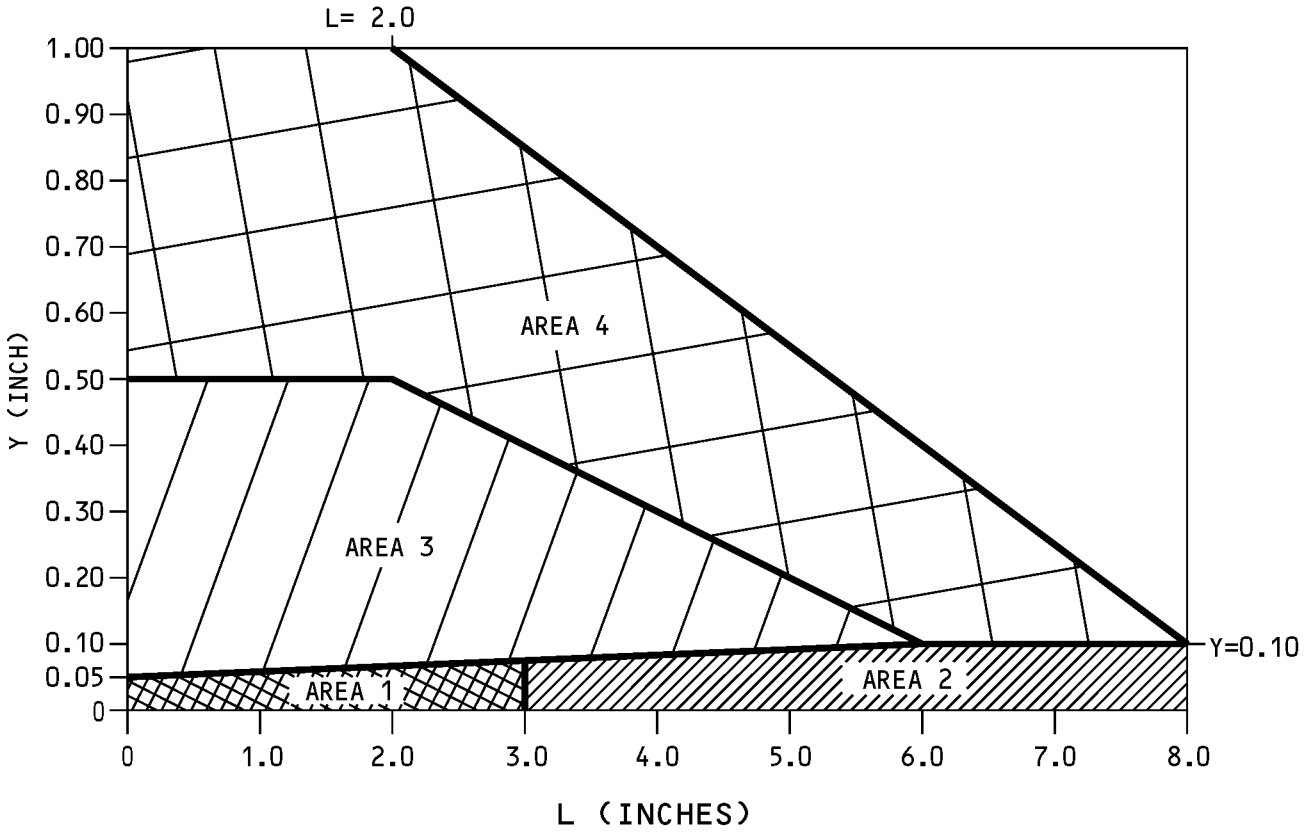




Allowable Damage Limits
Figure 102 (Sheet 2 of 2)



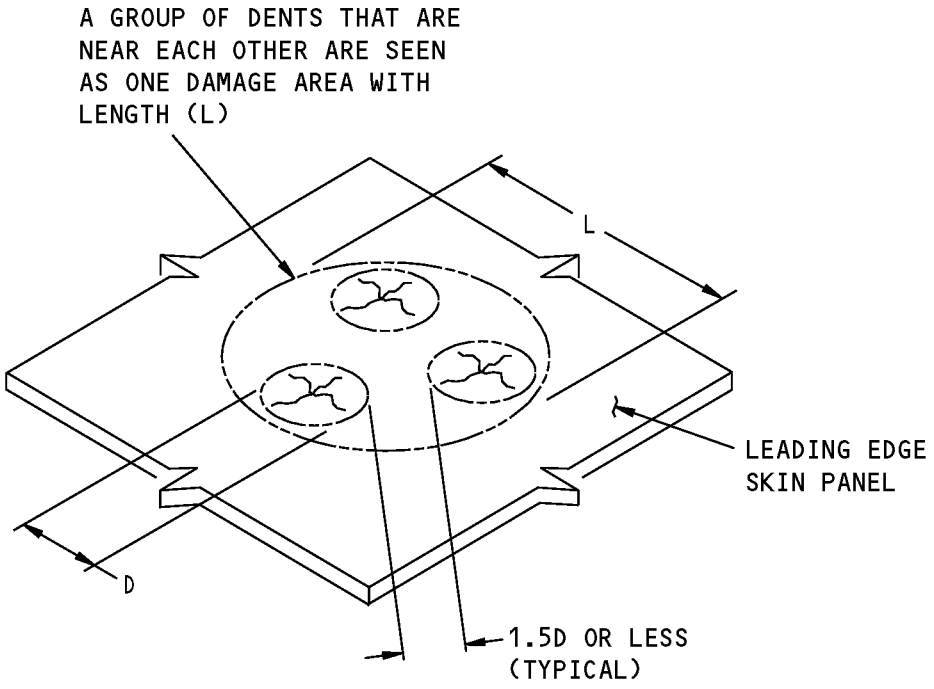
Definition of Dent Dimensions
Figure 103



FOR AREA NUMBER	REFER TO ALLOWABLE DAMAGE PARAGRAPH
1	4. D. (3) (a)
2	4. D. (3) (b)
3	4. D. (3) (c)
4	4. D. (3) (d)

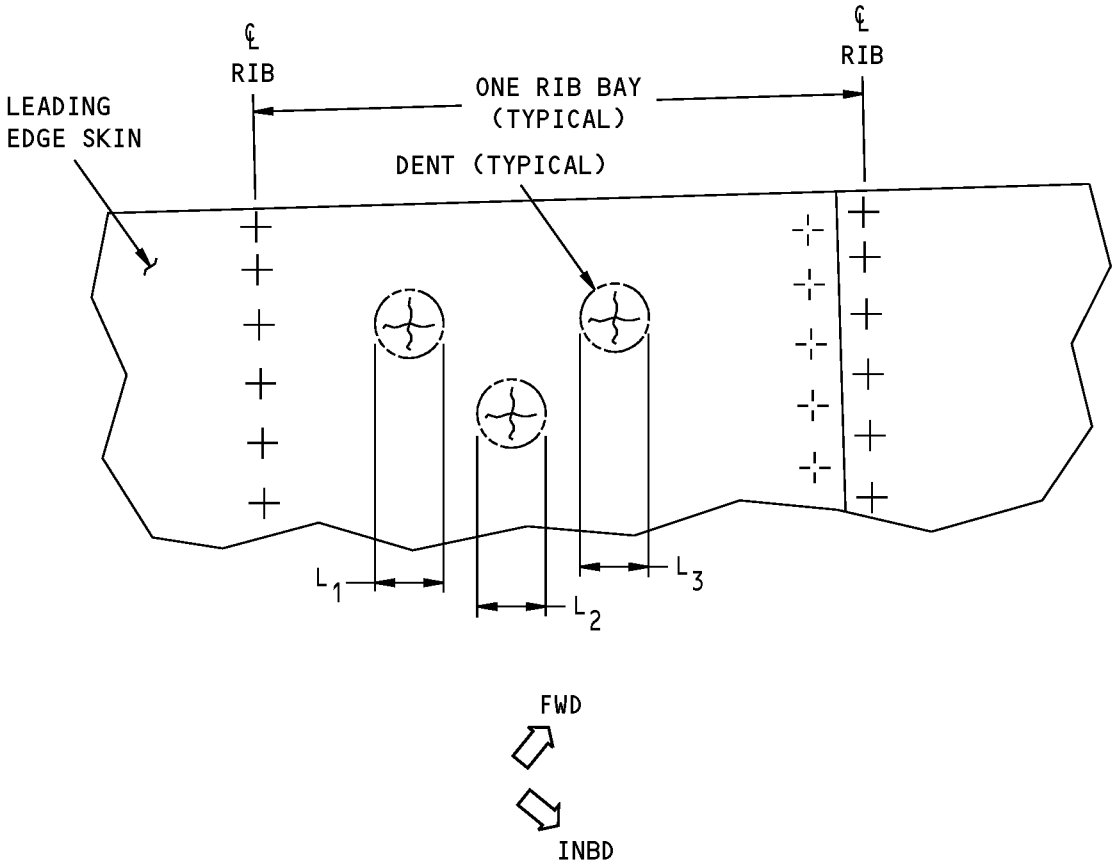
TABLE A

Allowable Damage Limits for Leading Edge Skin Dents
Figure 104



NOTE: D IS THE LARGEST LENGTH OF THE ADJACENT DENTS.

Damage Size and Spacing Limits for Adjacent Dents
Figure 105



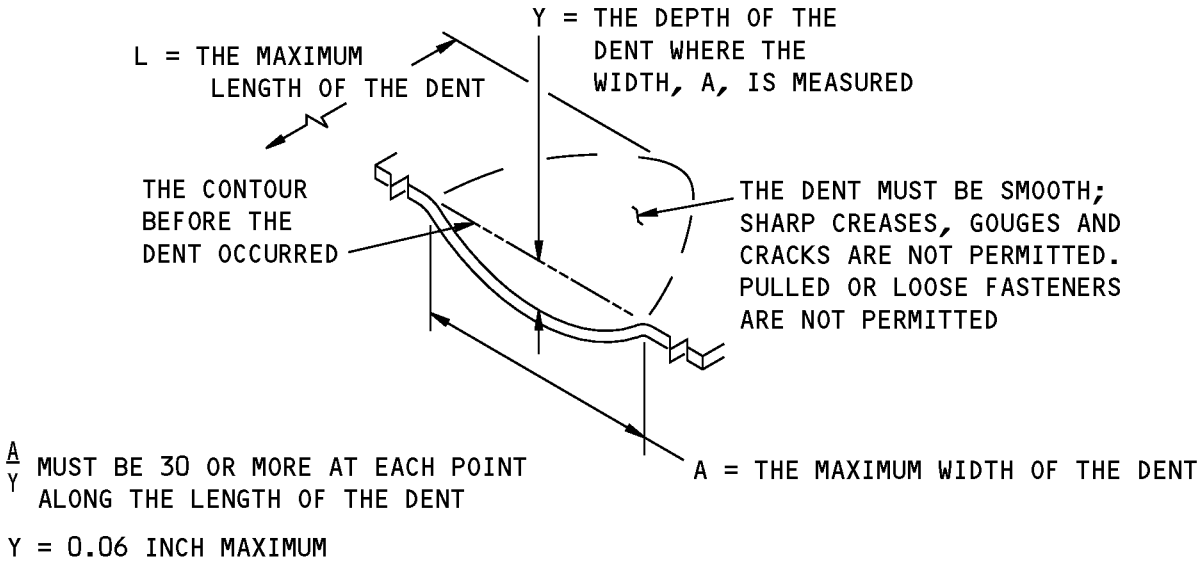
NOTE: IF THE DEPTH OF THE DENT IS 0.050 INCH OR MORE, THEN

1) ADD THE LENGTH OF EACH DENT TO GET THE EQUIVALENT LENGTH (L) OF THE DENTS.

$L = L_1 + L_2 + L_3$

2) AND APPLY THE ALLOWABLE DAMAGE LIMITS FOR ONE DENT.

Equivalent Length of Dents When the Depth is Large
Figure 106



DENT THAT IS PERMITTED

(A)

Allowable Damage Limits
Figure 107

ALLOWABLE DAMAGE 2 - HORIZONTAL STABILIZER INSPAR SKINS

1. Applicability

A. This subject gives the allowable damage limits for the horizontal stabilizer inspar skins shown in Horizontal Stabilizer Upper Inspar Skin Location, Figure 101/ALLOWABLE DAMAGE 2 and Horizontal Stabilizer Lower Inspar Skin Location, Figure 102/ALLOWABLE DAMAGE 2.

2. General

A. Remove the damaged material as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) If countersink rivets are removed to clean up the damage, then do the steps that follow:

(a) Install new rivets that have the same material and diameter as the initial rivets.

1) Use oversize rivets as necessary.

2) It is optional to install solid protruding head rivets with countersink washers.

(b) Make sure the countersink depth is not more than 80 percent of the skin thickness.

(c) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

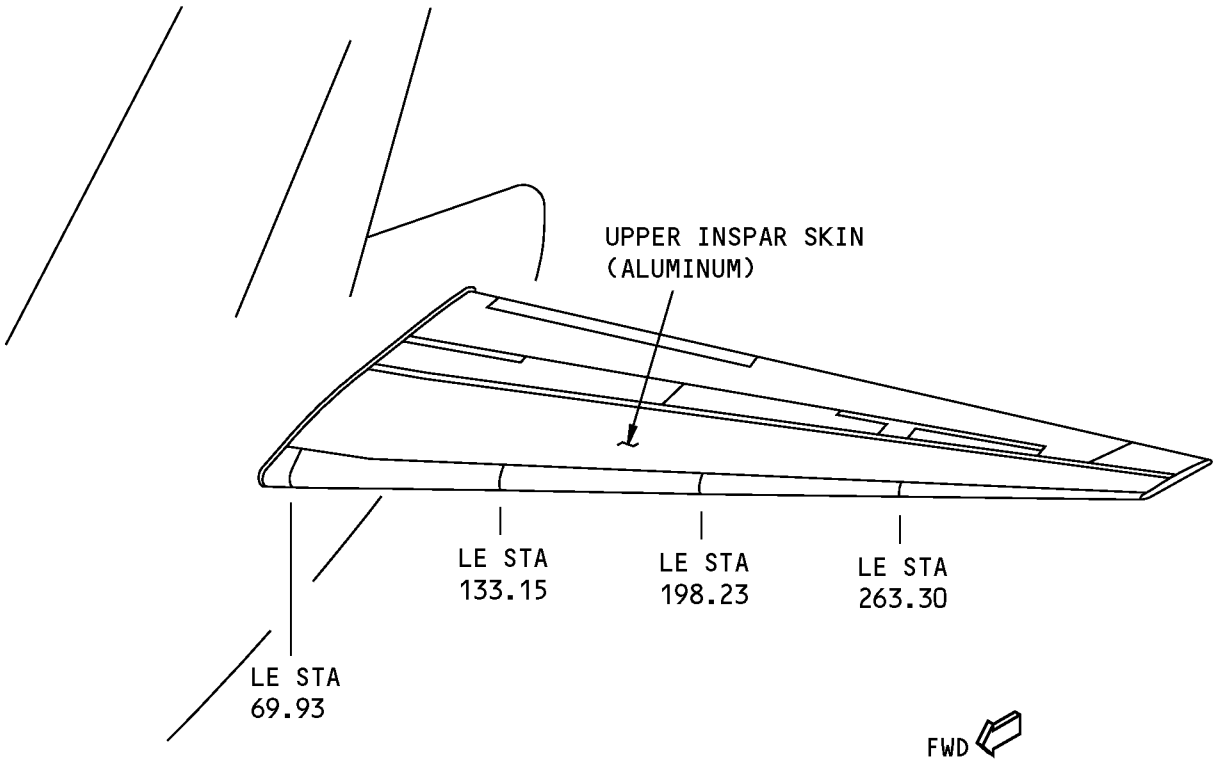
1) The maximum head height that is permitted above the skin is 0.006 inch.

B. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

C. Apply two layers of BMS 10-79, Type II or III, primer to the reworked areas. Refer to SOPM 20-44-04.

D. Apply the decorative finish to the reworked areas as given in AMM PAGEBLOCK 51-21-99/701.

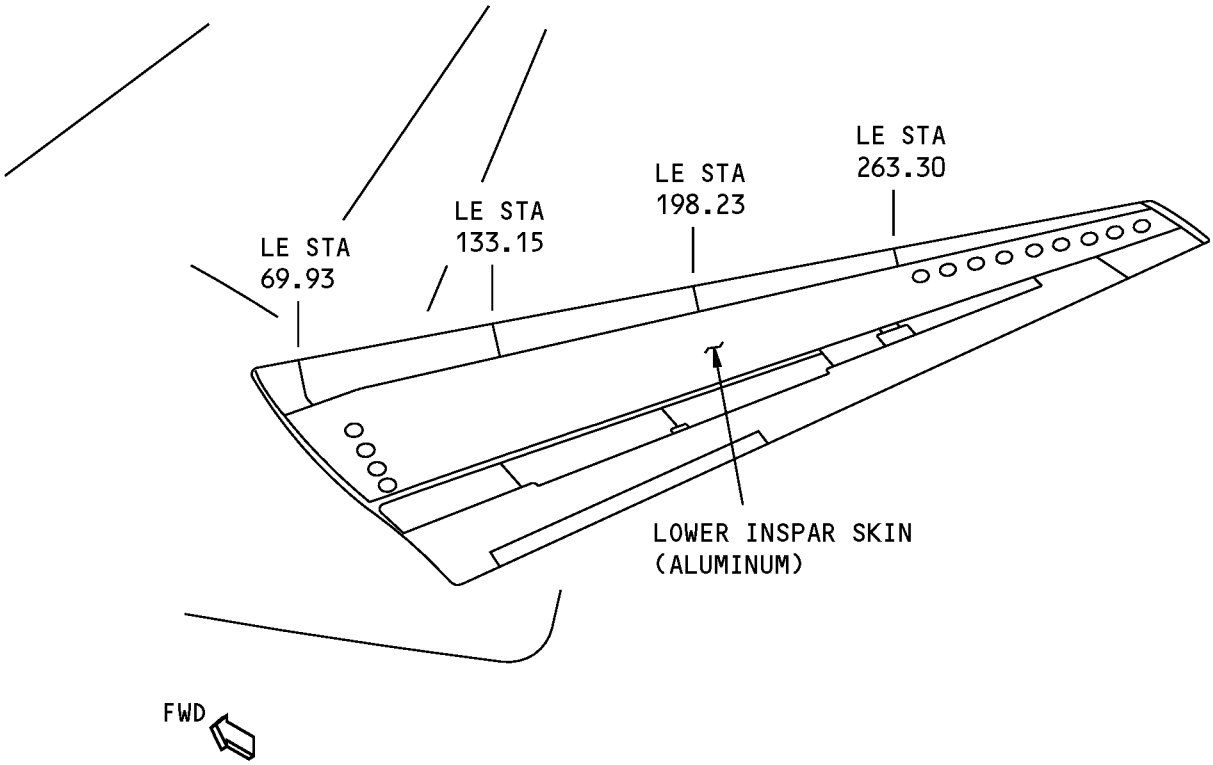
E. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Inspar Skin Location
Figure 101



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Inspar Skin Location
Figure 102

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Cracks:

(1) Damage is permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Detail A.

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, D, F, G, H, and I.

(a) Only one area of damage removal, as shown in Detail D, is permitted for each 15.0 square inches of panel.

C. Dents are permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Detail E if:

(1) The edge of the dent is a minimum 4D from the edge of any other damage. D is the maximum dimension of the largest damage.

Table 101:

PERCENT OF CROSS-SECTIONAL AREA REMOVED FROM THE UPPER AND LOWER INSPAR SKINS	
ZONE NUMBER AND SKIN	**MAXIMUM PERCENTAGE OF THE INITIAL CROSS-SECTIONAL AREA (AS MANUFACTURED BY BOEING) PERMITTED**
1, UPPER	15
2, UPPER	10
3, UPPER	NO DAMAGE PERMITTED
4, UPPER	10
5, UPPER	NO DAMAGE PERMITTED
6, LOWER	15
7, L0WER	10
8, LOWER	5
9, LOWER	10
10, LOWER	5
11, LOWER	NO DAMAGE PERMITTE

D. Holes and Punctures are permitted if:

(1) They are a maximum of 0.25 inch in diameter

(2) There is not more than one hole or puncture for each 15.0 square inches of panel area

(3) They are not more than the limits shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details G, H, and I.

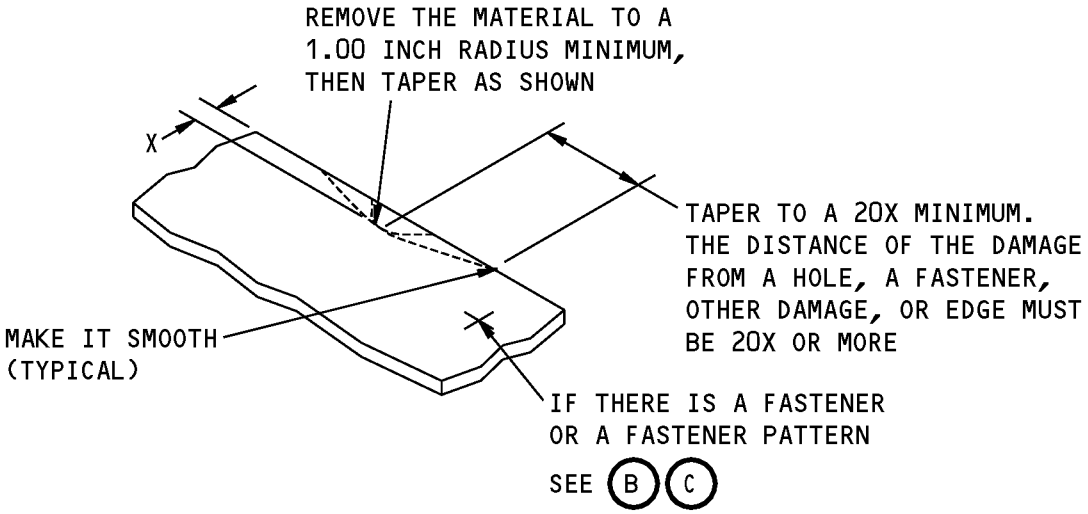
(4) The edge of the damage is a minimum of 1.00 inch away from the edge of a fastener hole, other damage, or the panel.

(5) They are filled with a 2117-T3 or 2117-T4 aluminum flush head rivet.

  (a) The countersink depth must not be more than 80 percent of the skin thickness.

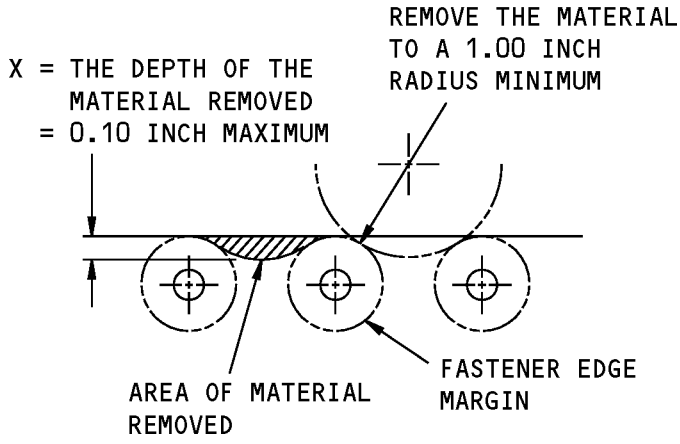
  (b) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

  (c) It is optional to install a 2117-T3 or 2117-T4 aluminum protruding head rivet.



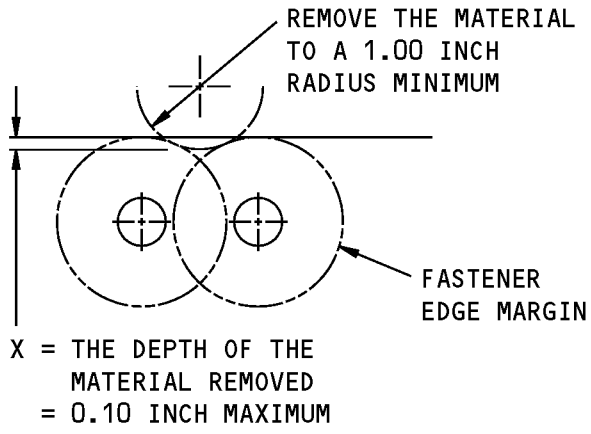
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

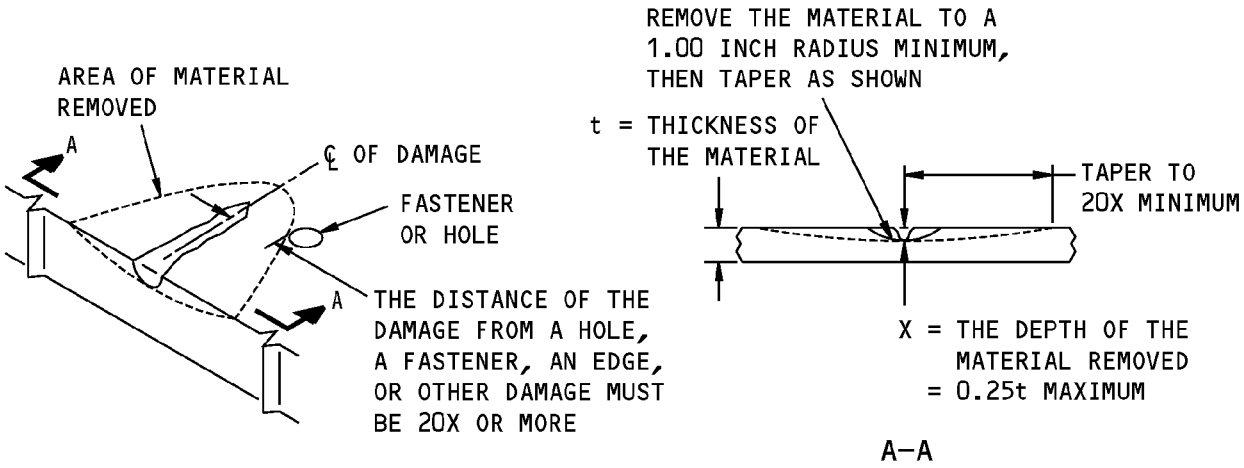
B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

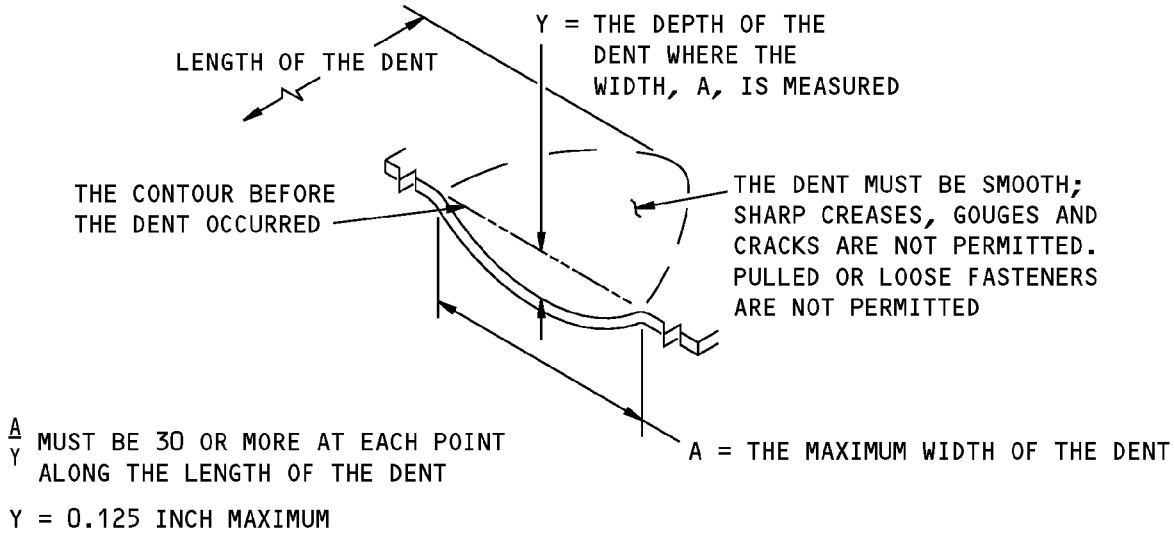
C

Allowable Damage Limits
Figure 103 (Sheet 1 of 7)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

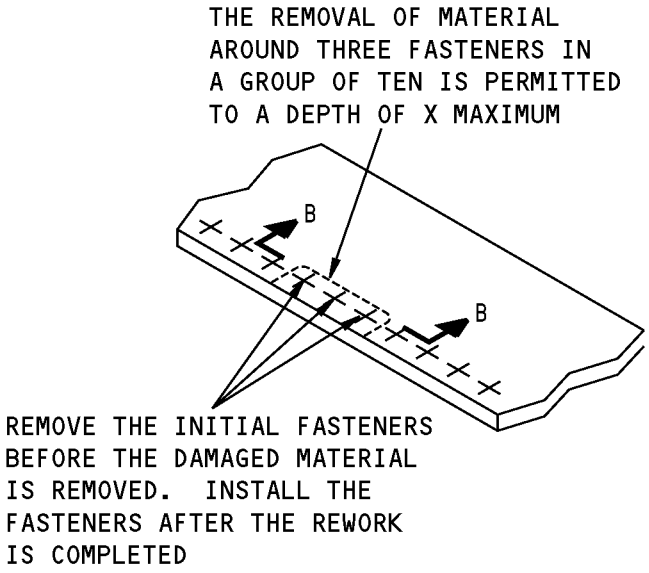
(D)



DENT THAT IS PERMITTED

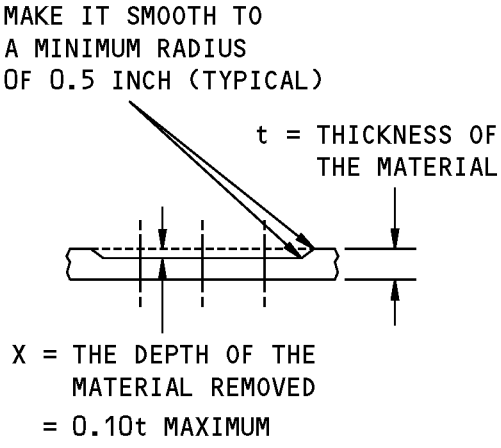
(E)

Allowable Damage Limits
Figure 103 (Sheet 2 of 7)



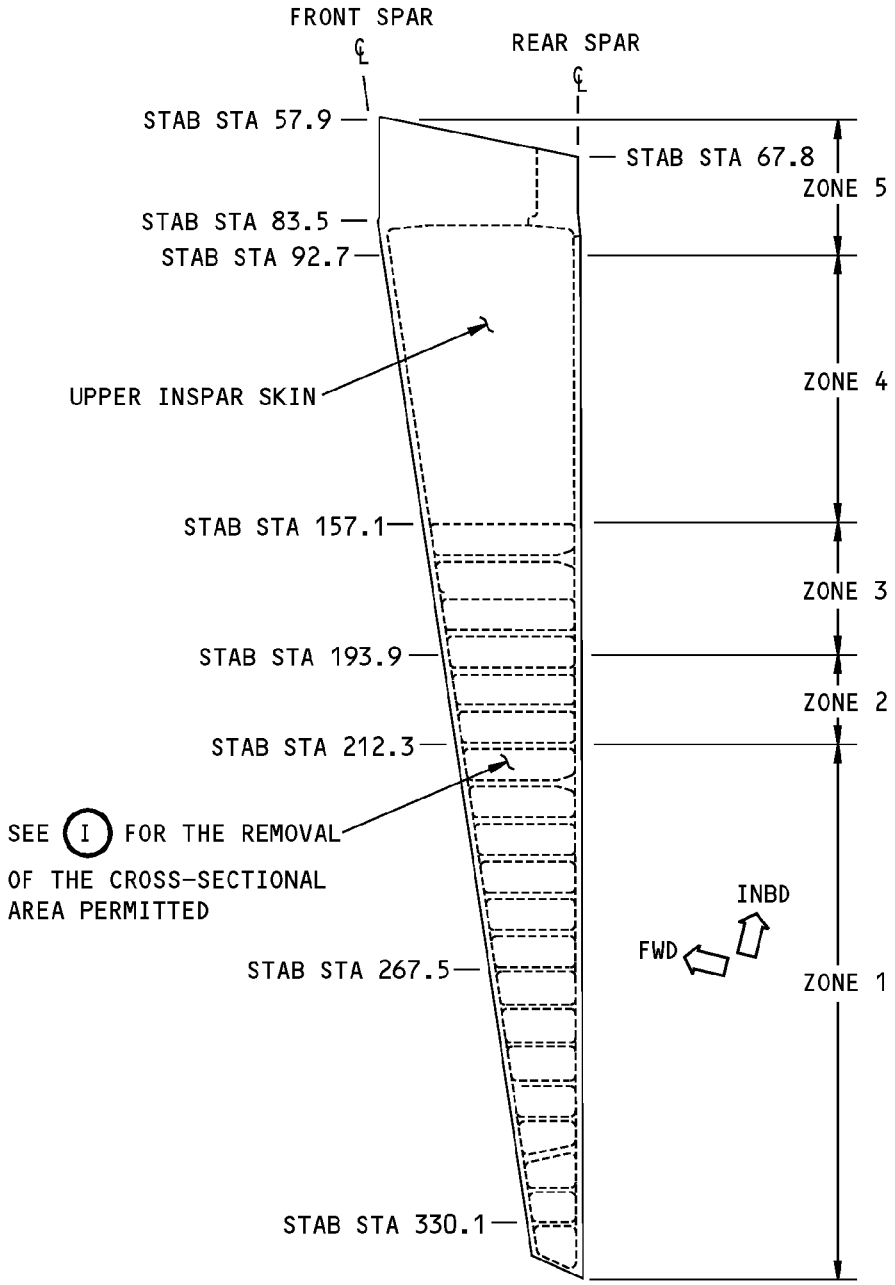
REMOVAL OF CORROSION
AROUND THE FASTENERS

F



B–B

Allowable Damage Limits
Figure 103 (Sheet 3 of 7)

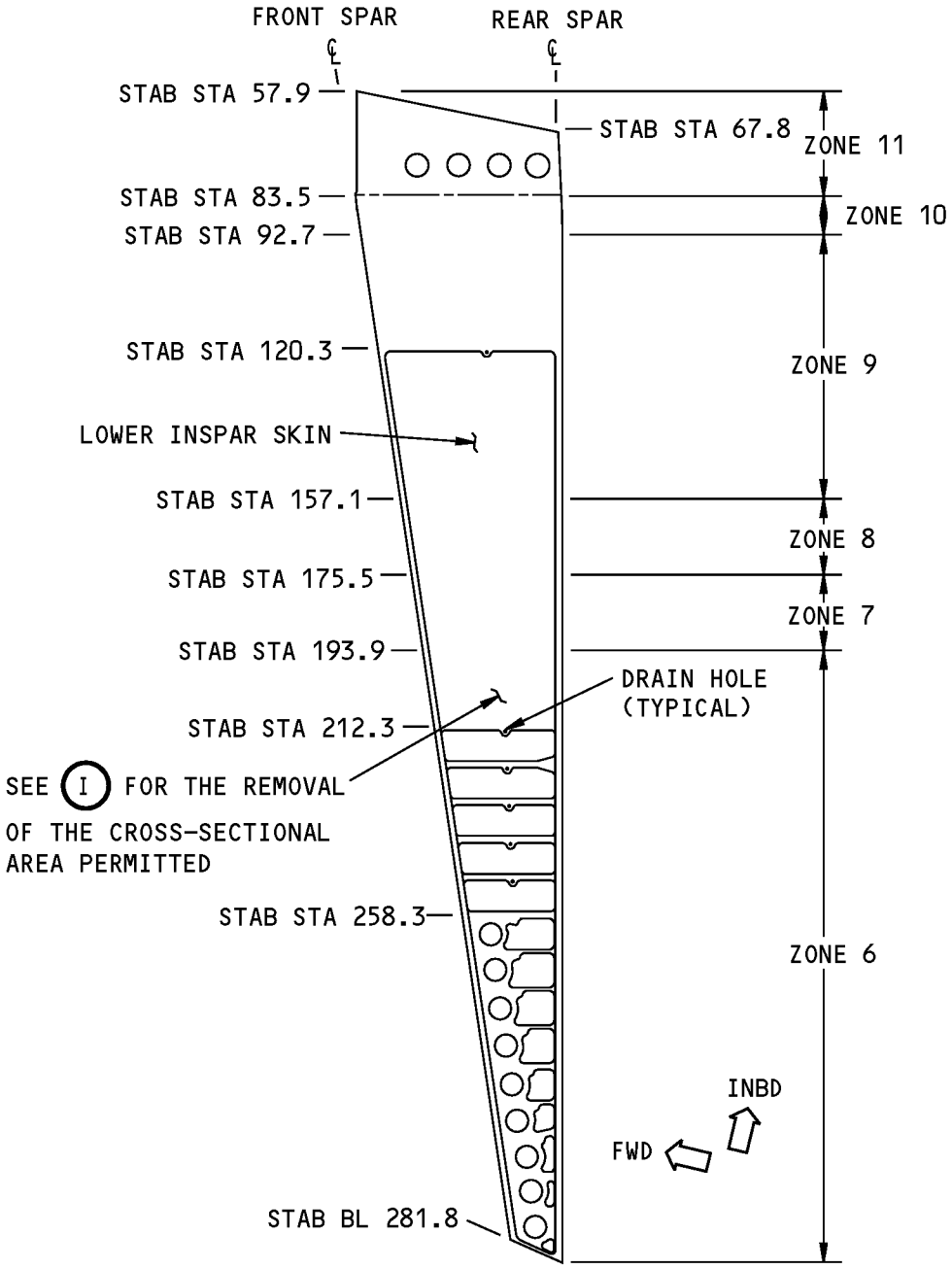


NOTE: REFER TO TABLE 101 FOR THE REMOVAL OF DAMAGE FROM THE SKIN.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
UPPER SURFACE IS SHOWN

(G)

Allowable Damage Limits
Figure 103 (Sheet 4 of 7)

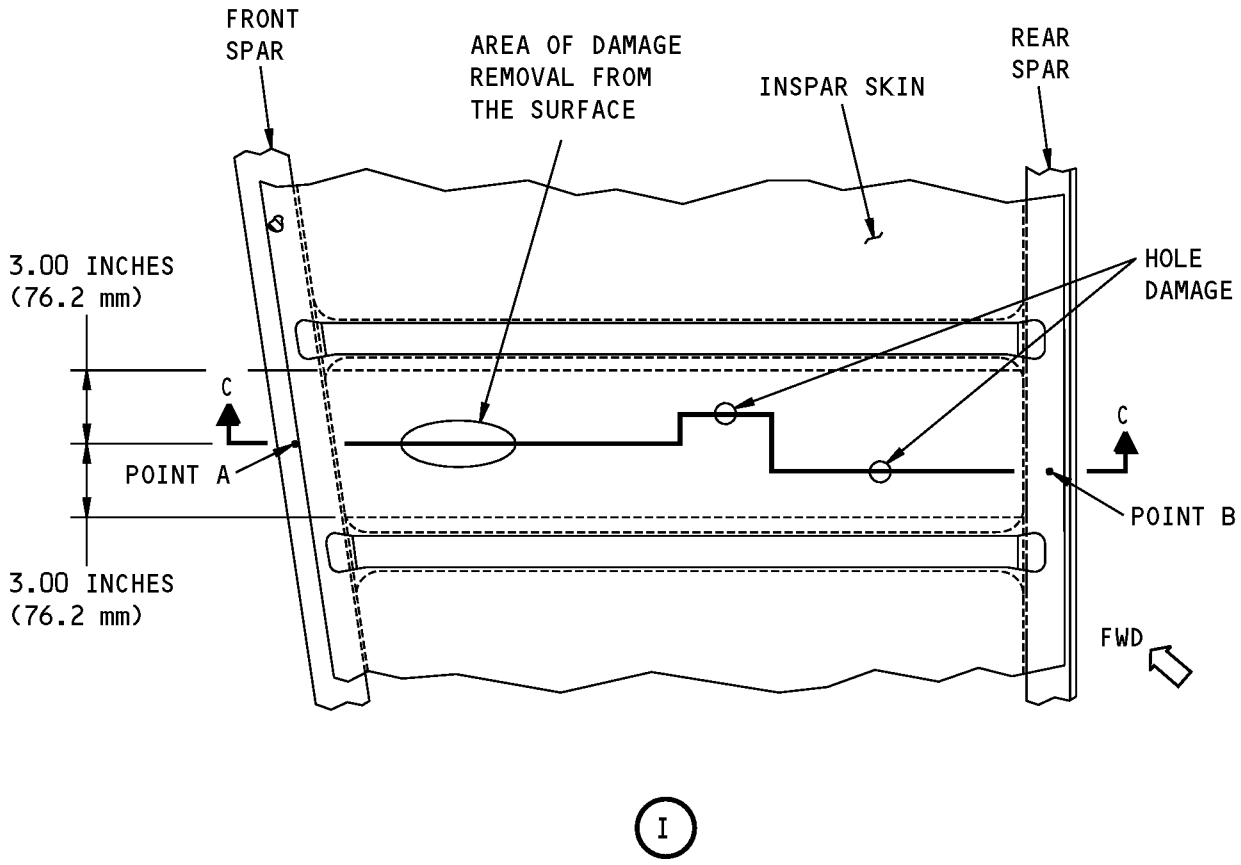


NOTE: REFER TO TABLE 101 FOR THE REMOVAL OF DAMAGE FROM THE SKIN.

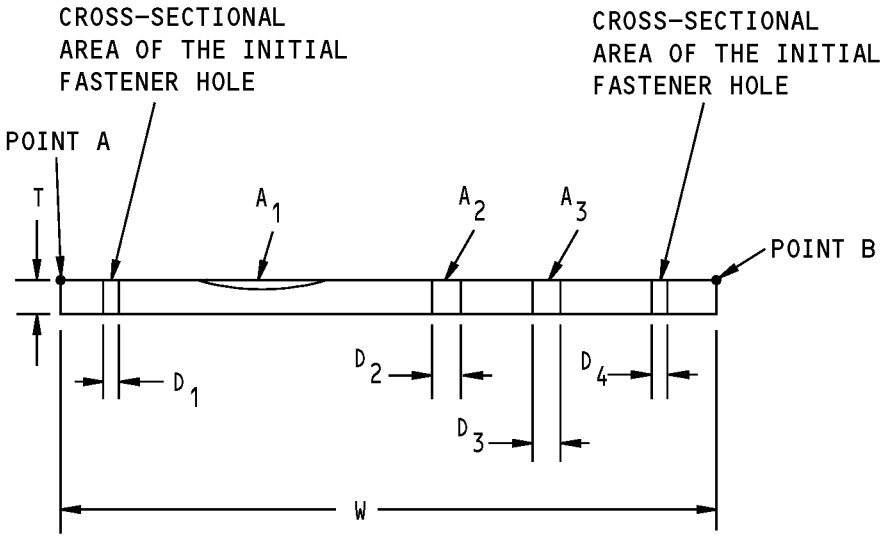
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
LOWER SURFACE IS SHOWN

(H)

Allowable Damage Limits
Figure 103 (Sheet 5 of 7)



Allowable Damage Limits
Figure 103 (Sheet 6 of 7)



D_1, D_4 = DIAMETERS OF THE INITIAL FASTENER HOLES

D_2, D_3 = DIAMETERS OF THE HOLES WHERE THERE IS DAMAGE

W = WIDTH OF THE SKIN AT THE CROSS-SECTION BETWEEN POINTS A AND B

T = THICKNESS OF THE SKIN AS GIVEN BY THE NOMINAL THICKNESS ON THE PRODUCTION DRAWING

A_i = INITIAL AREA OF THE SKIN
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL FASTENERS HOLES (AS MANUFACTURED BY BOEING)
= $WT - D_1T - D_4T$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

A_2 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 2

A_3 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 3

$\left(\frac{A_1+A_2+A_3}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED AS GIVEN IN TABLE 101

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES A-B (3.00 INCH (76.2 mm) ON EACH SIDE OF A LINE A-B) MUST NOT BE MORE THAN THE LIMITS GIVEN IN TABLE 101

C-C

Allowable Damage Limits
Figure 103 (Sheet 7 of 7)

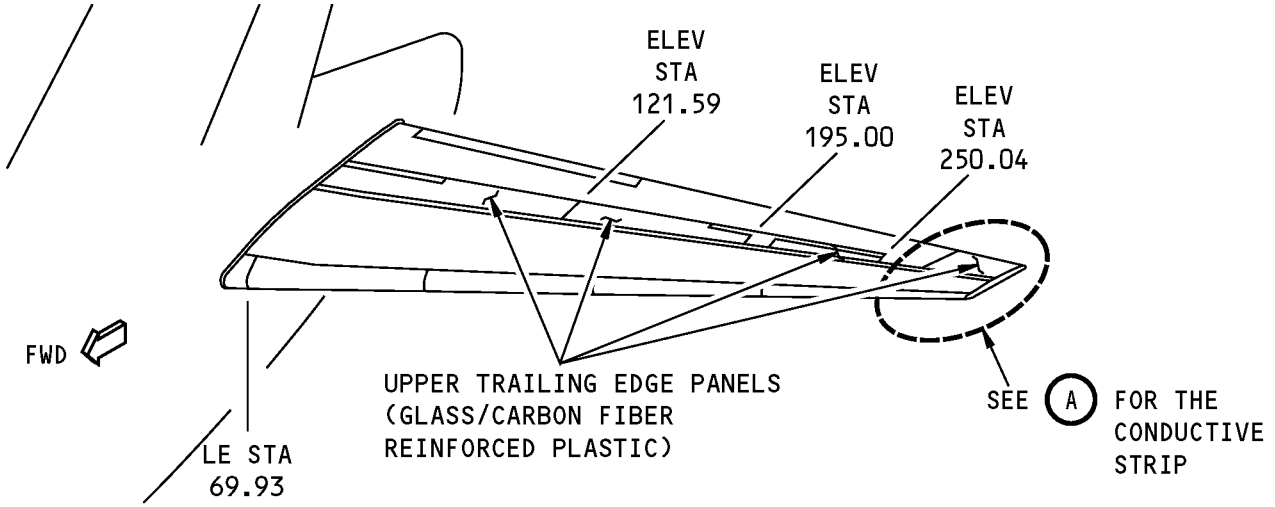
ALLOWABLE DAMAGE 3 - HORIZONTAL STABILIZER TRAILING EDGE PANELS

1. Applicability

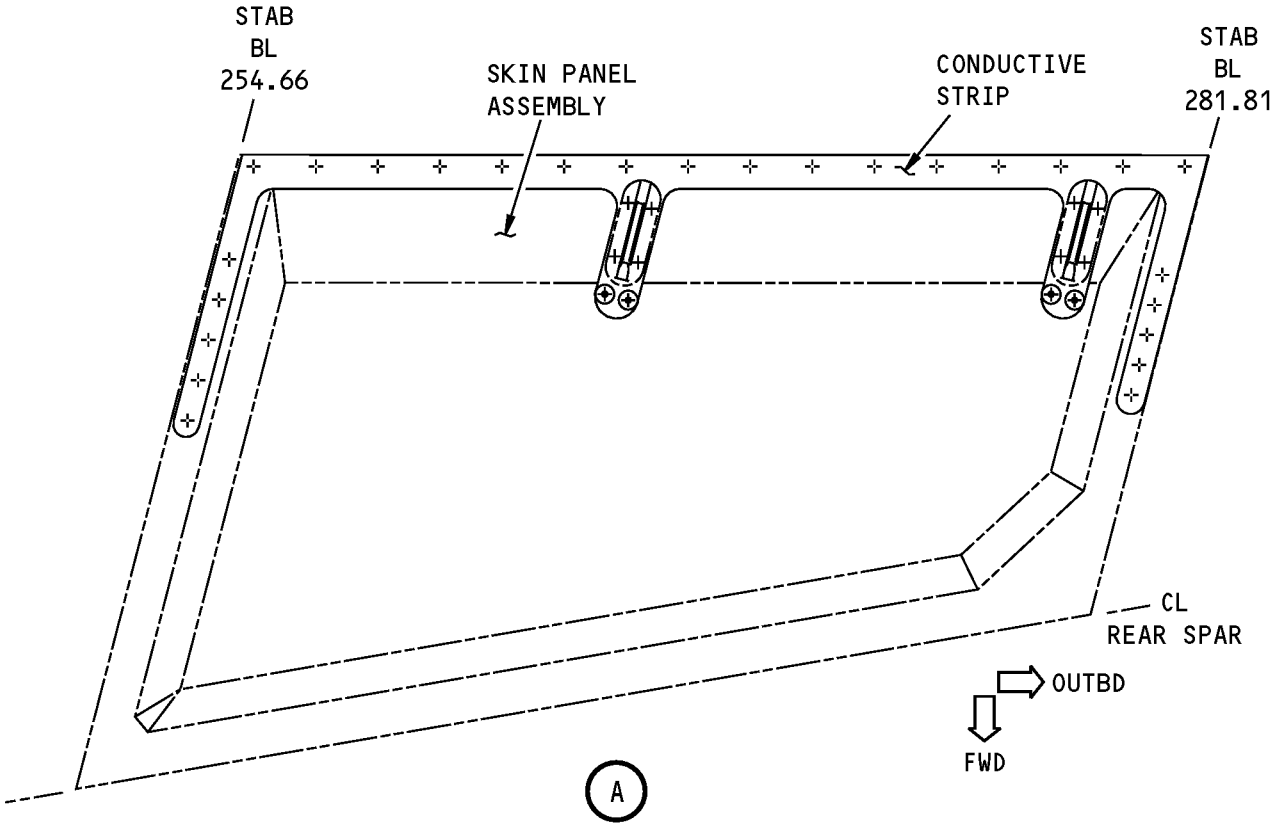
A. This subject gives the allowable damage limits for the parts that follow:

(1) Horizontal stabilizer trailing edge panels and the conductive strip shown in Horizontal Stabilizer Upper Trailing Edge Panel Locations, Figure 101/ALLOWABLE DAMAGE 3.

Horizontal stabilizer trailing edge panels shown in Horizontal Stabilizer Lower Trailing Edge Panel Locations, Figure 102/ALLOWABLE DAMAGE 3.

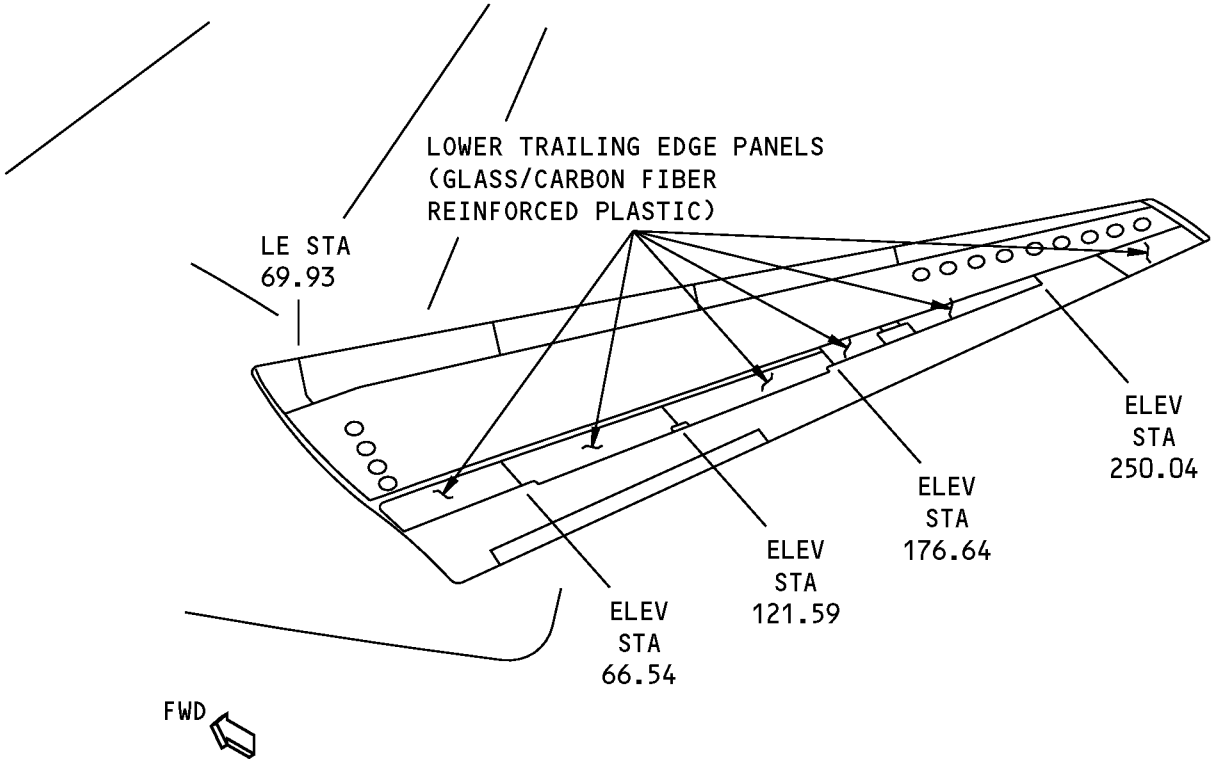


(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)
(UPPER SURFACE IS SHOWN)



NOTE: REFER TO FIGURE 105 FOR THE DEFINITIONS OF THE ALLOWABLE DAMAGE ZONES.

Horizontal Stabilizer Upper Trailing Edge Panel Locations
Figure 101



NOTE: REFER TO FIGURE 105 FOR THE DEFINITIONS OF THE ALLOWABLE DAMAGE ZONES.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Trailing Edge Panel Locations
Figure 102

2. General

A. Paragraphs 2.B, 2.C, 2.D, and 2.E are applicable to the trailing edge panels only. Paragraph 2.F is applicable to the conductive strip only.

B. Use a Non-Destructive Test (NDT) to find the length, width, and depth of damage.

(1) For the honeycomb core areas that have damage on a facesheet with 3 or less plies, Boeing recommends that you use an instrumented NDT procedure. The tap test procedure is optional. Refer to 737 NDT Part 1, 51-01-02, 737 NDT Part 1, 51-01-03, and 737 NDT Part 1, 51-05-01 for the inspection procedures.

(2) For the honeycomb core areas that have damage on a facesheet with 4 or more plies, Boeing recommends that you use an instrumented NDT procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

NOTE: The tap test procedure as given in 737 NDT Part 1, 51-05-01 is optional only if it can be shown that the defects (that are less than or equal to the allowable damage limits) can be found.

(3) For damage in the solid laminate areas, Boeing recommends that you use an instrumented NDT procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

(4) Refer to Definitions of Damage Size, Figure 103/ALLOWABLE DAMAGE 3, Details A, B, and C for the definitions of the length, width, and depth of damage.

(5) Refer to Definitions of the Facesheets, Figure 104/ALLOWABLE DAMAGE 3 for the definitions of the facesheets of a honeycomb core area.

(6) Refer to Horizontal Stabilizer Trailing Edge Panels Allowable Damage Zones, Figure 105/ALLOWABLE DAMAGE 3 for the locations of the allowable damage zones.

C. Remove all contamination and water from the structure.

(1) Refer to 51-30-05 for possible sources of equipment and tools you can use to remove the damage.

(2) Refer to 51-70-04 for the damage removal procedures.

D. Seal all permitted damage areas that are not more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits. Seal the damage with one of the two methods that follow:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure that the tape is in satisfactory condition at each 400 flight hour interval.

(d) Repair the damage after no more than 5000 flight hours.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type 3 primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

E. Seal all permitted damage areas that are more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits. Seal the damage as follows:

(1) Use vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

(4) Repair the damage after no more than 400 flight hours.

F. Aluminum material damage removal.

(1) Remove damage from the aluminum material as necessary.

(a) Refer to INSPECTION AND REMOVAL OF DAMAGE, 51-10-02 for the inspection and removal of damage.

(b) Refer to NON-METALLIC MATERIALS, 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(c) Refer to EQUIPMENT AND TOOLS FOR REPAIRS, 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(2) Make sure there is a 125 micro inches Ra or smoother surface finish. Refer to 51-20-13, GENERAL.

(3) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS, 51-20-01.

(4) Apply two layers of BMS 10-11, Type I primer to the reworked areas. Refer to SOPM 20-41-02.

(5) Apply BMS 5-95 sealant at the damage location to make sure all gaps are filled. Refer to 51-20-05, GENERAL.

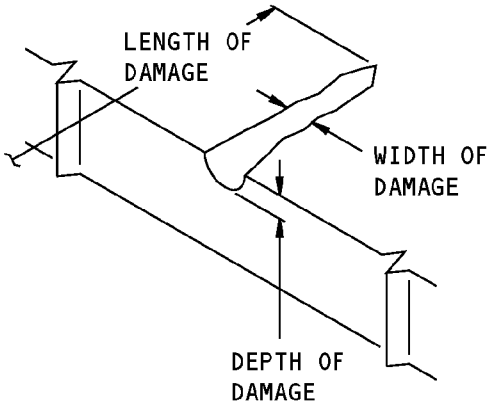
(6) Apply the decorative finish to the reworked areas as given in AMM PAGEBLOCK 51-21-99/701.

(7) Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in AERODYNAMIC SMOOTHNESS, 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(8) After 30 days or less, make an initial visual inspection of the damaged Conductive Strip for signs of new damage or for loose or missing fasteners. Repeat the inspections at each 30 day interval. If any new damage is found to the conductive strip then replace the part.

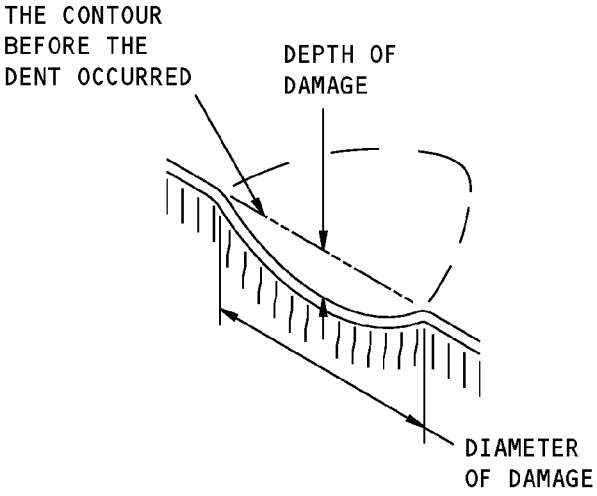
NOTE: Replacement of the damaged part with a new part stops the repeat inspection intervals.

(9) Replace the damaged Conductive Strip with a new part in 24 months or less.



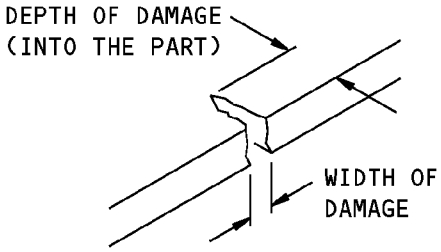
SIZE DEFINITIONS FOR
NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

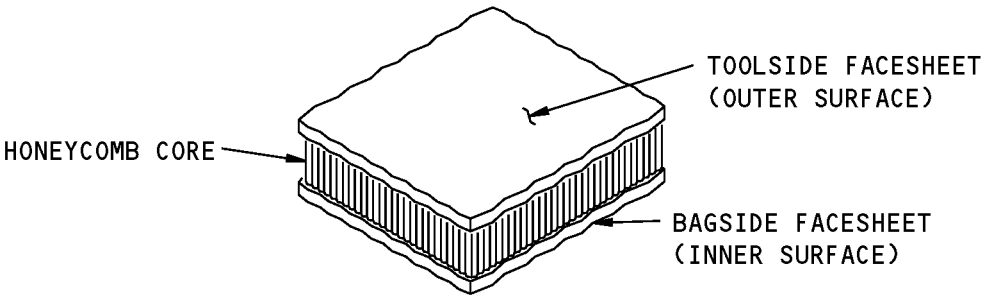
B



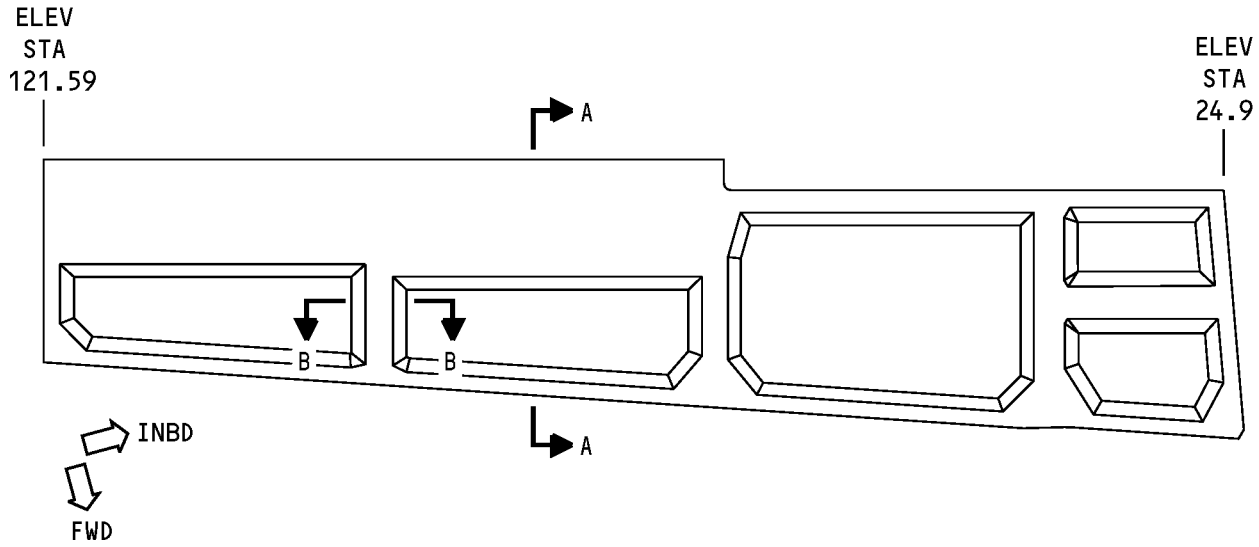
SIZE DEFINITIONS FOR
EDGE DAMAGE

C

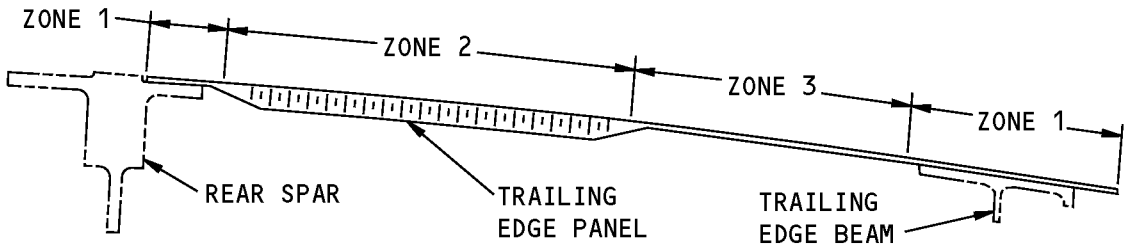
Definitions of Damage Size
Figure 103



Definitions of the Facesheets
Figure 104



TYPICAL UPPER PANEL IS SHOWN, LOWER PANELS ARE THE SAME



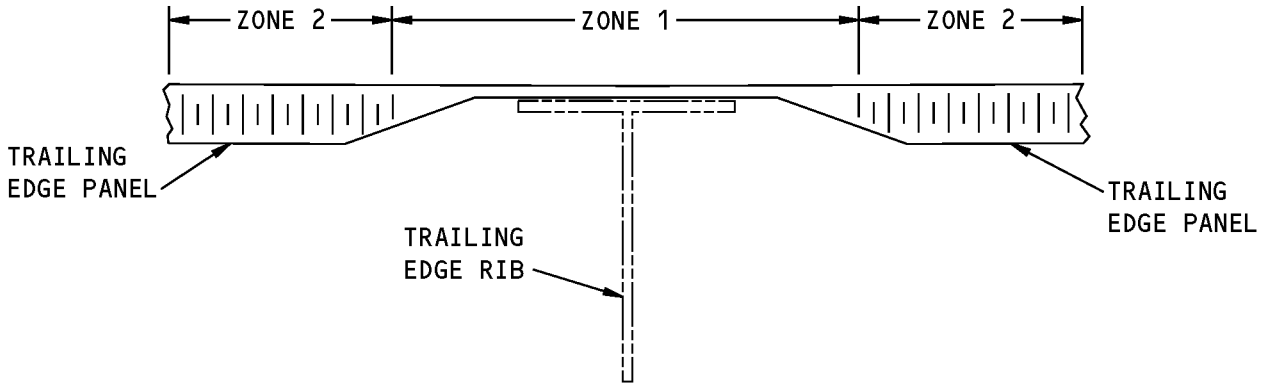
A–A

ZONE 1: SOLID LAMINATE AREA WITH FASTENERS, EDGE BAND

ZONE 2: HONEYCOMB CORE AREA

ZONE 3: SOLID LAMINATE AREA WITHOUT FASTENERS

Horizontal Stabilizer Trailing Edge Panels Allowable Damage Zones
Figure 105 (Sheet 1 of 2)



ZONE 1: SOLID LAMINATE AREA WITH FASTENERS, EDGE BAND

ZONE 2: HONEYCOMB CORE AREA

Horizontal Stabilizer Trailing Edge Panels Allowable Damage Zones
Figure 105 (Sheet 2 of 2)

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-20-13, GENERAL	Surface Roughness Finish Requirements
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure
737 NDT Part 1, 51-05-01	Tap Test Inspection of Honeycomb Sandwich Structure

4. Allowable Damage Limits

A. Zone 1 - Solid Laminate Areas With Fasteners

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:

(a) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(3) Dents are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(4) Holes and Punctures are permitted if:

(a) They are a maximum 0.25 inch in diameter

(b) Not more than one fastener hole in six is damaged

(c) Not more than 10 percent of the edgeband for each side of panel is damaged

(d) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(5) Delaminations are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(6) Edge Erosion is permitted as shown in Edge Erosion Damage Removal, Figure 106/ALLOWABLE DAMAGE 3 if:

(a) Not more than 10 percent of the edgeband for each side of panel is damaged

(b) It is sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(7) Edge damage is permitted if:

(a) It is a maximum 0.10 inch in depth

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) It is removed as shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 3, Detail A

(d) It is sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

B. Zone 2 - Honeycomb Core Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:

(a) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum length of 1.50 inches

(c) A maximum width of 1.50 inches

(d) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(3) Dents are permitted if:

(a) They are a maximum of one facesheet

(b) They are a maximum diameter of 1.50 inches

(c) They are a minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(d) There is no fiber damage or delamination

(e) The damage is sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(4) Holes and Punctures are permitted if they are:

(a) A maximum of one facesheet and the core in depth

(b) A maximum diameter of 1.50 inches

(c) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(d) Sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

NOTE: Do not remove the damage unless it is necessary to remove resin burrs that extend into the surface contour.

(5) Delaminations are permitted if they are:

(a) On a maximum of one facesheet

(b) A maximum diameter of 1.50 inches

(c) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(d) Sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

C. Zone 3 - Solid Laminate Areas Without Fasteners

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:

(a) They are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum length of 1.50 inches

(c) A maximum width of 1.50 inches

(d) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(3) Dents are permitted if:

(a) They are a maximum diameter of 0.75 inch

(b) They are a minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(c) There is no fiber damage or delamination

(d) The damage is sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(4) Holes and Punctures are not permitted.

(5) Delaminations are permitted if they are:

(a) A maximum diameter of 0.75 inch

(b) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 108/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply, and

2) Are sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

(c) Sealed as given in Paragraph 2.D./ALLOWABLE DAMAGE 3

D. Conductive Strip

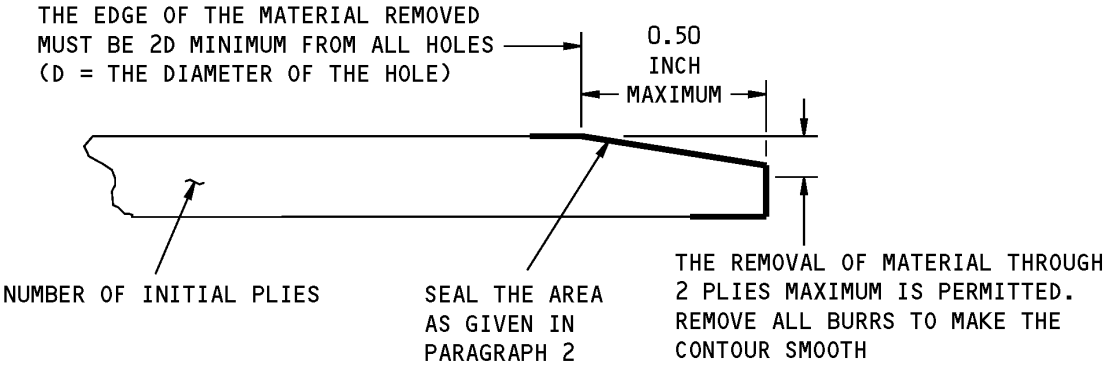
NOTE: This allowable damage section is approved only for conductive strip damage where none of the initial fasteners are loose or damaged. If there are initial fasteners loose or damaged, refer to 55-10-01, Repair 10 – CONDUCTIVE STRIP.

(1) Remove the damage. Refer to Figure 109 for the permitted damage limits. Find the area removed from the initial cross-sectional area. If the area removed is less than or equal to 20% of the initial cross-sectional area, continue with Paragraph 4.D.(2). If the area removed is more than 20% of the initial cross-sectional area, refer to 55-10-01, Repair 10 – CONDUCTIVE STRIP.

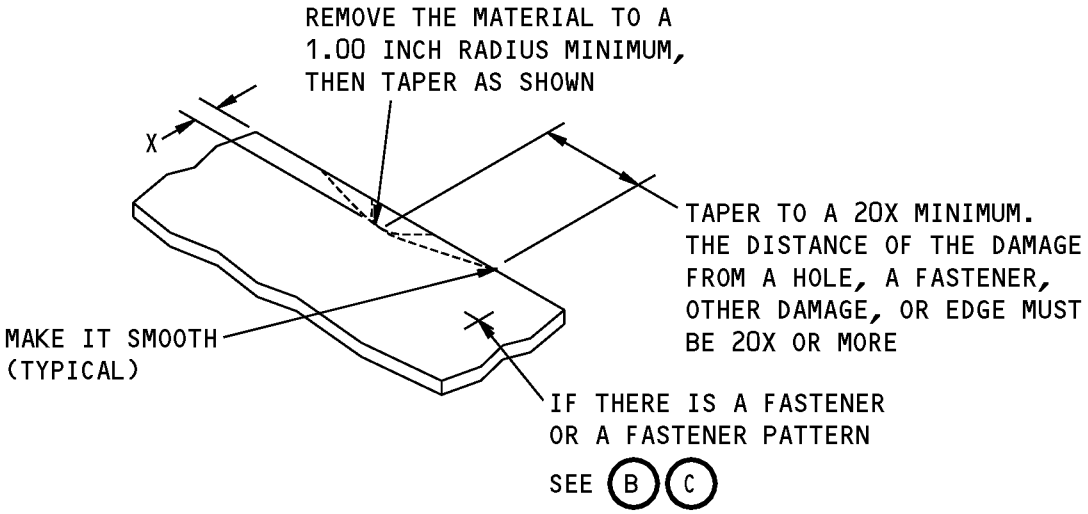
(2) After 30 days or less, make an initial visual inspection of the damaged Conductive Strip for signs of new damage and for loose or missing fasteners. Repeat the inspections at each 30 day interval. If any new damage is found to the conductive strip then replace the part.

NOTE: Replacement of the damaged part with a new conductive strip stops the repeat inspection intervals.

(3) Replace the damaged Conductive Strip with a new part in 24 months or less.

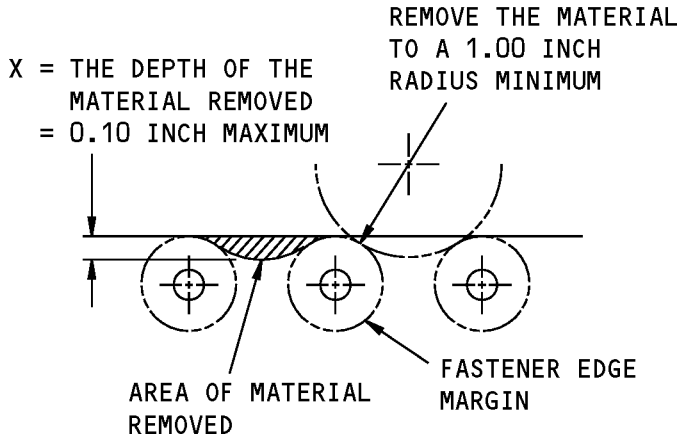


Edge Erosion Damage Removal
Figure 106



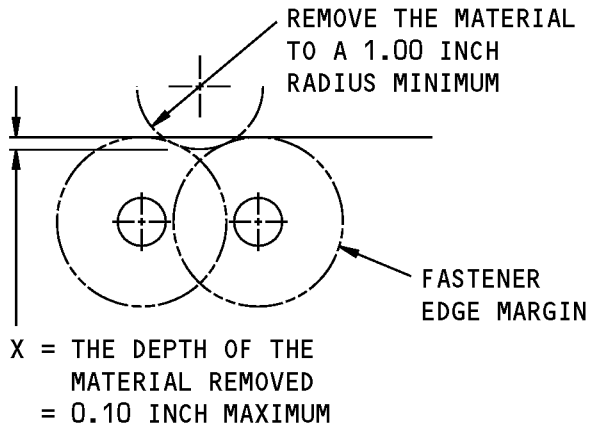
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

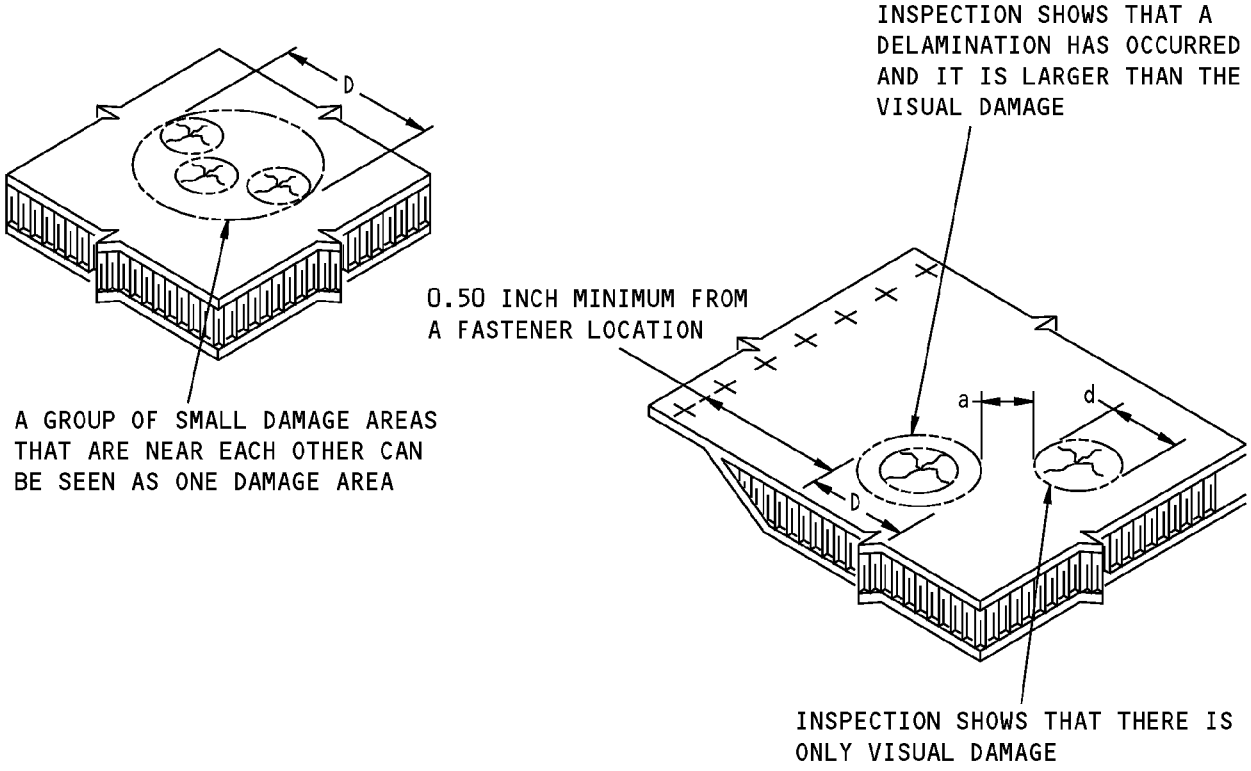
B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

C

Allowable Damage Limits
Figure 107



NOTE: TO FIND DELAMINATION YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES (REFER TO NDT PART 1, 51-01-02).

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

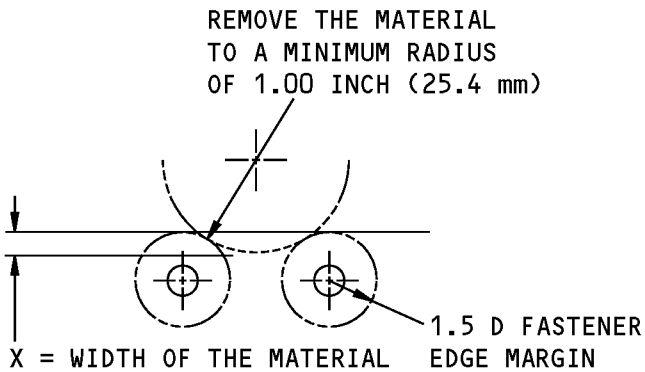
A DAMAGE AREA DOES NOT INCLUDE NICKS, GOUGES, AND SCRATCHES THAT DO NOT CAUSE DAMAGE TO THE GLASS AND CARBON FIBER PLIES IF:
- YOU MAKE A TEMPORARY SEAL OF THE DAMAGE AS GIVEN IN PARAGRAPH 2 OR
- YOU MAKE A PERMANENT SEAL OF THE DAMAGE AS GIVEN IN PARAGRAPH 2

(D) IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND IS A MAXIMUM OF 1.50 INCHES

(d) IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

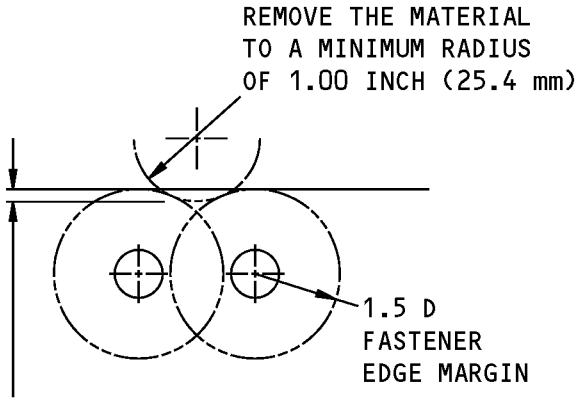
(a) IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS. THE MINIMUM (a) THAT IS PERMITTED IS (4D).

Damage Size and Spacing Limits
Figure 108



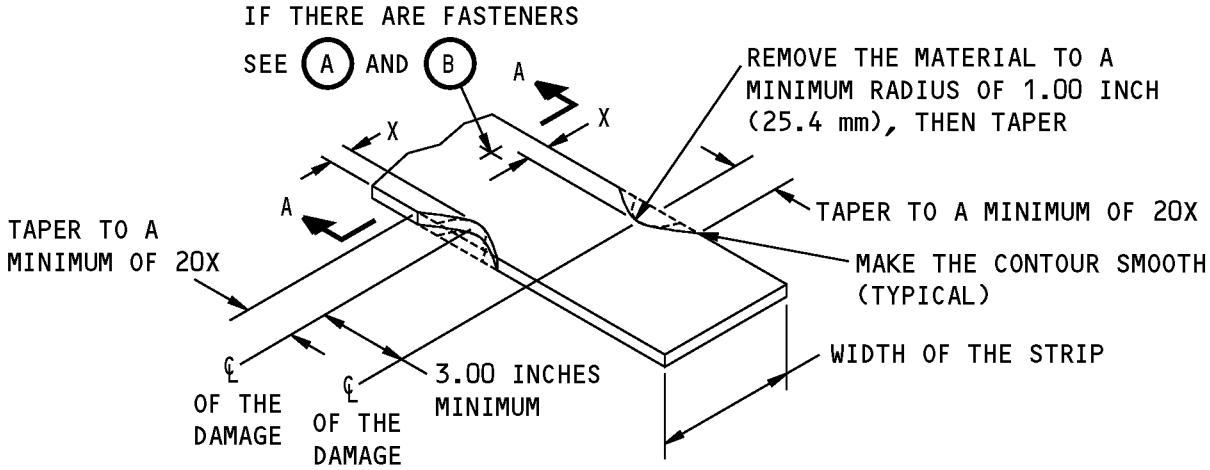
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B



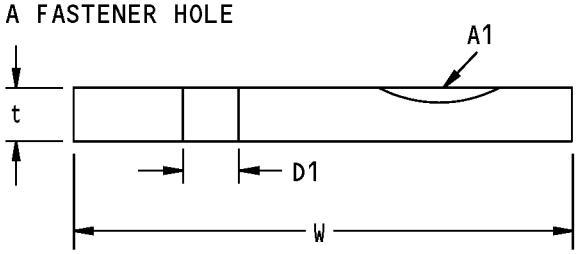
X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 20 PERCENT OF THE STRIP CROSS SECTIONAL AREA

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

C

Conductive Strip Allowable Damage Limits
Figure 109 (Sheet 1 of 2)

CROSS-SECTIONAL AREA OF THE CONDUCTIVE STRIP AT A FASTENER HOLE



A–A

D_1 = DIAMETERS OF THE INITIAL FASTENER HOLES

t = MATERIAL THICKNESS

W = STRIP WIDTH

A_i = INITIAL AREA OF THE STRIP

= THE CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL HOLE (AS MANUFACTURED BY BOEING)

$= Wt - D_1t$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE REMOVED AT LOCATION 1

$\left(\frac{A_1}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED

= A MAXIMUM OF 20 PERCENT

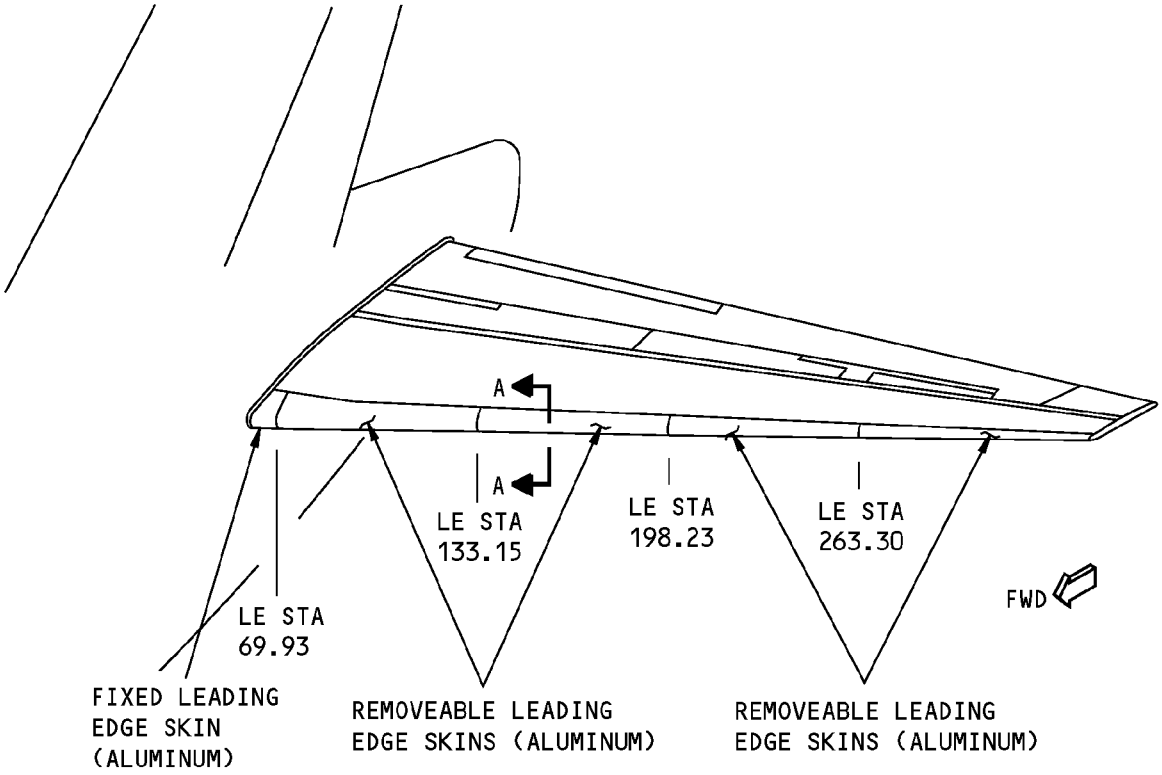
(D)

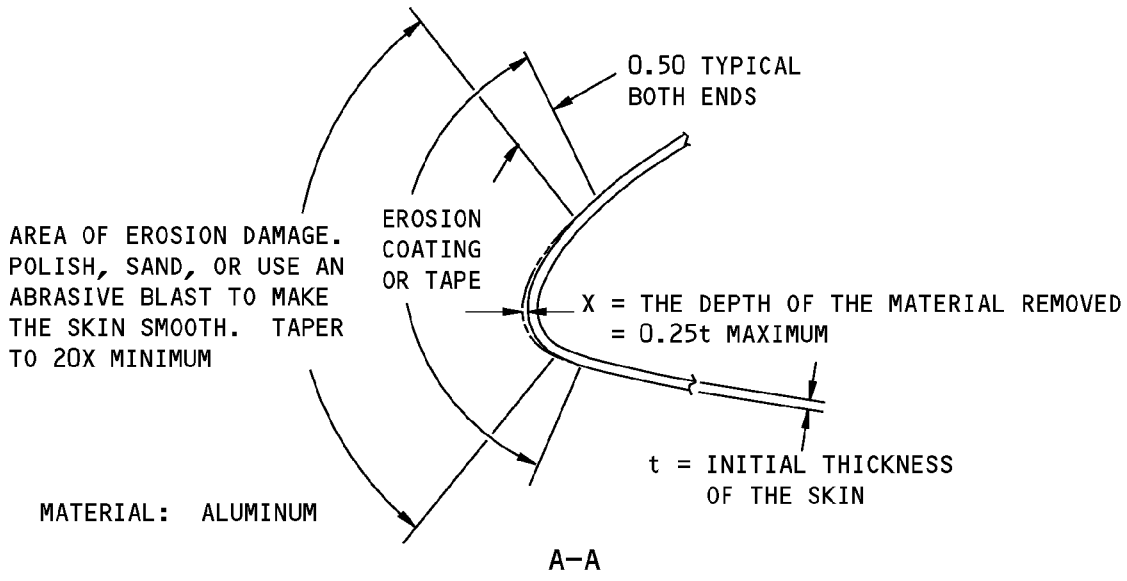
Conductive Strip Allowable Damage Limits
Figure 109 (Sheet 2 of 2)

ALLOWABLE DAMAGE 4 - HORIZONTAL STABILIZER LEADING EDGE SKINS, EROSION DAMAGE

1. Applicability

A. This subject gives the allowable damage limits for the horizontal stabilizer leading edge skins that have erosion damage. These limits are for the removable skin panels shown in Horizontal Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4. Do not use the limits of this subject for the fixed leading edge skin or the outboard tip. Refer to Allowable Damage 1 for other types of damage limits permitted.





Horizontal Stabilizer Leading Edge Skin Locations
Figure 101

2. General

A. Do what follows for the aluminum leading edge skins:

(1) Remove the damaged material as given in Paragraph 4./ALLOWABLE DAMAGE 4 The maximum depth of material that can be removed is equal to 25% of the initial thickness of the skin.

(a) Refer to 51-10-02 for the inspection and removal of damage.

(b) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(c) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(2) Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-08	EROSION PROTECTION
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING

4. Allowable Damage Limits

WARNING: MATERIALS THAT ARE USED TO CLEAN AND COAT ARE TOXIC AND FLAMMABLE. MAKE SURE THERE IS A GOOD FLOW OF AIR AND YOU OBEY ALL FIRE PRECAUTIONS.

A. Light Erosion Damage to the Aluminum Skin:

(1) Make the metal contour smooth.

(a) Apply masking tape to the areas where there is no damage.

(b) Clean the surface with a moist cheesecloth. Use water to make the cheesecloth moist.

(c) Polish or sand the damaged area to make a smooth surface. The maximum depth of removal must not be more than 25% of the initial skin thickness.

NOTE: Use aluminum oxide abrasives or aluminum wool. Do not use silicon carbide abrasives or steel wool.

(d) Where the skin has been pushed in, make the skin contour smooth with the adjacent skin.

1) Use powdered household cleanser or 400 grit aluminum oxide paper.

2) Refer to Horizontal Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4, Section A-A , for the surface contour limits.

(e) Clean the surface with a moist new cheesecloth. Use MIBK to make the cheesecloth moist.

(f) Find the depth of material that has been removed.

1) Use a Vidigage, Branson digital caliper, dial gage, or a straight edge with feeler gages to find the depth.

2) Repair the leading edge skin if the depth of material removed is more than 25% of the initial skin thickness.

3) Apply a chemical conversion coating if the depth of material removed is less than 25% of the initial skin thickness. Apply the conversion coating to the bare surfaces of the skin as given in 51-20-01.

(g) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.

2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

B. Moderately damaged to badly damaged areas of the aluminum skin:

(1) Prepare the metal areas.

(a) Apply masking tape to the areas where there is no damage.

(b) Close and seal all openings to keep all material out of the structure.

(c) Static ground the airplane and the abrasive blast equipment.

(d) Use a spray gun with water or toluene to clean the eroded area of the skin.

CAUTION: DO NOT USE A CLOTH OR OTHER FABRIC TO CLEAN THE ABRASIVE BLASTED AREA. UNWANTED LINT ON THE CLEANED AREA WILL DECREASE THE LIFE OF THE EROSION COATING.

(e) Use an abrasive blast to remove the erosion damage as given in 51-10-02.

1) Make sure all of the oxide and corrosion has been removed from the eroded areas.

2) Refer to Horizontal Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4, Section A-A , for the limits of a good taper.

(f) Find the depth of material that has been removed.

1) Use a Vidigage, Branson digital caliper, dial gage, or a straight edge with feeler gages to find the depth.

2) Repair the leading edge skin if the depth of material removed is more than 25% of the initial skin thickness.

3) Apply a chemical conversion coating if the depth of material removed is less than 25% of the initial skin thickness. Apply the conversion coating to the bare surfaces of the skin as given in 51-20-01.

(g) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.

2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

C. Damage to the initial layer of erosion protection:

(1) Areas of bare metal or unsatisfactory aerodynamic smoothness are caused by damage to the erosion protection. Refer to 51-10-01 for the aerodynamic smoothness limits and do what follows for these areas:

(a) Remove the erosion coating with MIBK.

1) Soak the coating with MIBK with the use of cheesecloth.
2) Keep the cheesecloth on the coating until it is soft.
3) Use a plastic scraper to remove the erosion coating.

(b) Remove the erosion tape.

1) Soak the tape edge sealer with MIBK with the use of cheesecloth.
2) Keep the cheesecloth on the edge sealer until it is sufficiently soft to remove.
3) Heat (150°F maximum temperature) can be used to make the tape soft.
4) Use a plastic scraper, razor, or knife to start the removal of the tape at edges. Use your hand to pull the tape away from the metal skin.

(c) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.
2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

REPAIR 1 - HORIZONTAL STABILIZER LEADING EDGE SKIN EXTERNAL REPAIR

1. Applicability

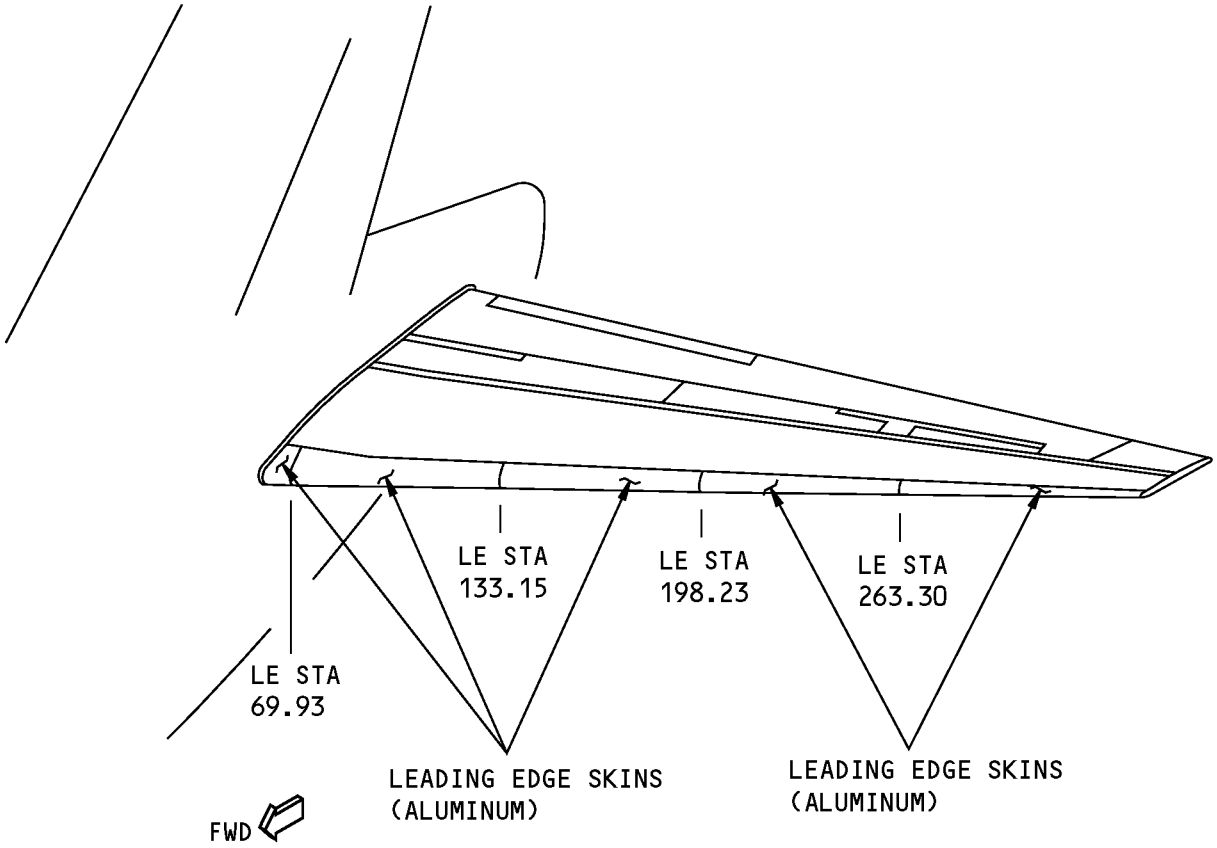
A. Repair 1 is applicable to damage to the horizontal stabilizer leading edge skins shown in Horizontal Stabilizer Leading Edge Skin Locations, Figure 201/REPAIR 1 if:

(1) You do inspections of the repair as given in Paragraph 5./REPAIR 1

(2) You replace Repair 1 no more than 15,000 hours after installation with one of the repairs that follow:

(a) A permanent flush repair as shown in Repair 2

(b) A replacement of the blind rivets with solid flush rivets for a permanent external repair.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Leading Edge Skin Locations
Figure 201

2. General

A. Repair 1 gives instructions for a Category C repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

C. Make sure that all blind rivets are correctly seated on the internal side of the skin. Make sure that there is sufficient edge margin from the edge of all chem-milled pockets.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES

4. Repair Instructions

A. Drill a stop hole at the ends of all skin cracks that do not end at fastener holes. Refer to Horizontal Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the skin as shown in Horizontal Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1. Refer to 51-10-02 for the procedures to remove the damage.

(a) Make the cut in the shape of a rectangle with the longest sides parallel to the leading edge ribs.

(b) Make the corner radii of the cut a minimum of 0.50 inch.

(c) Make sure there is a minimum of two rows of repair fasteners around the edges of the cut.

B. Put the skin that is around the damage back to the initial contour. Refer to 51-10-01.

C. Make the part [1] doubler as shown in Horizontal Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1. Refer to Table 201/REPAIR 1 for the repair material.

(1) Make the contour of the part [1] doubler the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad 2024-T3 that is 0.063 inch thick when the initial skin is 0.040 inch thick. Use clad 2024-T3 that is one gage thicker than the initial skin when the thickness is more than 0.040 inch.

D. Assemble the part [1] doubler as shown in Horizontal Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1.

E. Drill and countersink the fastener holes.

F. Remove the part [1] doubler.

G. Remove the nicks, scratches, gouges, burrs, and sharp edges from the doubler and the bare surfaces of the skin.

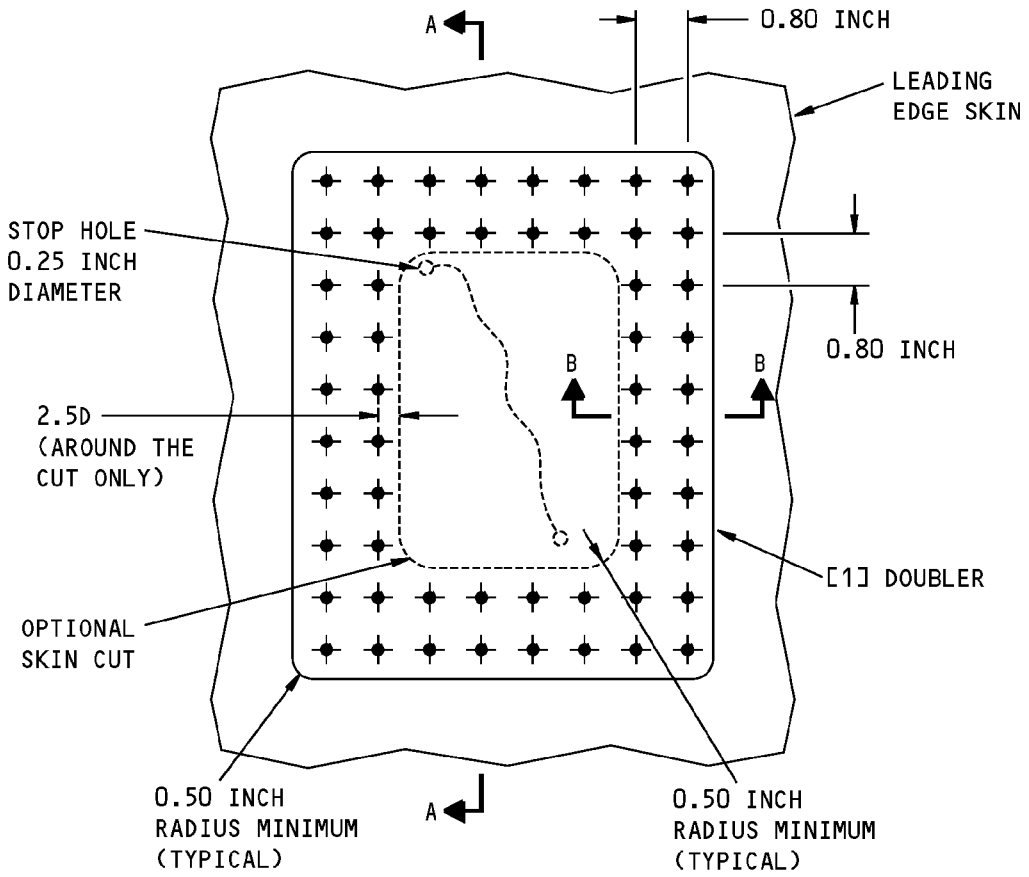
H. Apply a chemical conversion coating to the part [1] doubler and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

I. Install the part [1] doubler with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

J. Install the fasteners dry.

K. Apply BMS 5-95 sealant around the edges of the part [1] doubler as given in 51-20-05.

L. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



FLAT PATTERN OF THE REPAIR

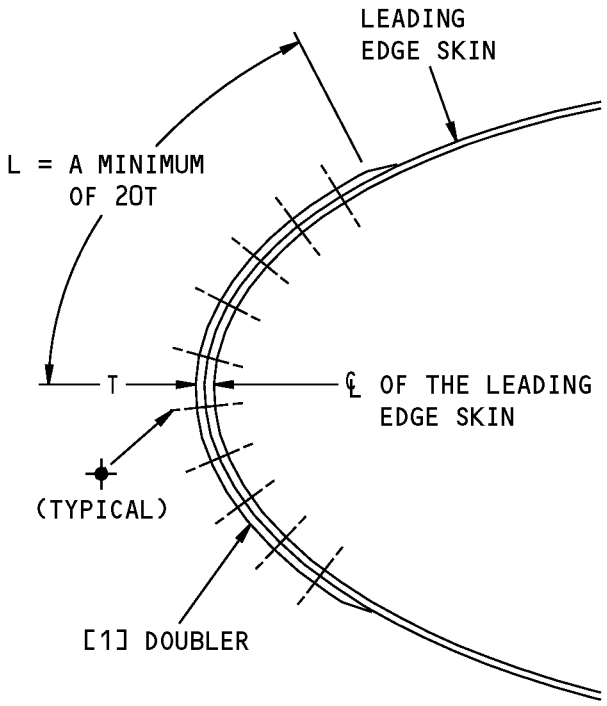
NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENERS. USE (D) TO CALCULATE EDGE MARGINS.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

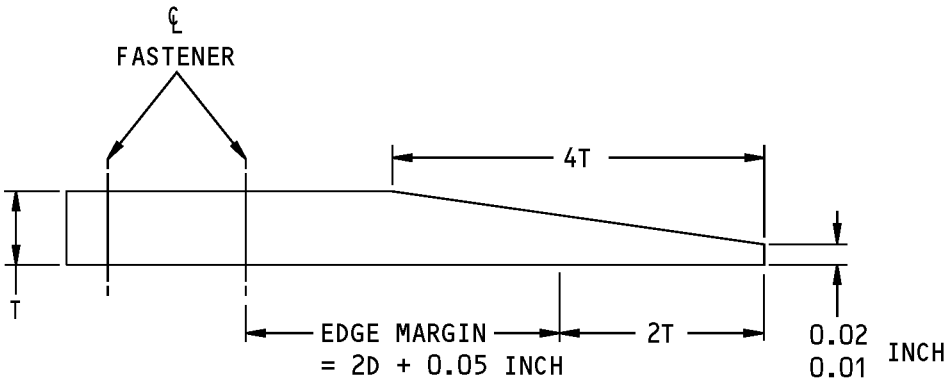
FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E() OR A NAS 1739E5 BLIND RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Horizontal Stabilizer Leading Edge Skin External Repair
Figure 202 (Sheet 1 of 2)



A–A



(TYPICAL FOR ALL DOUBLER EDGES)
B–B

Horizontal Stabilizer Leading Edge Skin External Repair
Figure 202 (Sheet 2 of 2)

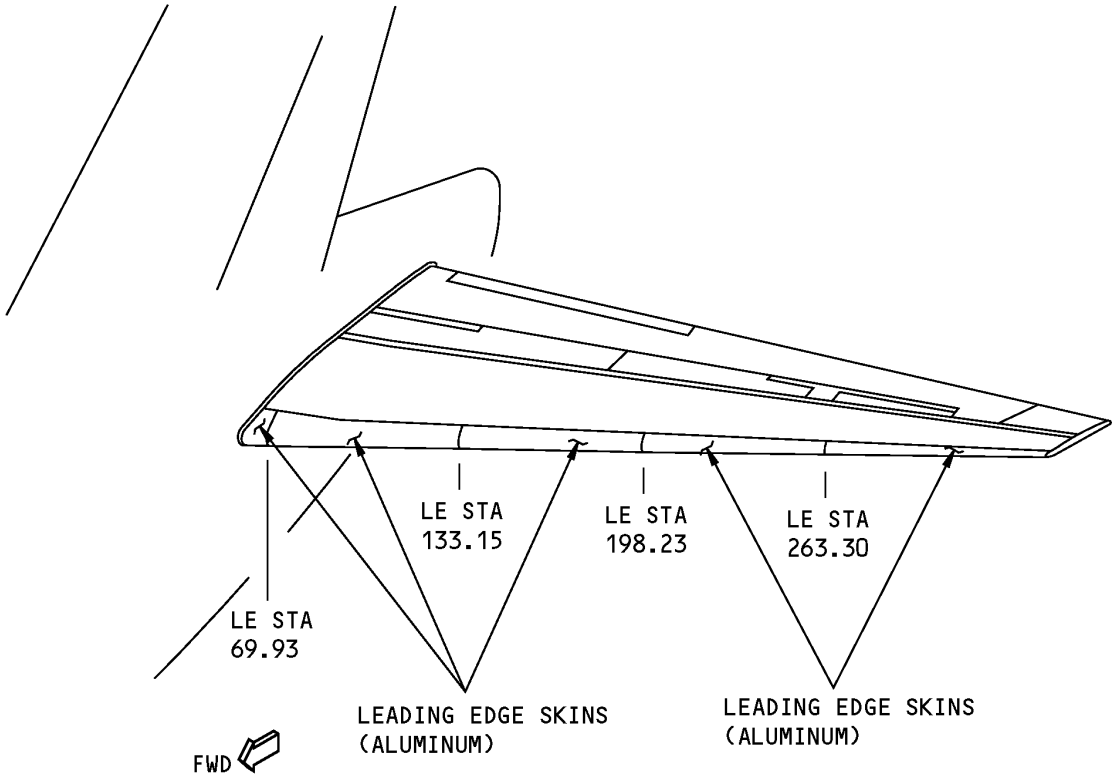
5. Inspection Instructions

A. Do a detailed visual inspection of the repair at each 5000 flight hour interval or more frequently. Inspect the blind rivets carefully. Blind rivets that are loose, missing, or damaged must be replaced.

REPAIR 2 - FLUSH REPAIR OF THE HORIZONTAL STABILIZER LEADING EDGE SKIN

1. Applicability

A. Repair 2 is applicable to damage to the horizontal stabilizer leading edge skins shown in Horizontal Stabilizer Leading Edge Skin Locations, Figure 201/REPAIR 2. Repair 2 is also applicable as a replacement repair for Repair 1.



Horizontal Stabilizer Leading Edge Skin Locations
Figure 201

2. General

A. Repair 2 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the aircraft. Refer to 51-10-01.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Remove the damaged leading edge section.

B. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

C. Cut and remove the damaged part of the skin as shown in Horizontal Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longest sides parallel to the leading edge ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

(3) Make the edges of the cut smooth to a surface finish of 125 microinches.

(4) Make sure there is a minimum of two rows of repair fasteners around the edges of the cut.

D. Put the skin that is around the damage back to the initial contour.

E. Make the repair parts as shown in Horizontal Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to Table 201/REPAIR 2 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad 2024-T3 that is 0.063 inch thick when the initial skin is 0.040 inch thick. Use clad 2024-T3 that is one gage thicker than the initial skin when the thickness is more than 0.040 inch
[2]	Filler	1	Use clad 2024-T3 that is the same thickness as the initial skin

F. Assemble the repair parts as shown in Horizontal Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2.

G. Drill and countersink the fastener holes.

(1) Align fastener holes in the part [1] doubler with holes in the skin made from an external repair.

H. Remove the repair parts.

I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

J. Bond the part [1] doubler to the leading edge skin with BMS 5-141 as shown in Horizontal Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to 51-70-09 for the procedures to bond the doubler at room temperature.

NOTE: It is optional to make a mating surface seal with BMS 5-95 sealant when you install the part [1] doubler.

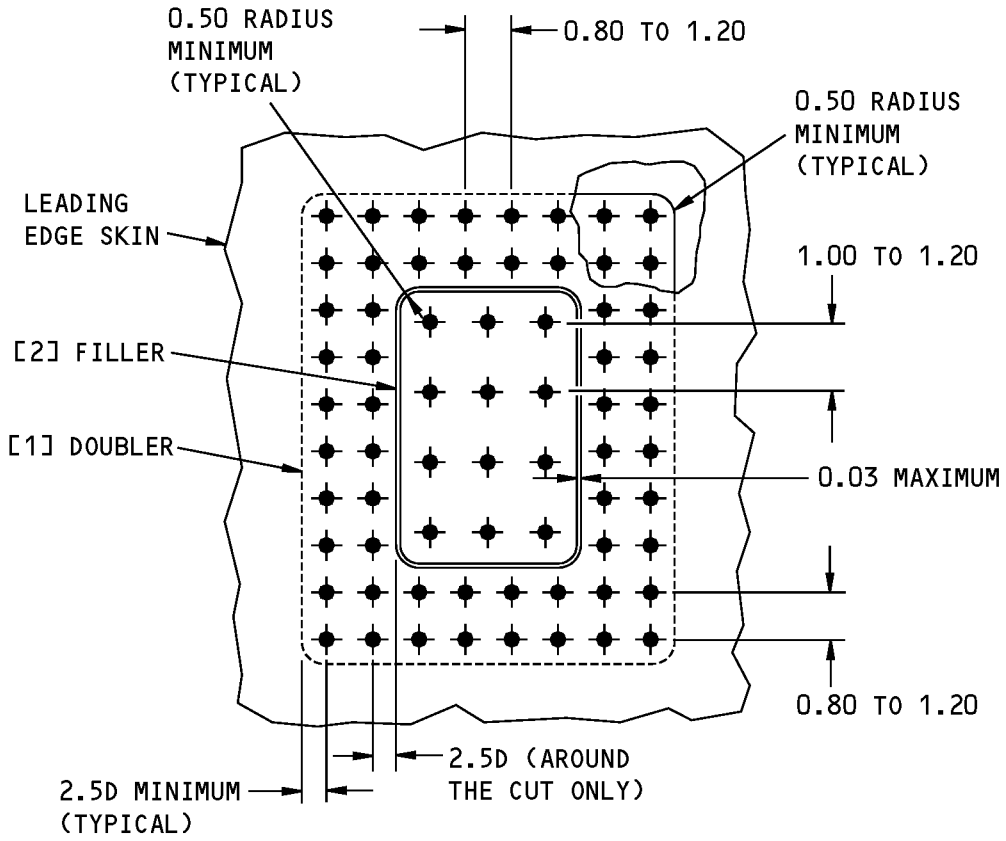
K. Install the rivets dry in the part [1] doubler and skin.

L. Bond the part [2] filler to the part [1] doubler with BMS 5-141 as given in 51-70-09.

M. Install the rivets without sealant in the part [2] filler.

N. Apply BMS 5-95 or BMS 5-26 sealant in the gap between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

O. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



FLAT PATTERN OF THE REPAIR

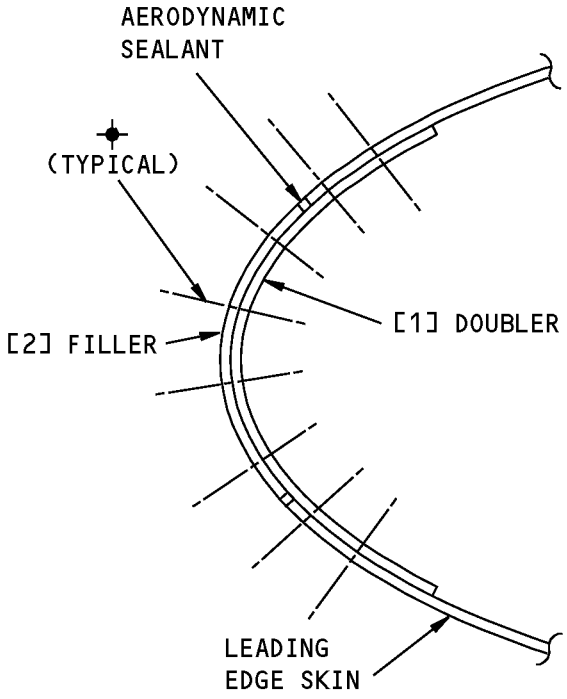
NOTES

- ALL DIMENSIONS ARE IN INCHES
- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS.

FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15GF5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Horizontal Stabilizer Leading Edge Skin Flush Repair
Figure 202 (Sheet 1 of 2)



SECTION THROUGH LEADING EDGE REPAIR

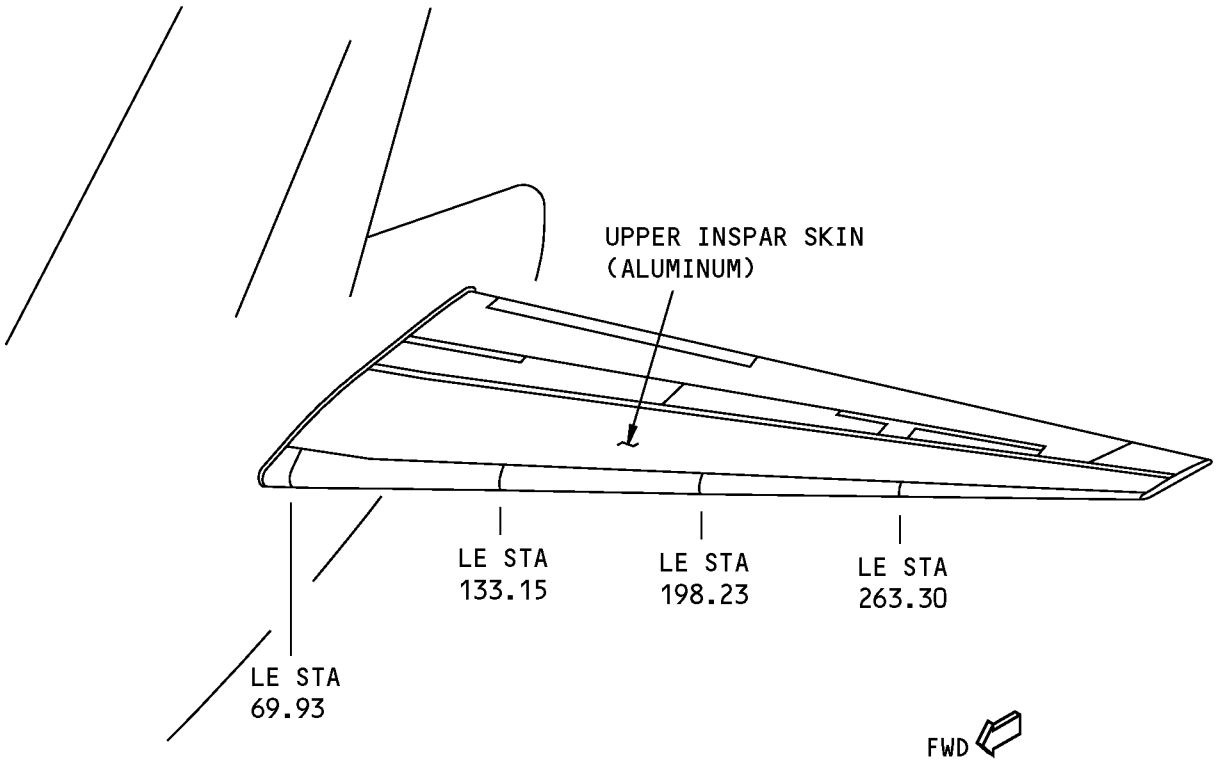
Horizontal Stabilizer Leading Edge Skin Flush Repair
Figure 202 (Sheet 2 of 2)

REPAIR 3 - HORIZONTAL STABILIZER INSPAR SKIN EXTERNAL REPAIR

1. Applicability

A. Repair 3 is applicable to damage to the horizontal stabilizer inspar skins shown in Horizontal Stabilizer Upper Inspar Skin Location, Figure 201/REPAIR 3 and Horizontal Stabilizer Lower Inspar Skin Location, Figure 202/REPAIR 3.

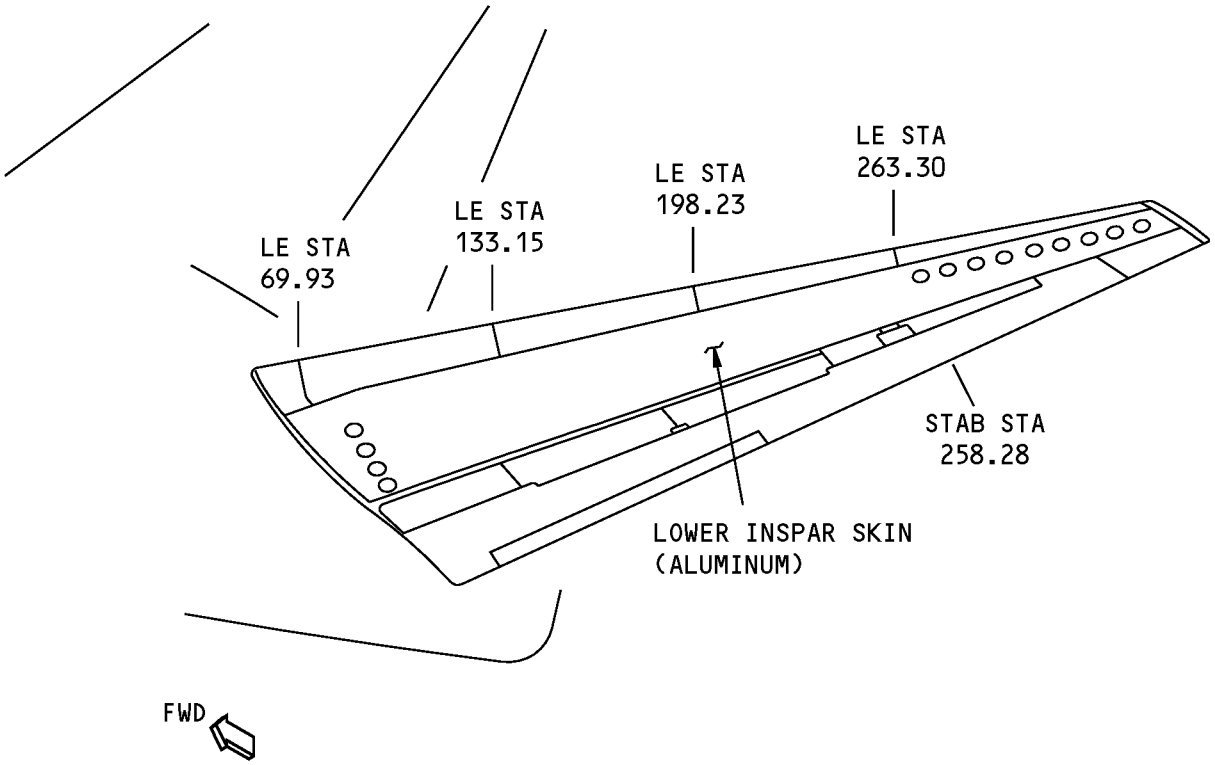
B. Repair 3 is not applicable to damage to the lower inspar skin outboard of Stabilizer Station 258.28.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Inspar Skin Location
Figure 201



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Inspar Skin Location
Figure 202

2. General

A. Repair 3 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to Repair 4 for a flush repair to the horizontal stabilizer inspar skin.

C. Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

D. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

E. Repair 3 can be used only if you install the rivets flush against the internal structure.

F. Get access to the inside of the stabilizer through openings in the front spar.

(1) Use these openings to make sure the repair fasteners are installed correctly.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Drill a stop hole at the ends of all skin cracks that do not end at fastener holes. Refer to Horizontal Stabilizer Inspar Skin External Repair, Figure 203/REPAIR 3 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the skin as shown in Horizontal Stabilizer Inspar Skin External Repair, Figure 203/REPAIR 3. Refer to 51-10-02 for the procedures to remove the damage.

(a) Make the cut in the shape of a rectangle with the longest sides parallel to the inspar ribs.

(b) Make the corner radii of the cut a minimum of 0.50 inch.

B. Put the skin that is around the damage back to the initial contour.

C. Make the part [1] doubler as shown in Horizontal Stabilizer Inspar Skin External Repair, Figure 203/REPAIR 3. Refer to Table 201/REPAIR 3 for the repair material.

(1) Make the contour of the part [1] doubler the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER THICKNESS (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.040	0.063	3/16
0.050	0.063	3/16
0.060	0.080	3/16
0.071	0.090	3/16
0.080	0.100	3/16

D. Assemble the part [1] doubler as shown in Horizontal Stabilizer Inspar Skin External Repair, Figure 203/REPAIR 3.

E. Drill the fastener holes.

F. Countersink the fastener holes in the part [1] doubler.

G. Remove the part [1] doubler.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the doubler and the bare surfaces of the skin.

I. Apply a chemical conversion coating to the part [1] doubler and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

J. Apply one layer of BMS 10-79, Type III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the part [1] doubler.

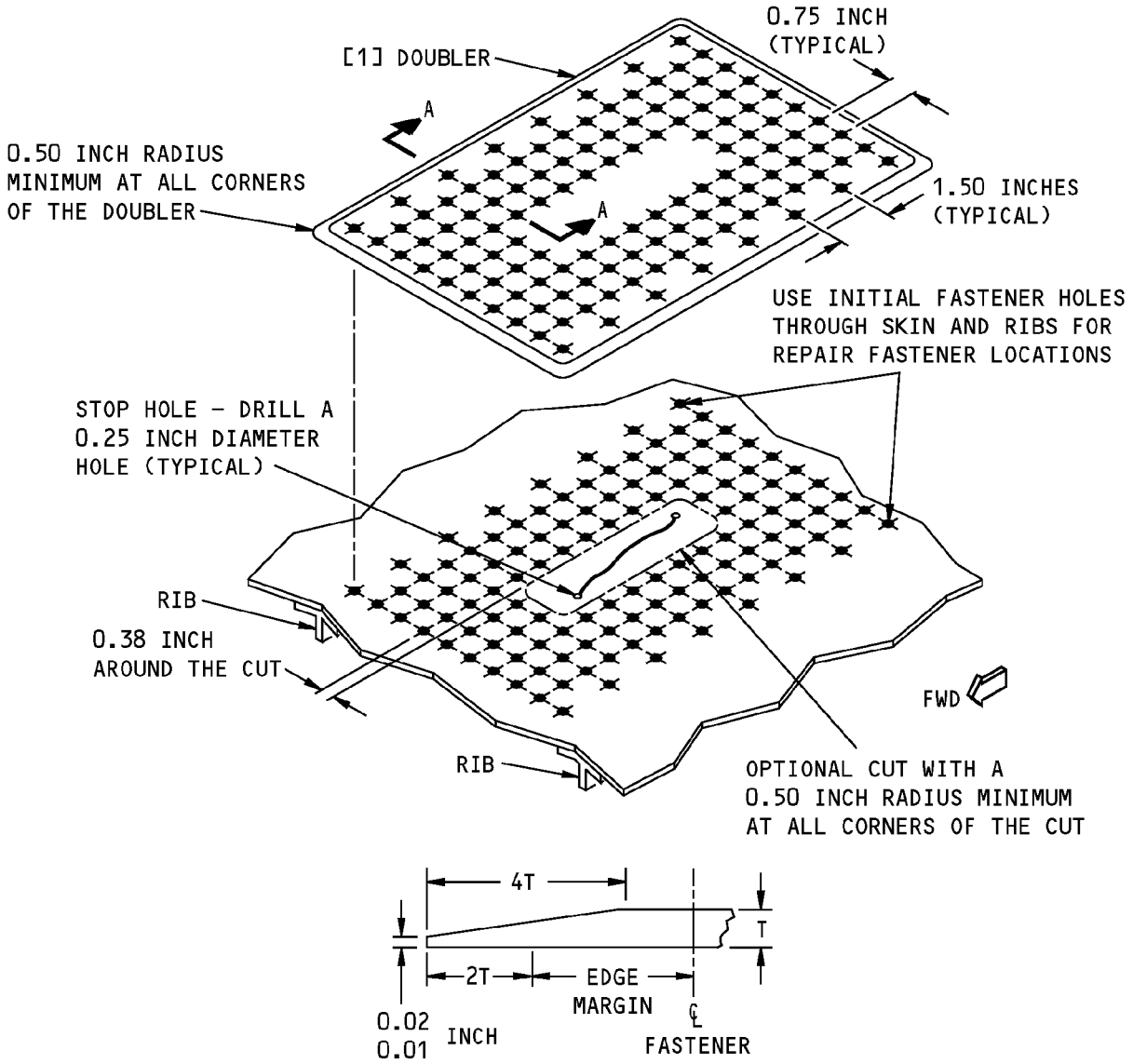
(2) Apply the primer to the bare surfaces of the skin.

K. Install the part [1] doubler with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

L. Install the fasteners dry.

M. Apply BMS 5-95 sealant around the edges of the part [1] doubler as given in 51-20-05.

N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



SECTION OF DOUBLER EDGE
A-A

NOTES

- MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.
- MAKE SURE THERE IS A MINIMUM OF FOUR ROWS OF REPAIR FASTENERS AROUND THE DAMAGE.

FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15CE6D SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

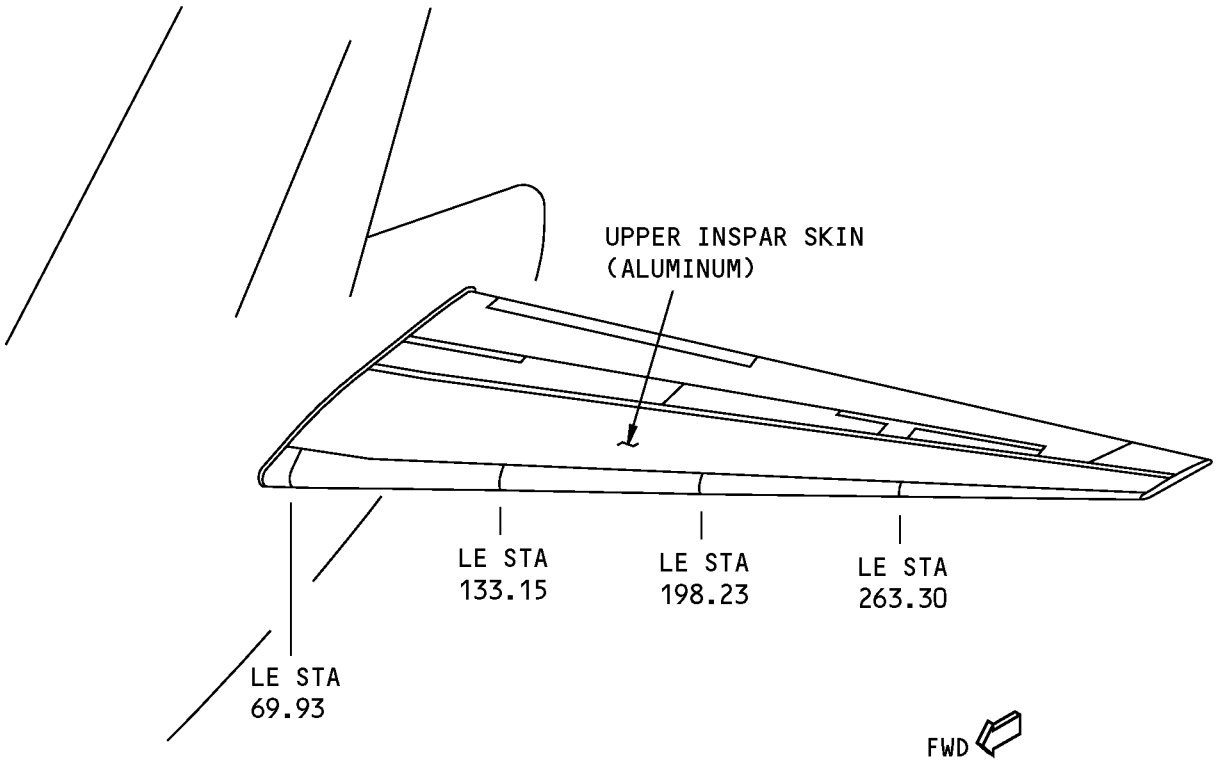
Horizontal Stabilizer Inspar Skin External Repair
Figure 203

REPAIR 4 - HORIZONTAL STABILIZER INSPAR SKIN FLUSH REPAIR

1. Applicability

A. Repair 4 is applicable to damage to the horizontal stabilizer inspar skins shown in Horizontal Stabilizer Upper Inspar Skin Location, Figure 201/REPAIR 4 and Horizontal Stabilizer Lower Inspar Skin Location, Figure 202/REPAIR 4.

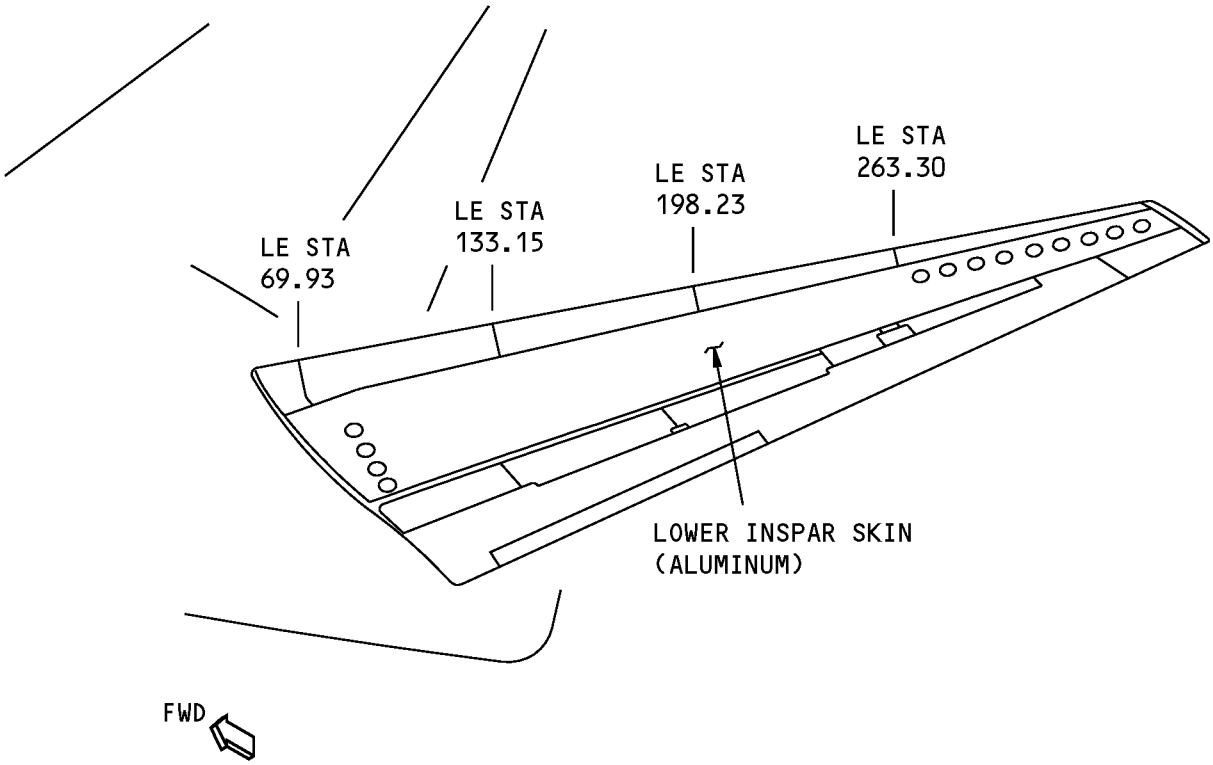
(1) Repair 4 is also applicable as a replacement repair for Repair 3.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

UPPER SURFACE IS SHOWN

Horizontal Stabilizer Upper Inspar Skin Location
Figure 201



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

LOWER SURFACE IS SHOWN

Horizontal Stabilizer Lower Inspar Skin Location
Figure 202

2. General

A. Repair 4 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

C. Repairs with protruding head fasteners are permitted as shown in Horizontal Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 203/REPAIR 4 and as follows:

(1) For the area of each skin located in front of balance bays numbers 2, 3, and 4 (located between ELEV STA 66.54 and ELEV STA 149.12), repairs are permitted as follows:

(a) The total outboard width across all repairs can not be more than 15 percent of the width of the airstream for each skin. The width of this airstream is the distance across the airstream measured in the outboard direction.

(2) For the area of each skin not located in front of balance bays numbers 2, 3, and 4 repairs are permitted as follows:

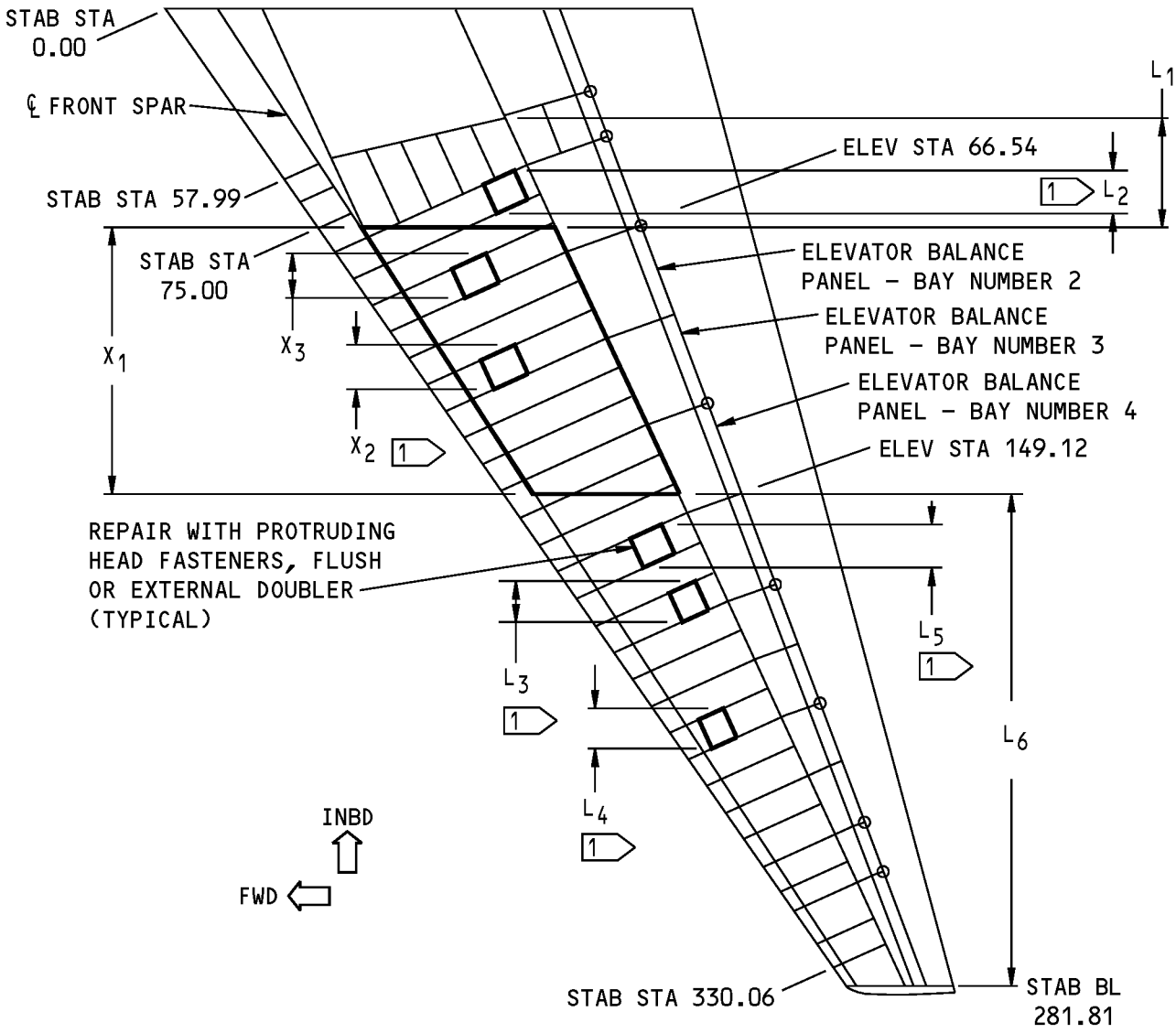
(a) The total outboard width across all repairs can not be more than 25 percent of the width of the airstream for each skin. The width of this airstream is the distance across the airstream measured in the outboard direction. This width does not include the airstream in front of balance bays numbers 2, 3, and 4.

D. Get access to the inside of the stabilizer through openings in the front spar.

(1) It is optional to make an access door in the inspar skin.

(2) Use these openings or doors to make sure the repair fasteners are installed correctly.

(3) Refer to Repair 7 and Repair 8 to make an access door.



L_2 = A MAXIMUM OF $0.25L_1$ FOR EACH SKIN

$X_2 + X_3$ = A MAXIMUM OF $0.15X_1$ FOR EACH SKIN

$L_3 + L_4 + L_5$ = A MAXIMUM OF $0.25L_6$ FOR EACH SKIN

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 203

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

B. Cut and remove the damaged part of the skin as shown in Horizontal Stabilizer Inspar Skin Flush Repair, Figure 204/REPAIR 4. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

(3) Make sure there is a minimum of three rows of repair fasteners around the edges of the cut.

C. Put the skin that is around the damage back to the initial contour.

D. Make the repair parts as shown in Horizontal Stabilizer Inspar Skin Flush Repair, Figure 204/REPAIR 4. Refer to Table 201/REPAIR 4 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended
[2]	Filler	1	Use clad or bare 2024-T3 that is the same thickness as the initial skin. The use of clad material is recommended

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER THICKNESS (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.040	0.063	3/16
0.050	0.063	3/16
0.060	0.071	3/16
0.071	0.090	3/16
0.080	0.100	3/16

E. Assemble the repair parts as shown in Horizontal Stabilizer Inspar Skin Flush Repair, Figure 204/REPAIR 4.

F. Drill the fastener holes.

(1) Align fastener holes in the part [1] doubler with holes in the skin made from an external repair.

G. Remove the repair parts.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

I. Apply a chemical conversion coating to the repair parts and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

J. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

(2) Apply the primer to the bare surfaces of the skin.

K. Bond the part [1] doubler to the inspar skin with BMS 5-101 as shown in Horizontal Stabilizer Inspar Skin Flush Repair, Figure 204/REPAIR 4. Refer to 51-70-09 for the procedures to bond the doubler.

NOTE: It is optional to apply BMS 5-95 sealant to the mating surfaces when you install the repair parts.

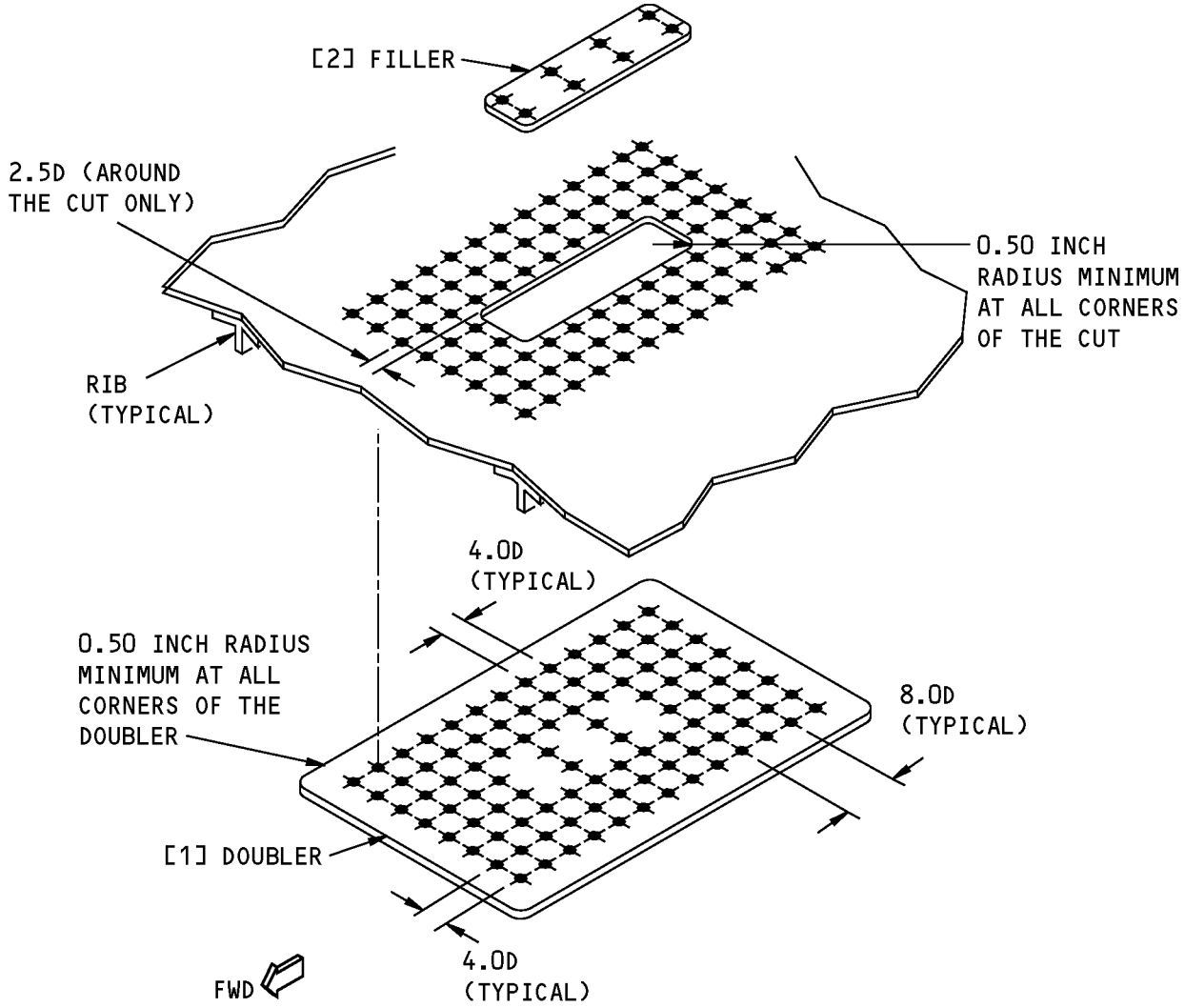
L. Install the rivets dry without sealant in the part [1] doubler and skin.

M. Bond the part [2] filler to the part [1] doubler with BMS 5-101 as given in 51-70-09.

N. Install the rivets dry without sealant in the part [2] filler.

O. Apply BMS 5-95 or BMS 5-26 sealant in the gap between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

P. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



REPAIR FASTENER LOCATIONS - STABILIZER STATIONS 83.5 TO 92.7

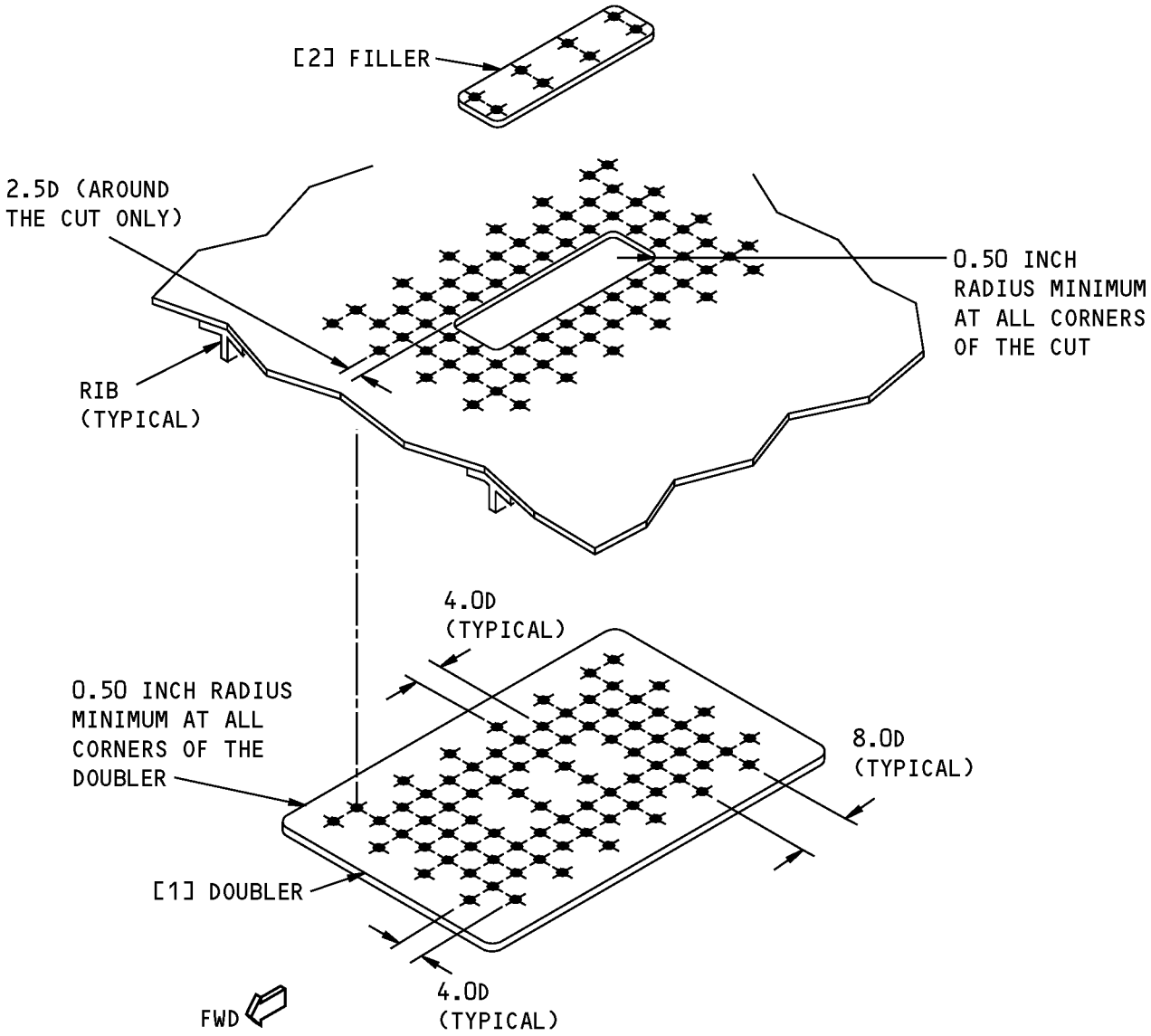
NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15FT6D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Horizontal Stabilizer Inspar Skin Flush Repair
Figure 204 (Sheet 1 of 2)



REPAIR FASTENER LOCATIONS – OUTBOARD OF STABILIZER STATION 92.7

Horizontal Stabilizer Inspar Skin Flush Repair
Figure 204 (Sheet 2 of 2)

REPAIR 7 - HORIZONTAL STABILIZER ACCESS PANEL INSTALLATION WITH A ONE-PIECE DOUBLER

1. Applicability

A. Repair 7 is applicable to damage to the horizontal stabilizer lower skin from Stab BL 83.5 to Stab BL 258.

B. Repair 7 can be used to make an access hole in the lower skin of the horizontal stabilizer.

C. Repair 7 is not applicable to damage on the upper skin of the horizontal stabilizer.

(1) Locations where there is sufficient clearance to install a one-piece part [2] doubler.

2. General

A. Repair 7 is a Category A repair. Refer to 51-00-06 for the definitions of the different categories of repairs.

B. An alternative to Repair 7 is Repair 8.

NOTE: Repair 8 is an access panel installation with a two-piece doubler for locations where there is not sufficient clearance to install a one-piece doubler.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
AMM 51-21-99/701	Decorative Exterior Paint System - Cleaning and Painting
SOPM 20-44-01	Application of Special Purpose Coatings and Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Cut the hole in the skin to the shape shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 7.

(1) Make sure you do not cover a drain hole with the repair parts.

(a) If you must do the repair in a drain hole area, then put the cutout in position so you can drill a hole through a repair part at the initial drain hole.

B. Remove the fasteners from the rib chords as necessary.

(1) Refer to 51-40-02.

C. Make the repair parts. Refer to Table 201/REPAIR 7.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Cover Plate	1	Use bare or clad 2024-T3 that is 0.070 inch thick
[2]	Doubler	1	Use bare or clad 2024-T351 that is 0.250 inch thick

REPAIR MATERIAL			
ITEM	PART	QUANTITY	MATERIAL
[3]	Shim	1	Use bare or clad 2024-T3 that is 0.030 inch thick

D. Assemble the part [2] doubler and the part [3] shim as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 7.

E. Drill the fastener holes that go through the skin, rib chords, the part [2] doubler, and the part [3] shim.

(1) Refer to 51-40-05 for the fastener hole dimensions.

(2) If you installed the repair parts at a drain hole location, then drill a hole through the repair parts and through the initial drain hole.

(a) Make the hole you drill the same diameter as the initial drain hole.

F. Disassemble the repair parts.

G. Remove the nicks, scratches, gouges, and burrs from the initial parts and from the part [2] doubler and the part [3] shim.

H. Apply a chemical conversion coating to the part [2] doubler and the part [3] shim and the bare surfaces of the skin. Refer to 51-20-01.

I. Apply one layer of BMS 10-79, Type II primer to the part [2] doubler and the part [3] shim and the bare surfaces of the initial parts. Refer to SOPM 20-44-04.

J. Install the part [2] doubler and the part [3] shim.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the rivets without sealant.

(3) If you use hex drive bolts, install the fasteners wet with BMS 5-95 sealant.

K. Put the part [1] cover plate in position as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 7.

L. Drill the 0.190 to 0.199 inch diameter holes for the nutplates as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 7.

M. Remove the part [1] cover plate.

N. Put the nutplates in position on the part [2] doubler and drill the holes for the rivets.

O. Remove all the nicks, scratches, gouges, and burrs from the part [1] cover plate, the part [2] doubler, and the part [3] shim.

P. Apply a chemical conversion coating to the part [1] cover plate and the bare surfaces of the part [2] doubler and the part [3] shim. Refer to 51-20-01.

Q. Apply one layer of BMS 10-79, Type II primer to the part [1] cover plate and the bare surfaces of the part [2] doubler and the part [3] shim. Refer to SOPM 20-44-04.

R. Install the nutplates on the part [2] doubler.

(1) Install the rivets without sealant.

S. Apply BMS 10-86, Type I white abrasion resistant coating to the mating surfaces of the part [1] cover plate and the part [2] doubler. Refer to SOPM 20-44-01.

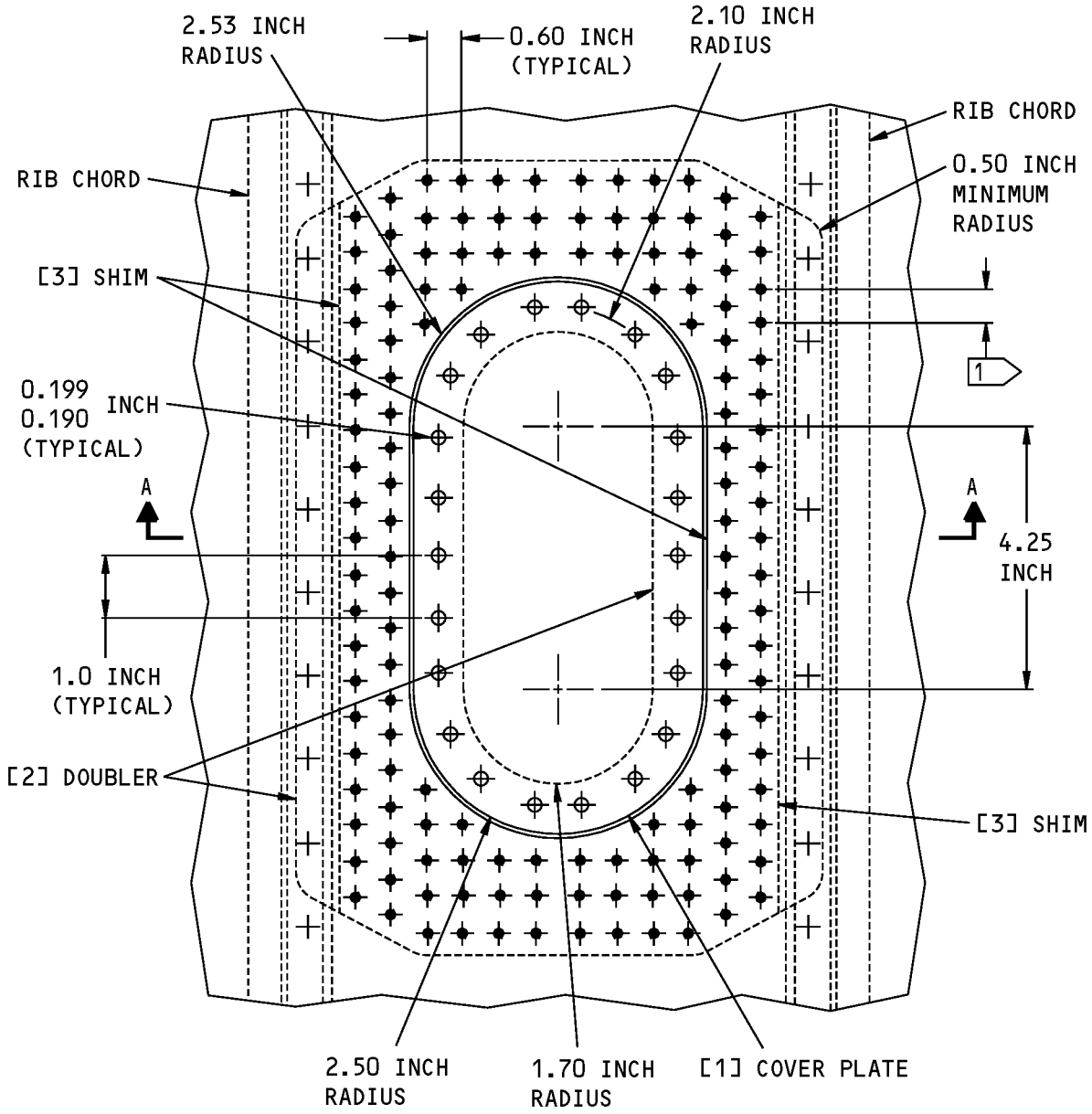
T. Install the part [1] cover plate.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the fasteners wet with BMS 5-95 sealant.

(3) Put BMS 5-95 sealant into the space between the skin and the part [1] cover plate.

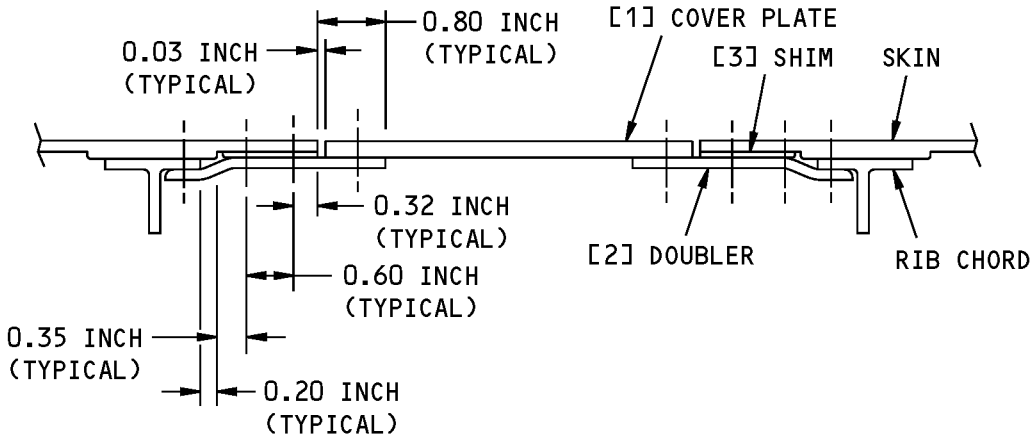
U. Apply the decorative finish to the repair area if necessary. Refer to AMM 51-21-99/701.



NOTES

1 USE THE FASTENER SPACING AS FOLLOWS:
- 0.65 INCH FOR STAB BL 83.5 TO STAB BL 258.0

Horizontal Stabilizer Access Panel Installation
Figure 201 (Sheet 1 of 2)



A–A

FASTENER SYMBOLS

- INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER AS THE INITIAL FASTENER. YOU CAN INSTALL A FASTENER THAT IS UP TO 1/32 INCH DIAMETER OVERSIZE.
- REPAIR FASTENER LOCATION. INSTALL A BACB30MY6K HEX DRIVE BOLT.
- REPAIR FASTENER LOCATION. INSTALL BACN10JR03CFM NUTPLATE WITH BACR15BA3D RIVETS. INSTALL A BACB30EL3-() BOLT TO ATTACH THE PART [1] COVER PLATE.

Horizontal Stabilizer Access Panel Installation
Figure 201 (Sheet 2 of 2)

REPAIR 8 - HORIZONTAL STABILIZER LOWER SKIN AND ACCESS PANEL INSTALLATION WITH A TWO-PIECE DOUBLER

1. Applicability

A. Repair 8 is applicable for damage to:

(1) The horizontal stabilizer lower skin from Stab BL 83.5 to Stab BL 258

(2) Locations where there is not sufficient clearance to install a one-piece part [2] doubler.

B. Repair 8 can be used to make an access hole in the lower skin of the horizontal stabilizer.

C. Repair 8 does not apply to the upper skin of the horizontal stabilizer.

2. General

A. Repair 8 is a Category A repair. Refer to 51-00-06 for the definitions of the different categories of repairs.

B. An alternative to Repair 8 is Repair 7.

NOTE: Repair 7 is an access panel installation for locations where there is sufficient clearance to install a one-piece doubler.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
AMM 51-21-99/701	Decorative Exterior Paint System - Cleaning and Painting
SOPM 20-44-01	Application of Special Purpose Coatings and Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Cut the hole in the skin to the shape shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 8.

(1) Make sure you do not cover a drain hole with the repair parts.

(a) If you must do the repair in a drain hole area, then put the cutout in position so you can drill through a repair part at the initial drain hole.

B. Remove the fasteners from the rib chords as necessary.

(1) Refer to 51-40-02.

C. Make the repair parts. Refer to Table 201/REPAIR 8.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Cover Plate	1	Use bare or clad 2024-T3 that is 0.070 inch thick

REPAIR MATERIAL			
ITEM	PART	QUANTITY	MATERIAL
[2]	Doubler	2	Use bare or clad 2024-T351 that is 0.25 inch thick
[3]	Shim	2	Use bare or clad 2024-T3 that is 0.030 inch thick
[4]	Splice Plate	2	Use bare or clad 2024-T351 that is 0.25 inch thick

D. Assemble the part [2] doublers and the part [3] shims as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 8.

E. Drill the fastener holes that go through the skin, the rib chords, the part [2] doublers, and the part [3] shims.

(1) Refer to 51-40-05 for the fastener hole dimensions.

(a) If you installed the repair parts at a drain hole location, then drill a hole through the repair parts and through the initial drain hole.

(b) Make the hole you drill the same diameter as the initial drain hole.

F. Assemble the part [4] splice plates as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 8.

G. Drill the fastener holes that go through the skin, the part [4] splice plates, the part [2] doublers. Refer to 51-40-05 for the fastener hole dimensions.

H. Disassemble the repair parts.

I. Remove the nicks, scratches, gouges, and burrs from the initial parts and from the part [2] doublers, the part [3] shims, and the part [4] splice plates.

J. Apply a chemical conversion coating to the bare surfaces of the initial parts and to the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to 51-20-01.

K. Apply one layer of BMS 10-79, Type II primer to the bare surfaces of the initial parts and to the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to SOPM 20-44-04.

L. Install the part [2] doublers, the part [3] shims, and the part [4] splice plates.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the rivets without sealant.

(3) If you use hex drive bolts, install the fasteners wet with BMS 5-95 sealant.

M. Put the part [1] cover plate in position as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 8.

N. Drill the 0.190 to 0.199 inch diameter holes for the nutplates as shown in Horizontal Stabilizer Access Panel Installation, Figure 201/REPAIR 8.

O. Remove the part [1] cover plate.

P. Put the nutplates in position on the part [2] doubler and drill the holes for the rivets.

Q. Remove the nicks, scratches, gouges, and burrs from the repair parts.

R. Apply a chemical conversion coating to the part [1] cover plate and the bare surfaces of the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to 51-20-01.

S. Apply one layer of BMS 10-79, Type II primer to the part [1] cover plate and the bare surfaces of the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to SOPM 20-44-04.

T. Install the nutplates on the part [2] doubler.

(1) Install the rivets without sealant.

U. Apply BMS 10-86, Type I white abrasion resistant coating to the mating surfaces of the part [1] cover plate and the part [2] doublers. Refer to SOPM 20-44-01.

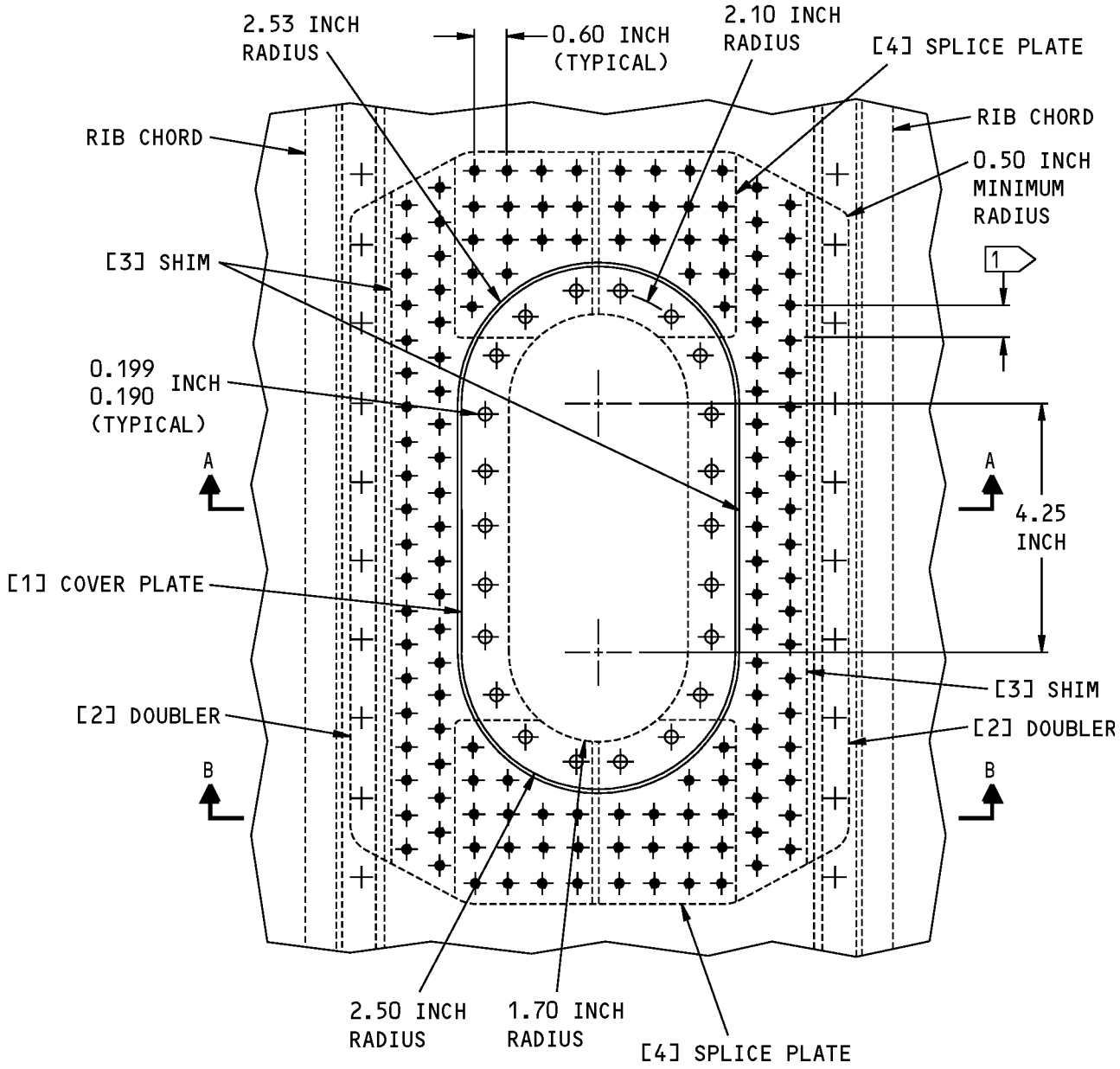
V. Install the part [1] cover plate.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the fasteners wet with BMS 5-95 sealant.

(3) Put BMS 5-95 sealant into the space between the skin and the part [1] cover plate.

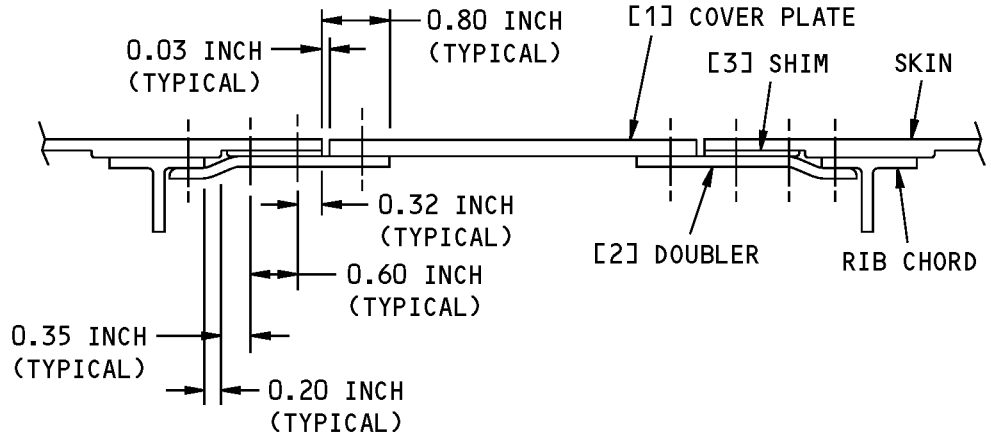
W. Apply the decorative finish to the repair area if necessary. Refer to AMM 51-21-99/701.



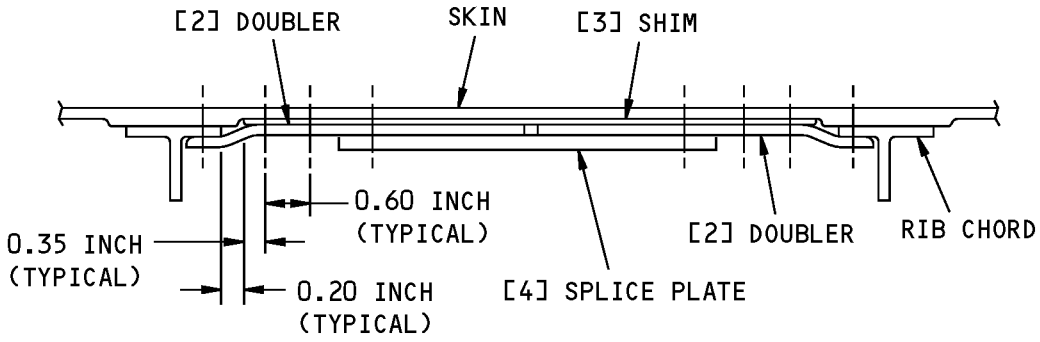
NOTES

1 USE THE FASTENER SPACING AS FOLLOWS:
- 0.65 INCH FOR STAB BL 83.5 TO STAB BL 258.0

Horizontal Stabilizer Access Panel Installation
Figure 201 (Sheet 1 of 2)



A–A



B–B

FASTENER SYMBOLS

- INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER AS THE INITIAL FASTENER. YOU CAN INSTALL A FASTENER THAT IS UP TO 1/32 INCH DIAMETER OVERSIZE.
- REPAIR FASTENER LOCATION. INSTALL A BACB30MYK HEX DRIVE BOLT.
- REPAIR FASTENER LOCATION. INSTALL BACN10JR03CFM NUTPLATE WITH BACR15BA3D RIVETS. INSTALL A BACB30EL3-() BOLT TO ATTACH THE PART [1] COVER PLATE.

Horizontal Stabilizer Access Panel Installation
Figure 201 (Sheet 2 of 2)

REPAIR 9 - HORIZONTAL STABILIZER TRAILING EDGE PANELS

1. Applicability

A. Repair 9 is applicable to damage on the horizontal stabilizer trailing edge panels shown in Horizontal Stabilizer Upper Trailing Edge Panel Locations, Figure 201/REPAIR 9. The trailing edge panels are made of Glass Fiber Reinforced Plastic (GFRP) and Carbon Fiber Reinforced Plastic (CFRP).

B. Repair 9 is applicable to damage that is more than the limits permitted in Allowable Damage 3. Refer to Allowable Damage 3 for the type and size of damage that is permitted.

2. General

A. Repair 9 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the trailing edge panels.

(2) Refer to 51-40-02 for information on fastener removal.

C. Refer to Damage Definitions, Figure 202/REPAIR 9, Details A, B, and C for the definitions of the length, width, and depth of damage.

D. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definitions of the facesheets of a honeycomb core area.

E. Some trailing edge panels have a protective layer of Teflon film. If damage occurs, refer to AMM 51-21-81/701 for the procedures to repair the Teflon film.

F. The conditions that follow must be true for panel areas other than the edgeband:

(1) The edges of the room-temperature Category B repairs must be 6 inches or more away from:

(a) The edge of other repairs

(b) The panel edge

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 3.

(2) The edges of the 150°F (66°C) and 200°F (93°C) cure Category A repairs must be 3 inches or more away from:

(a) The edge of other repairs

(b) The panel edge

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 3.

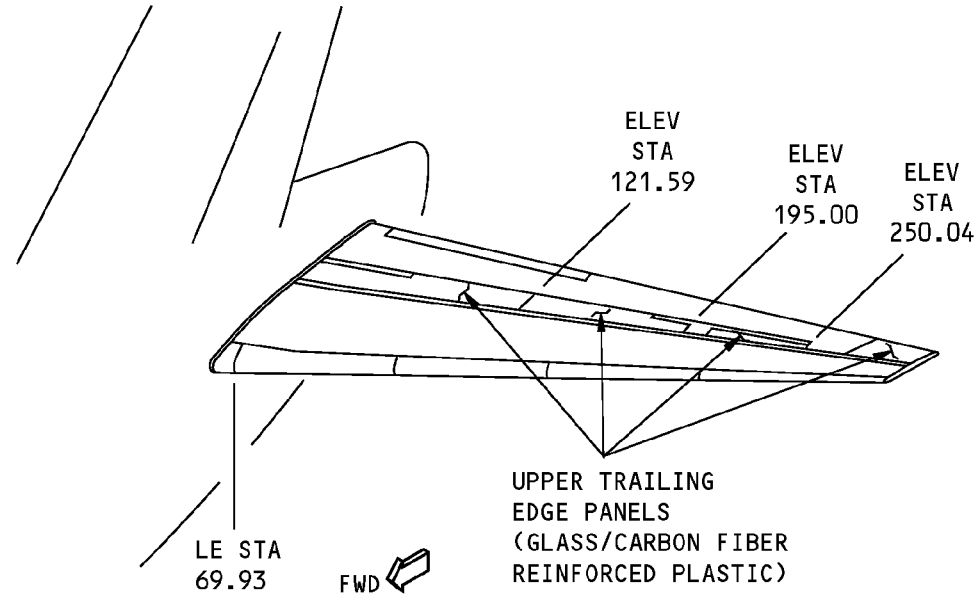
G. Do the repair as given in Paragraph 4./REPAIR 9

H. Put the trailing edge panels back to the initial condition, as applicable.

(1) Install the trailing edge panels, if they were removed.

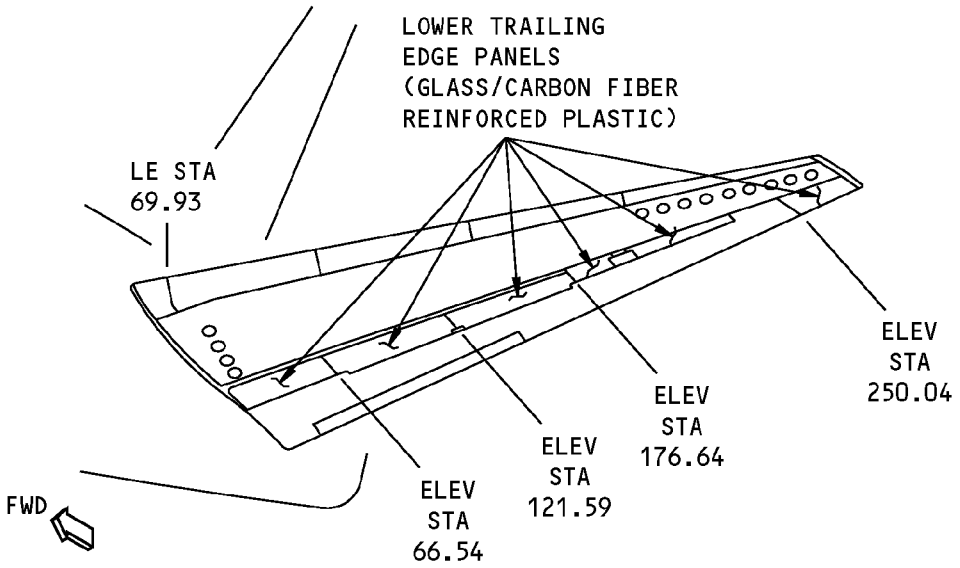
(a) Refer to 51-40-02 for information on fastener installation.

(2) Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the airplane. Refer to 51-10-01.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

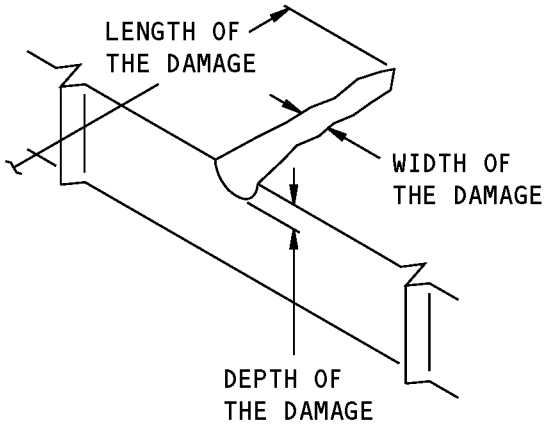
UPPER SURFACE IS SHOWN



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

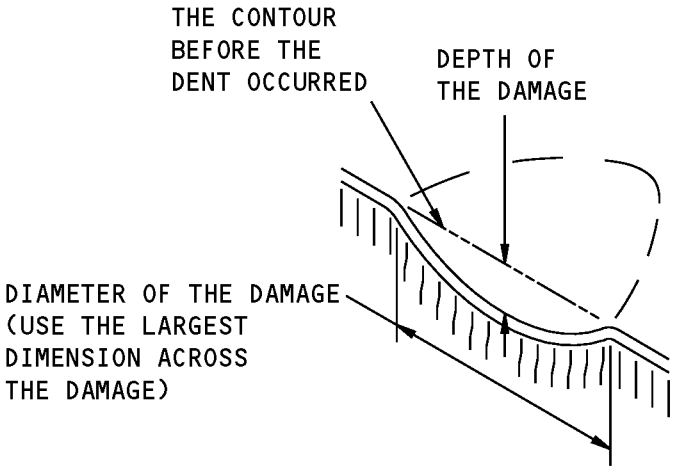
LOWER SURFACE IS SHOWN

Horizontal Stabilizer Upper Trailing Edge Panel Locations
Figure 201



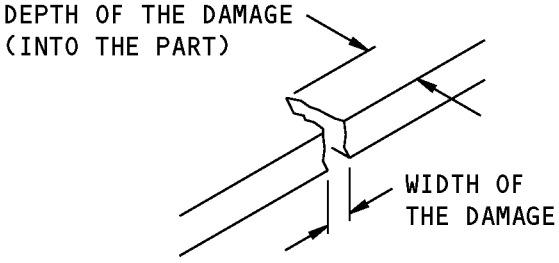
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

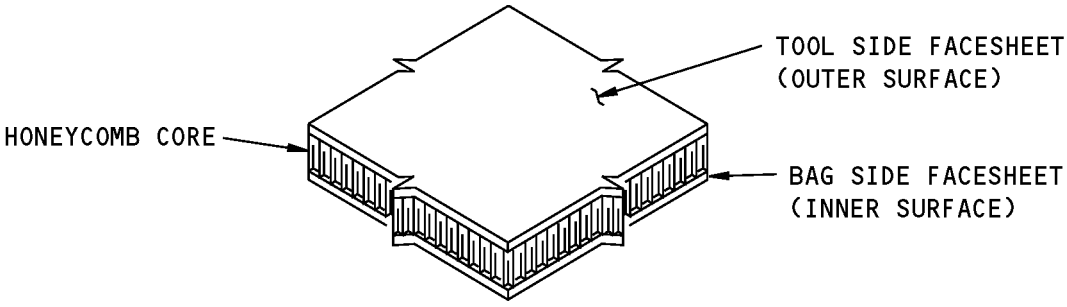
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 202



Definitions of the Facesheets
Figure 203

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS
51-70-14, REPAIR GENERAL	Structures With Aluminum Coatings and Foils
55-10-01, ALLOWABLE DAMAGE 3	Horizontal Stabilizer Trailing Edge Panels
AMM 51-21-81 P/B 701	ABRASION-RESISTANT TEFLON FINISH - CLEANING/PAINTING
AMM 51-21-81/701	Abrasion-resistant Teflon Finish - Cleaning/Painting

4. Repair Instructions

A. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound.

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

B. For dents that are not permitted by Paragraph 4.A./REPAIR 9 and for other damage that is not permitted by Allowable Damage 3, refer to:

(1) Table 201/REPAIR 9 for panel areas with honeycomb core

(2) Table 202/REPAIR 9 for solid laminate panel areas, except edgebands

(3) Table 203/REPAIR 9 for panel areas with edgebands.

Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE TRAILING EDGE PANELS FOR PANEL AREAS WITH HONEY COMB CORE				
REPAIR TYPE	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-06**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A PREIMPREGNATED LAYUP REPAIR AS GIVEN IN SRM 51-70-05**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 2.0 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location - One facesheet and the honeycomb core in depth	Damage that is a maximum of: - 4.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	Damage that is a maximum of: - 6.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	There are no limits on the size of the repair
REPAIR PROCEDURES	Refer to Paragraph 4.C	Refer to Paragraph 4.D	Refer to Paragraph 4.E	Refer to Paragraph 4.F

Table 202:

REPAIR DATA FOR THE 250°F (121°C) CURE TRAILING EDGE PANELS FOR SOLID LAMINATE PANEL AREAS, EXCEPT EDGEBANDS				
REPAIR TYPE	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-06**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A PREIMPREGNATED LAYUP REPAIR AS GIVEN IN SRM 51-70-05**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 1.0 inches in diameter - 15 percent of the smallest dimension across the panel at the damage location - One facesheet and the honeycomb core in depth	Damage that is a maximum of: - 2.0 inches in diameter - 25 percent of the smallest dimension across the panel at the damage location	Damage that is a maximum of: - 3.0 inches in diameter - 35 percent of the smallest dimension across the panel at the damage location	There are no limits on the size of the repair
REPAIR PROCEDURES	Refer to Paragraph 4.C	Refer to Paragraph 4.D	Refer to Paragraph 4.E	Refer to Paragraph 4.F

Table 203:

REPAIR DATA FOR THE EDGEBANDS OF 250°F (121°C) CURE TRAILING EDGE PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-06**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A PREIMPREGNATED LAYUP REPAIR AS GIVEN IN SRM 51-70-05**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 15 percent of the cross-sectional area of the edge- band at the damage location - 10 percent of the length of the edgeband on the side of the damage	Damage that is a maximum of: - 15 percent of the cross-sectional area of the edgeband at the damage location - 10 percent of the length of the edgeband on the side of the damage	There are no size limits on the dimensions of the repair	There are no limits on the size of the repair
REPAIR PROCEDURES	Refer to Paragraph 4.C	Refer to Paragraph 4.D	Refer to Paragraph 4.E	Refer to Paragraph 4.F

C. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) Repair the damage as given in 51-70-06, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

(d) You must do an inspection of the repair every 800 flight hours or sooner.

D. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.

(1) Repair the damage as given in 51-70-04, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.

(1) Repair the damage as given in 51-70-04, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

F. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

REPAIR 10 - HORIZONTAL STABILIZER TRAILING EDGE PANEL CONDUCTIVE STRIP

1. Applicability

A. Repair 10 is applicable to damage on the horizontal stabilizer trailing edge panel conductive strip.

B. Repair 10 is applicable to damage to the conductive strip that is more than the limits permitted in SRM 55-10-01, Allowable Damage 3.

2. General

A. Repair 10 gives instructions for a Category C repair. Refer to STRUCTURAL REPAIR DEFINITIONS, 51-00-06 for definitions of the different categories of repairs.

B. Gain access to the damaged area.

(1) If necessary, remove the trailing edge panels.

(2) Refer to FASTENER INSTALLATION AND REMOVAL, 51-40-02 for information on fastener removal.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-20-13	SURFACE ROUGHNESS FINISH REQUIREMENTS
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-08	COUNTERSINKING
51-70-14	STRUCTURES WITH ALUMINUM COATINGS AND FOILS
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Repair Instructions

A. Remove fasteners as necessary to the conductive strip at the damaged location. Refer to the part [1] doubler given in Figure 201.

B. Blend or completely remove the damaged area as shown in Figure 201. Maintain a minimum 125 micro inches Ra surface smoothness or smoother. Refer to SURFACE ROUGHNESS FINISH REQUIREMENTS, 51-20-13.

C. Make the repair parts as shown in Figure 201/REPAIR 10. Refer to Table 201/REPAIR 10 for the repair material. Make the Part [1] Doubler to follow the skin panel contour. Make sure the Part [1] Doubler extends two fasteners minimum beyond damage in either direction. Make sure there is 1.5D minimum edge margin on all the fasteners. Make sure the corner radii are 0.5 inch minimum.

Table 201:

REPAIR MATERIAL			
ITEM	PART	QUANTITY	MATERIAL
[1]	Doubler	1	0.04 inch (1.0 mm) 6061-T4. It is optional to use 2024-T3 sheet

Table 201:

REPAIR MATERIAL			
[2]	Filler (if necessary)	1	Use 6061-T4 sheet with a thickness to limit all gaps to a maximum 0.01 inch (0.25 mm). It is optional to use 2024-T3 sheet.

D. Remove the finish from the initial conductive strip surface that is common to the part [1] doubler.

E. Make the countersink washers for necessary initial fastener locations. Refer to COUNTERSINKING, 51-40-08.

F. At necessary initial fastener locations, install countersink repair washers with BMS 5-95 sealant. Refer to COUNTERSINKING, 51-40-08. Perform a resistance check between the washers and the conductive strip as given in BAC 5117-6. The maximum resistance is to be 0.01 ohms.

G. Assemble the repair parts as shown in Figure 201/REPAIR 10.

H. Drill the fastener holes.

I. Remove the repair parts.

J. Remove all nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the initial parts.

K. Install the repair parts dry.

L. Install the fasteners without sealant. Do a resistance check between the fastener head and the initial structure as given in BAC 5117.

M. Apply a chemical conversion coating to the repair parts and bare surfaces. Refer to PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS, 51-20-01.

N. Apply two layers of BMS 10-11, Type II primer to the bare surfaces except at areas common to the static wicks. Refer to SOPM 20-41-02.

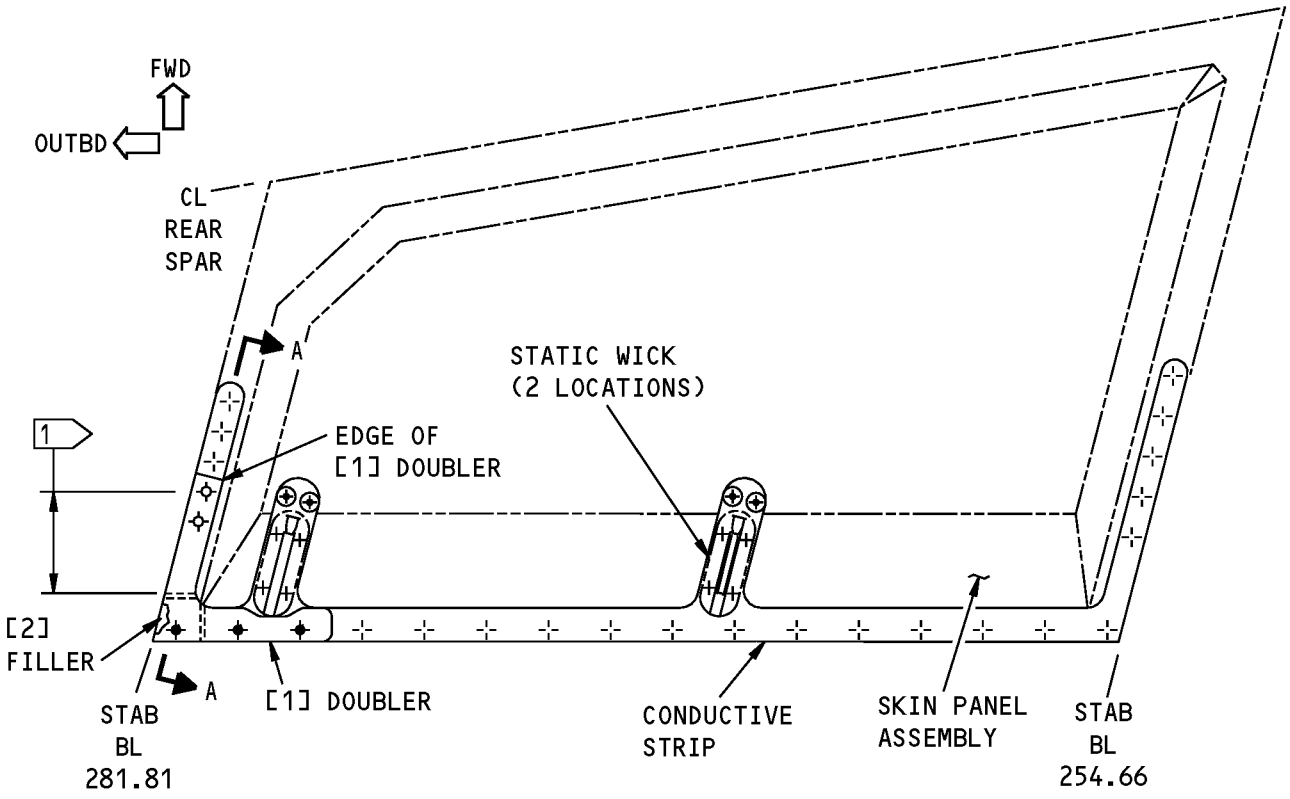
O. Fillet seal the repair parts and all gaps with BMS 5-95 sealant. Refer to REPAIR SEALING, 51-20-05.

P. Do a resistance test between the Part [1] Doubler and conductive strip. Refer to STRUCTURES WITH ALUMINUM COATINGS AND FOILS, 51-70-14 for test procedures.

Q. Apply all initial production drawing finishes as necessary.

R. After 30 days or less, make an initial visual inspection of the repaired conductive strip for signs of new damage or for loose or missing fasteners. Repeat the inspections at each 30 day interval. If there is new damage found to the conductive strip then replace the conductive strip. Replacement of the damaged part with a new conductive strip stops the necessary inspection.

S. Replace the damaged conductive strip with a new conductive strip in 24 months or less.



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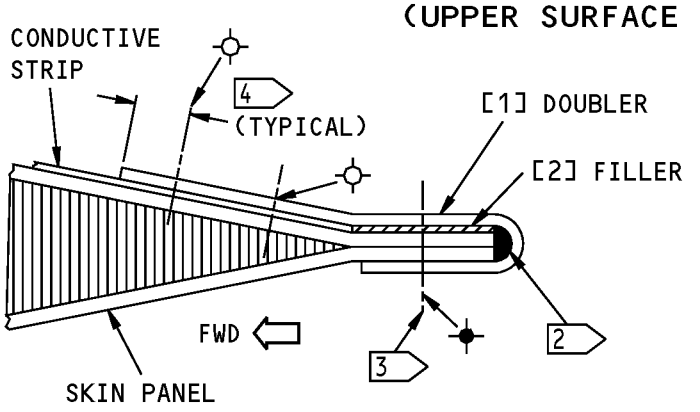
(UPPER SURFACE IS SHOWN)



A–A

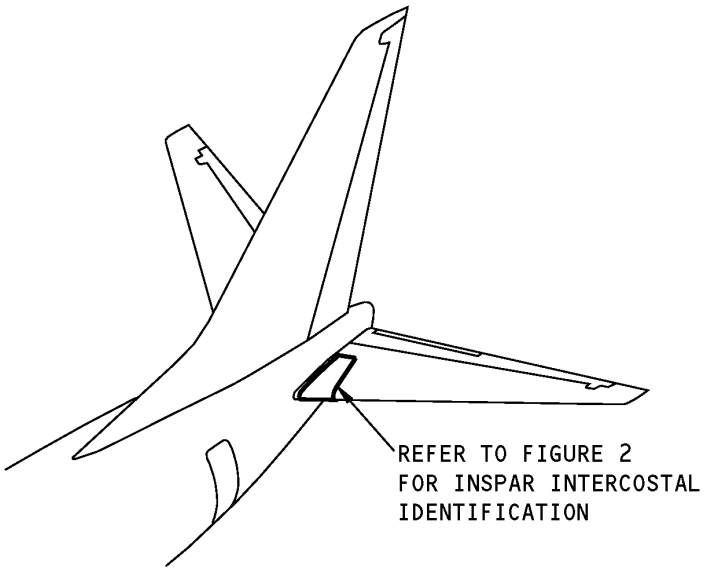
FASTENER SYMBOLS

- REFERENCE FASTENER LOCATION
- INITIAL FASTENER LOCATION. INSTALL A BACR15FR5MP() RIVET (UP TO 1/32–INCH DIAMETER OVERSIZE)
- INITIAL FASTENER LOCATION. A BACR15BB5AD() RIVET USING SQUEEZE METHOD (UP TO 1/32–INCH DIAMETER OVERSIZE)

1. THE PART [1] REPAIR DOUBLER MUST EXTEND 2 FASTENERS BEYOND DAMAGE IN EITHER DIRECTIONS.
2. FILL VOID WITH BMS 5–95 SEALANT.
3. IF THIS FASTENER ROW IS INCLUDED IN THE REPAIR, EXTEND THE DOUBLER AS SHOWN. EXAMPLE DAMAGE LOCATION SHOWN, OTHER DAMAGE LOCATIONS SIMILAR.
4. MAKE SURE THERE IS A MINIMUM OF 1.5D EDGE MARGIN.

Conductive Strip Repair
Figure 201

IDENTIFICATION 1 - HORIZONTAL STABILIZER INSPAR INTERCOSTALS

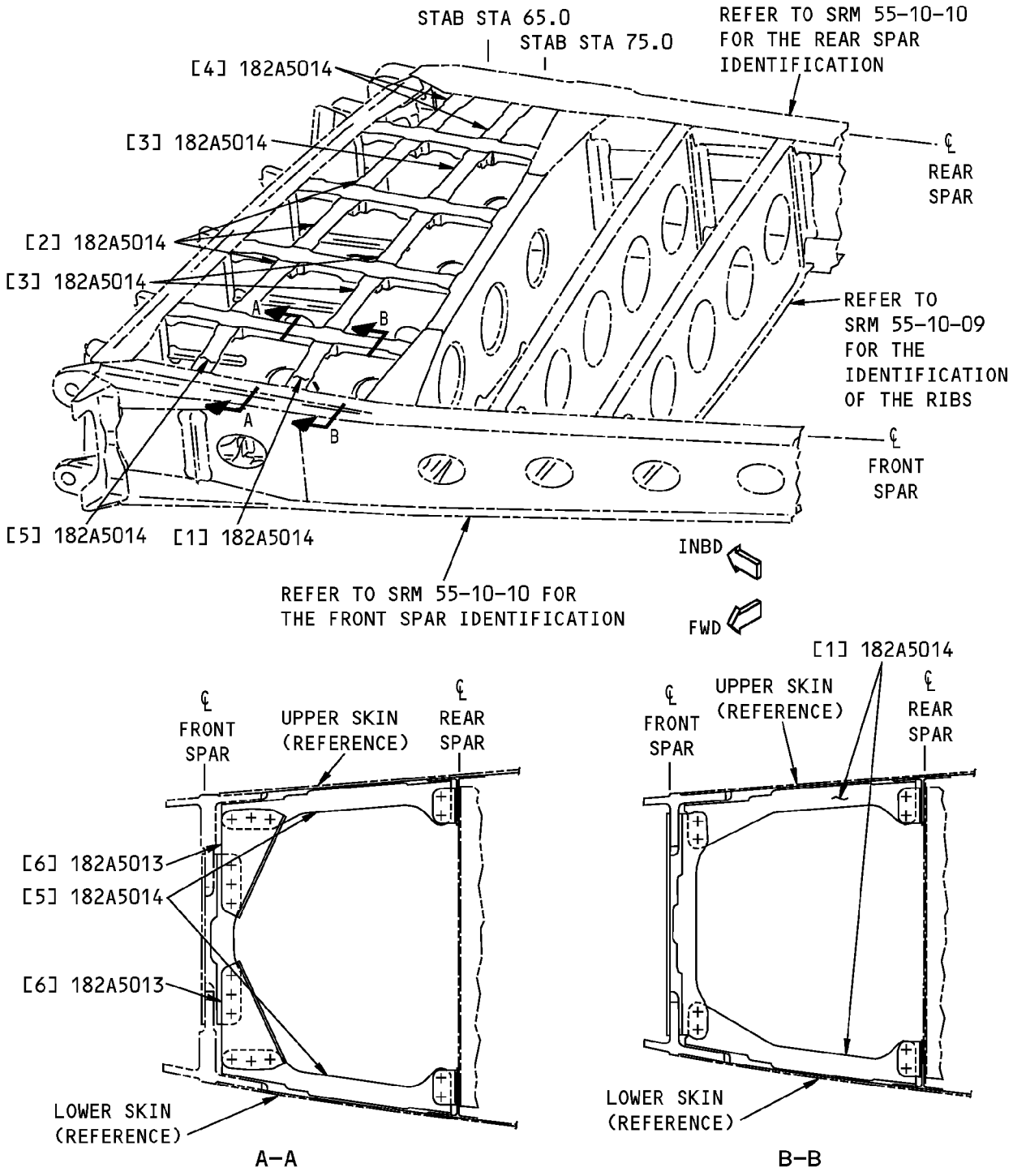


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Inspar Intercostal Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A8001	Section 82 Left Horizontal Stabilizer - Product Collector
001A8002	Section 82 Right Horizontal Stabilizer - Product Collector
182A0001	Torque Box Functional Collector - Left Horizontal Stabilizer
182A0002	Torque Box Functional Collector - Right Horizontal Stabilizer
182A5000	Intercostal Installation - Inboard Rib, Horizontal Stabilizer



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

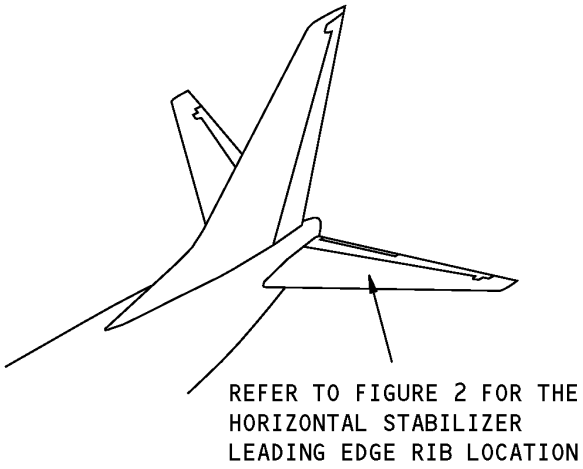
Horizontal Stabilizer Inspar Intercostal Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Intercostal (2)		BAC1506-4354 7075-T73511 extrusion as given in QQ-A-200/11	
[2]	Intercostal (3)		BAC1506-4381 7075-T73511 extrusion as given in QQ-A-200/11	
[3]	Intercostal (3)		BAC1506-4384 7075-T73511 extrusion as given in QQ-A-200/11	
[4]	Intercostal (2)		BAC1506-4352 7075-T73511 extrusion as given in QQ-A-200/11	
[5]	Intercostal (2)		BAC1506-4353 7075-T73511 extrusion as given in QQ-A-200/11	
[6]	Gusset (2)	0.063 (1.60)	2024-T42 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 1 - HORIZONTAL STABILIZER LEADING EDGE RIBS



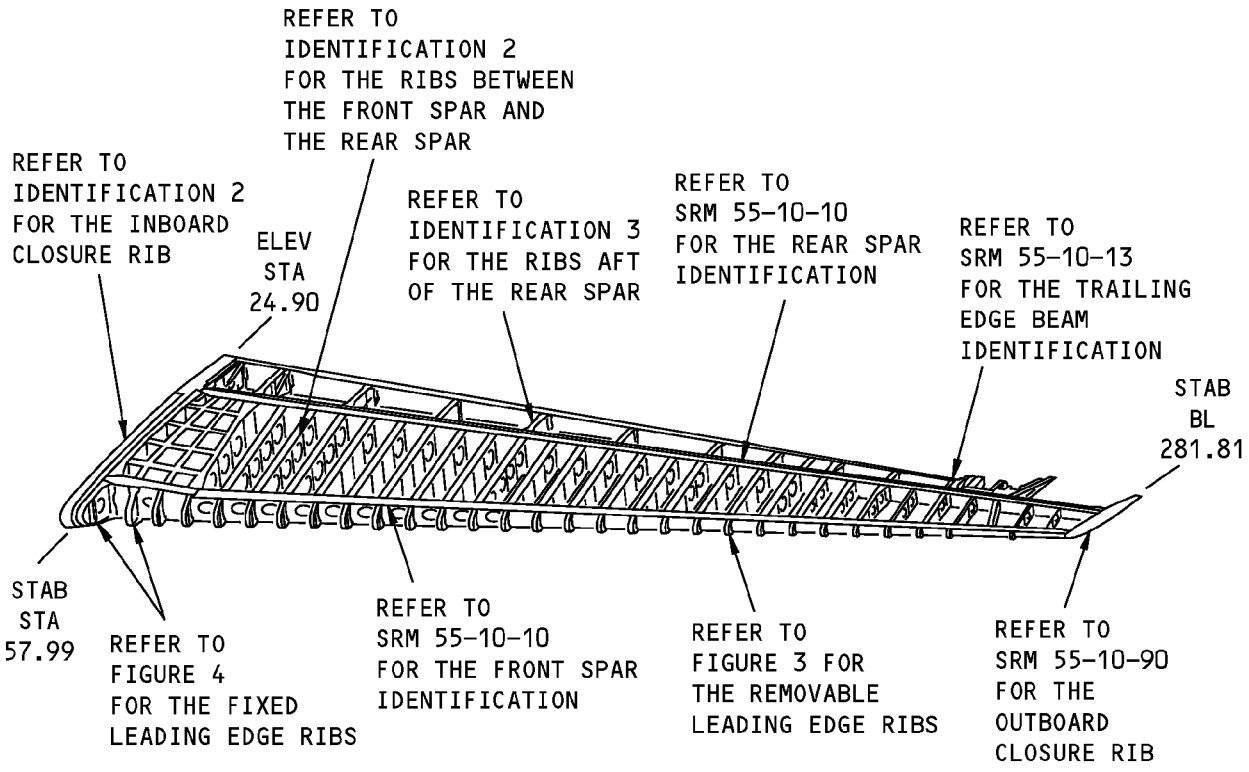
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Leading Edge Rib
Figure 1

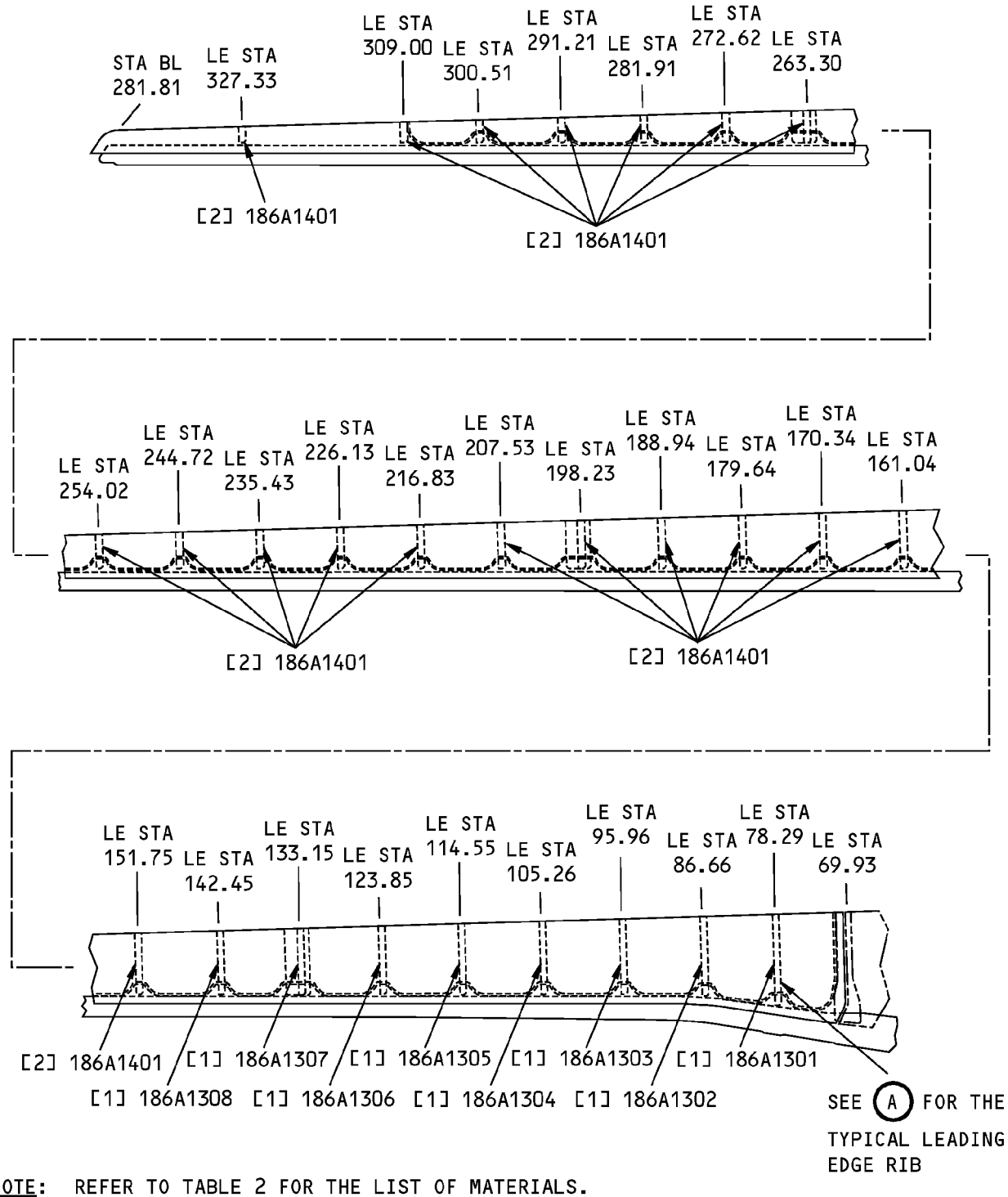
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
186A0001	Leading Edge and Miscellaneous Functional Collector - Left Horizontal Stabilizer
186A0002	Leading Edge and Miscellaneous Functional Collector - Right Horizontal Stabilizer
186A1001	Leading Edge Assembly/Installation-Removable, Horizontal Stabilizer
186A1301	Rib Assembly - Leading Edge Station 78.29
186A1302	Rib Assembly - Leading Edge Station 86.66
186A1303	Rib Assembly - Leading Edge Station 95.96

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
186A1304	Rib Assembly - Leading Edge Station 105.26
186A1305	Rib Assembly - Leading Edge Station 114.55
186A1306	Rib Assembly - Leading Edge Station 123.85
186A1307	Rib Assembly - Leading Edge Station 133.15
186A1308	Rib Assembly - Leading Edge Station 142.45
186A2001	Leading Edge Installation, Fixed - Horizontal Stabilizer
186A2002	Rib Assembly - Leading Edge Station 56.01-61.81
186A2003	Rib Assembly - Leading Edge Station 69.93

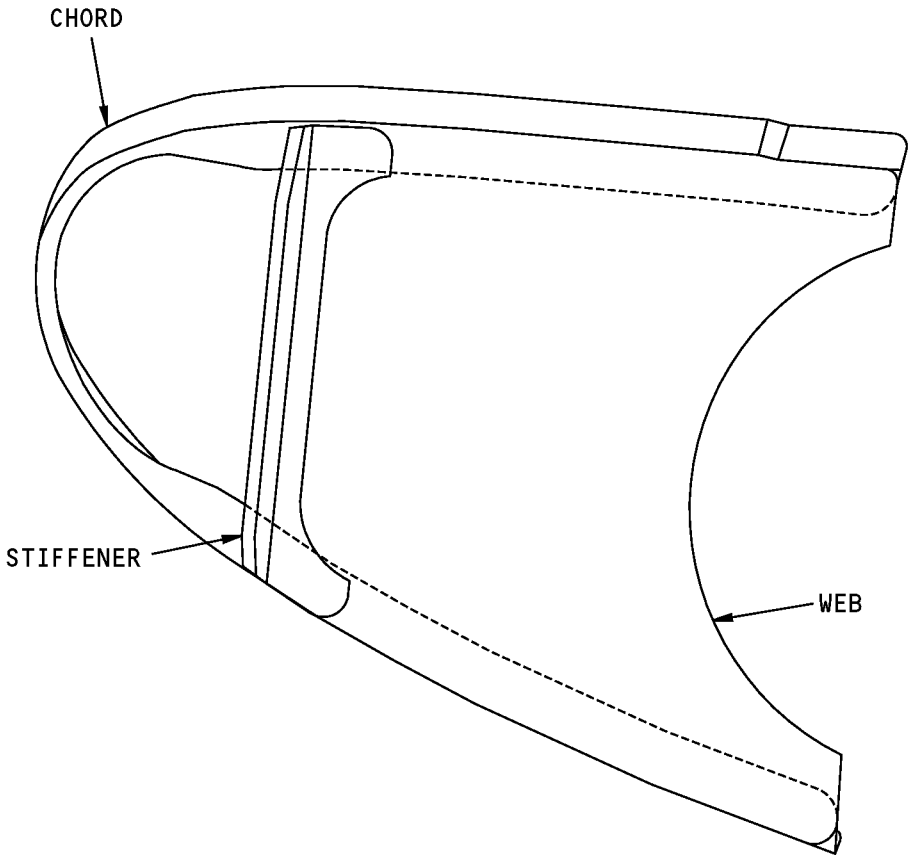


Horizontal Stabilizer Leading Edge Rib Location
Figure 2



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Removable Horizontal Stabilizer Leading Edge Rib Identification
Figure 3 (Sheet 1 of 2)



TYPICAL LEADING EDGE RIB

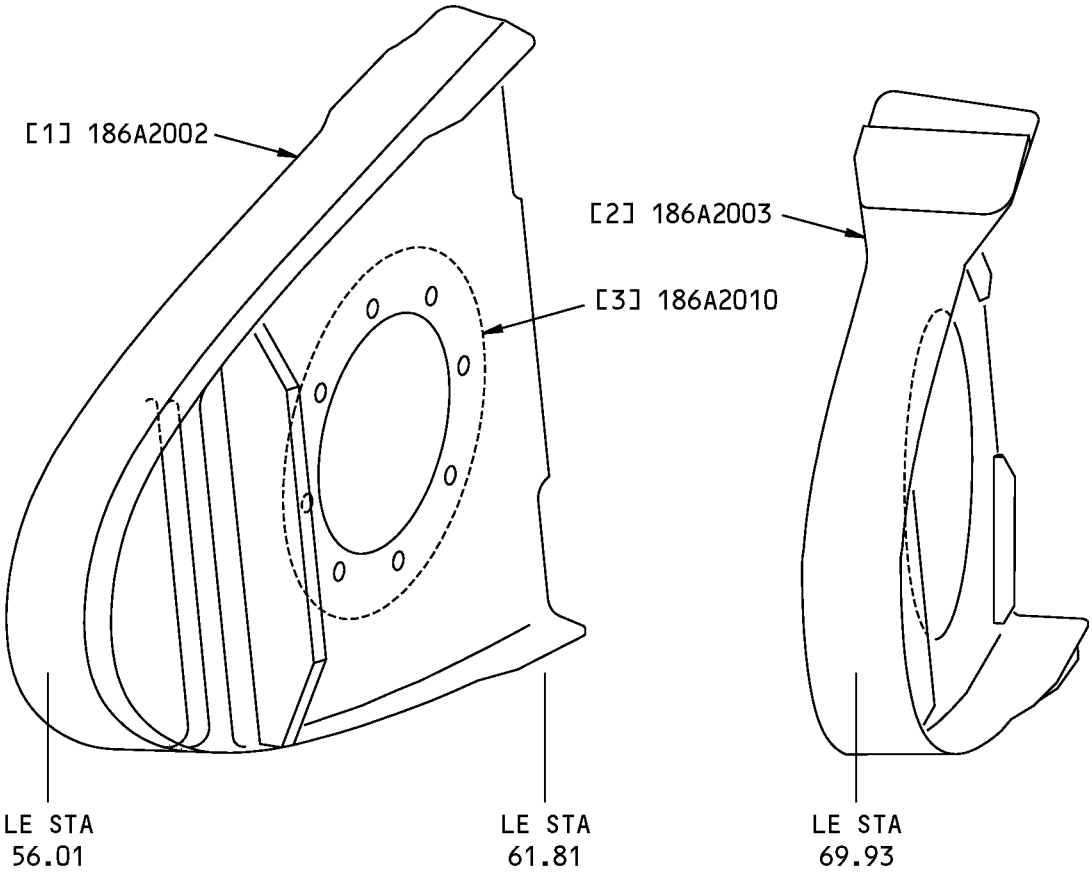
A

Removable Horizontal Stabilizer Leading Edge Rib Identification
Figure 3 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Leading Edge Rib Assembly			
	Web	0.020 (0.51)	2024-T3 clad sheet as given in QQ-A-250/5 (Bonded 2 ply 0.010 + 0.010 (0.25 mm + 0.25 mm) as given in BAC5514-5101)	
	Chord		BAC1490-2655 2024-T42 clad rolled section as given in QQ-A-250/5	
	Stiffener		BAC1503-100235 2024-T3511 extrusion as given in QQ-A-200/3	
[2]	Rib, Removable Leading Edge	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

FIXED HORIZONTAL STABILIZER LEADING EDGE RIB

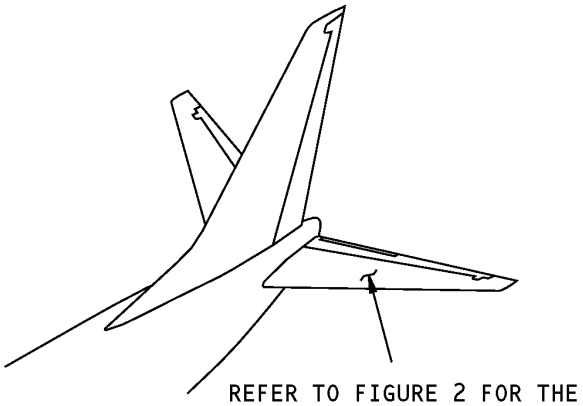
Fixed Horizontal Stabilizer Leading Edge Rib Identification
Figure 4

Table 3:

LIST OF MATERIALS FOR FIGURE 4				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Leading Edge Rib Assembly			
	Rib		7075-T7351 plate as given in QQ-A-250/12. Grain direction controlled part	
	Stiffener		BAC1503-100026 7075-T73511 extrusion as given in QQ-A-200/11	
[2]	Leading Edge Rib Assembly			
	Web	0.020 (0.51)	2024-T3 clad sheet as given in QQ-A-250/5 (Bonded 2 ply 0.010 + 0.010 (0.25 mm + 0.25 mm) as given in BAC5514-5101)	
	Chord		BAC1505-100624 2024-T42 extrusion as given in QQ-A-200/3	
	Stiffener		BAC1503-100235 2024-T3511 extrusion as given in QQ-A-200/3	
[3]	Door	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - HORIZONTAL STABILIZER INSPAR RIBS



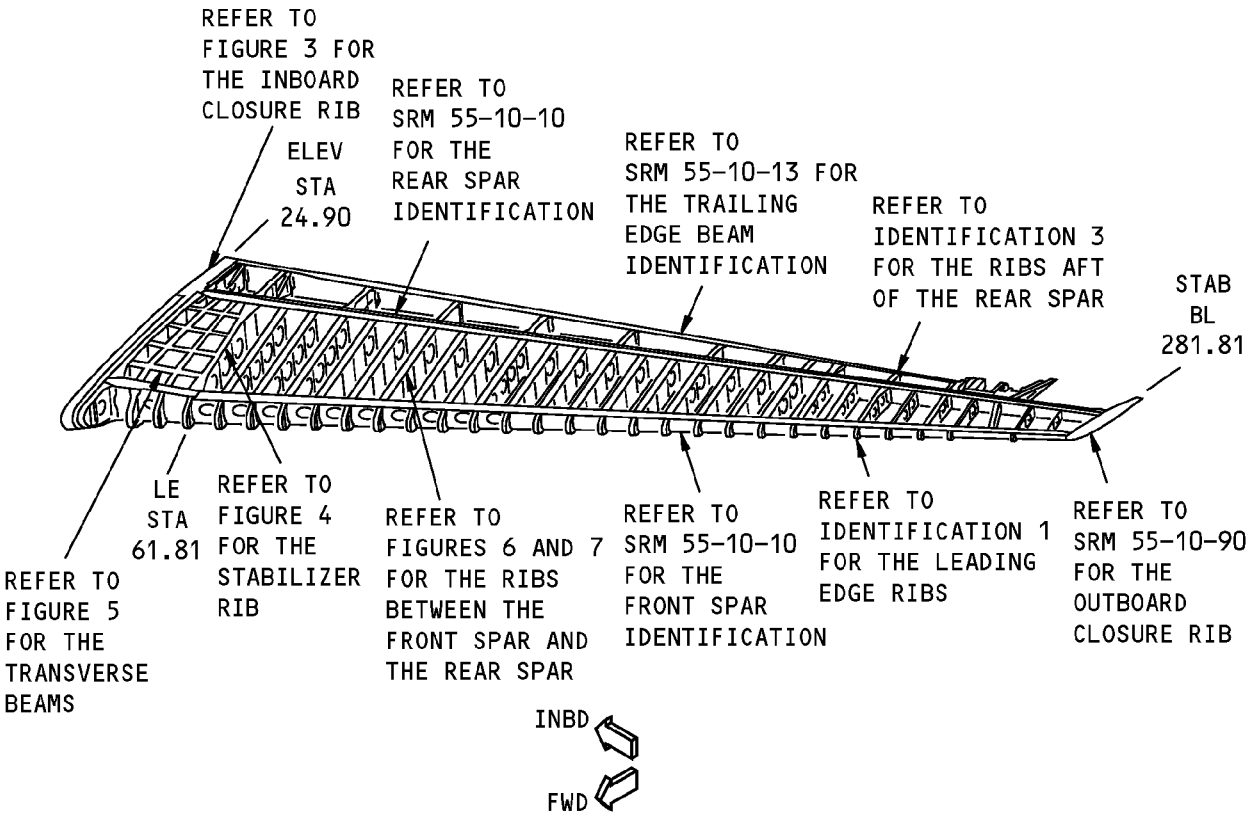
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Inspar Rib
Figure 1

Table 1:

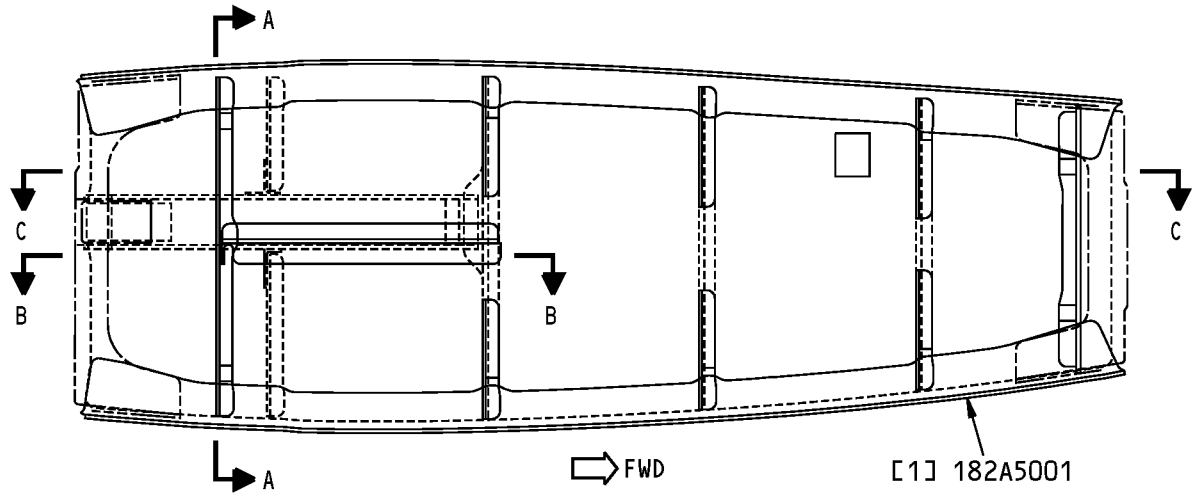
REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
182A0001	Torque Box Functional Collector - Left Horizontal Stabilizer
182A0002	Torque Box Functional Collector - Right Horizontal Stabilizer
182A5001	Rib Assembly/Installation Inboard Closure, Horizontal Stabilizer
182A5002	Rib Assembly/Installation Stabilizer Station 83.50, Horizontal Stabilizer
182A5003	Rib Assembly/Installation Transverse No. 1, Horizontal Stabilizer
182A5004	Rib Assembly/Installation Transverse No. 2, Horizontal Stabilizer

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
182A5005	Rib Assembly/Installation Transverse No. 3, Horizontal Stabilizer
182A5006	Rib Assembly/Installation Transverse No. 4, Horizontal Stabilizer



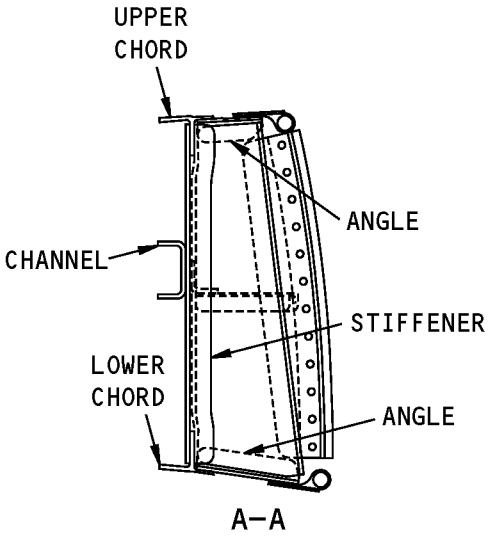
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Inspar Rib Location
Figure 2

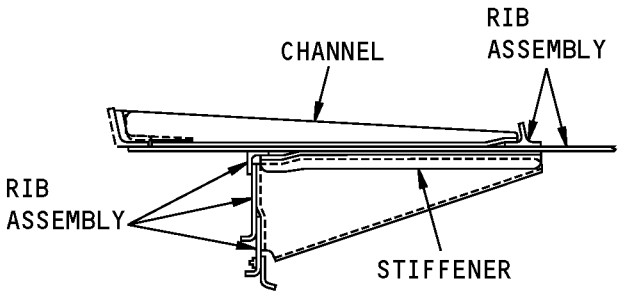


NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

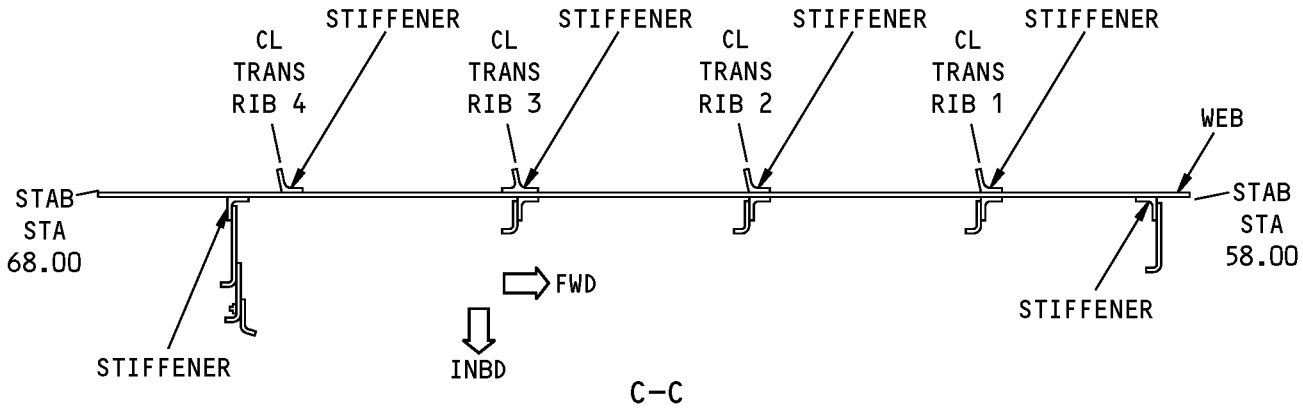
INBOARD CLOSURE RIB



A–A



B–B



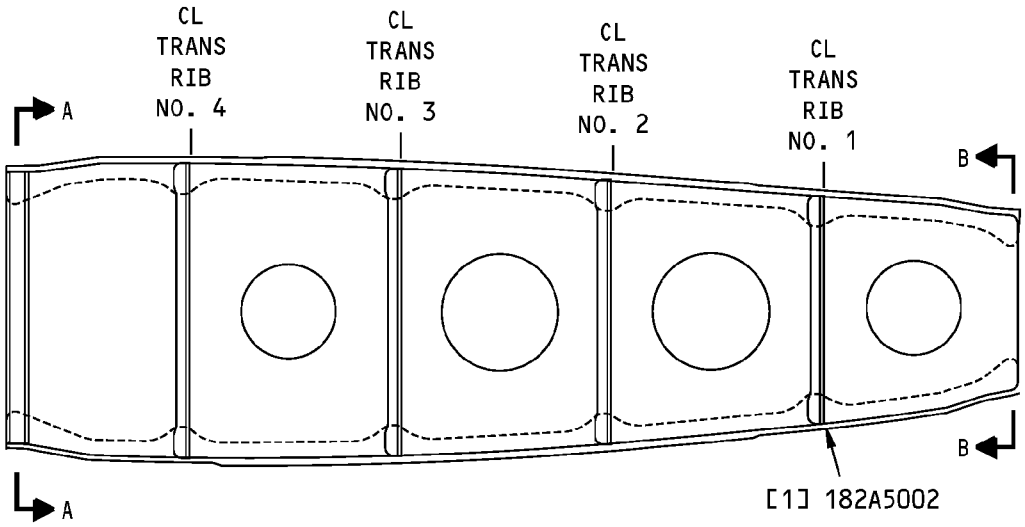
C–C

Horizontal Stabilizer Inspar Rib Identification
Figure 3

Table 2:

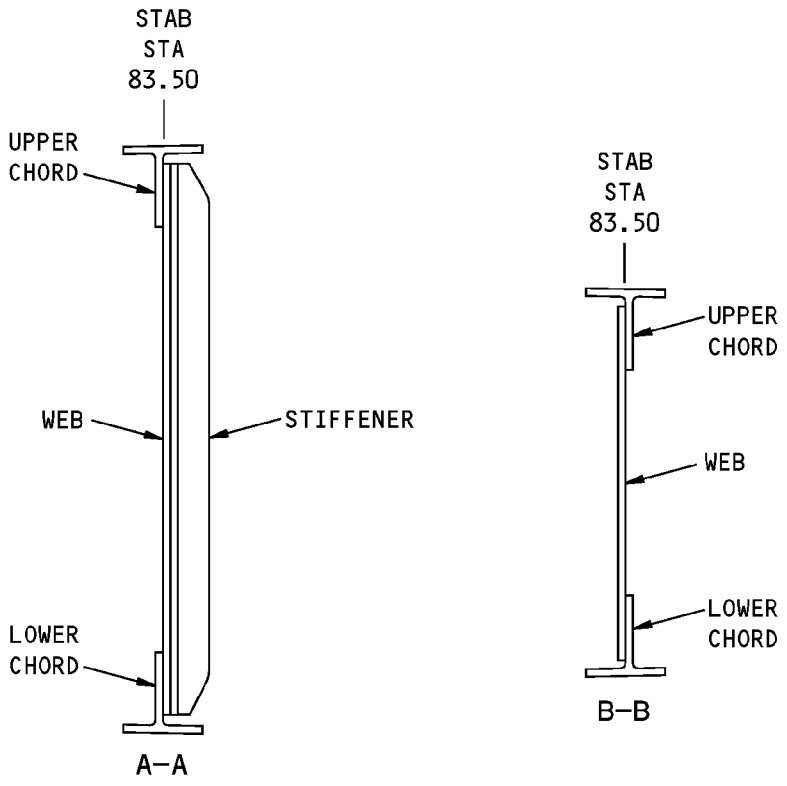
LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib, Inboard Closure			
	Stiffener		AND10134-1204 7075-T6511 extrusion as given in QQ-A-200/11	
	Channel	0.090 (2.23)	2024-T42 clad sheet as given in QQ-A-250/5 and BAC 5602	
	Rib Assembly			
	Stiffener (4)		BAC1514-1681 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener (2)		BAC1503-100028 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.056 (1.42)	2024-T3 clad sheet as given in QQ-A-250/5.	
	Angle (2)		BAC1514-1262 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener		BAC1506-4442 7075-T6511 extrusion as given in QQ-A-200/11	
	Upper Chord		BAC1506-4359 7075-T62 extrusion as given in QQ-A-200/11	
	Lower Chord		BAC1506-4379 7075-T62 extrusion as given in QQ-A-200/11	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

RIB ASSEMBLY - STABILIZER STATION 83.50

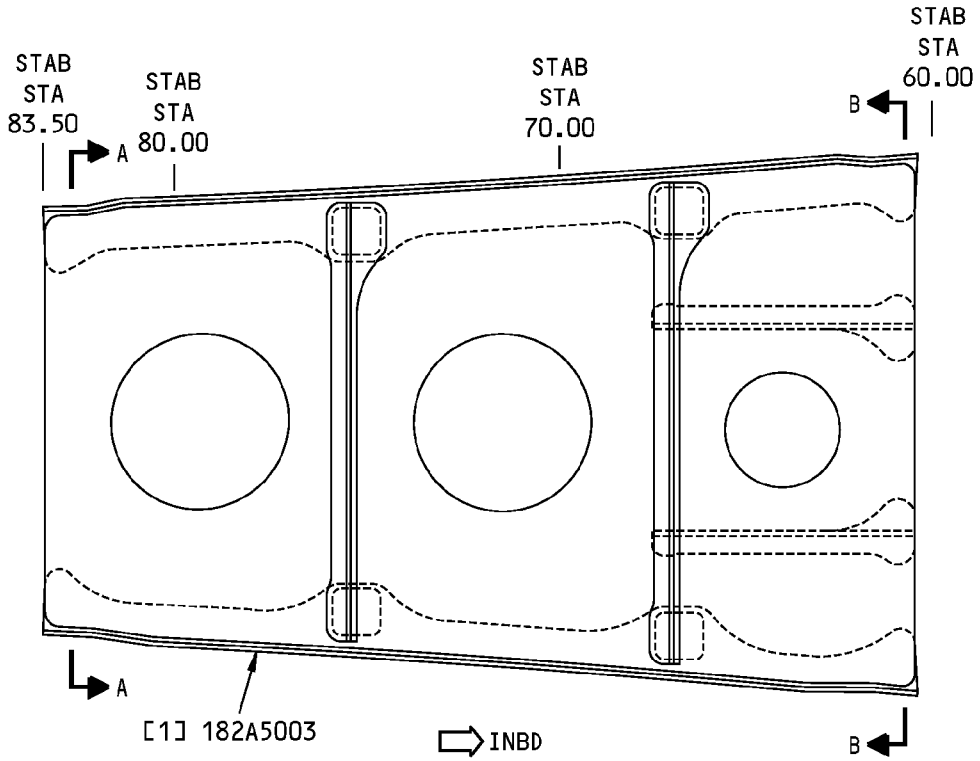


Horizontal Stabilizer Rib Identification
Figure 4

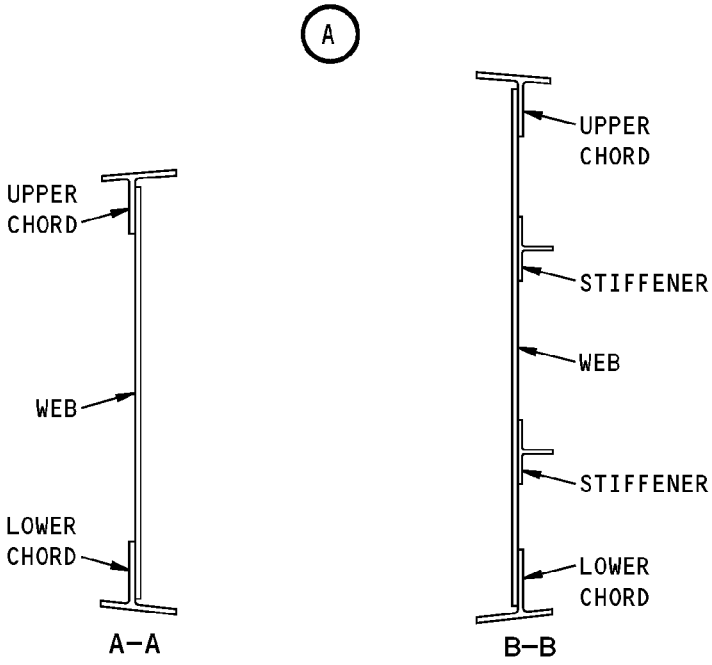
Table 3:

LIST OF MATERIALS FOR FIGURE 4				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Assembly, Stabilizer Station 83.50			
	Web	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
	Stiffener (4)		BAC1503-100397 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener		BAC1509-100673 7075-T6511 extrusion as given in QQ-A-200/11	
	Upper Chord		BAC1505-101674 7075-T62 extrusion as given in QQ-A-200/11	
	Lower Chord		BAC1505-101674 7075-T62 extrusion as given in QQ-A-200/11	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



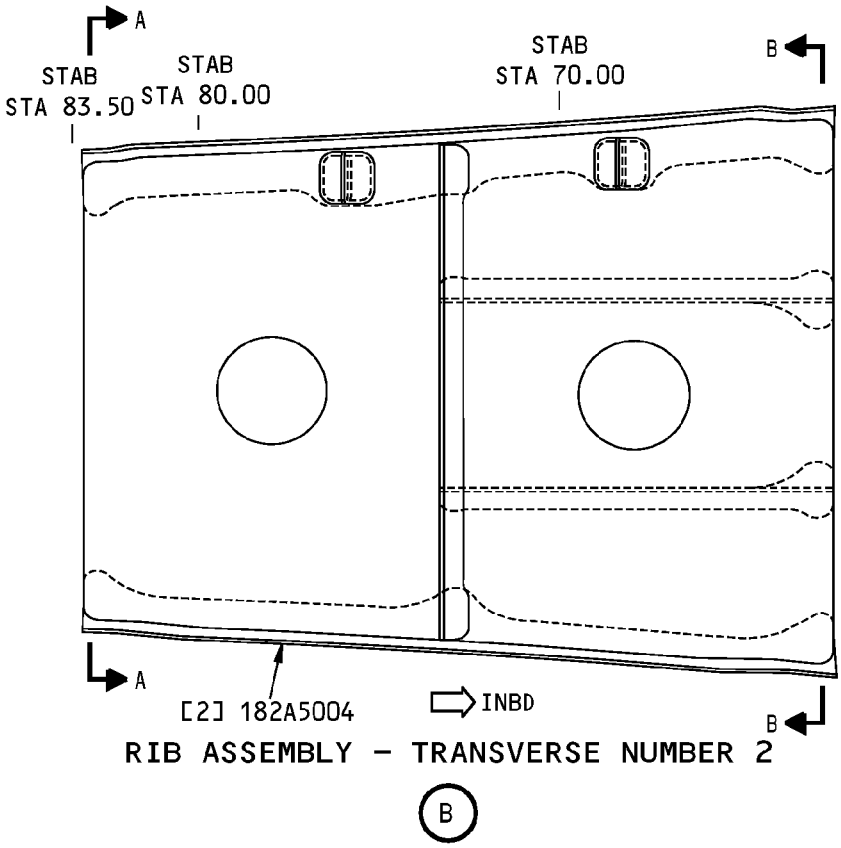
RIB ASSEMBLY – TRANSVERSE NUMBER 1



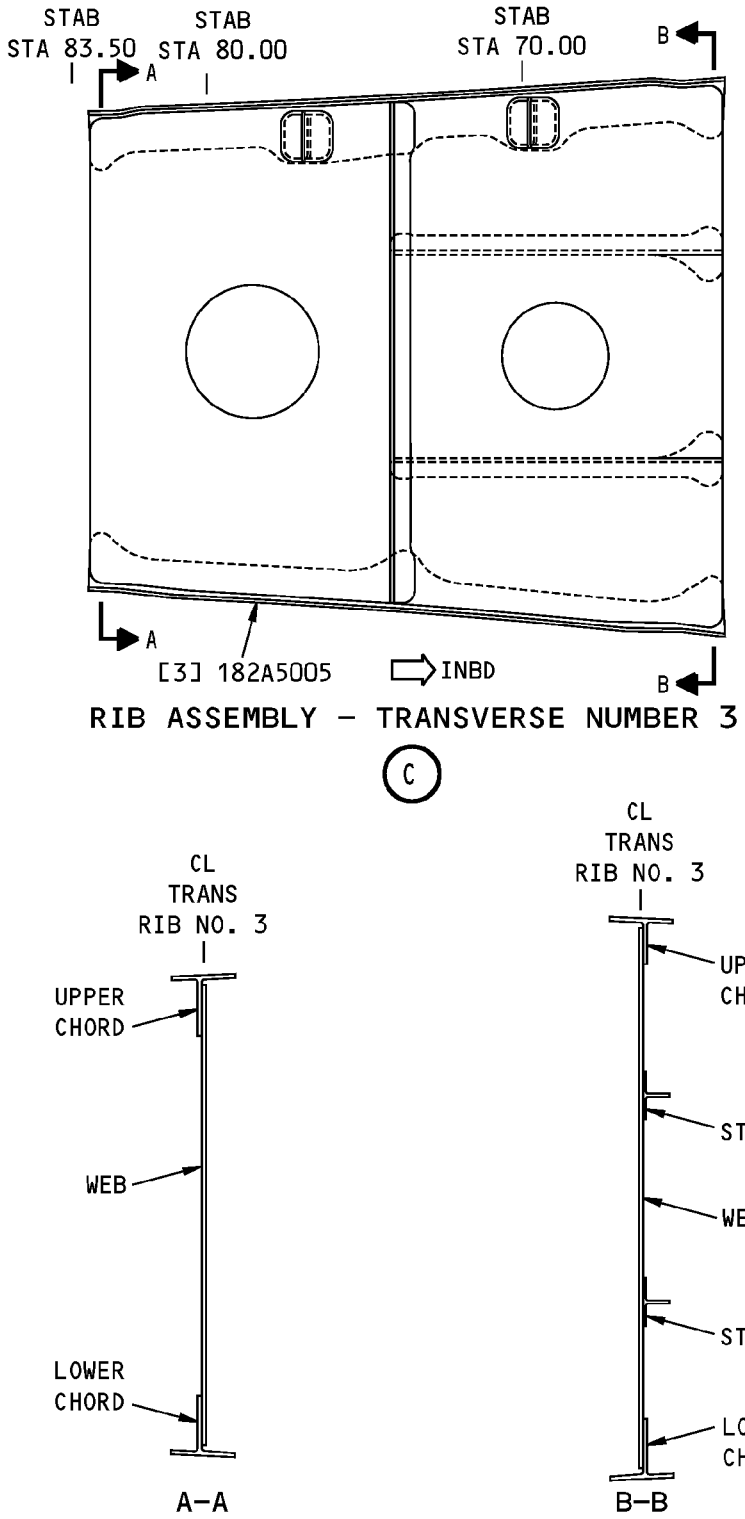
NOTES

- REFER TO TABLE 4 FOR THE LIST OF MATERIALS.

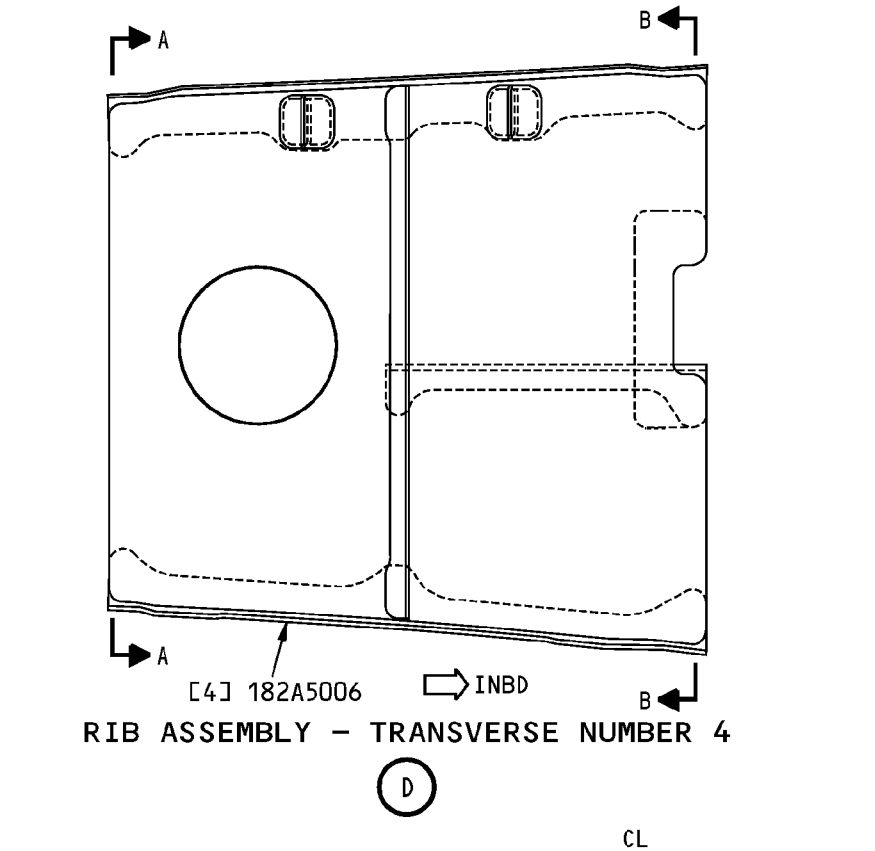
Horizontal Stabilizer, Transverse Rib Assembly Identification
Figure 5 (Sheet 1 of 4)



Horizontal Stabilizer, Transverse Rib Assembly Identification
Figure 5 (Sheet 2 of 4)



Horizontal Stabilizer, Transverse Rib Assembly Identification
Figure 5 (Sheet 3 of 4)



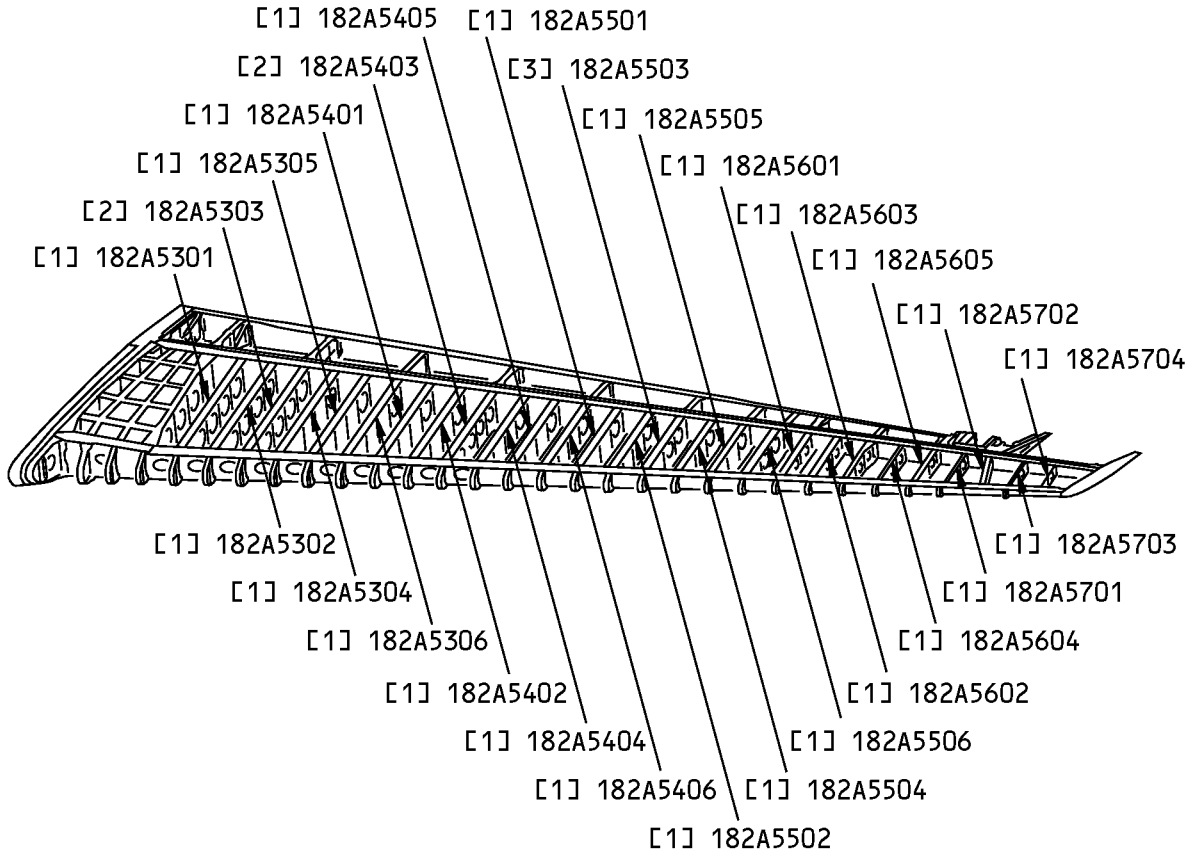
Horizontal Stabilizer, Transverse Rib Assembly Identification
Figure 5 (Sheet 4 of 4)

Table 4:

LIST OF MATERIALS FOR FIGURE 5				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Assembly, Transverse No. 1			
	Stiffener (2)		BAC1505-23760 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.036 (0.91)	2024-T3 clad sheet as given in QQ-A-250/5	
	Stiffener		BAC1506-4358 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener		BAC1506-4357 7075-T6511 extrusion as given in QQ-A-200/11	
	Upper Chord		BAC1506-4359 7075-T62 extrusion as given in QQ-A-200/11	
	Lower Chord		BAC1506-4359 7075-T62 extrusion as given in QQ-A-200/11	
[2]	Rib Assembly, Transverse No. 2			
	Stiffener		BAC1503-1430 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.036 (0.91)	2024-T3 clad sheet as given in QQ-A-250/5.	
	Stiffener (2)		BAC1505-23760 7075-T6511 extrusion as given in QQ-A-200/11	
	Upper Chord		BAC1506-4359 7075-T62 extrusion as given in QQ-A-200/11	
	Lower Chord		BAC1506-4356 7075-T62 extrusion as given in QQ-A-200/11	
[3]	Rib Assembly, Transverse No. 3			
	Stiffener		BAC1503-1430 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.036 (0.91)	2024-T3 clad sheet as given in QQ-A-250/5	
	Stiffener (2)		BAC1505-23760 7075-T6511 Extrusion as given in QQ-A-200/11	
	Upper Chord		BAC1506-4355 7075-T62 extrusion as given in QQ-A-200/11	
	Lower Chord		BAC1506-4356 7075-T62 extrusion as given in QQ-A-200/62	
[4]	Rib Assembly, Transverse No. 4			
	Stiffener		BAC1503-100277 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener		BAC1503-1430 7075-T6511 extrusion as given in QQ-A-200/11	
	Doubler	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
	Web	0.036 (0.91)	2024-T3 clad sheet as given in QQ-A-250/5	
	Upper Chord		BAC1505-101662 7075-T62 extrusion as given in QQ-A-200/11	

LIST OF MATERIALS FOR FIGURE 5				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
	Lower Chord		BAC1506-4355 7075-T62 extrusion as given in QQ-A-200/11	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



NOTE: REFER TO TABLE 5 FOR THE LIST OF MATERIALS.

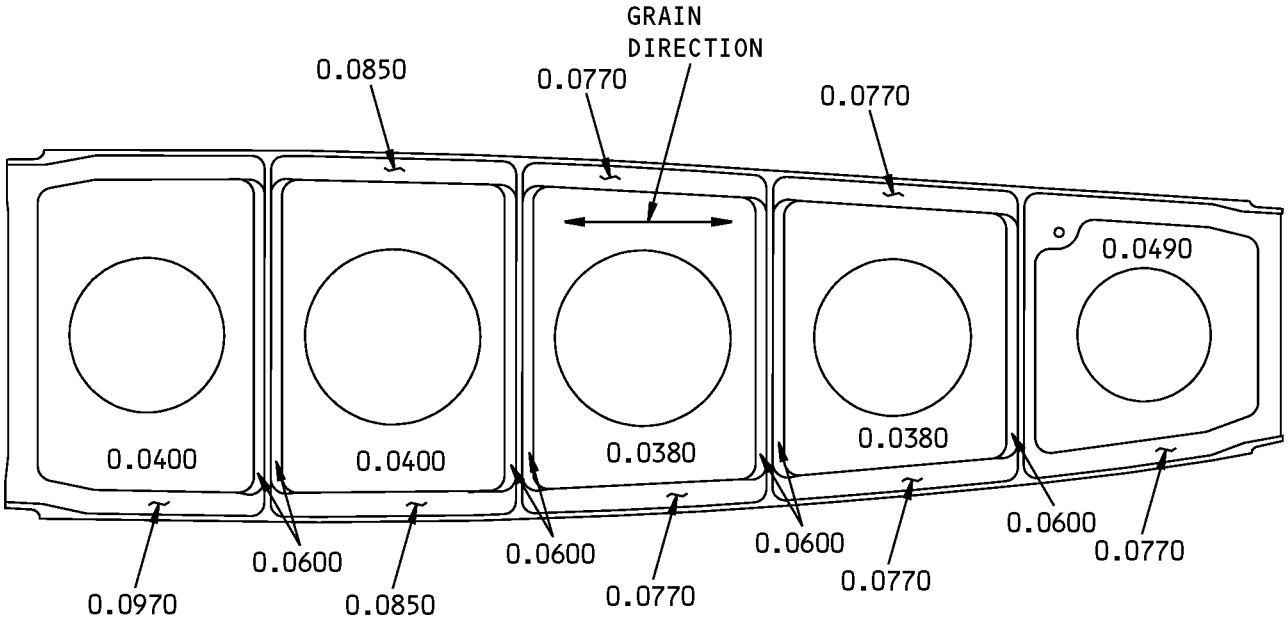
INSPAR RIB ASSEMBLIES

Horizontal Stabilizer Inspar Rib Identification
Figure 6

Table 5:

LIST OF MATERIALS FOR FIGURE 6				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Fitting		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses (Optional: 7050-T7451 plate as given in AMS 4050)	 YA001 to YA003
[1]	Rib Fitting		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses	
[2]	Rib Fitting		7050-T7451 plate as given in AMS 4050. Refer to the production drawing for machined thicknesses. Refer to Figure 6 for an example of a typical machined rib	
[3]	Rib Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for machined thicknesses	

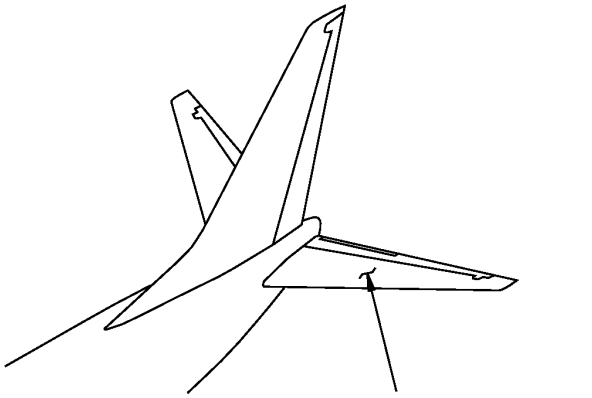
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



TYPICAL INSPAR RIB

Machined Thicknesses For Figure 6, Item [2]
Figure 7

IDENTIFICATION 3 - HORIZONTAL STABILIZER TRAILING EDGE RIBS



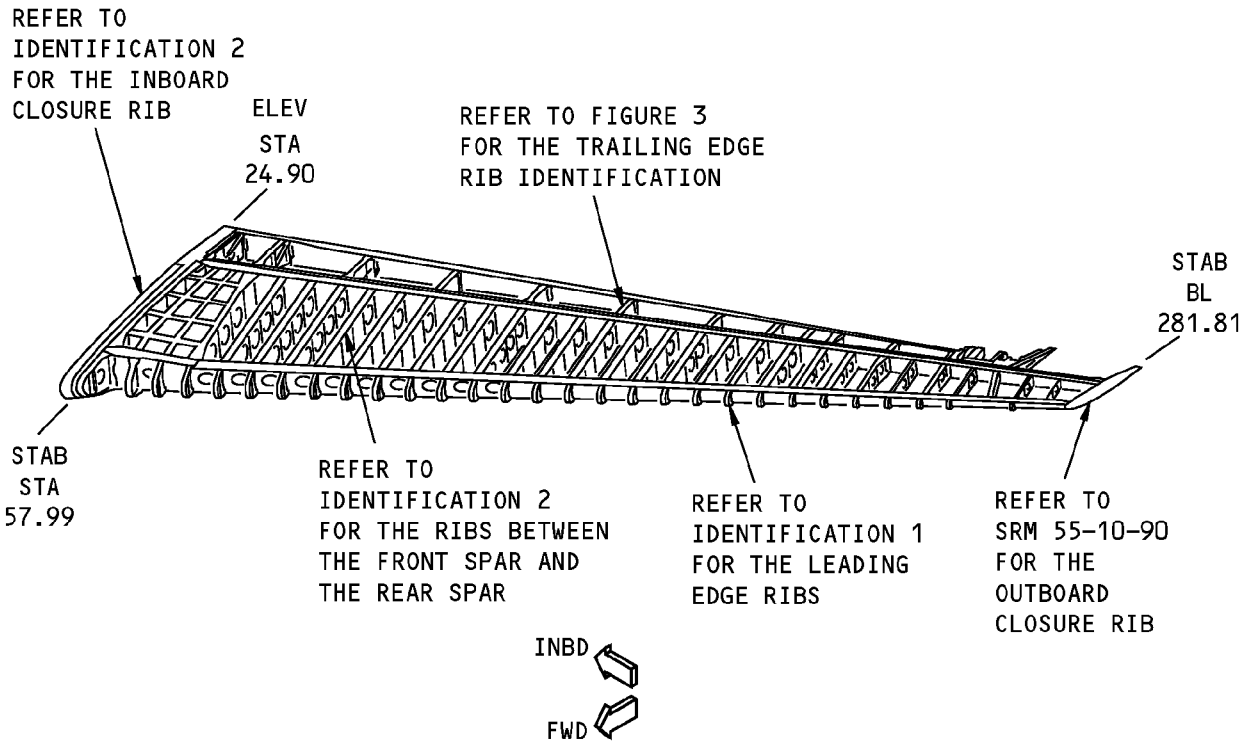
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Trailing Edge Rib
Figure 1

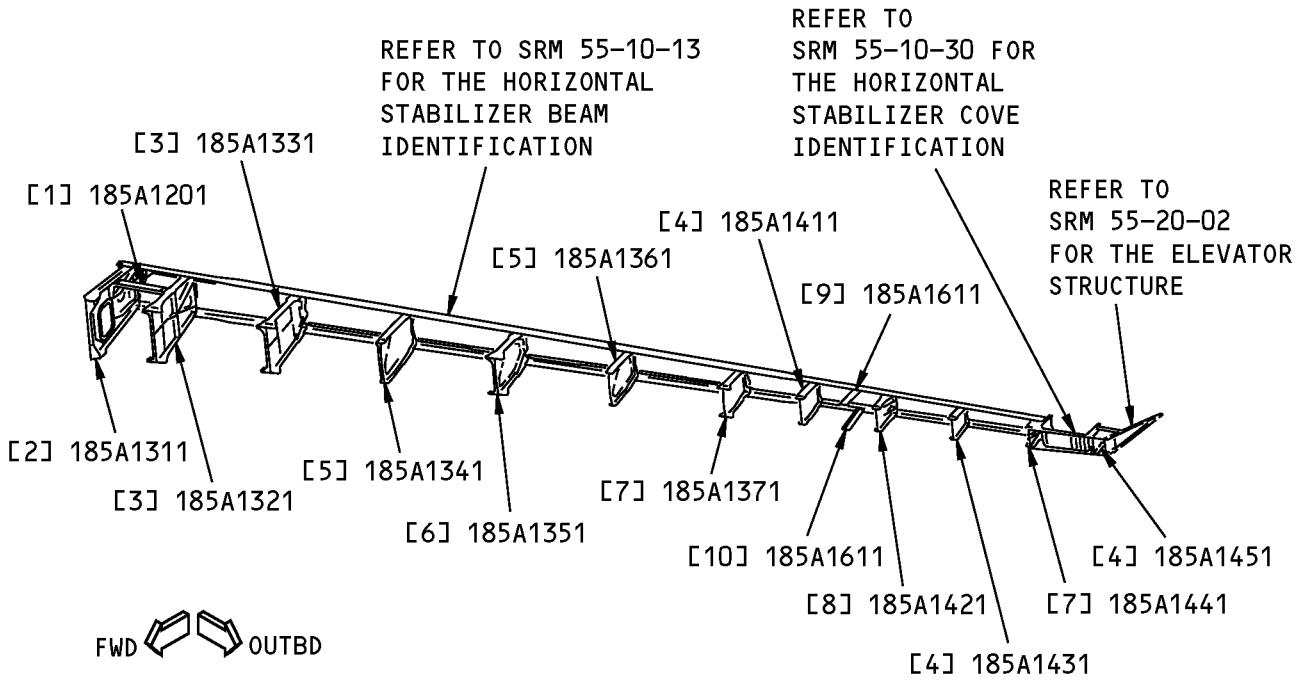
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A0001	Trailing Edge Functional Collector - Left, Horizontal Stabilizer
185A0002	Trailing Edge Functional Collector - Right, Horizontal Stabilizer
185A1200	Support Installation - Trim Tab Lock, Horizontal Stabilizer
185A1310	Rib Installation - Trailing Edge, Elevator Station 23.04 - 24.90
185A1320	Rib Installation - Trailing Edge, Elevator Station 39.02
185A1330	Rib Installation - Trailing Edge, Elevator Station 66.54

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A1340	Rib Installation - Trailing Edge, Elevator Station 94.07
185A1350	Rib Installation - Trailing Edge, Elevator Station 121.59
185A1360	Rib Installation - Trailing Edge, Elevator Station 149.12
185A1370	Rib Installation - Trailing Edge, Elevator Station 176.64
185A1410	Rib Installation - Trailing Edge, Elevator Station 195.00
185A1420	Rib Installation - Trailing Edge, Elevator Station 213.32
185A1430	Rib Installation - Trailing Edge, Elevator Station 231.70
185A1440	Rib Installation - Trailing Edge, Elevator Station 250.04
185A1450	Rib Installation - Trailing Edge, Elevator Station 265.45
185A1610	Chord Installation - Trailing Edge, Horizontal Stabilizer



Horizontal Stabilizer Trailing Edge Rib Location
Figure 2



TRAILING EDGE RIBS

NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

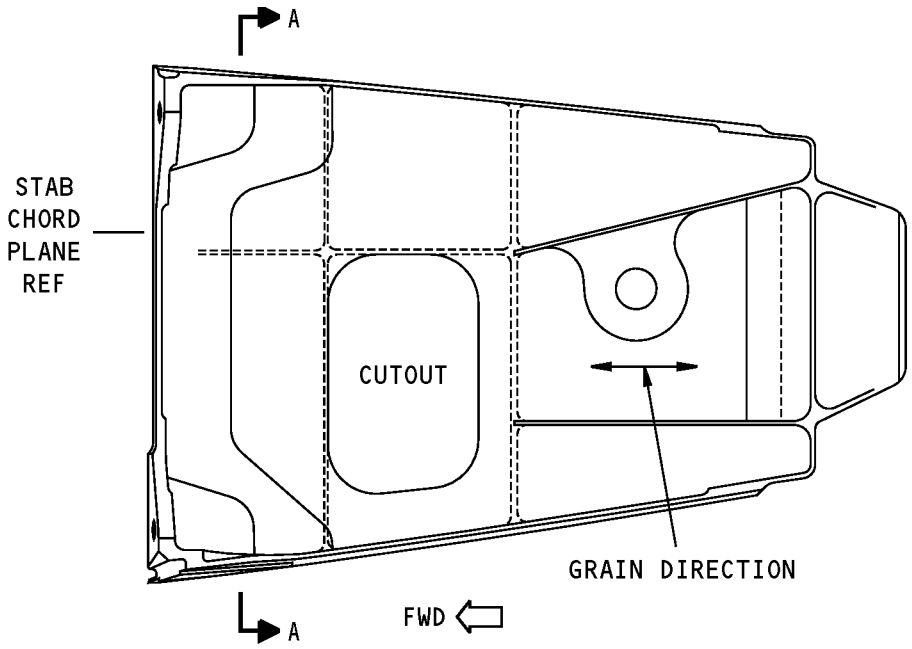
Horizontal Stabilizer Trailing Edge Rib Identification
Figure 3

Table 2:

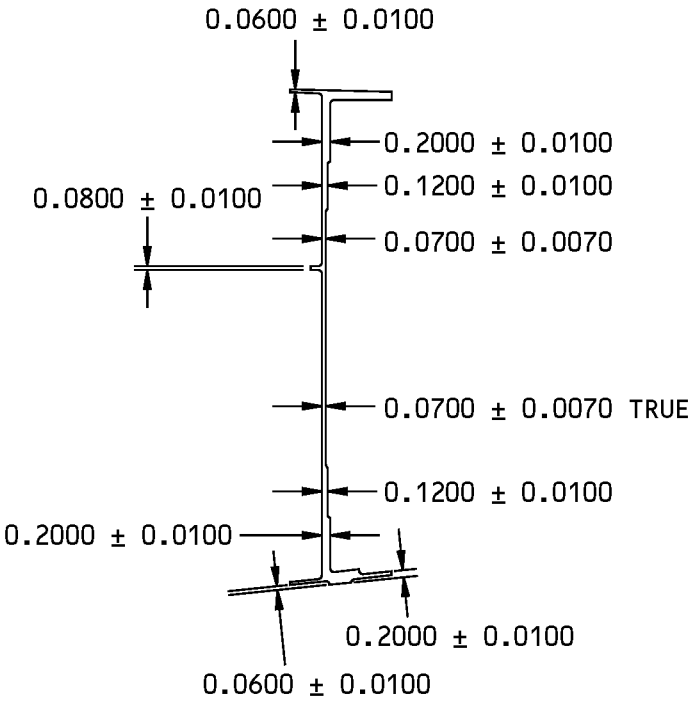
LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Support Chord, Trim Tab		BAC1506-4461 7075-T3511 extrusion as given in QQ-A-200/11	
[2]	Rib Assembly, Elevator Station 23.04			
	Access Door	0.063 (1.60)	2024-T3 clad sheet as given in QQ-A-250/5	
	Rib Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses. Refer to Figure 3 for an example of a typical machined rib	
[3]	Rib Fitting, Elevator Stations 39.02 and 66.54		7050-T7451 plate as given in BMS 7-323, Type I. (Grain direction controlled part) Refer to the production drawing for machined thicknesses	
[4]	Rib Fitting, Elevator Stations 195.00, 231.70 and 265.45		7050-T7451 plate as given in AMS 4050. (Grain direction controlled part) Refer to the production drawing for machined thicknesses	
[5]	Rib Assembly, Elevator Stations 94.07 and 149.12			
	Web Assembly			
	Core	0.200 (5.08)	Aluminum honeycomb core as given in BMS 4-4, Type 3-10ND, Grade 1, Form B	
	Pan	0.020 (0.51)	2024-T42 clad sheet as given in QQ-A-250/5	
	Doubler	0.012 (3.05)	2024-T3 clad sheet as given in QQ-A-250/5	
	Face Panel	0.020 (0.51)	2024-T3 clad sheet as given in QQ-A-250/5	
	Rib Fitting		7050-T7451 plate as given in AMS 4050. (Grain direction direction controlled part) Refer to the production drawing for machined thicknesses	
[6]	Rib Assembly, Elevator Station 121.59			
	Web Assembly			
	Core	0.200 (5.08)	Aluminum honeycomb core as given in BMS 4-4, Type 3-10ND, Grade 1, Form B	
	Pan	0.020 (0.51)	2024-T42 clad sheet as given in QQ-A-250/5	
	Doubler	0.012 (3.05)	2024-T3 clad sheet as given in QQ-A-250/5	
	Face Panel	0.020 (0.51)	2024-T3 clad sheet as given in QQ-A-250/5	
	Rib Fitting		7050-T7451 plate as given in BMS 7-323, Type I. (Grain direction controlled part) Refer to the production drawing for machined thicknesses	
[7]	Rib Assembly, Elevator Stations 176.64 and 250.04			
	Rib Fitting		7050-T7451 plate as given in BMS 7-323, Type I. (Grain direction controlled part) Refer to the production drawing for machined thicknesses	
	Clevis Fitting		BAC1507-48859 7075-T73511 extrusion as given in QQ-A-200/11	
[8]	Rib Assembly, Elevator Station 213.32			

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
	Rib Fitting		7050-T7451 plate as given in AMS 4050. (Grain direction controlled part) Refer to the production drawing for machined thicknesses	
	Clevis Fitting		BAC1507-48859 7075-T73511 extrusion as given in QQ-A-200/11	
[9]	Upper Chord		BAC1505-101654 7075-T73511 extrusion as given in QQ-A-200/11	
[10]	Lower Chord		BAC1505-101654 7075-T73511 extrusion as given in QQ-A-200/11	

*[1] T = Pre-manufactured thickness in inches (millimeters).



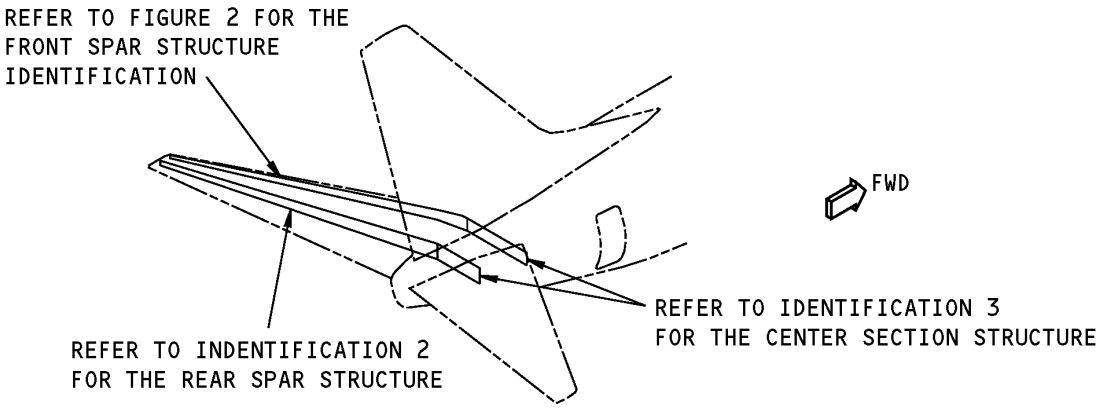
RIB FITTING



A–A

Machine Thicknesses and Grain Direction of Figure 3, Item [2]
Figure 4

IDENTIFICATION 1 - HORIZONTAL STABILIZER FRONT SPAR STRUCTURE

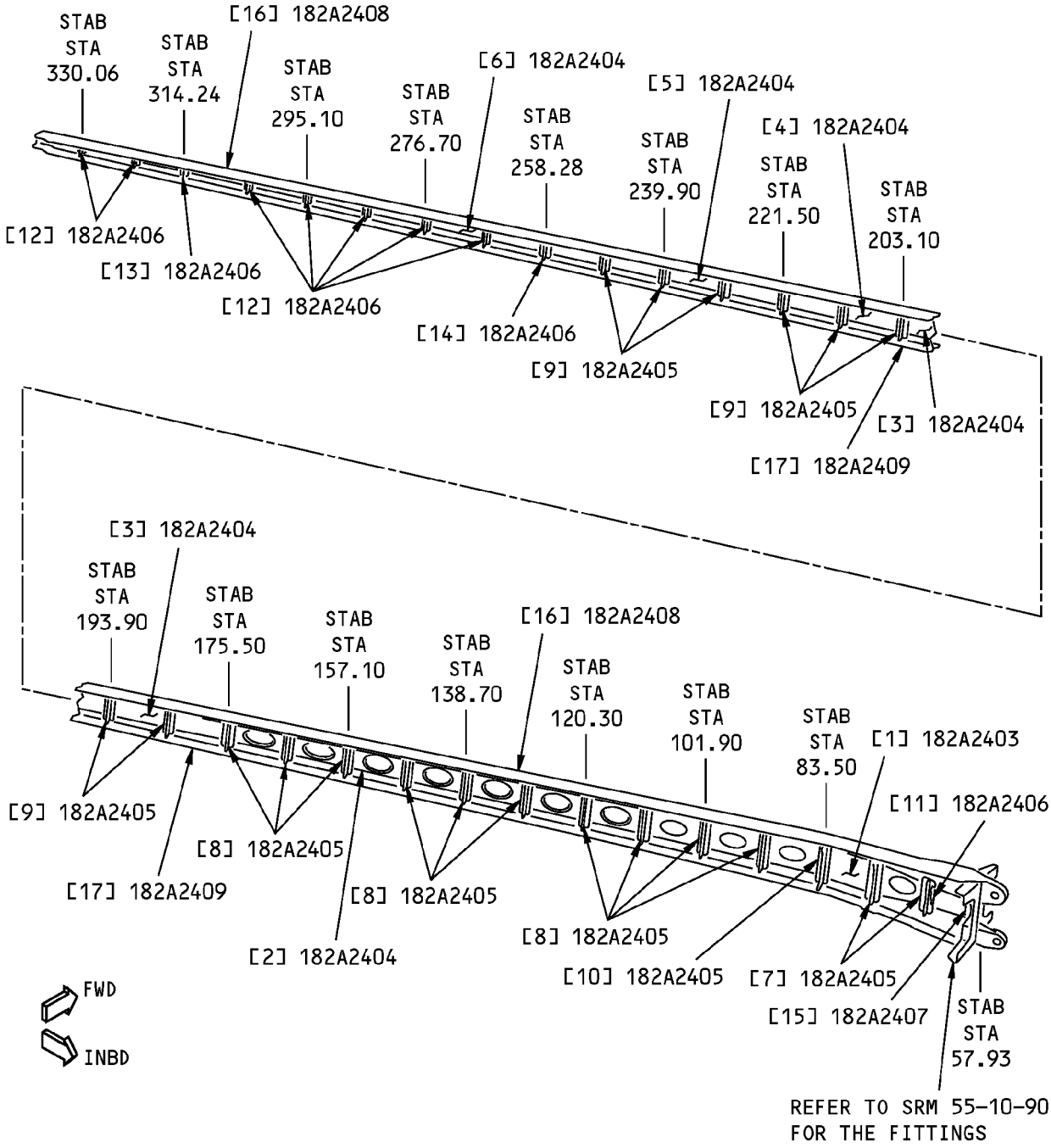


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Front Spar Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
182A0001	Torque Box Functional Collector - Left Horizontal Stabilizer
182A0002	Torque Box Functional Collector - Right Horizontal Stabilizer
182A2401	Front Spar Assembly/Installation-Horizontal Stabilizer
001A8001	Section 82 Left Horizontal Stabilizer - Product Collector
001A8002	Section 82 Right Horizontal Stabilizer - Product Collector



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

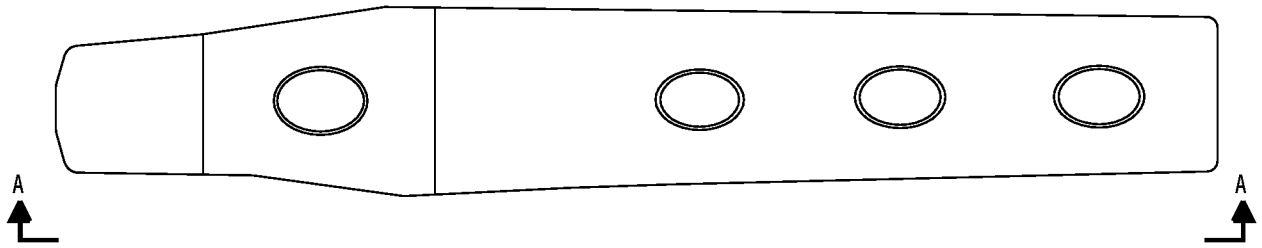
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Front Spar Structure Identification
Figure 2

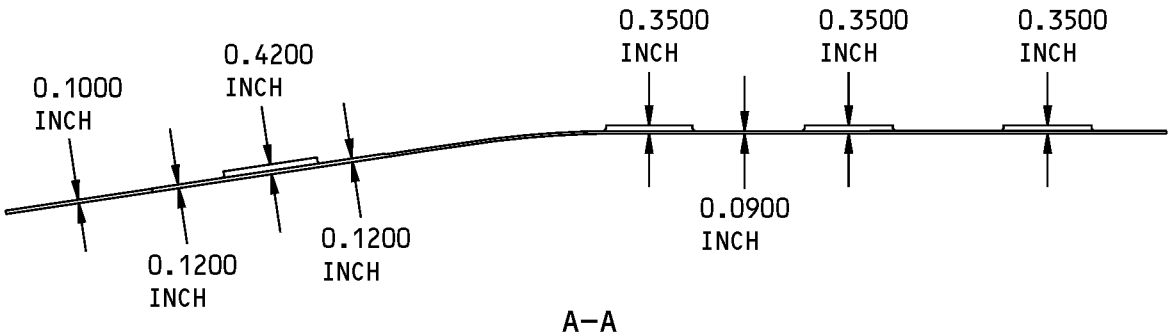
Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Web		7075-T7351 plate as given in QQ-A-250/12. Refer to Figure 3 for the machined thicknesses	
[2]	Web	0.080 (2.03)	7075-T62 clad sheet as given in QQ-A-250/13	
[3]	Web	0.063 (1.60)	7075-T6 clad sheet as given in QQ-A-250/13	
[4]	Web	0.056 (1.42)	7075-T6 clad sheet as given in QQ-A-250/13	
[5]	Web	0.050 (1.27)	7075-T6 clad sheet as given in QQ-A-250/13	
[6]	Web	0.032 (0.81)	7075-T6 clad sheet as given in QQ-A-250/13	
[7]	Stiffener		BAC1506-4367 7075-T73511 extrusion as given in QQ-A-200/11	
[8]	Stiffener		BAC1506-4343 7075-T73511 extrusion as given in QQ-A-200/11	
[9]	Stiffener		BAC1506-4342 7075-T73511 extrusion as given in QQ-A-200/11	
[10]	Stiffener		BAC1506-4351 7075-T73511 extrusion as given in QQ-A-200/11	
[11]	Stiffener		BAC1506-4380 7075-T73511 extrusion as given in QQ-A-200/11	
[12]	Stiffener		BAC1506-4328 7075-T73511 extrusion as given in QQ-A-200/11	
[13]	Stiffener		BAC1506-4329 7075-T73511 extrusion as given in QQ-A-200/11	
[14]	Stiffener		BAC1506-4327 7075-T73511 extrusion as given in QQ-A-200/11	
[15]	Fitting		7050-T7451 plate as given in AMS 4050	
[16]	Upper Spar Chord		BAC1506-4432 7150-T77511 ex- trusion as given in BMS 7-306	
[17]	Lower Spar Chord		BAC1506-4431 7150-T77511 ex- trusion as given in BMS 7-306	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



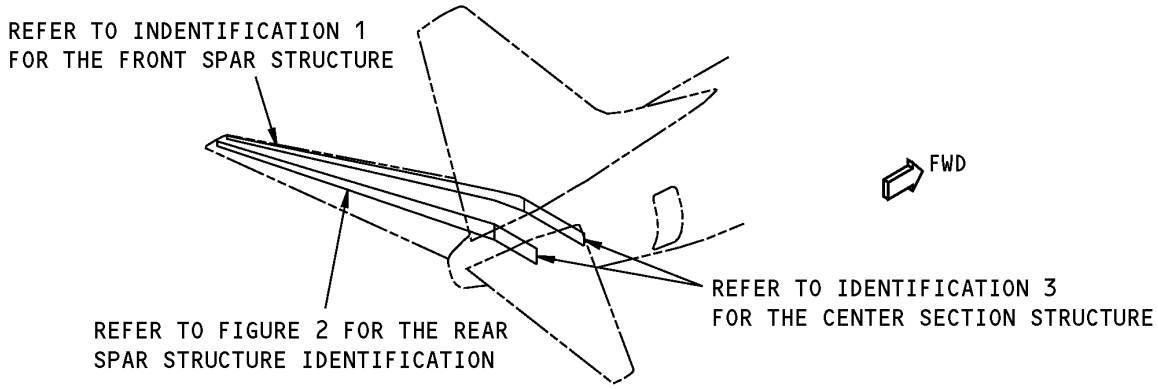
INBOARD FRONT SPAR WEB



A–A

Machined Areas of Figure 2, Item [1]
Figure 3

IDENTIFICATION 2 - HORIZONTAL STABILIZER REAR SPAR STRUCTURE

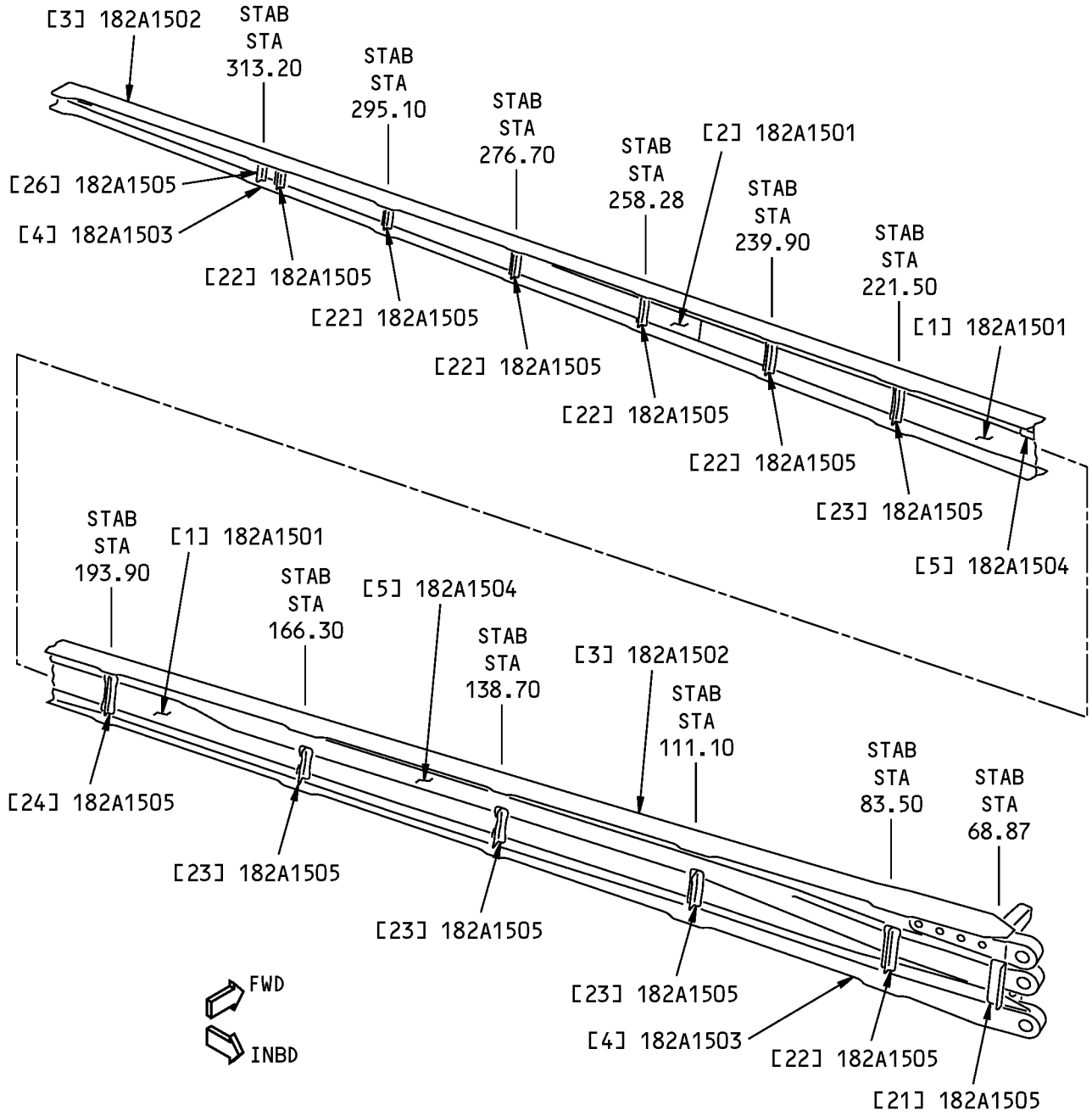


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Rear Spar Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A8001	Section 82 Left Horizontal Stabilizer - Product Collector
001A8002	Section 82 Right Horizontal Stabilizer - Product Collector
182A1500	Rear Spar Assembly/Installation - Horizontal Stabilizer
185A0001	Trailing Edge Functional Collector - Left, Horizontal Stabilizer
185A0002	Trailing Edge Functional Collector - Right, Horizontal Stabilizer

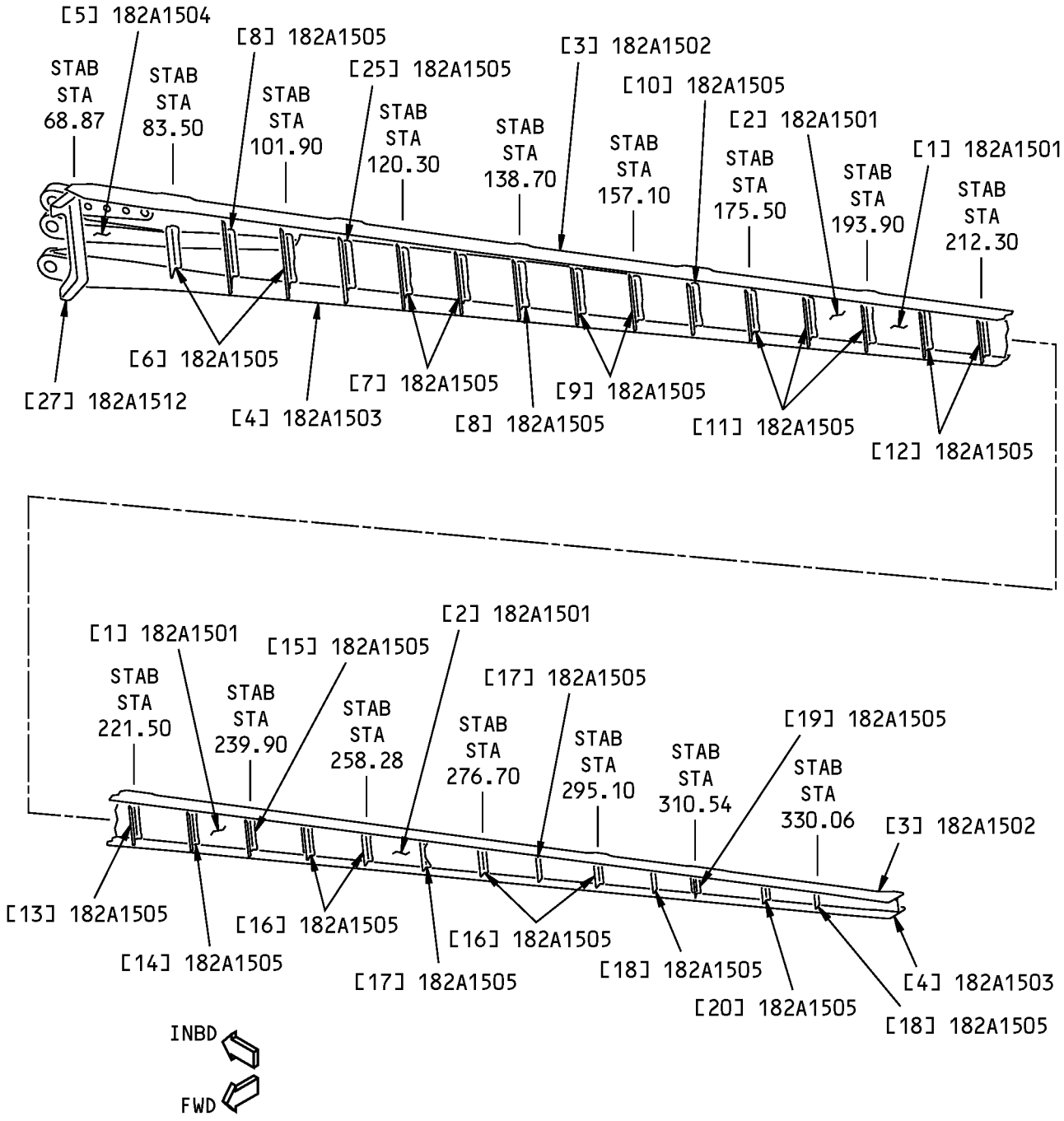


VIEW LOOKING FORWARD

NOTES

- REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Rear Spar Structure Identification
Figure 2 (Sheet 1 of 2)



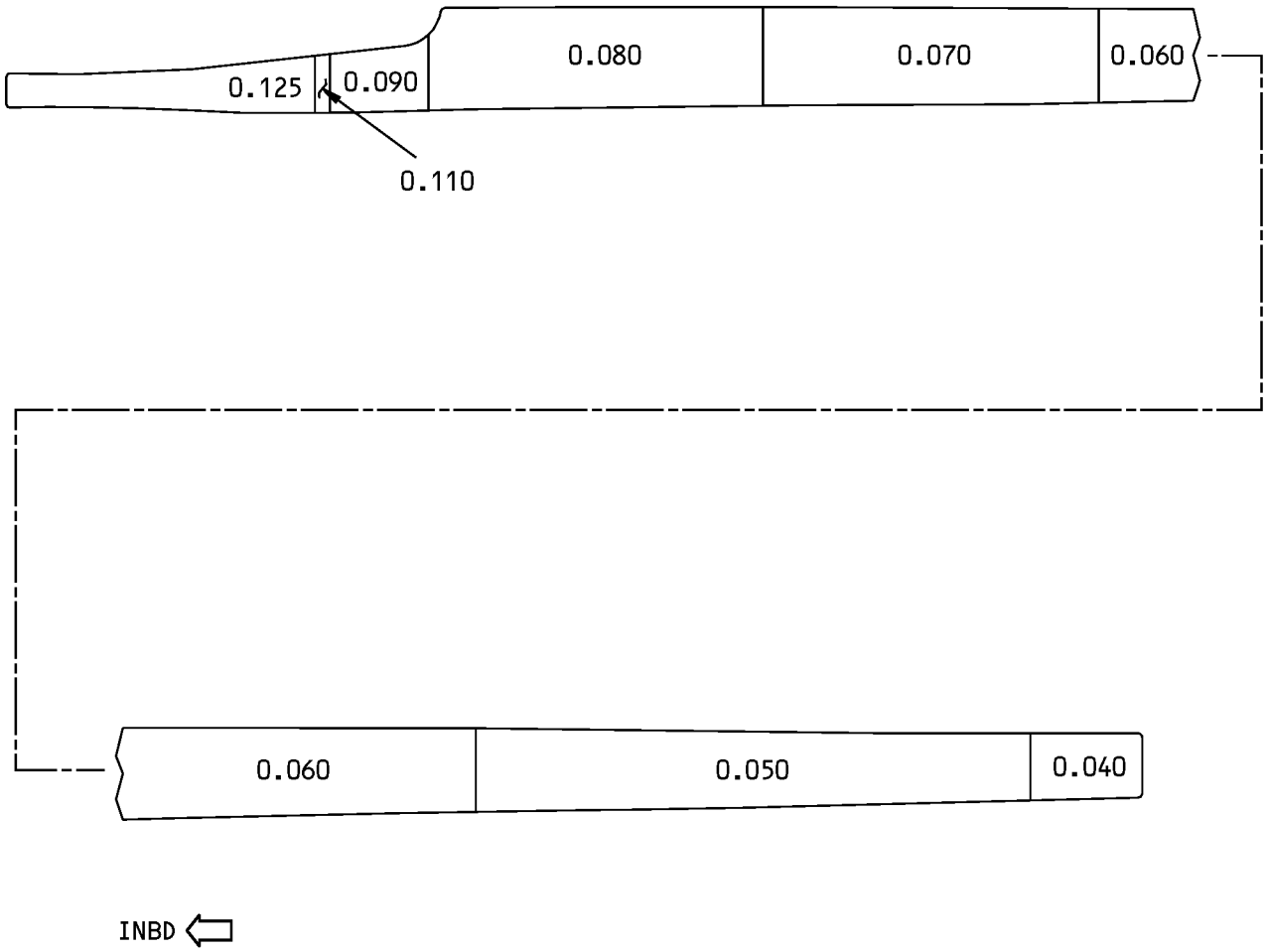
Horizontal Stabilizer Rear Spar Structure Identification
Figure 2 (Sheet 2 of 2)

Table 2:

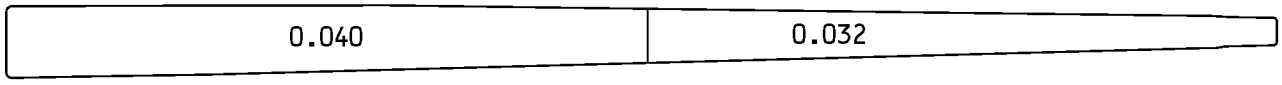
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Web - Inboard	0.125 (3.18)	7075-T6 sheet as given in QQ-A-250/12. Refer to Figure 3 for chem-mill thicknesses	
[2]	Web - Outboard	0.040 (1.02)	7075-T6 sheet as given in QQ-A-250/12. Refer to Figure 4 for chem-mill thicknesses	
[3]	Chord - Upper		BAC1506-4318 2024-T3511 extrusion as given in QQ-A-200/3	
[4]	Chord - Lower		BAC1506-4341 7150-T77511 extrusion as given in BMS7-306	
[5]	Chord - Failsafe		BAC1520-2787 7150-T77511 extrusion as given in BMS7-306	
[6]	Stiffener (2)		BAC1505-100416 7075-T6511 extrusion as given in QQ-A-200/11	
[7]	Stiffener (2)		BAC1506-4418 7075-T6511 extrusion as given in QQ-A-200/11	
[8]	Stiffener (2)		BAC1506-4415 7075-T6511 extrusion as given in QQ-A-200/11	
[9]	Stiffener (2)		BAC1506-4419 7075-T6511 extrusion as given in QQ-A-200/11	
[10]	Stiffener		BAC1506-4420 7075-T6511 extrusion as given in QQ-A-200/11	
[11]	Stiffener (3)		BAC1506-4421 7075-T6511 extrusion as given in QQ-A-200/11	
[12]	Stiffener (2)		BAC1506-4422 7075-T6511 extrusion as given in QQ-A-200/11	
[13]	Stiffener		BAC1506-4423 7075-T6511 extrusion as given in QQ-A-200/11	
[14]	Stiffener		BAC1506-4424 7075-T6511 extrusion as given in QQ-A-200/11	
[15]	Stiffener		BAC1506-4425 7075-T6511 extrusion as given in QQ-A-200/11	
[16]	Stiffener (4)		BAC1505-101672 7075-T6511 extrusion as given in QQ-A-200/11	
[17]	Stiffener (2)		BAC1503-101038 7075-T6511 extrusion as given in QQ-A-200/11	
[18]	Stiffener (2)		BAC1503-101039 7075-T6511 extrusion as given in QQ-A-200/11	
[19]	Stiffener		BAC1506-4426 7075-T6511 extrusion as given in QQ-A-200/11	
[20]	Stiffener		BAC1505-101673 7075-T6511 extrusion as given in QQ-A-200/11	
[21]	Stiffener		BAC1514-3284 7075-T6511 extrusion as given in QQ-A-200/11	
[22]	Stiffener (6)		BAC1506-4427 7075-T6511 extrusion as given in QQ-A-200/11	

LIST OF MATERIALS FOR FIGURE 2				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
[23]	Stiffener (4)		BAC1506-4428 7075-T6511 extrusion as given in QQ-A-200/11	
[24]	Stiffener		BAC1506-4429 7075-T6511 extrusion as given in QQ-A-200/11	
[25]	Stiffener		BAC1506-4417 7075-T6511 extrusion as given in QQ-A-200/11	
[26]	Stiffener		BAC1506-4430 7075-T6511 extrusion as given in QQ-A-200/11	
[27]	Fitting (2)		7075-T7351 plate as given in QQ-A-250/12	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



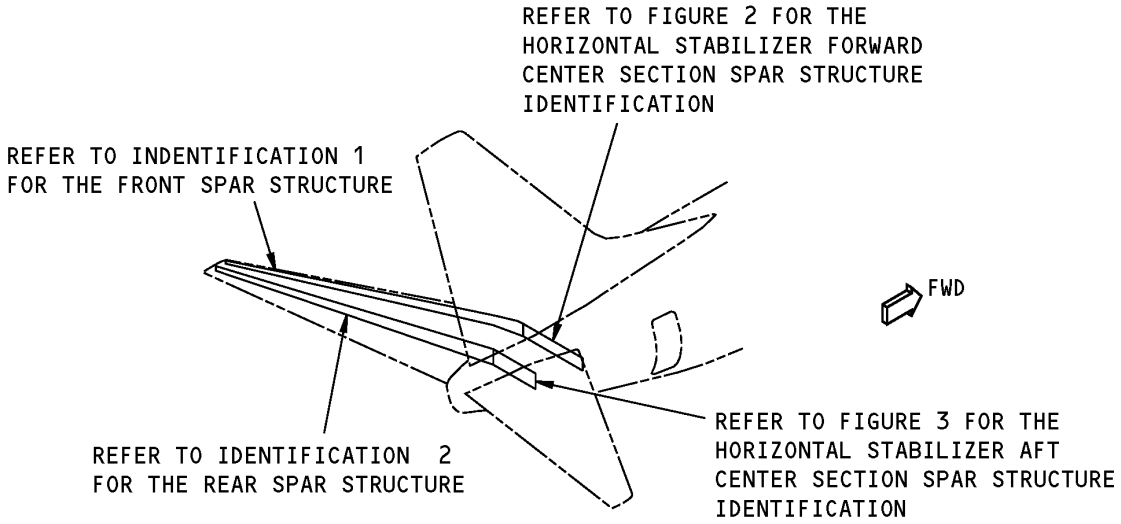
Chem-Milled Areas of Figure 2, Item [1]
Figure 3



INBD ⇦

Chem-Milled Areas of Figure 2, Item [2]
Figure 4

IDENTIFICATION 3 - HORIZONTAL STABILIZER CENTER SECTION SPAR STRUCTURE

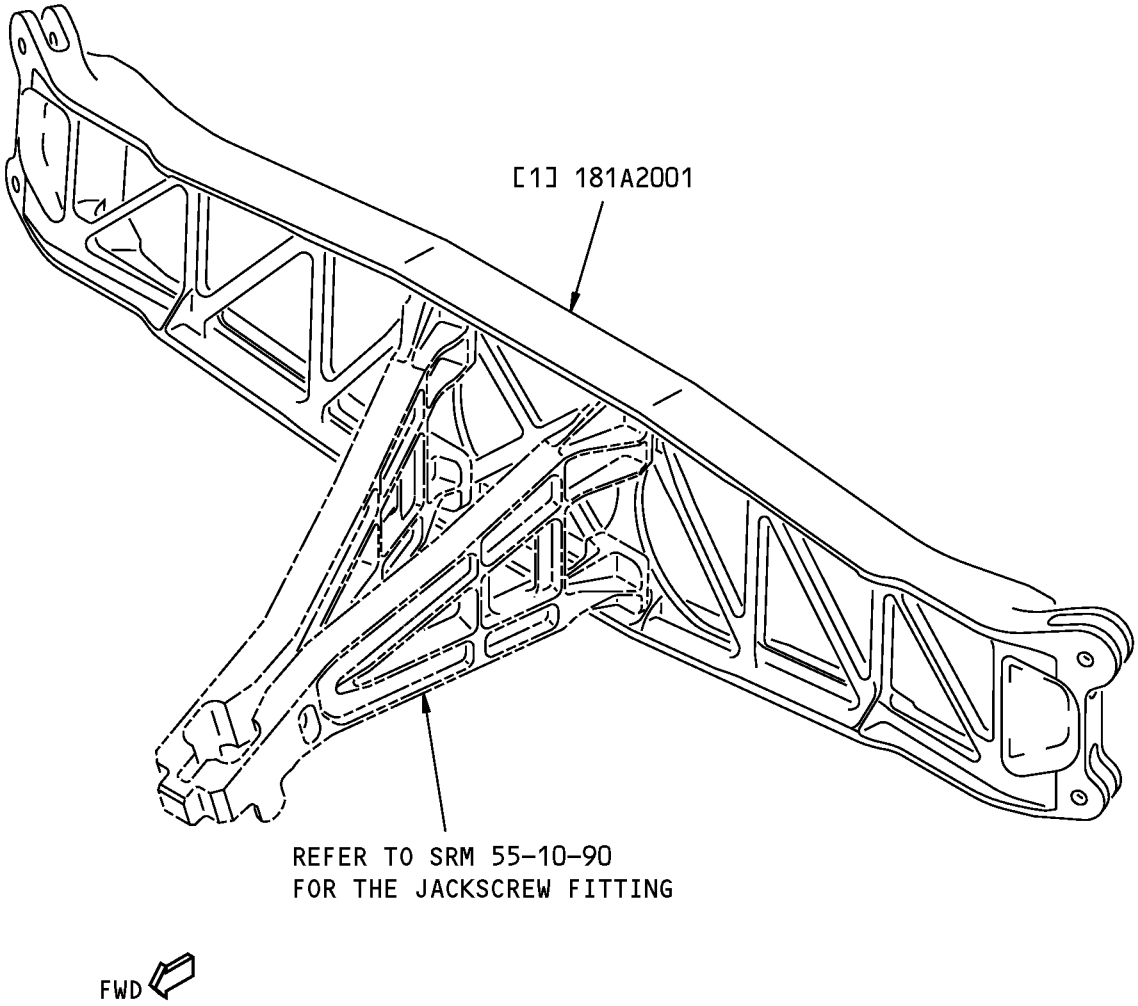


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Center Section Spar Structure Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A4001	Fuselage Product Collector
140A0810	Center Section Functional Collector Horizontal Tail
181A1000	Rear Spar Installation, Center Section, Horizontal Stabilizer
181A1110	Rear Spar Fitting - Upper, Center Section Horizontal Tail
181A1120	Rear Spar Fitting - Center Section Horizontal Tail
181A2000	Front Spar Installation - Center Section Horizontal Tail



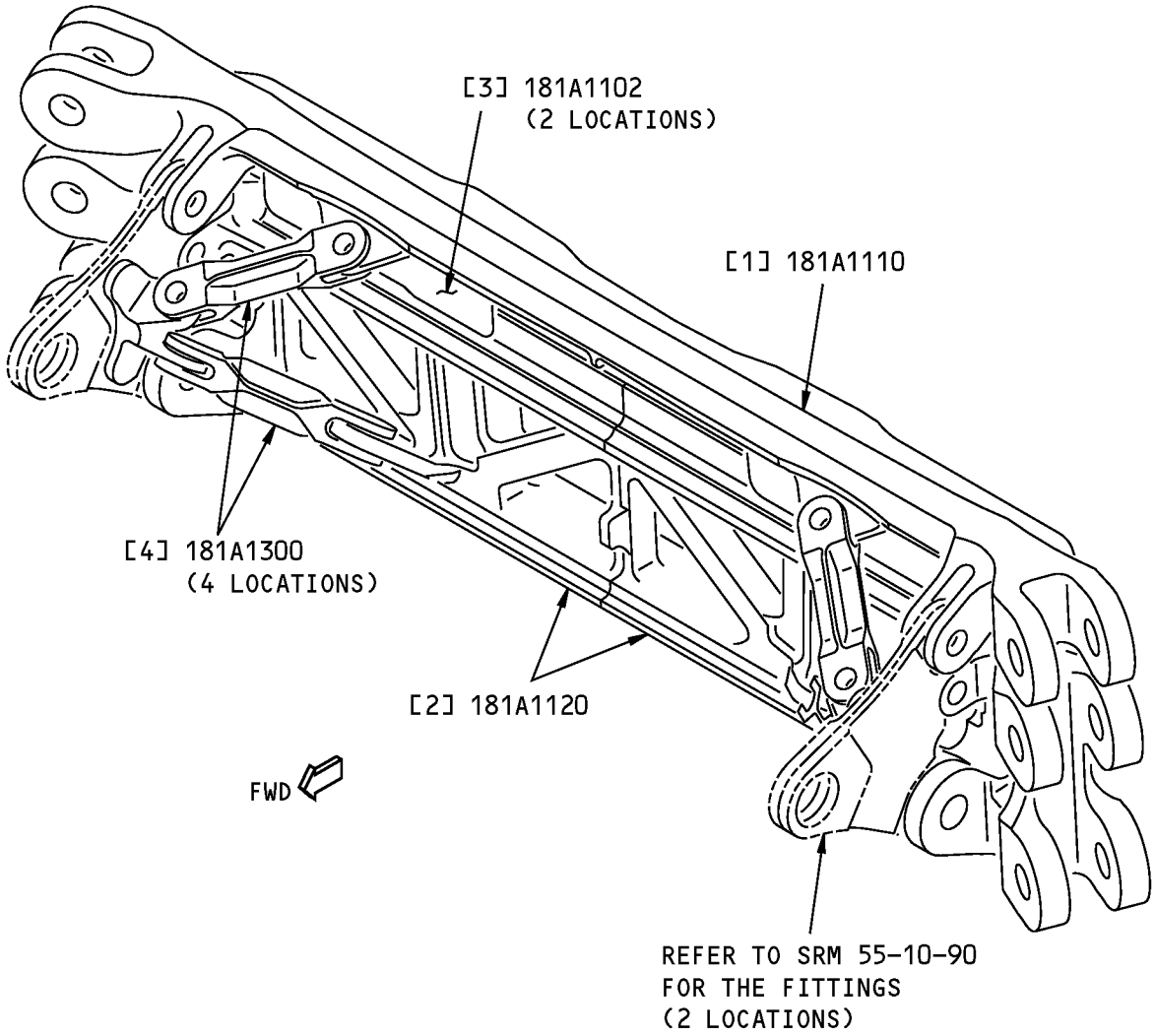
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Forward Center Section Spar Structure Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Front Spar Fitting		7050-T74 die forging as given in BMS 7-214	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Aft Center Section Spar Structure Identification
Figure 3

Table 3:

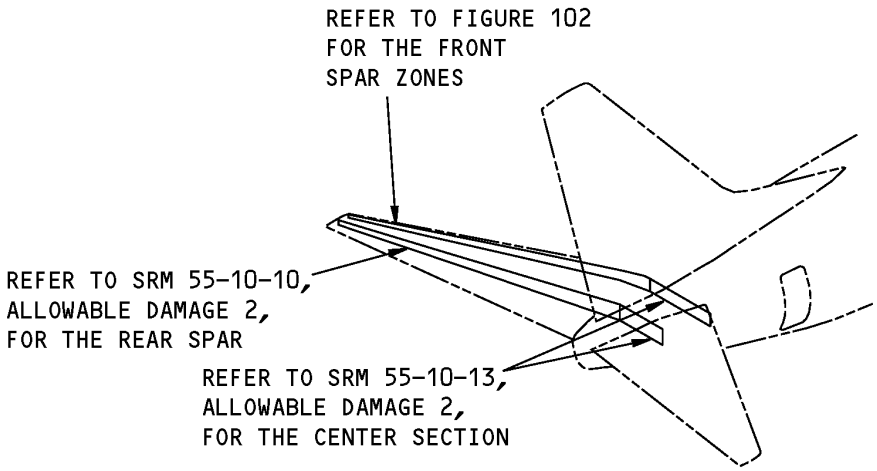
LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rear Spar Fitting - Upper		Ti-6Al-4V titanium forging as given in BMS 7-247	
[2]	Rear Spar Fitting - Lower		7050-T74 forging as given in BMS 7-214	
[3]	Web-Splice	0.125 (3.18)	Ti-6Al-4V titanium sheet as given in MIL-T-9046, Code AB-1, in the annealed condition	
[4]	Upper and Lower Brace Fitting (LH and RH)		7050-T7451 plate as given in BMS 7-323, Type I	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

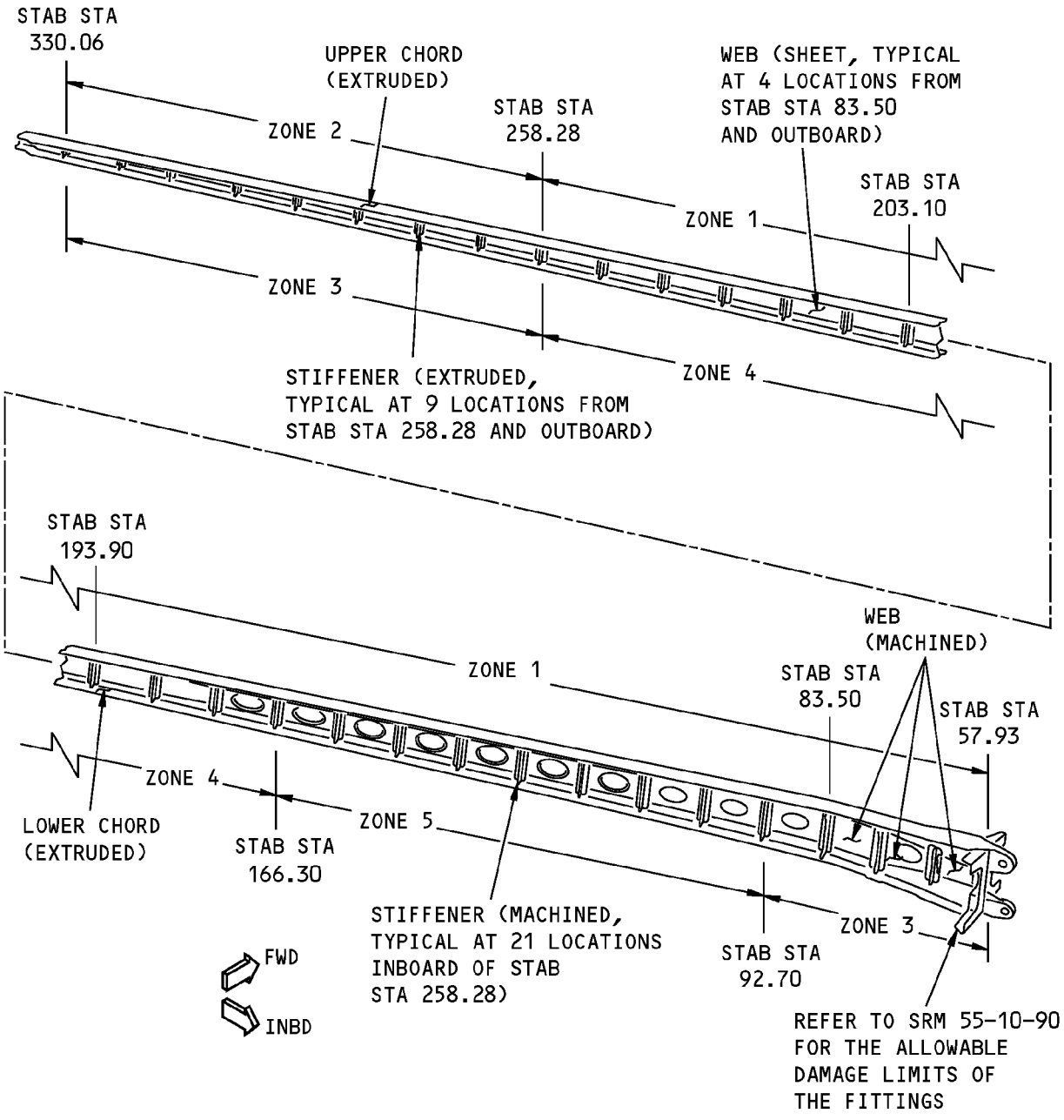
ALLOWABLE DAMAGE 1 - HORIZONTAL STABILIZER FRONT SPAR

1. Applicability

A. This subject gives the allowable damage limits for the horizontal stabilizer front spar shown in Horizontal Stabilizer Front Spar Location, Figure 101/ALLOWABLE DAMAGE 1 and Horizontal Stabilizer Front Spar Structure and Allowable Damage Zones , Figure 102/ALLOWABLE DAMAGE 1.



Horizontal Stabilizer Front Spar Location
Figure 101



NOTE: ALL PARTS IDENTIFIED ARE MADE OF ALUMINUM.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Front Spar Structure and Allowable Damage Zones
Figure 102

2. General

A. Refer to Table 101/ALLOWABLE DAMAGE 1 for the references of the allowable damage limits.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS			
TYPE OF STRUCTURE	**ZONE**	**STABILIZER STATION**	**PARAGRAPH**
Upper Chord	1	258.28 and inboard	4.A
	2	258.28 and outboard	4.
Lower Chord	3	92.70 and inboard 258.28 and outboard	4.C
	4	258.28 to 166.30	4.D
	5	166.30 to 92.70	4.E
Webs	——	All	4.F
Stiffeners	——	All	4.G

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

C. After you remove the damage, do the procedures that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(1) Flap peen or shot peen the surfaces of the upper and lower chords if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(3) Apply two layers of BMS 10-79, Type III, primer to the reworked areas of the upper and lower chords. Refer to SOPM 20-44-04.

(4) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the stiffeners and the webs. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS

(Continued)

Reference	Title
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Upper Chord - Zone 1

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Upper Chord - Zone 2

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Lower Chord - Zone 3

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

D. Lower Chord - Zone 4

(1) Cracks are not permitted.

(2) Nicks, Gouges, Scratches and Corrosion are not permitted.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

E. Lower Chord - Zone 5

(1) Cracks are not permitted.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

F. Webs

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and G.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, D, F, G, and I.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Detail H.

(4) Holes and Punctures are permitted if:

(a) They are a maximum of 0.25 inch (6.4 mm) in diameter

(b) They are a minimum of 4D (D = the diameter of the damage) away from a hole, a part edge, or other damage

(c) They are filled with a 2117-T3 or 2117-T4 aluminum protruding head rivet.

1) Install the rivet without sealant.

(d) There is not more than two holes or punctures in each bay between two stiffeners.

G. Stiffeners

(1) Cracks:

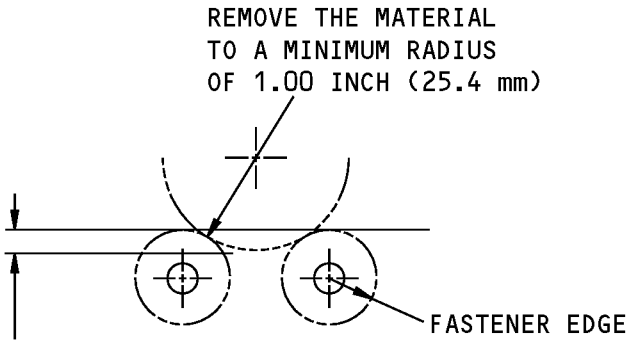
(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

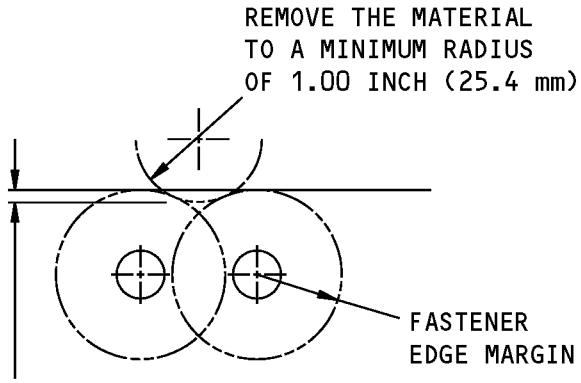
(4) Holes and Punctures are not permitted.



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm) FOR WEBS AND STIFFENERS
= A MAXIMUM OF 0.05 INCH (1.27 mm) FOR CHORDS

REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

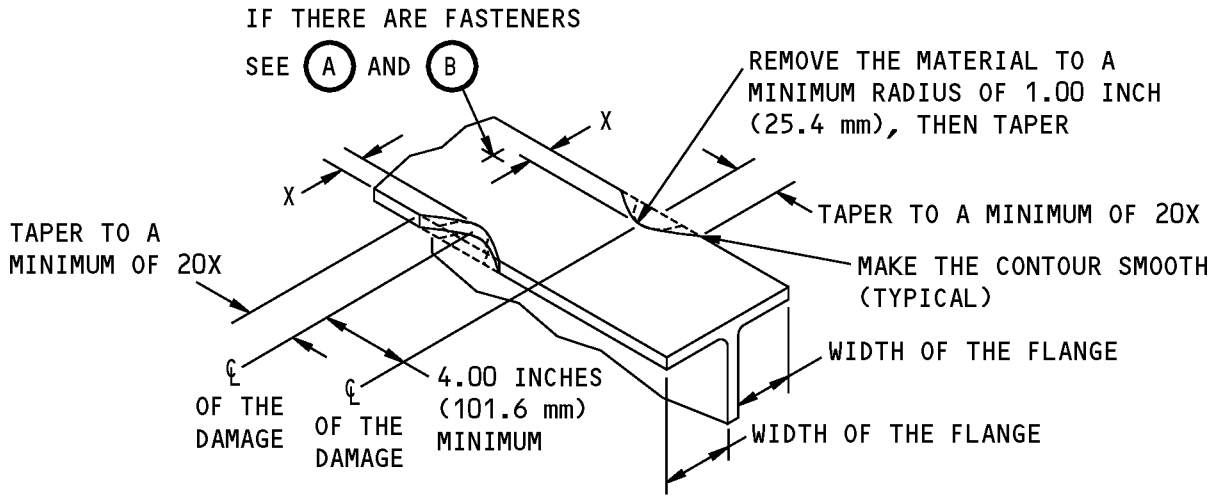
A



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm) FOR WEBS AND STIFFENERS
= A MAXIMUM OF 0.05 INCH (1.27 mm) FOR CHORDS

REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

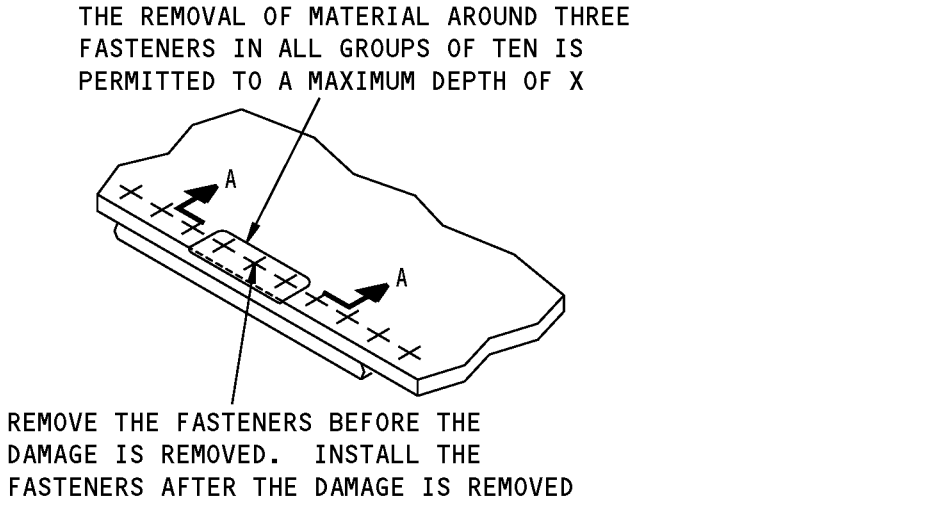


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE OR 0.05 INCH (1.27 mm), WHICHEVER IS LESS

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

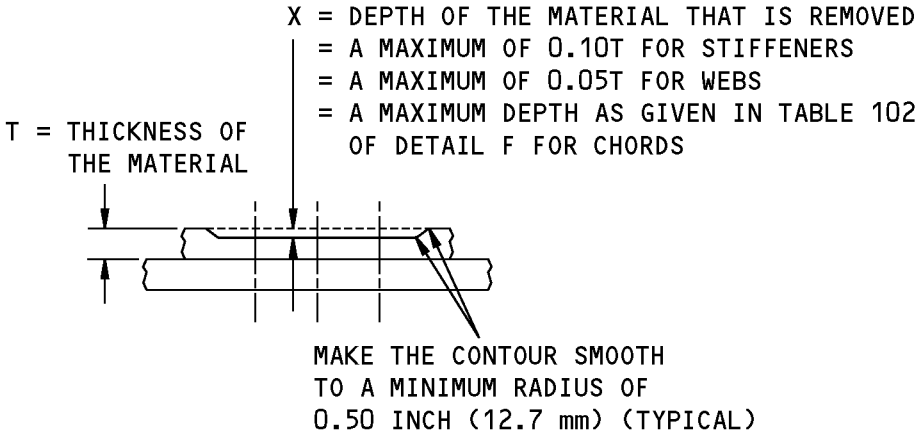
C

Allowable Damage Limits
Figure 103 (Sheet 1 of 8)



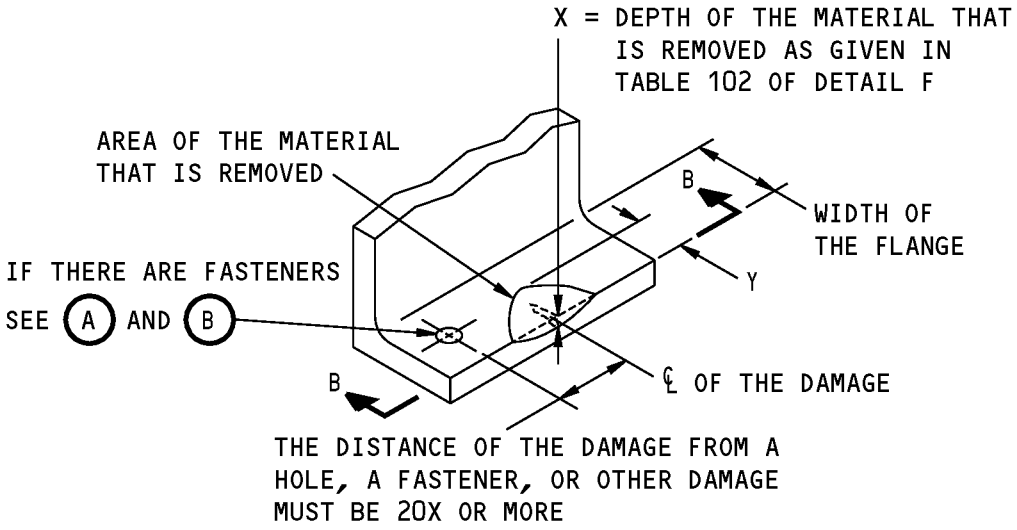
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

(D)



A–A

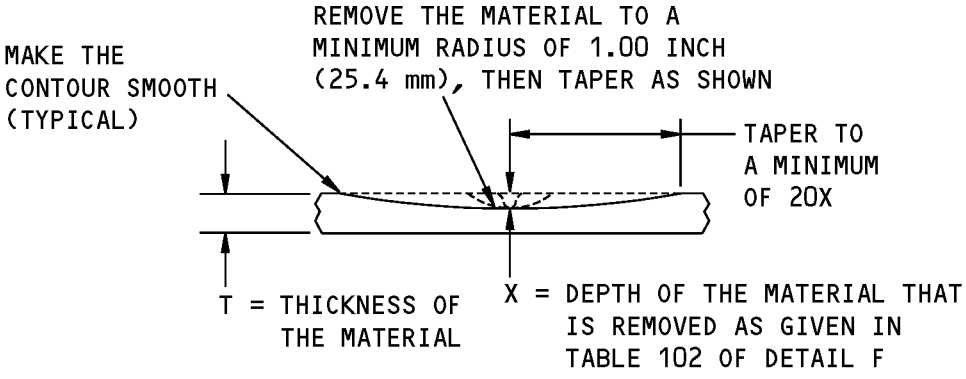
Allowable Damage Limits
Figure 103 (Sheet 2 of 8)



Y = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

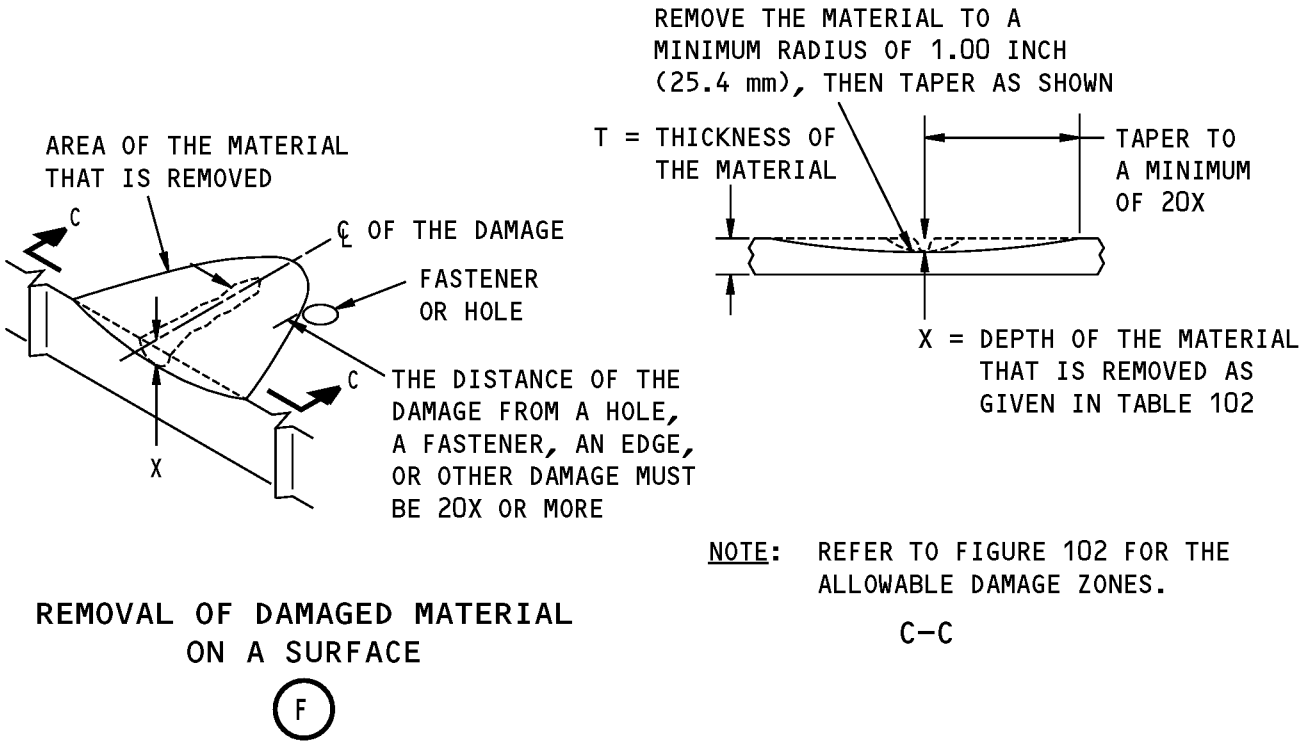
REMOVAL OF DAMAGED MATERIAL
ON A SURFACE AT AN EDGE

E



B–B

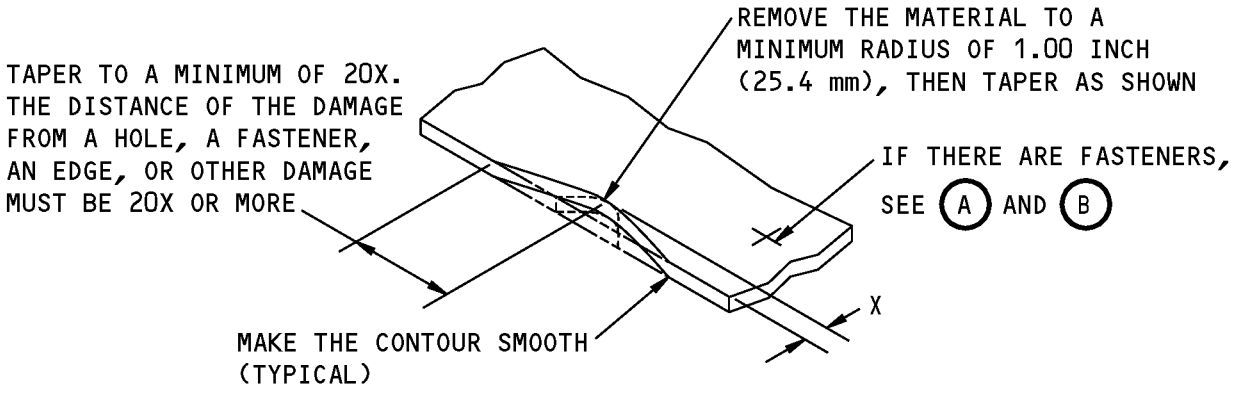
Allowable Damage Limits
Figure 103 (Sheet 3 of 8)



DEPTH OF THE REMOVED MATERIAL		
TYPE OF STRUCTURE	ZONE	MAXIMUM PERCENT OF THE INITIAL THICKNESS
UPPER CHORD	1	10
	2	10
LOWER CHORD	3	10
	4	NO DAMAGE PERMITTED
	5	5
WEB	-	15
STIFFENERS	-	10

TABLE 102

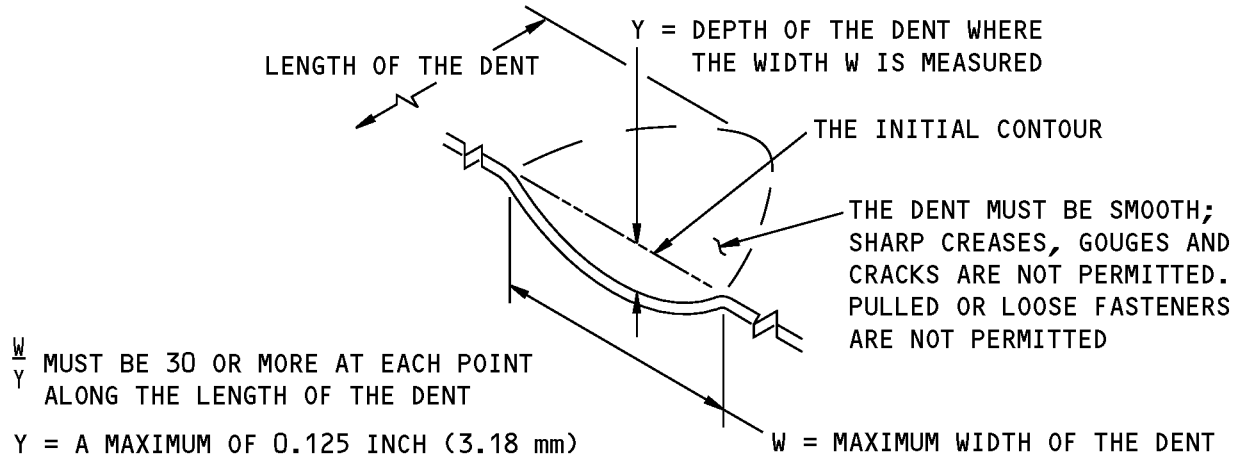
Allowable Damage Limits
Figure 103 (Sheet 4 of 8)



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm)

REMOVAL OF DAMAGED MATERIAL AT AN EDGE OF A METAL SKIN OR WEB

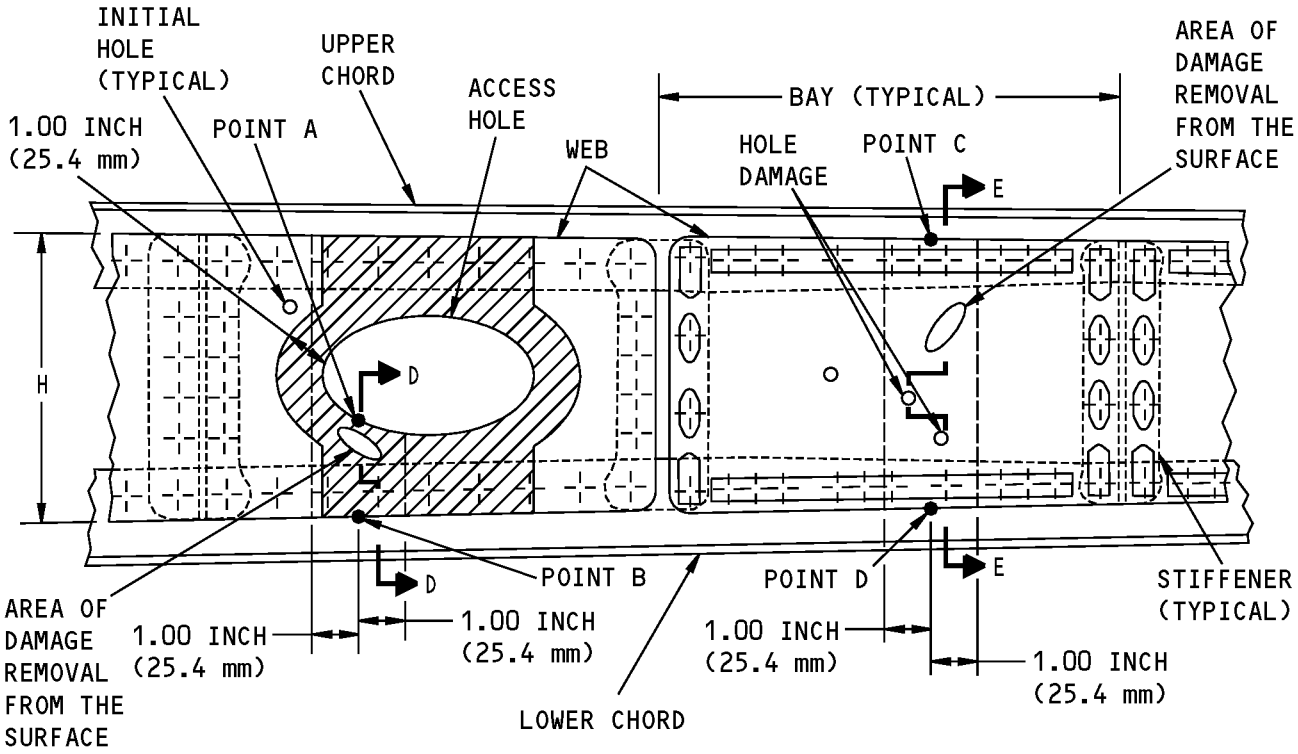
G



DENT THAT IS PERMITTED

H

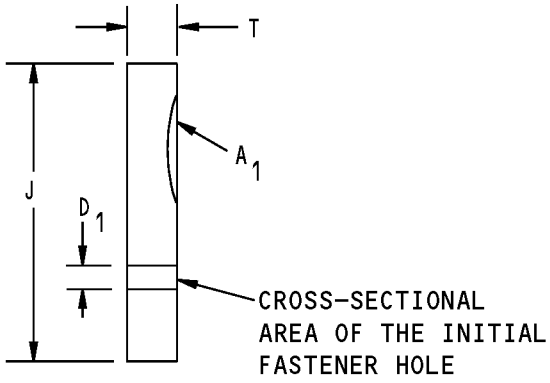
Allowable Damage Limits
Figure 103 (Sheet 5 of 8)



REMOVAL OF DAMAGED MATERIAL FROM A WEB

(I)

Allowable Damage Limits
Figure 103 (Sheet 6 of 8)



D_1 = DIAMETER OF THE INITIAL FASTENER HOLE

J = HEIGHT OF THE WEB IN SECTION D-D

T = THICKNESS OF THE WEB

A_i = INITIAL AREA OF THE WEB
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL HOLES (AS MANUFACTURED BY BOEING)
= $JT - D_1T$

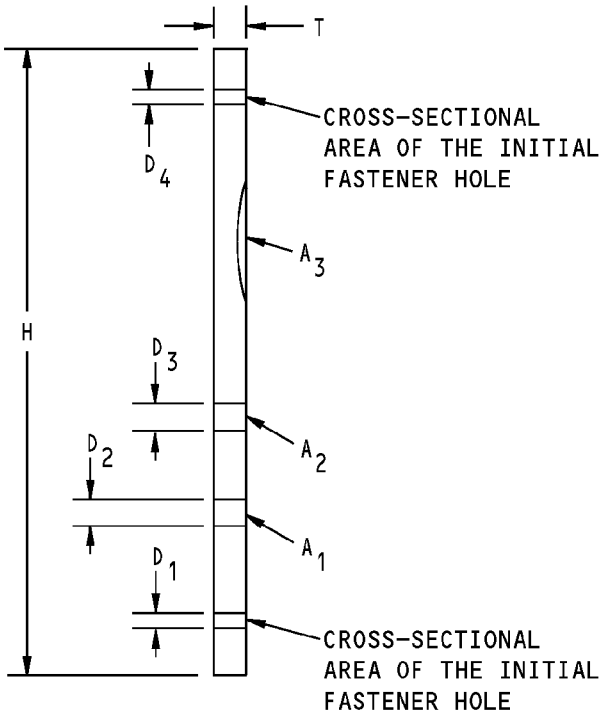
A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

$\left(\frac{A_1}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED
= A MAXIMUM OF 10 PERCENT

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES A-B (1.00 INCH (25.4 mm) ON EACH SIDE OF A LINE A-B) MUST NOT BE MORE THAN 10 PERCENT OF THE INITIAL AREA OF THE WEB.

D-D

Allowable Damage Limits
Figure 103 (Sheet 7 of 8)



D_1, D_4 = DIAMETERS OF THE INITIAL FASTENER HOLES

D_2, D_3 = DIAMETERS OF THE HOLES WHERE THERE IS DAMAGE

H = HEIGHT OF THE WEB AT THE CROSS-SECTION

T = THICKNESS OF THE WEB

A_i = INITIAL AREA OF THE WEB
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL FASTENERS HOLES (AS MANUFACTURED BY BOEING)
= $HT - D_1T - D_4T$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

A_2 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 2

A_3 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 3

$\left(\frac{A_1+A_2+A_3}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED
= A MAXIMUM OF 15 PERCENT

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES C-D (1.00 INCH (25.4 mm) ON EACH SIDE OF A LINE C-D) MUST NOT BE MORE THAN 15 PERCENT OF THE INITIAL AREA OF THE WEB

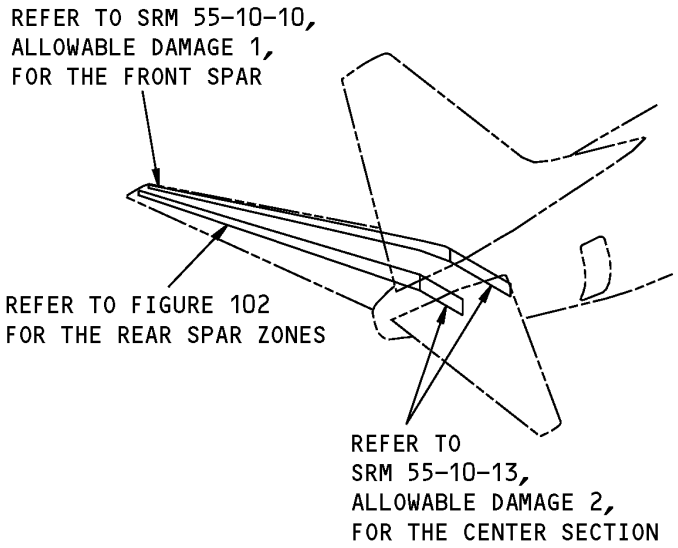
E-E

Allowable Damage Limits
Figure 103 (Sheet 8 of 8)

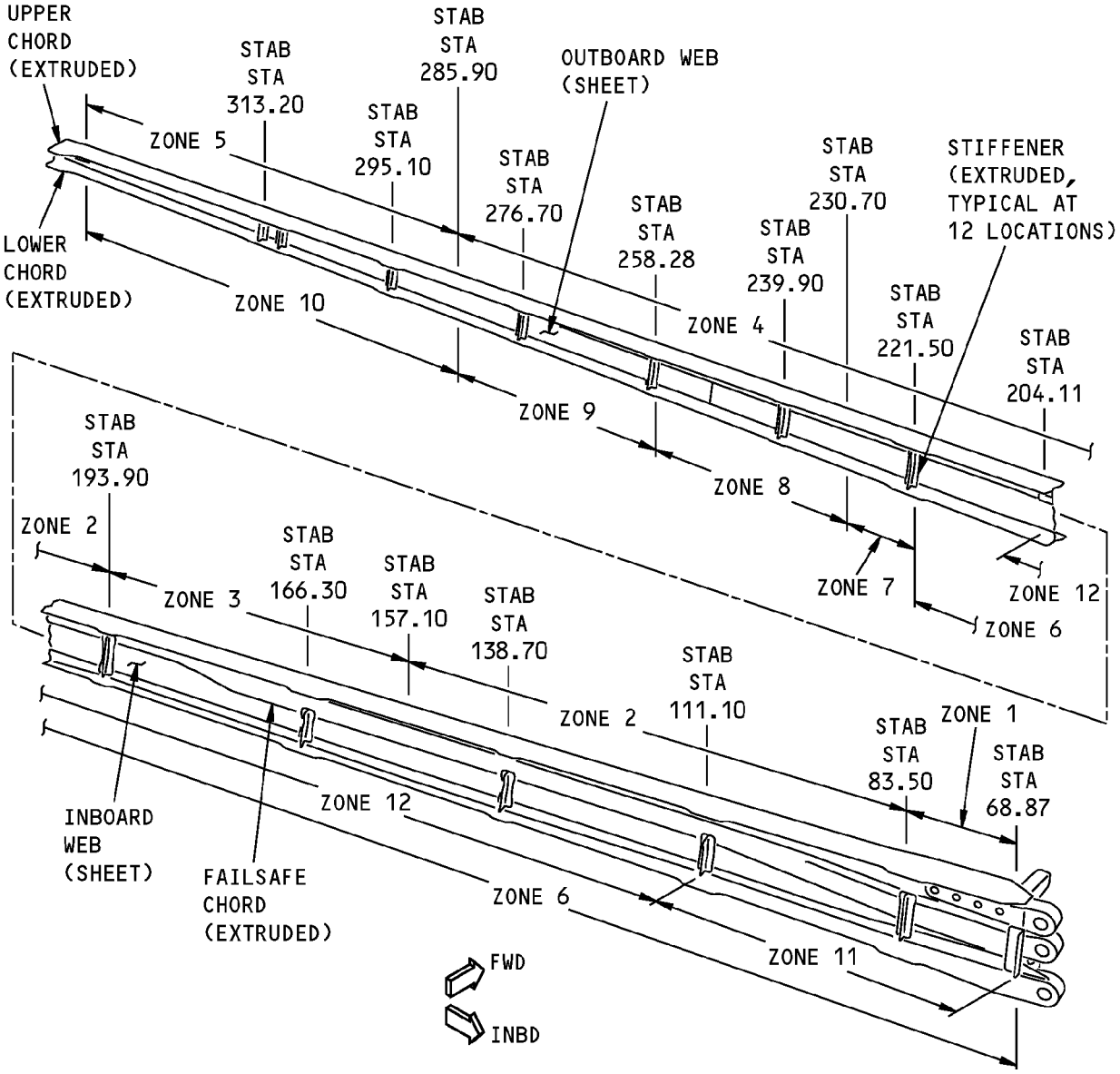
ALLOWABLE DAMAGE 2 - HORIZONTAL STABILIZER REAR SPAR

1. Applicability

A. This subject gives the allowable damage limits for the horizontal stabilizer rear spar shown in Horizontal Stabilizer Rear Spar Location, Figure 101/ALLOWABLE DAMAGE 2 and Horizontal Stabilizer Rear Spar Structure and Allowable Damage Zones , Figure 102/ALLOWABLE DAMAGE 2.



Horizontal Stabilizer Rear Spar Location
Figure 101

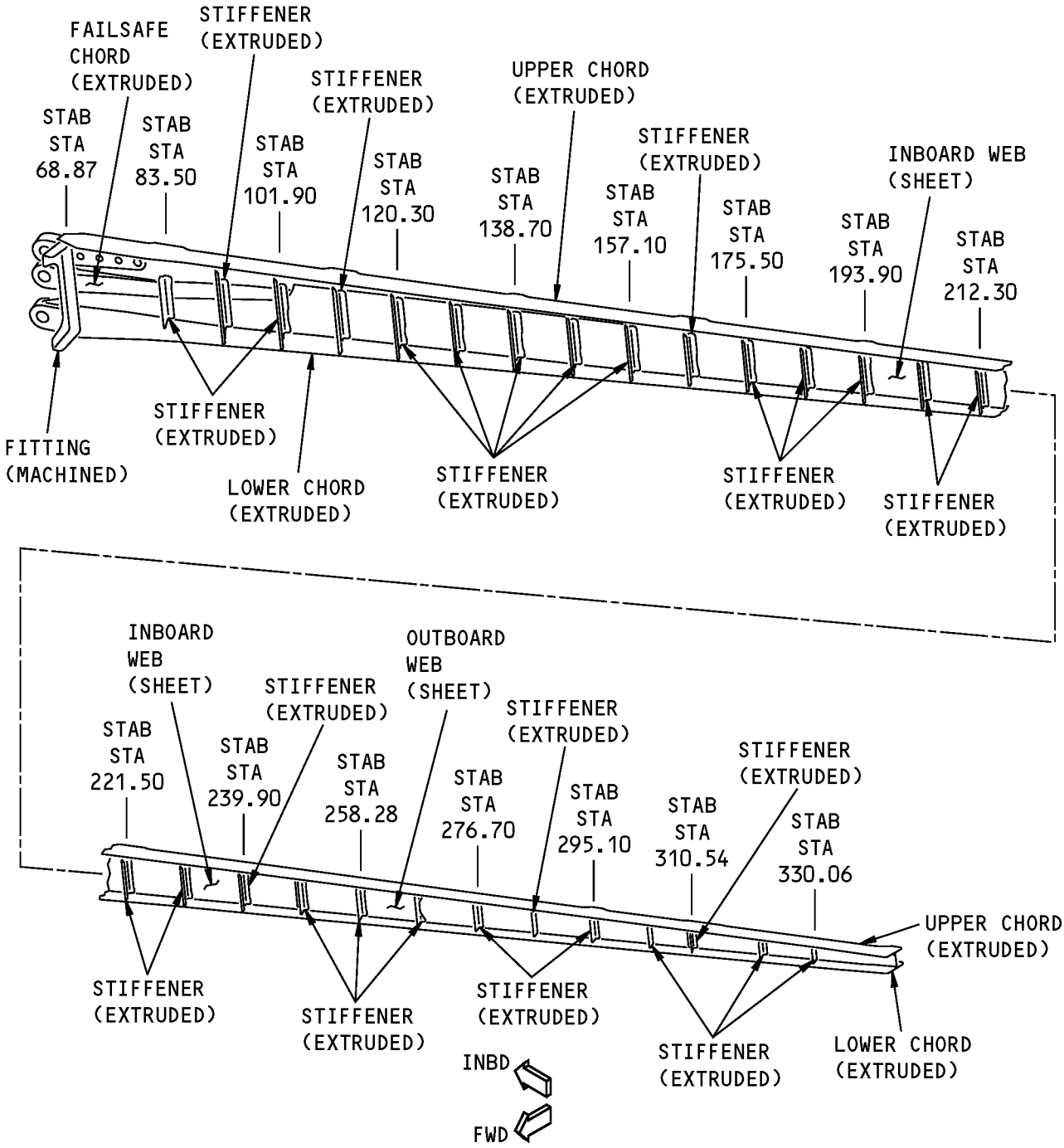


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

NOTES

- ALL PARTS IDENTIFIED ARE MADE OF ALUMINUM.
- ZONES 1, 2, 3, 4 AND 5 ARE APPLICABLE TO THE UPPER CHORD.
- ZONES 6,7,8,9, and 10 ARE APPLICABLE TO THE LOWER CHORD.
- ZONES 11 AND 12 ARE APPLICABLE TO THE FAILSAFE CHORD.

Horizontal Stabilizer Rear Spar Structure and Allowable Damage Zones
Figure 102 (Sheet 1 of 2)



FORWARD SIDE OF SPAR

Horizontal Stabilizer Rear Spar Structure and Allowable Damage Zones
Figure 102 (Sheet 2 of 2)

2. General

A. Refer to Table 101/ALLOWABLE DAMAGE 2 for the references of the allowable damage limits.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS			
TYPE OF STRUCTURE	**ZONE**	**STABILIZER STATION**	**PARAGRAPH**
Upper Chord	1	68.87 thru 83.50	4.A
	2	83.50 thru 157.10	4.A
	3	157.10 thru 193.90	4.A
	4	193.90 thru 285.90	4.A
	5	285.90 and outboard	4.A
Lower Chord	6	68.87 thru 221.50	4.B
	7	221.50 thru 230.70	4.B
	8	230.70 thru 258.28	4.B
	9	258.28 thru 285.90	4.B
	10	285.90 and outboard	4.B
Failsafe Chord	11	68.87 thru 111.10	4.C
	12	111.10 thru 204.11	4.C
Webs	——	All	4.D
Stiffeners, Fitting	——	All	4.E

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

C. After you remove the damage, do the procedures that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(1) Flap peen or shot peen the surfaces of the upper and lower chords if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(3) Apply two layers of BMS 10-79, Type III, primer to the reworked areas of the upper and lower chords. Refer to SOPM 20-44-04.

(4) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the stiffeners, fitting, and the webs. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Upper Chord - Zones 1 thru 5

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Lower Chord - Zones 6 thru 10

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Failsafe Chord - Zones 11 and 12

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

D. Webs

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and G.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, D, F, G d I.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Detail H.

(4) Holes and Punctures are permitted if:

(a) They are a maximum of 0.25 inch (6.4 mm) in diameter

(b) They are a minimum of 4D (D = the diameter of the damage) away from a hole, a part edge, or other damage

(c) They are filled with a 2117-T3 or 2117-T4 aluminum protruding head rivet

1) Install the rivet without sealant.

(d) There is not more than two holes or punctures in each bay between two stiffeners.

E. Stiffeners and Fittings

(1) Cracks:

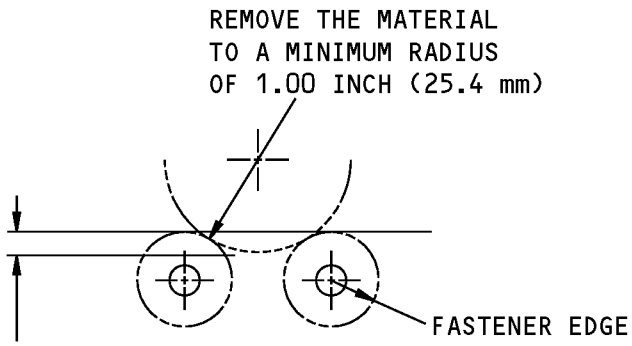
(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, C, D, E, and F.

(3) Dents are not permitted.

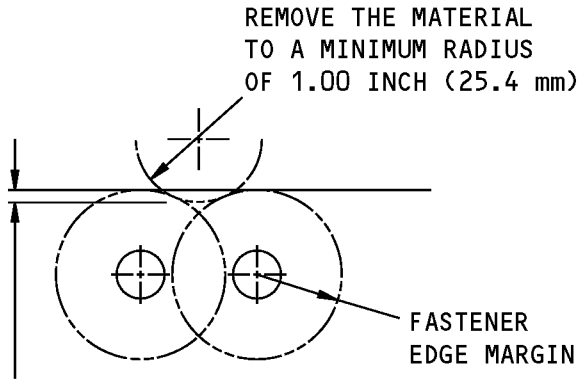
(4) Holes and Punctures are permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Detail J.



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm) FOR WEBS AND STIFFENERS
= A MAXIMUM OF 0.05 INCH (1.27 mm) FOR CHORDS

REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

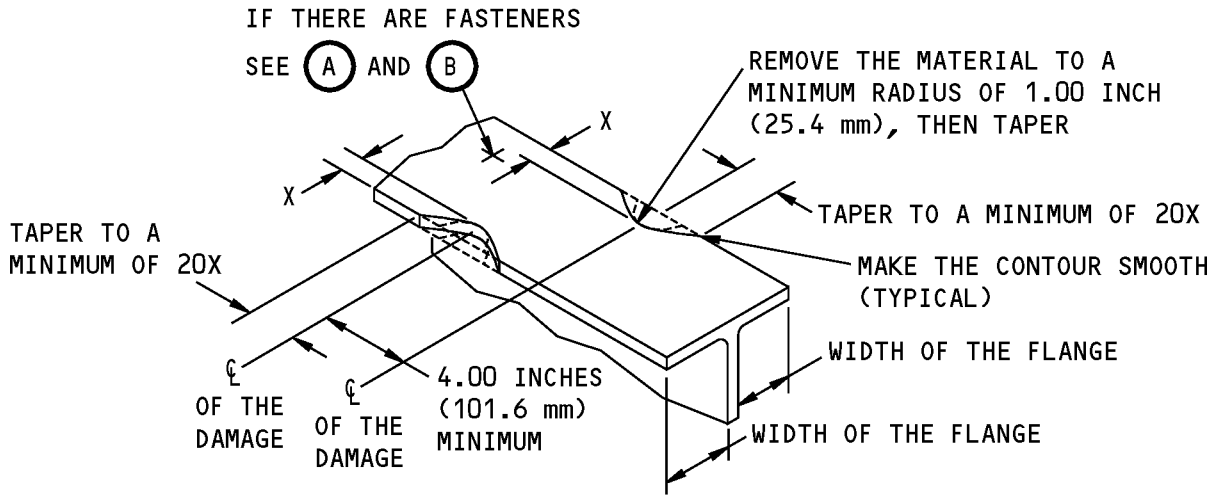
A



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm) FOR WEBS AND STIFFENERS
= A MAXIMUM OF 0.05 INCH (1.27 mm) FOR CHORDS

REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

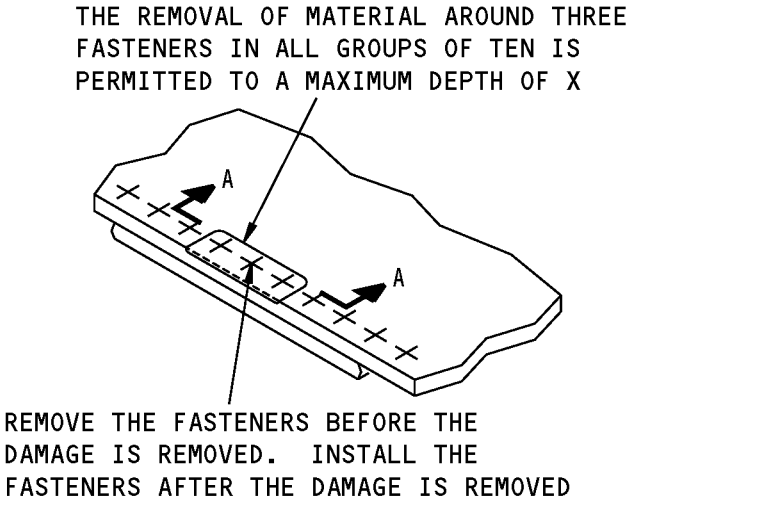


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE OR 0.05 INCH (1.27 mm), WHICHEVER IS LESS

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

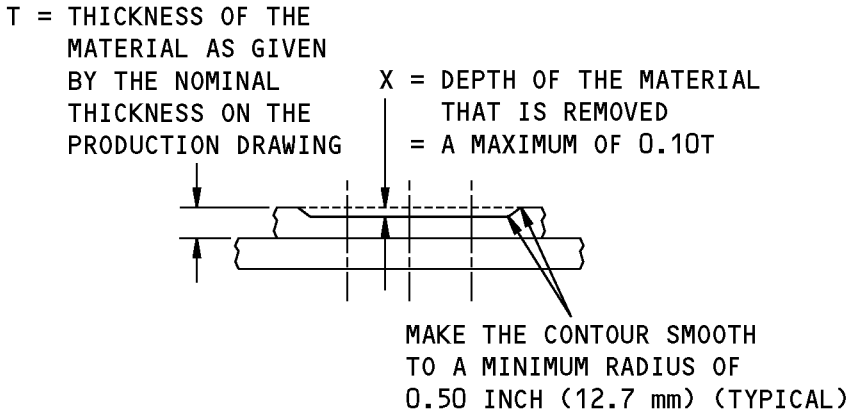
C

Allowable Damage Limits
Figure 103 (Sheet 1 of 10)



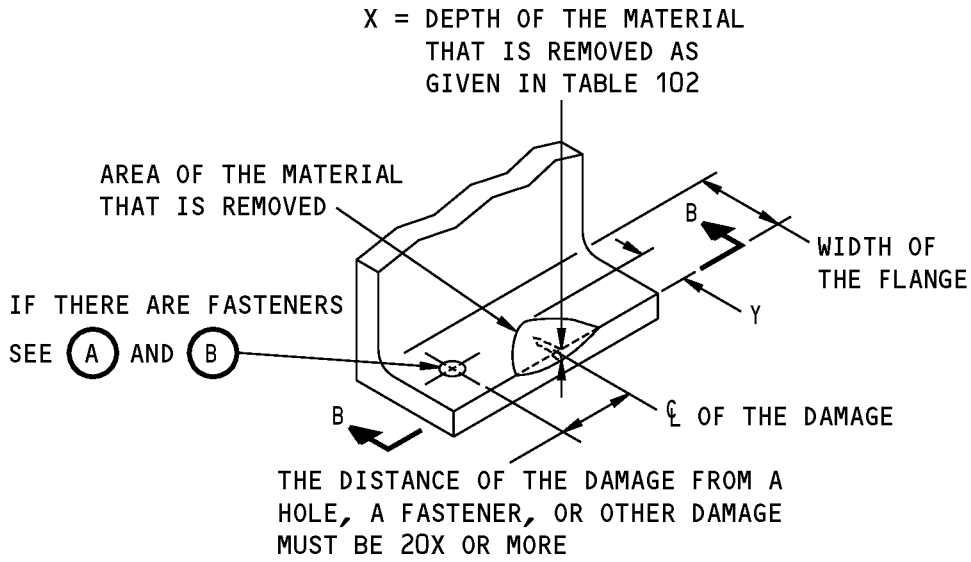
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

(D)



A–A

Allowable Damage Limits
Figure 103 (Sheet 2 of 10)

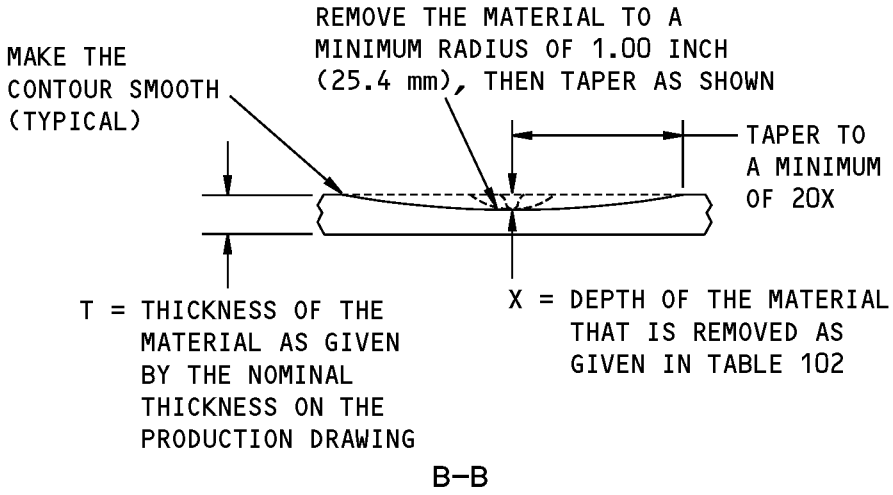


Y = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

NOTE: AN ANGLE IS SHOWN. THIS DETAIL ALSO APPLIES TO TEE SECTIONS.

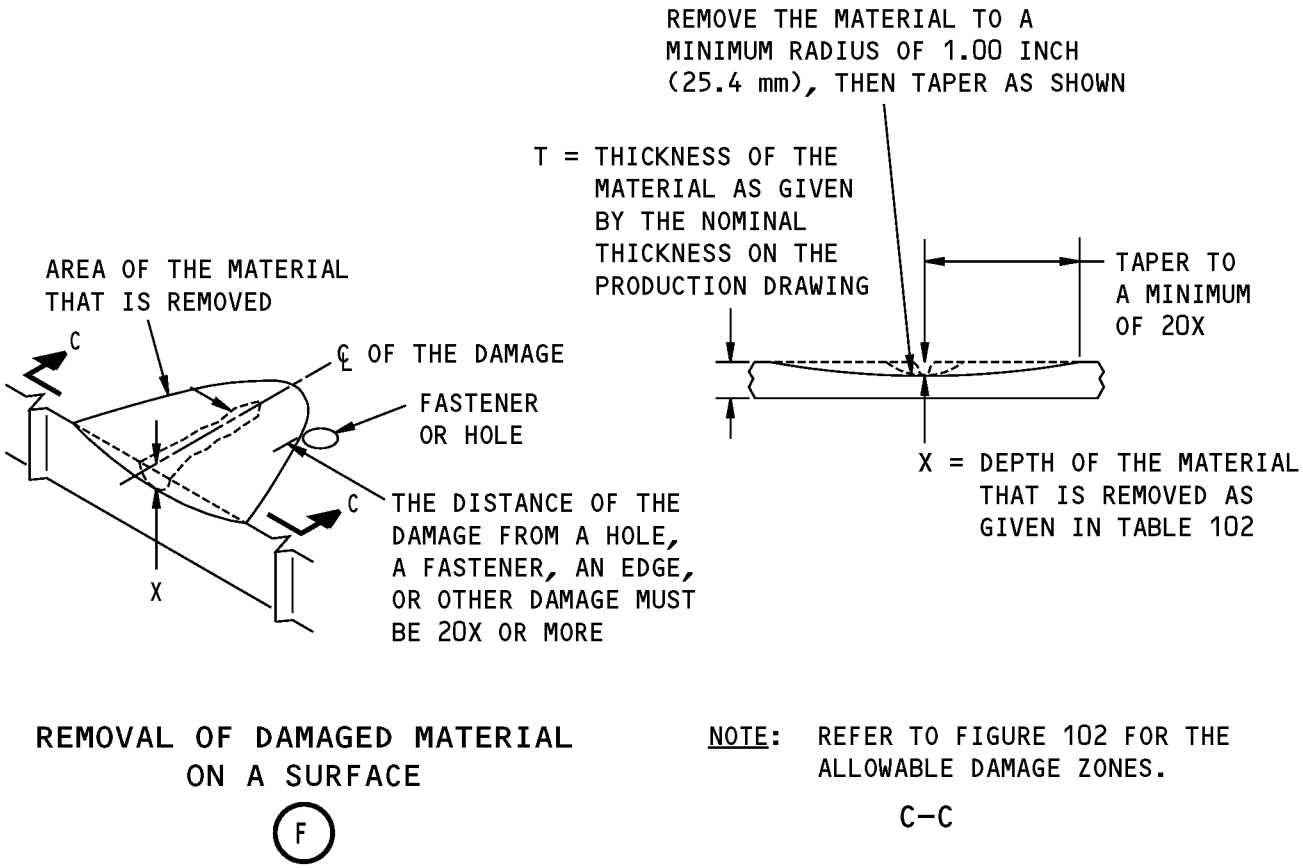
REMOVAL OF DAMAGED MATERIAL
ON A SURFACE AT AN EDGE

E



B–B

Allowable Damage Limits
Figure 103 (Sheet 3 of 10)



Allowable Damage Limits
Figure 103 (Sheet 4 of 10)

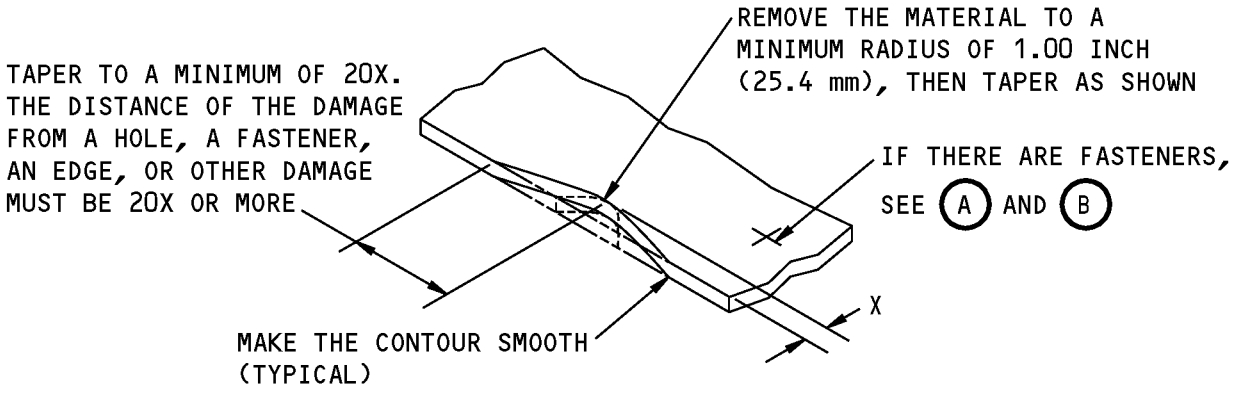
DEPTH OF THE REMOVED MATERIAL		
TYPE OF STRUCTURE	ZONE	MAXIMUM PERCENT OF THE INITIAL THICKNESS AS GIVEN BY THE NOMINAL THICKNESS ON THE PRODUCTION DRAWING
UPPER CHORD	1	DAMAGE THAT CAN NOT BE MEASURED
	2	3
	3	5
	4	10
	5	20
LOWER CHORD	6	10
	7	5
	8	DAMAGE THAT CAN NOT BE MEASURED
	9	5
	10	20
FAILSAFE CHORD	11	20
	12	5
INBOARD WEB 1	BAYS 1 THRU 6	20
	BAY 7	2
	BAY 8	4
	BAYS 9 THRU 21	20
OUTBOARD WEB	-	20
STIFFENERS	-	20
FITTING	-	10

TABLE 102

NOTES

1 WEB BAYS 1 THRU 6 ARE BETWEEN STAB STAS 68.87 AND 111.10
WEB BAY 7 IS BETWEEN STAB STAS 111.10 AND 120.30
WEB BAY 8 IS BETWEEN STAB STAS 120.30 AND 129.50
WEB BAYS 9 THRU 21 ARE BETWEEN STAB STAS 129.50 AND 249.10

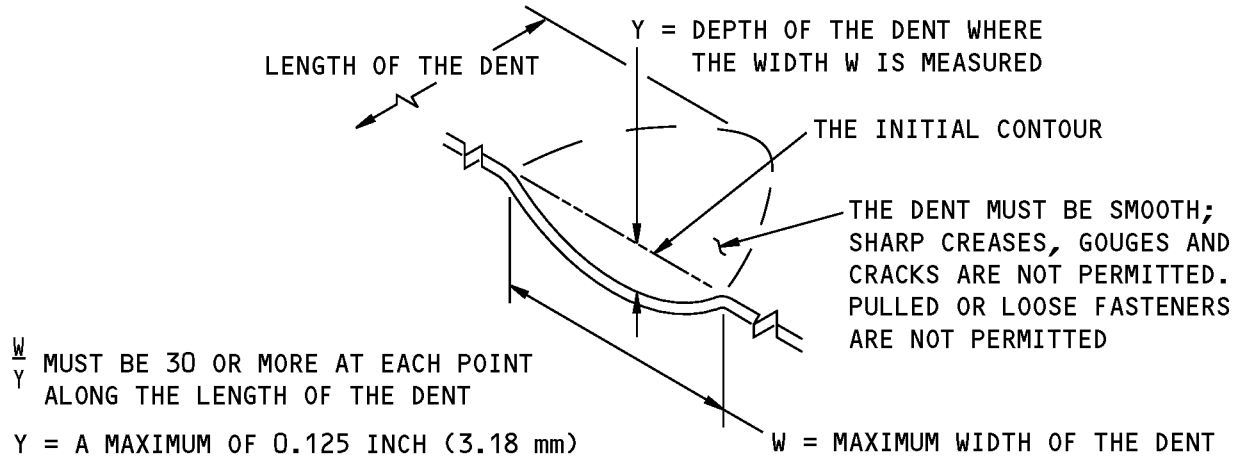
Allowable Damage Limits
Figure 103 (Sheet 5 of 10)



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH (2.54 mm)

REMOVAL OF DAMAGED MATERIAL AT AN EDGE OF A METAL SKIN OR WEB

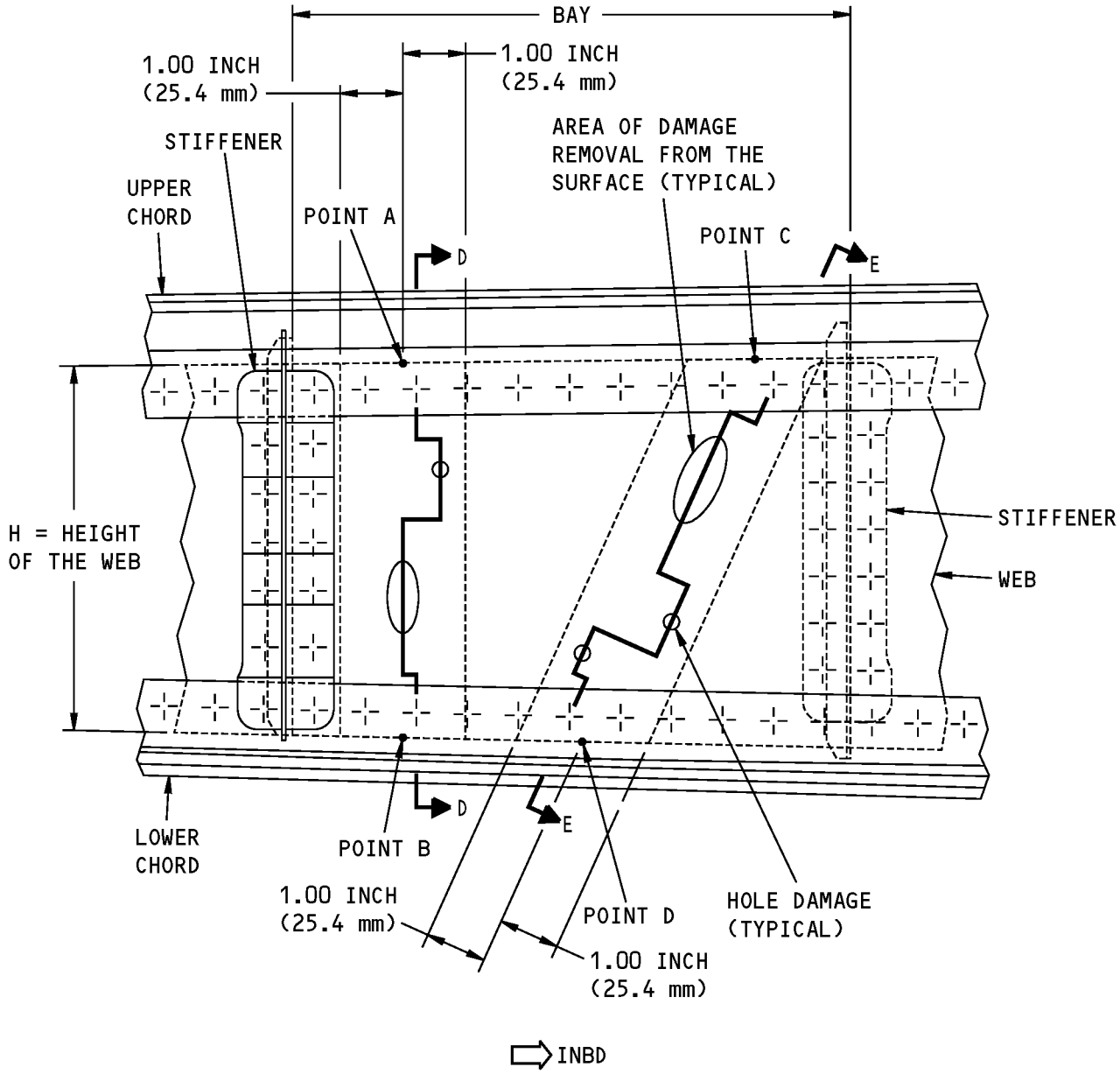
G



DENT THAT IS PERMITTED

H

Allowable Damage Limits
Figure 103 (Sheet 6 of 10)

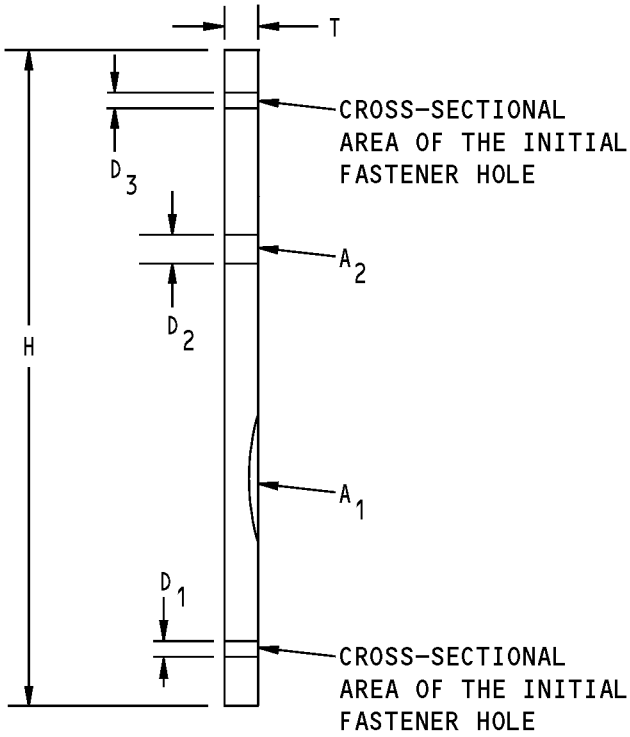


AFT SIDE OF REAR SPAR

REMOVAL OF DAMAGED MATERIAL FROM A WEB

I

Allowable Damage Limits
Figure 103 (Sheet 7 of 10)



D_1, D_3 = DIAMETERS OF THE INITIAL FASTENER HOLES

D_2 = DIAMETER OF THE HOLE WHERE THERE IS DAMAGE

H = HEIGHT OF THE WEB AT THE CROSS-SECTION

T = THICKNESS OF THE WEB AS GIVEN BY THE NOMINAL THICKNESS ON THE PRODUCTION DRAWING

A_i = INITIAL AREA OF THE WEB
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL FASTENERS HOLES (AS MANUFACTURED BY BOEING)
= $HT - D_1T - D_3T$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

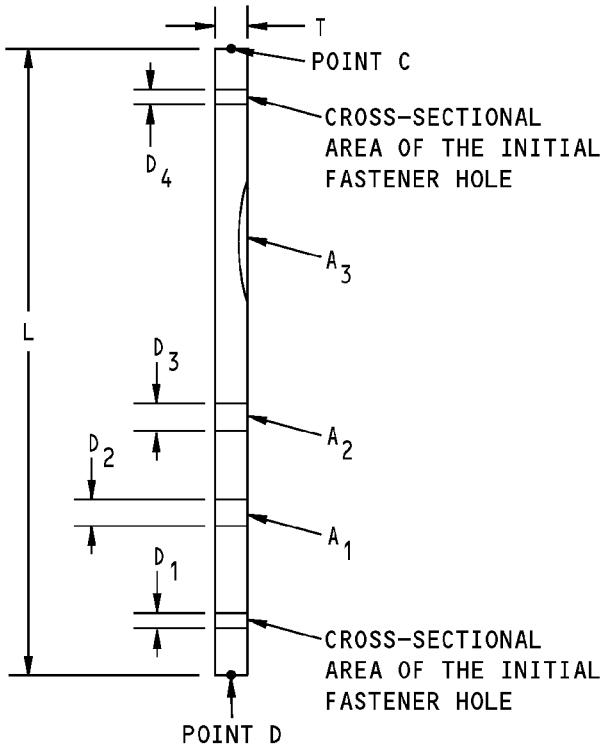
A_2 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 2

$\left(\frac{A_1+A_2}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED
= A MAXIMUM OF 20 PERCENT

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES A-B (1.00 INCH (25.4 mm) ON EACH SIDE OF A LINE A-B) MUST NOT BE MORE THAN 20 PERCENT OF THE INITIAL AREA OF THE WEB

D-D

Allowable Damage Limits
Figure 103 (Sheet 8 of 10)



D_1, D_4 = DIAMETERS OF THE INITIAL FASTENER HOLES

D_2, D_3 = DIAMETERS OF THE HOLES WHERE THERE IS DAMAGE

L = LENGTH OF THE WEB AT THE CROSS-SECTION BETWEEN POINTS C AND D

T = THICKNESS OF THE WEB AS GIVEN BY THE NOMINAL THICKNESS ON THE PRODUCTION DRAWING

A_i = INITIAL AREA OF THE WEB
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL FASTENERS HOLES (AS MANUFACTURED BY BOEING)
= $HT - D_1T - D_4T$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

A_2 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 2

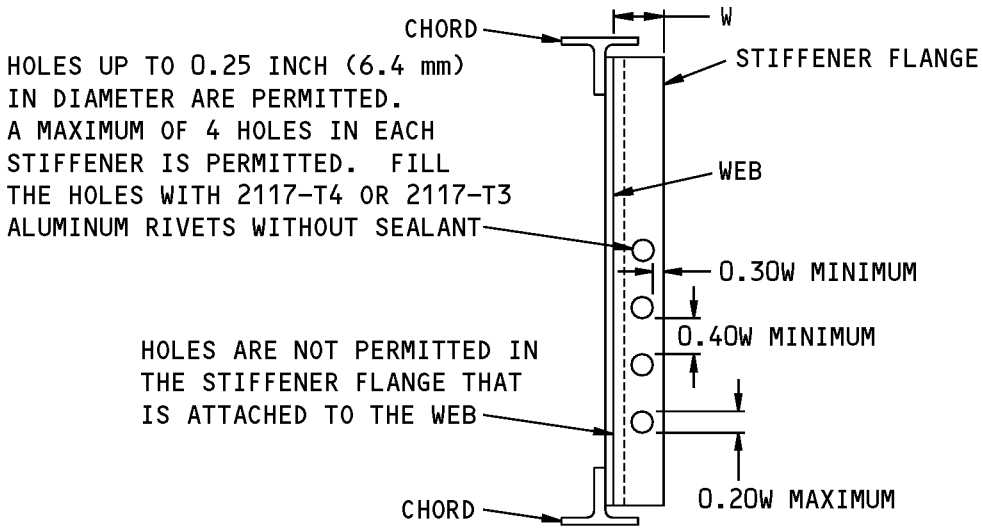
A_3 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 3

$\left(\frac{A_1+A_2+A_3}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED
= A MAXIMUM OF 20 PERCENT

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES C-D (1.00 INCH (25.4 mm) ON EACH SIDE OF A LINE C-D) MUST NOT BE MORE THAN 20 PERCENT OF THE INITIAL AREA OF THE WEB

E-E

Allowable Damage Limits
Figure 103 (Sheet 9 of 10)



W = THE WIDTH OF THE STIFFENER FLANGE

HOLES THAT ARE PERMITTED TO REMOVE
DAMAGED MATERIAL IN WEB STIFFENERS

J

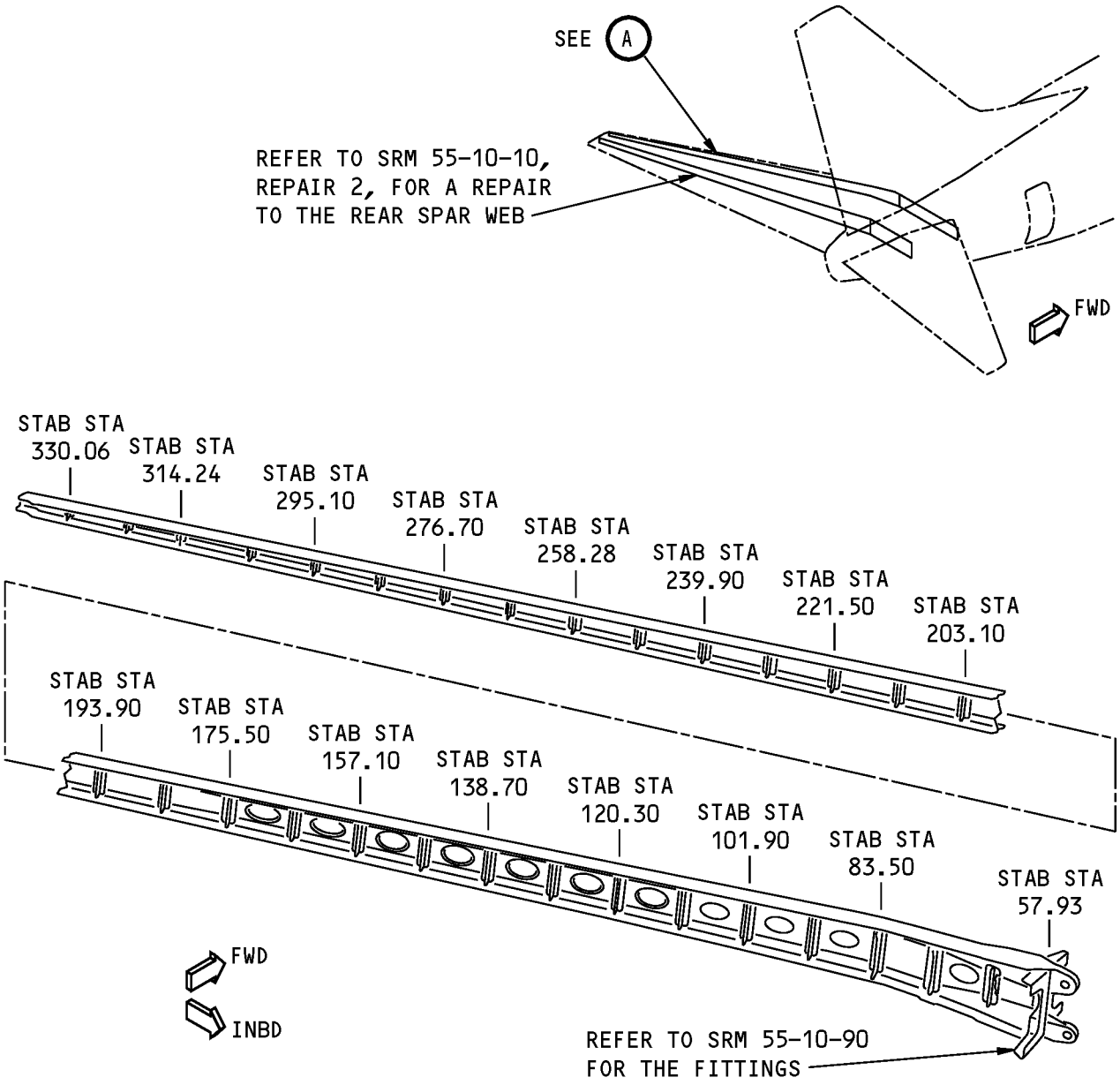
Allowable Damage Limits
Figure 103 (Sheet 10 of 10)

REPAIR 1 - HORIZONTAL STABILIZER FRONT SPAR WEB

1. Applicability

A. Repair 1 is applicable to damage to the web of the horizontal stabilizer front spar shown in Horizontal Stabilizer Front Spar Location, Figure 201/REPAIR 1 if:

(1) The damage is between Stabilizer Stations 111.10 and 175.50.



Horizontal Stabilizer Front Spar Location
Figure 201

2. General

A. Repair 1 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Repair Instructions

A. Remove initial fasteners from skin assemblies as necessary to get access to the damaged area of the web. Refer to 51-40-02.

B. Drill a stop hole at the ends of all web cracks that do not end at fastener holes. Refer to Horizontal Stabilizer Front Spar Web Repair, Figure 202/REPAIR 1 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the web as shown in Horizontal Stabilizer Front Spar Web Repair, Figure 202/REPAIR 1. Refer to 51-10-02 for the procedures to remove the damage.

C. Remove the initial web fasteners and stiffeners as necessary for the repair.

D. Make the repair part as shown in Horizontal Stabilizer Front Spar Web Repair, Figure 202/REPAIR 1. Refer to Table 201/REPAIR 1 for the repair material.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 7075-T6 that is 0.100 inch thick. The use of clad material is recommended. It is permitted to make the repair part from 7075-T6 plate

E. Assemble the repair part as shown in Horizontal Stabilizer Front Spar Web Repair, Figure 202/REPAIR 1.

F. Drill the fastener holes. Refer to 51-40-05 for the fastener hole dimensions.

G. Remove the repair part.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair part and the bare surfaces of the web.

I. Apply a chemical conversion coating to the repair part and bare surfaces of the web. Refer to 51-20-01 for the chemical conversion coating procedures.

J. Apply one layer of BMS 10-11, Type I, primer to the area of the repair. Refer to SOPM 20-41-02 for the procedures to apply the primer.

(1) Apply the primer to the repair part.

(2) Apply the primer to the bare surfaces of the web.

K. Install the repair part with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

(1) It is optional to bond the repair part to the initial web as given in 51-70-09. This option will increase the fatigue life of the repair.

L. Install the initial web stiffeners.

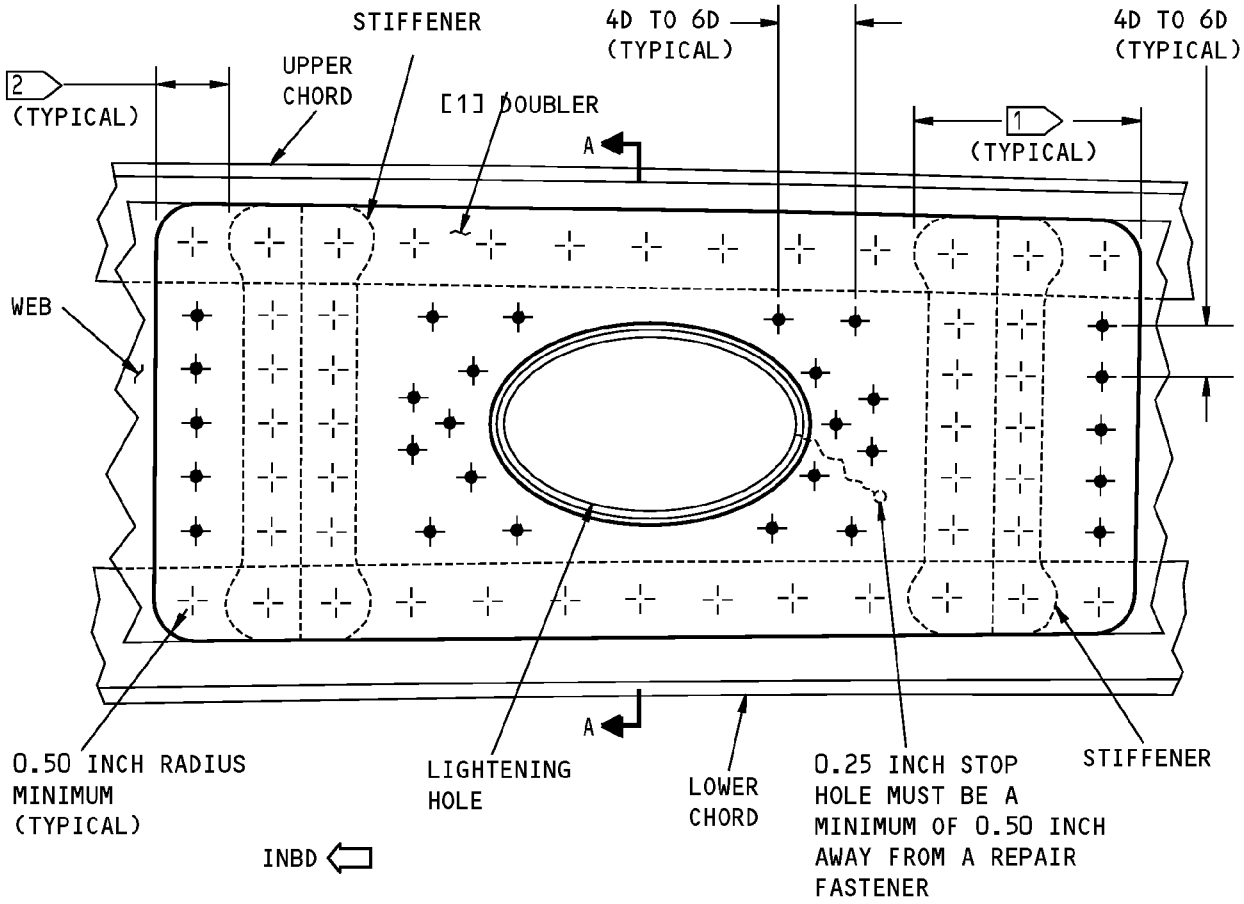
M. Install the fasteners.

(1) Install the hex drive fasteners wet with BMS 5-95 sealant in transition fit holes.

(2) Install the rivets at the initial locations without sealant.

N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.

O. Install the skin assemblies if they were removed.



TYPICAL REPAIR

A

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.

1 MAKE SURE THAT THERE IS A MINIMUM OF THREE FULL VERTICAL ROWS OF FASTENERS ON EACH SIDE OF THE DAMAGED AREA.

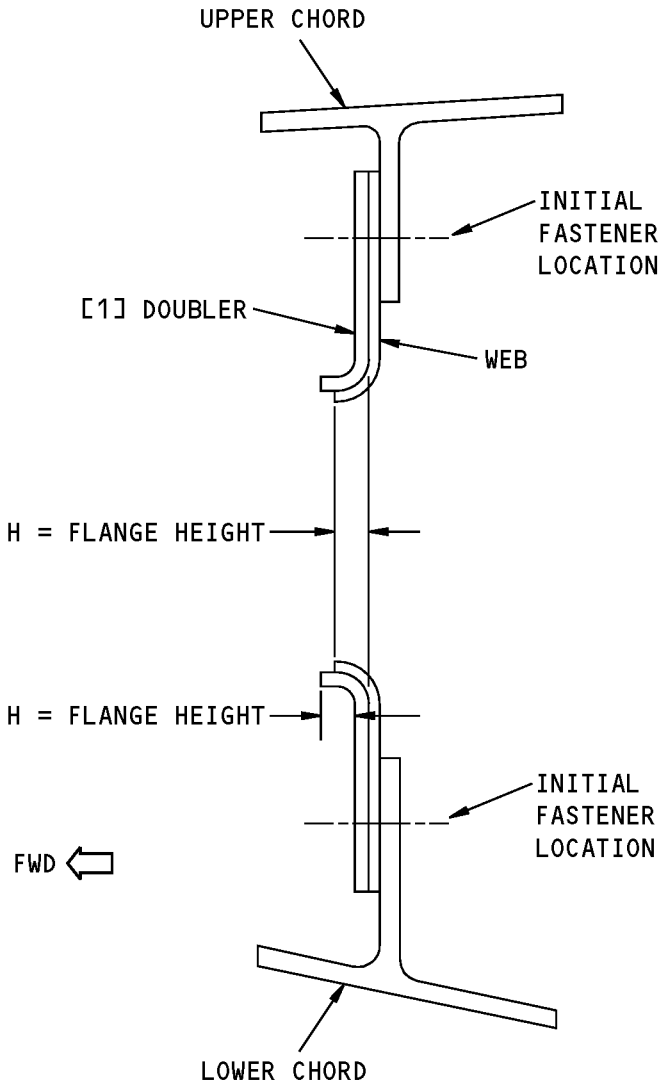
2 PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.

FASTENER SYMBOLS

-⊹- INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

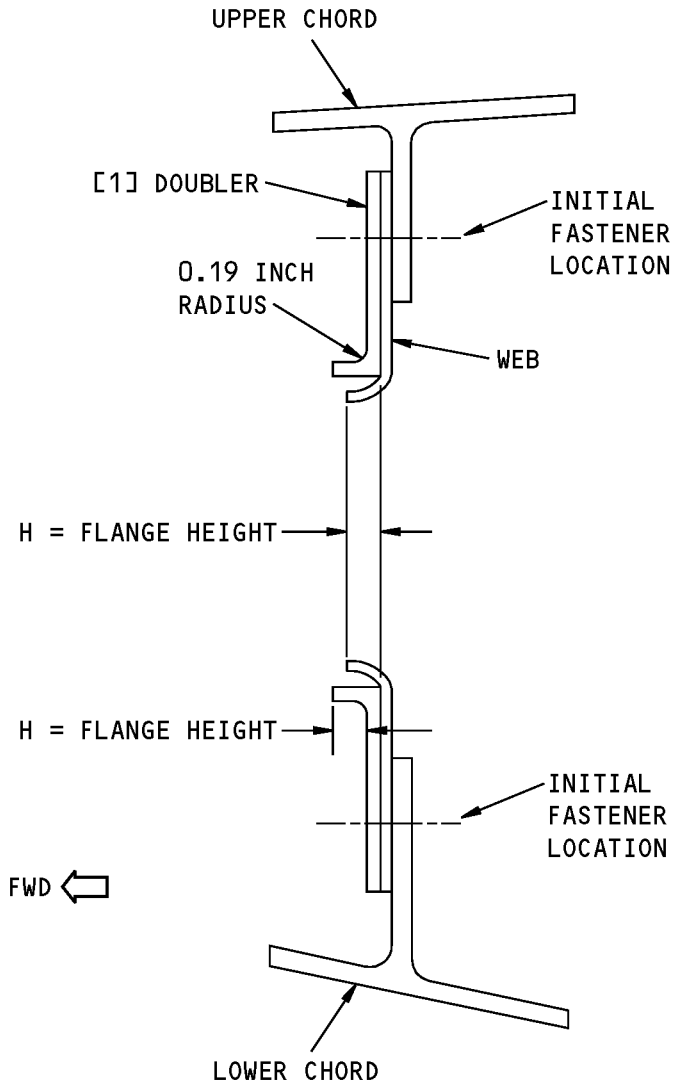
-✦- REPAIR FASTENER LOCATION. INSTALL A BACB30VT8K() OR BACB30FM8A() HEX DRIVE BOLT. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Horizontal Stabilizer Front Spar Web Repair
Figure 202 (Sheet 1 of 3)



REPAIR SHOWN WITH THE BEST FLANGE FOR THE DOUBLER
A-A

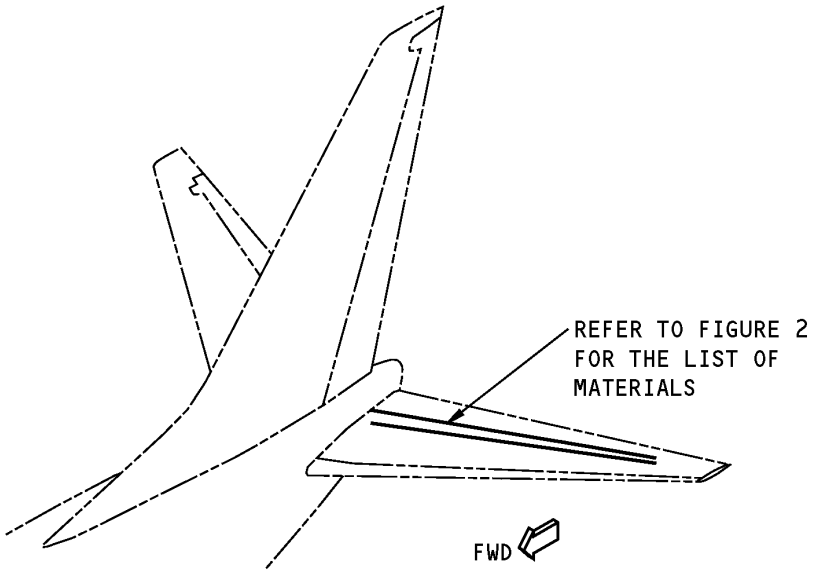
Horizontal Stabilizer Front Spar Web Repair
Figure 202 (Sheet 2 of 3)



REPAIR SHOWN WITH OPTIONAL MACHINED DOUBLER
A-A

Horizontal Stabilizer Front Spar Web Repair
Figure 202 (Sheet 3 of 3)

IDENTIFICATION 1 - HORIZONTAL STABILIZER BEAM

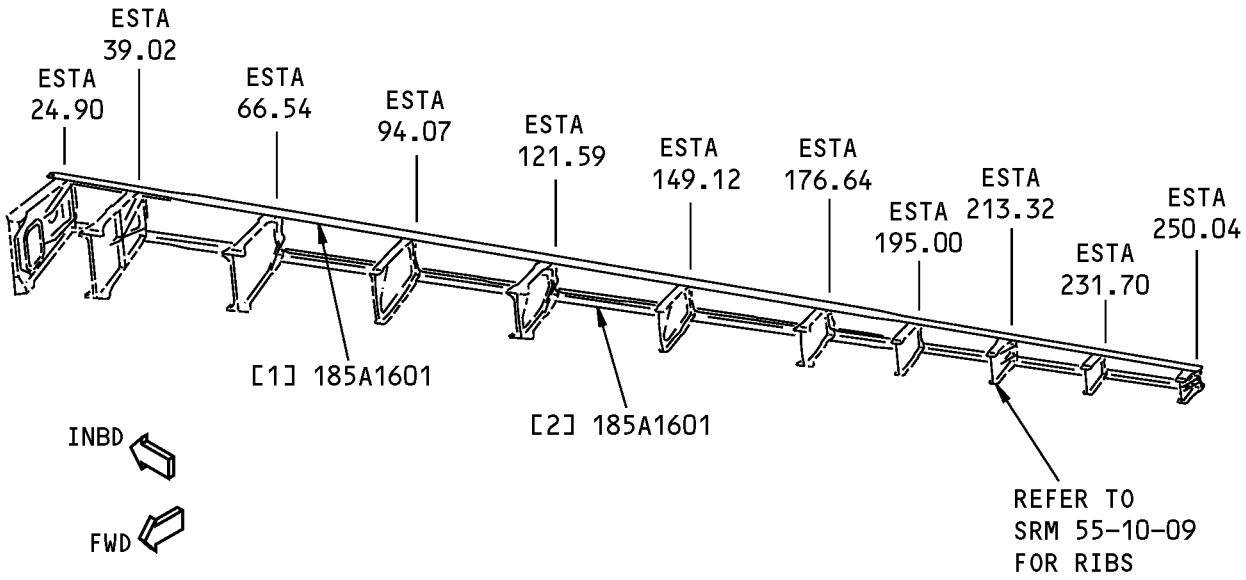


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Beam Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A0001	Trailing Edge Functional Collector - Left, Horizontal Stabilizer
185A0002	Trailing Edge Functional Collector - Right, Horizontal Stabilizer
185A1600	Beam Installation - Trailing Edge, Horizontal Stabilizer



THE LEFT HORIZONTAL STABILIZER BEAM IS SHOWN,
THE RIGHT HORIZONTAL STABILIZER BEAM IS OPPOSITE

NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

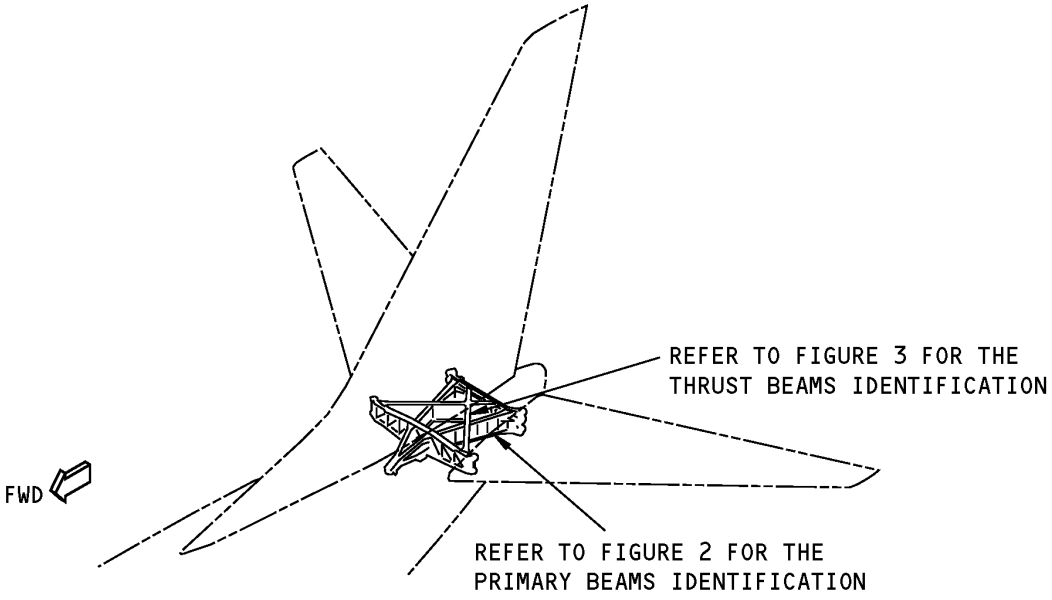
Horizontal Stabilizer Beam Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Upper Beam Assembly			
	Upper Beam		BAC1506-4398 7075-T73511 extrusion as given in QQ-A-200/11	Cum Line numbers 1 thru 215
	Upper Beam (Angle)		7050-T7451 plate as given in AMS 4050	
	Upper Beam Assembly Upper Beam		BAC1506-4398 7075-T73511 extrusion as given in QQ-A-200/11	Cum Line numbers 216 and on
	Upper Beam (Angle)		7050-T7451 plate as given in AMS 4050	
[2]	Lower Beam Assembly			
	Lower Beam		BAC1506-4398 7075-T73511 extrusion as given in QQ-A-200/11	Cum Line numbers 1 thru 215
	Lower Beam (Angle)		7050-T7451 plate as given in AMS 4050	
	Lower Beam		7050-T7451 plate as given in BMS 7-323	Cum Line numbers 216 and on

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - HORIZONTAL STABILIZER CENTER SECTION BEAMS



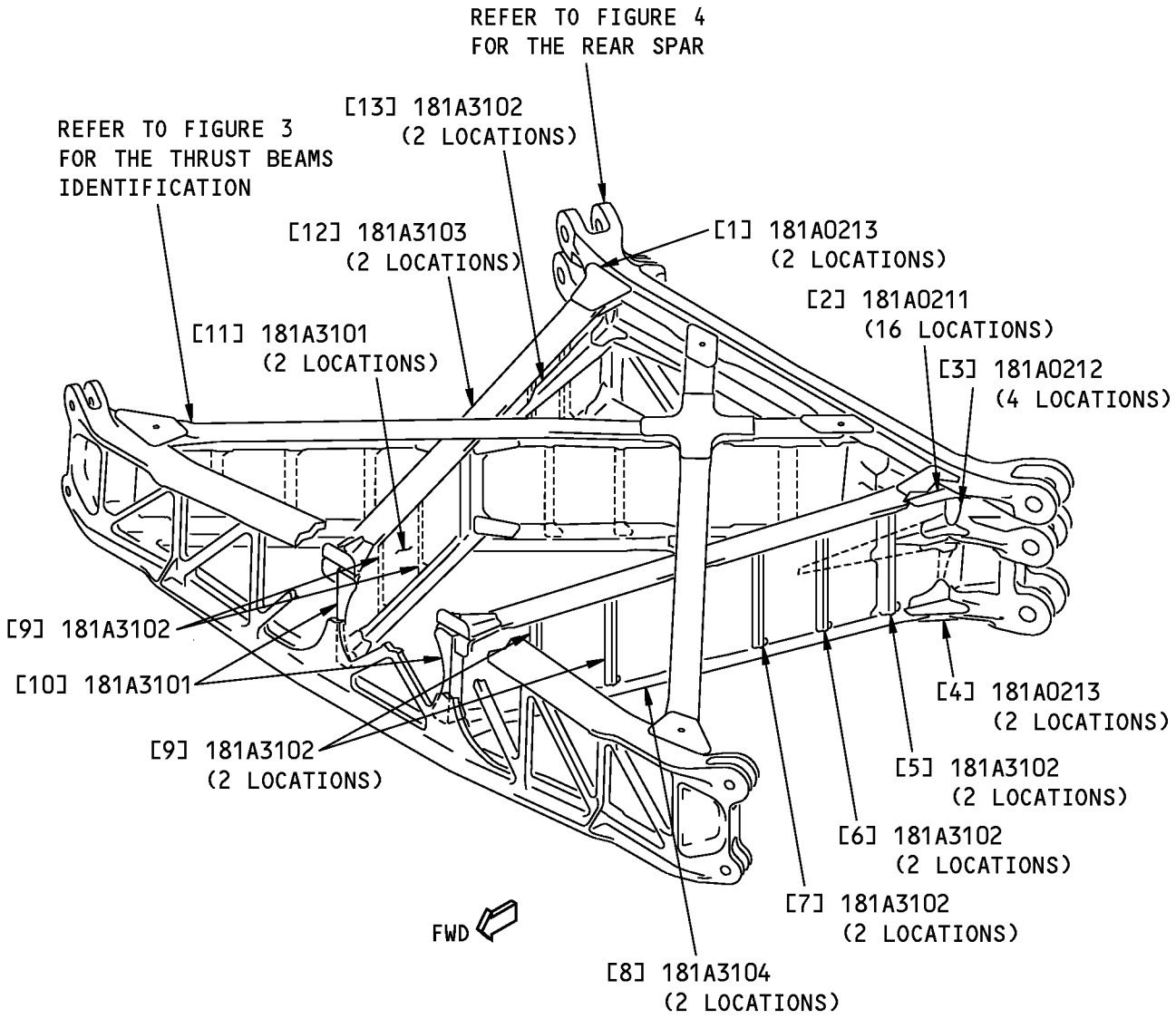
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Center Section Beam Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
181A3000	Beam Installation - Center Section Horizontal Tail
181A3101	Sheet Metal Details - Primary Beam, Center Section Horizontal Tail
181A3102	Extruded Details - Primary Beam, Center Section Horizontal Tail
181A3103	Upper Chord - Primary Beam, Center Section Horizontal Tail
181A3104	Lower Chord - Primary Beam, Center Section Horizontal Tail
181A3201	Sheet Metal Details - Thrust Beam Center Section Horizontal Tail

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
181A3202	Extruded Details - Thrust Beam, Center Section Horizontal Tail
181A3203	Chords - Thrust Beam, Center Section Horizontal Tail



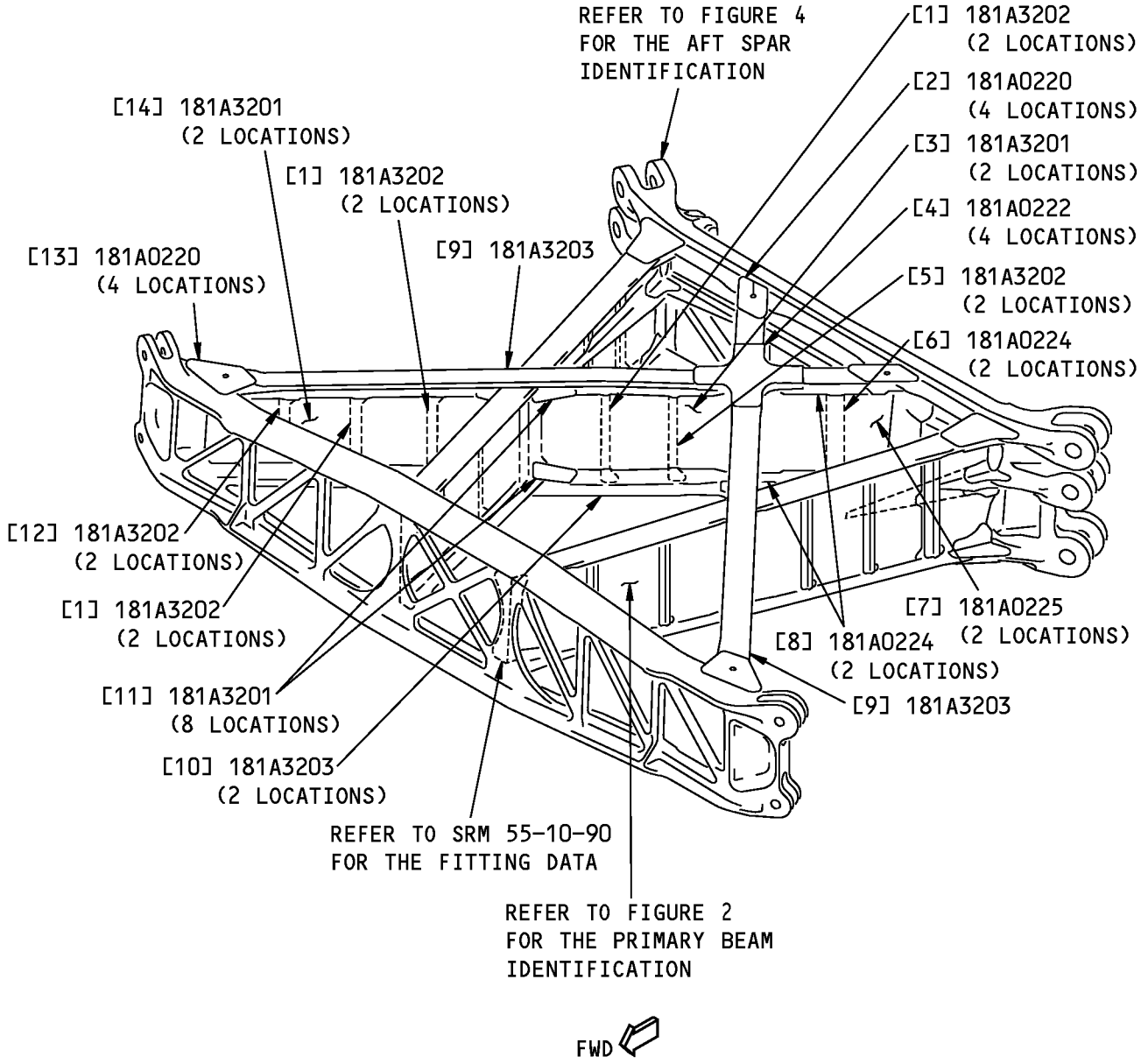
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Center Section Primary Beams Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Upper Gusset (2)	0.312 (7.92)	7075-T7351 machined plate as given in QQ-Q-250/12. Refer to the production drawing for the machined thicknesses	
[2]	Splice Angle (16)		BAC1514-3163 7075-T73511 extrusion, as given in QQ-A-200/11. Refer to the production drawing for machined thicknesses	
[3]	Splice Plate (4)	0.160 (4.64)	7075-T6 sheet as given in QQ-A-250/13	
[4]	Lower Gusset (2)	0.160 (4.64)	7075-T6 sheet as given in QQ-A-250/12	
[5]	Stiffener (2)		BAC1505-101411 7075-T6511 extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[6]	Stiffener (2)		BAC1505-100101 7075-T6511 extrusion as given in QQ-A-200/11. Refer to the production drawing for machined thicknesses	
[7]	Stiffener (2)		BAC1505-101579 7075-T6511 extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[8]	Lower Chord (2)		BAC1505-101216 7075-T73511 extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[9]	Stiffener (4)		BAC1505-1011184 7075-T6511 extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[10]	Attach Angle (2)	0.080 (2.03)	7075-T62 clad sheet as given in QQ-A-250/12	
[11]	Web (2)	0.090 (2.29)	7075-T6 sheet as given in QQ-A-250/12. Refer to the production drawing for the chem-milled thicknesses	
[12]	Upper Chord (2)		BAC1505-101216 7075-T73511 extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[13]	Splice Chord		7075-T73511 bar as given in QQ-A-200/11, Class A. Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thicknesses in inches (millimeters).



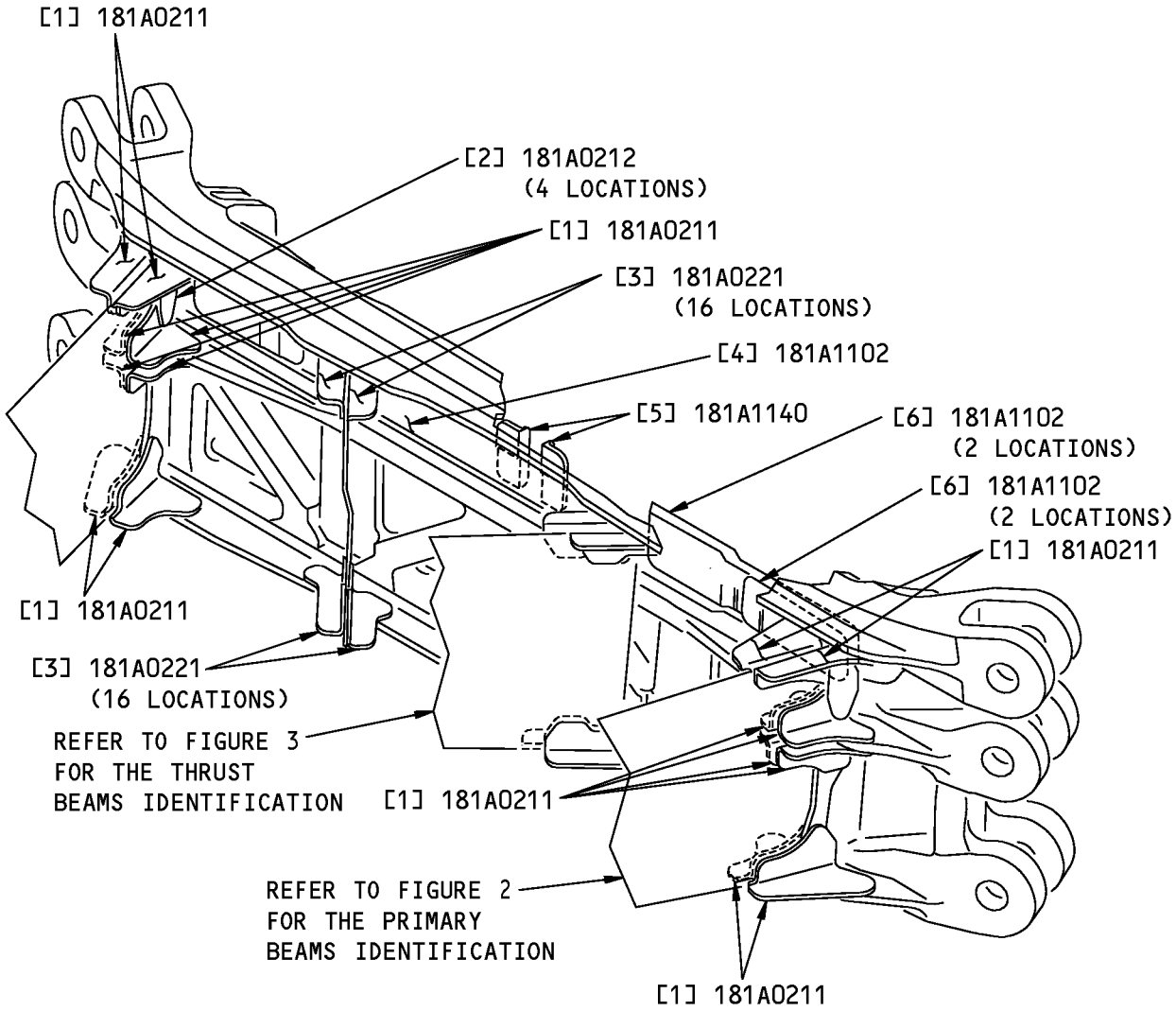
NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Center Section Thrust Beams Identification
Figure 3

Table 3:

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Stiffener (2)		BAC1505-100542 7075-T73511 extrusion as given in QQ-A-200/11	
[2]	Gusset, Upper/Lower (4)		7075-T6 machined sheet as given QQ-A-250/12. Refer to the production drawing for the machined thicknesses	
[3]	Web	0.050 (1.27)	7075-T6 clad sheet as given in QQ-A-250/13	
[4]	Splice Plate (16)		7075-T7351 machined plate as given in QQ-A-250/12. (Optional: 7075-T73511, Class A machined bar. Refer to to the production drawing for the machined thicknesses)	
[5]	Stiffener		BAC1505-100027 7075-T73511 extrusion as given in QQ-A-200/11	
[6]	Stiffener		AND10136-1501 7075-T73511 extrusion as given in QQ-A-200/11	
[7]	Web	0.063 (1.60)	7075-T6 chem-milled sheet as given in QQ-A-250/12. Refer to the production drawing for the chem-milled thicknesses	
[8]	Chord, Upper/Lower (4)		BAC15005-100587 7075-T73511 as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[9]	Chord, Upper (2)		BAC1505-100694 7075-T73511 machined extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[10]	Chord, Lower (2)		BAC1506-3612 7075-T73511 machined extrusion as given in QQ-A-200/11. Refer to the production drawing for the machined thicknesses	
[11]	Gusset (3)	0.125 (3.18)	7075-T6 clad sheet as given in QQ-A-250/13	
[12]	Stiffener		AND10136-1608 7075-T73511 extrusion as given in QQ-A-200/11	
[13]	Forward Gusset (4)		7075-T6 machined sheet as given QQ-A-250/12. Refer to the production drawing for the machined thicknesses	
[14]	Web	0.080 (2.03)	7075-T6 chem-milled sheet as given in QQ-A-250/12. Refer to the production drawing for the chem-milled thicknesses	

*[1] Note: T = Pre-manufactured thicknesses in inches (millimeters).



Horizontal Stabilizer Center Section Aft Spar Identification
Figure 4

Table 4:

LIST OF MATERIALS FOR FIGURE 4				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Splice Angle (16)		BAC1514-3163 7075-T73511 extrusion as given in QQ-A-200/11. Refer to the production drawing for machined thicknesses	
[2]	Splice Plate (4)	0.160 (4.64)	7075-T6 sheet as given in QQ-A-250/13	
[3]	Splice Plate (16)		7075-T7351 machined plate as given in QQ-A-250/12. (Optional: 7075-T73511, Class A machined bar. Refer to to the production drawing for the machined thicknesses)	
[4]	Web Splice		Ti-6Al-4V machined titanium plate as given in MIL-T-9046, Code AB-1, annealed. Refer to the production drawing for the machined thicknesses	
[5]	Shear Tie		BAC1514-1081 7075-T73511 extrusion as given in QQ-A-200/11	
[6]	Reinforcing Plate LH/RH (4)		Ti-6Al-4V machined titanium plate as given in MIL-T-9046, Code AB-1, annealed. Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thicknesses in inches (millimeters).

ALLOWABLE DAMAGE 1 - HORIZONTAL STABILIZER TRAILING EDGE BEAMS

1. Applicability

A. This subject gives the allowable damage limits for the horizontal stabilizer trailing edge beams shown in Horizontal Stabilizer Beam Location, Figure 101/ALLOWABLE DAMAGE 1 and Horizontal Stabilizer Beam Locations, Figure 102/ALLOWABLE DAMAGE 1.

2. General

A. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

B. After you remove the damage, do the procedures that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

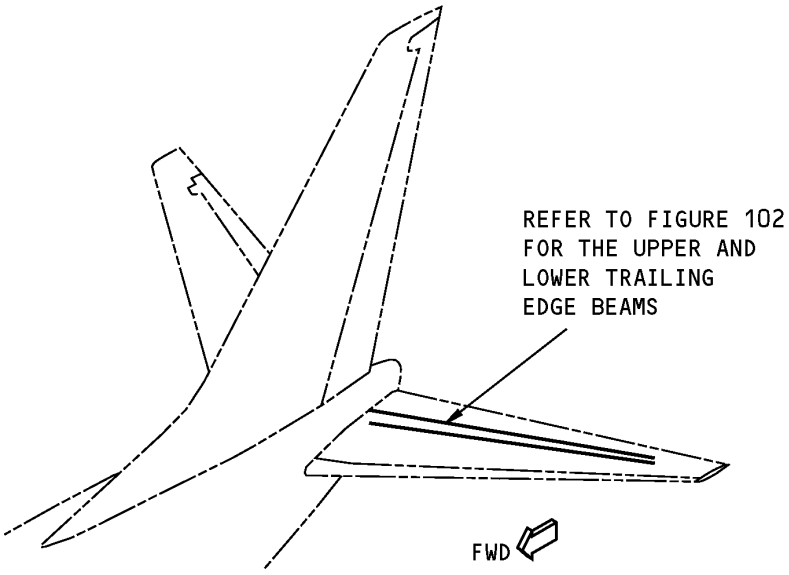
(1) Flap peen or shot peen the surfaces of the beams if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

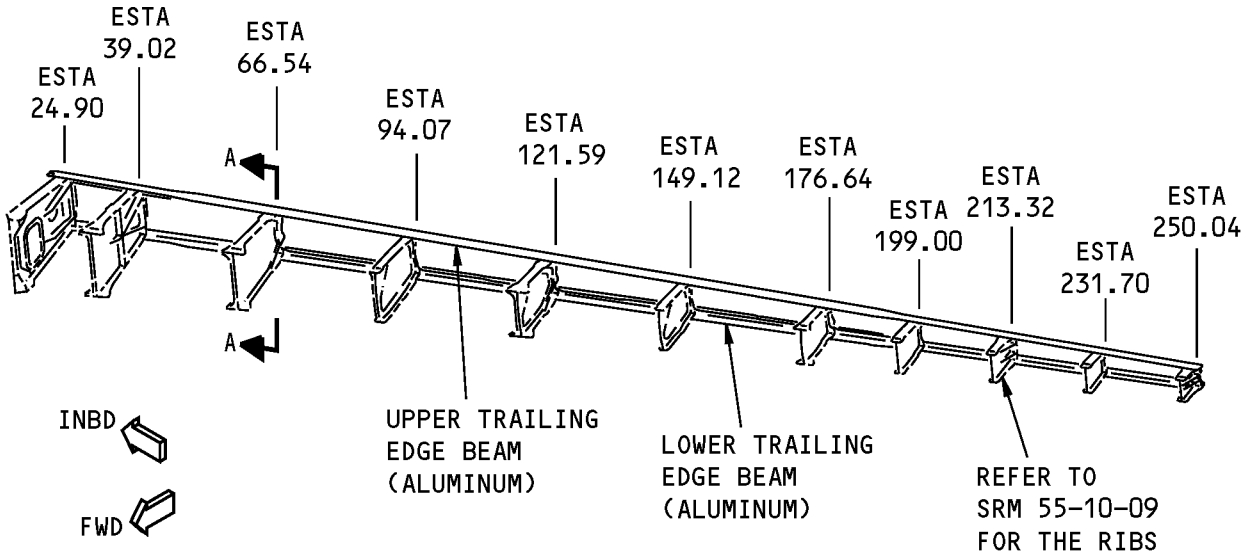
(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the bare surfaces of the reworked areas of the beams. Refer to 51-20-01.

(3) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the beams. Refer to SOPM 20-41-02.

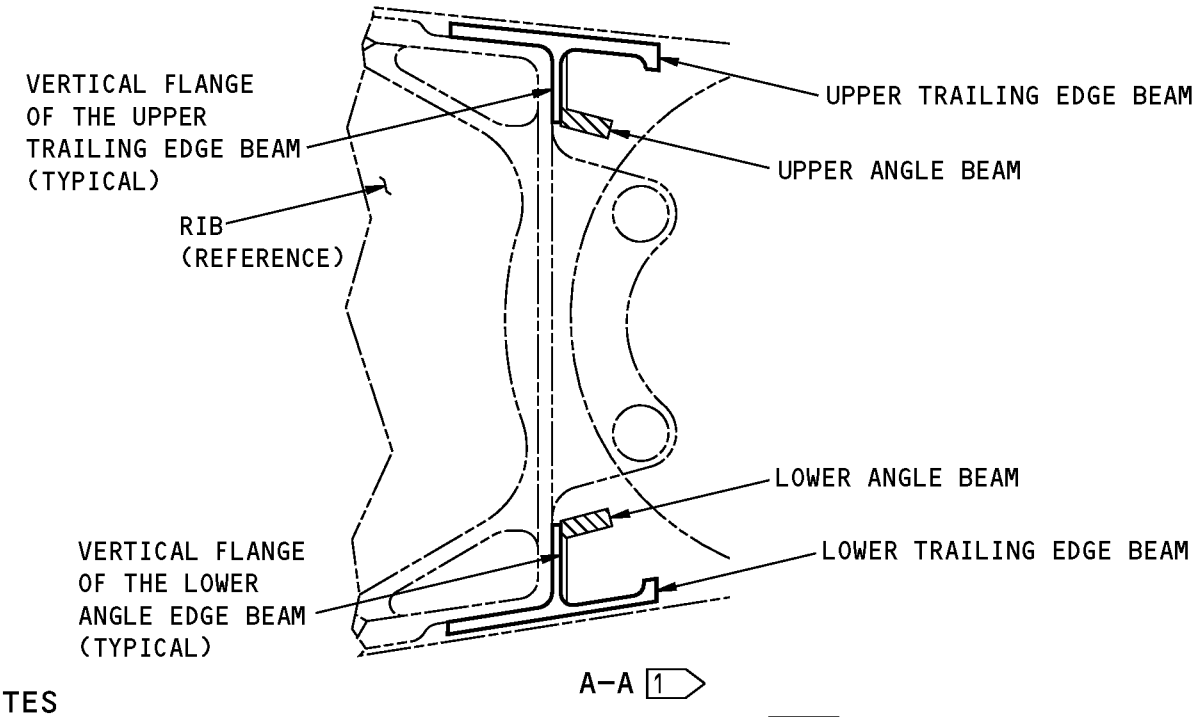


Horizontal Stabilizer Beam Location
Figure 101



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

HORIZONTAL STABILIZER BEAMS



NOTES

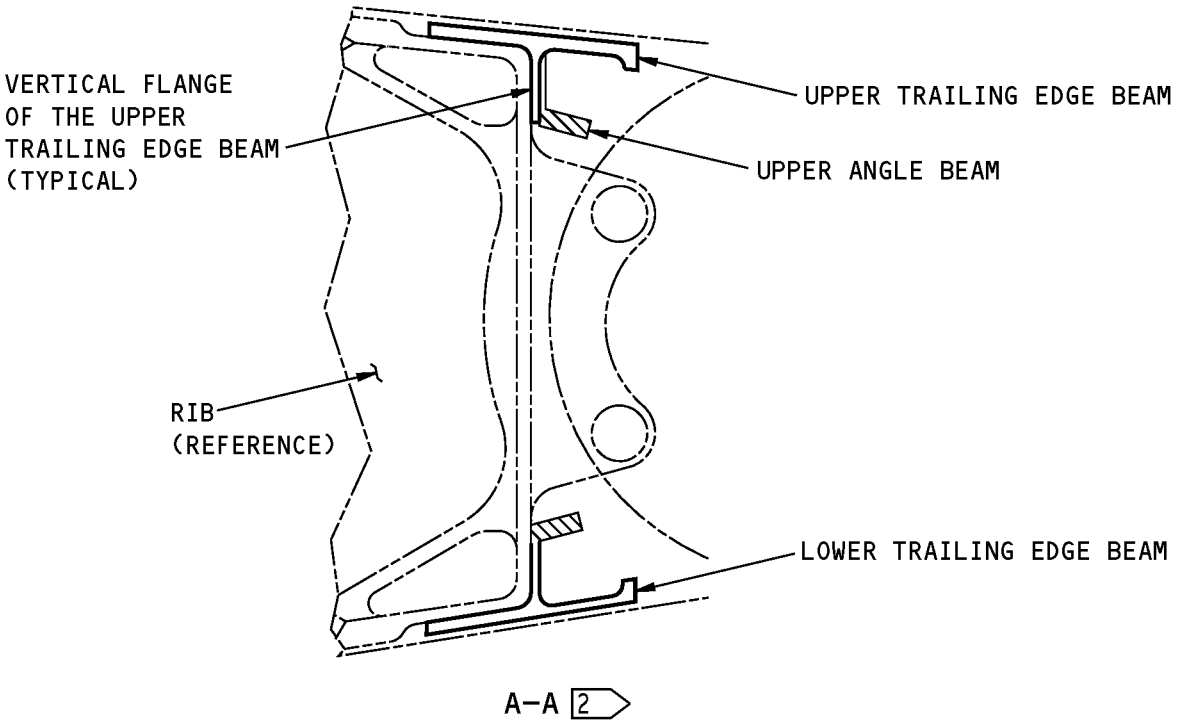
1 FOR CUM LINE NUMBERS 1 THRU 215

2 FOR CUM LINE NUMBERS 216 AND ON

ZONE 1

ZONE 2

Horizontal Stabilizer Beam Locations
Figure 102 (Sheet 1 of 2)



Horizontal Stabilizer Beam Locations
Figure 102 (Sheet 2 of 2)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Allowable Damage Limits

A. Zone 1

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, E, and F.

1) The removal of damage, as shown in Details C and F, is permitted for the vertical flange only if:

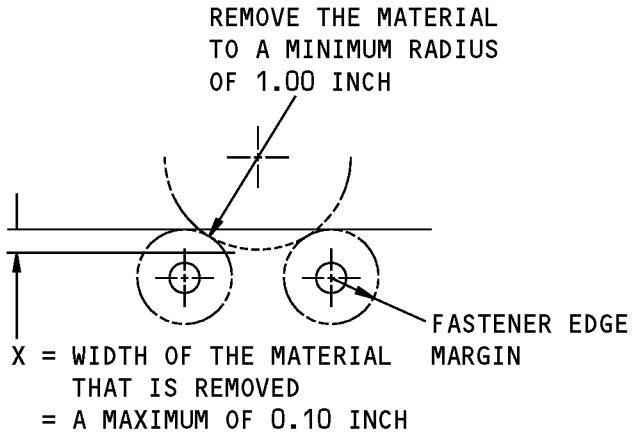
a) There is no removal of damage, as shown in Details C and F, from the aft or forward flange at the same section.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Detail D.

(4) Holes and Punctures are not permitted.

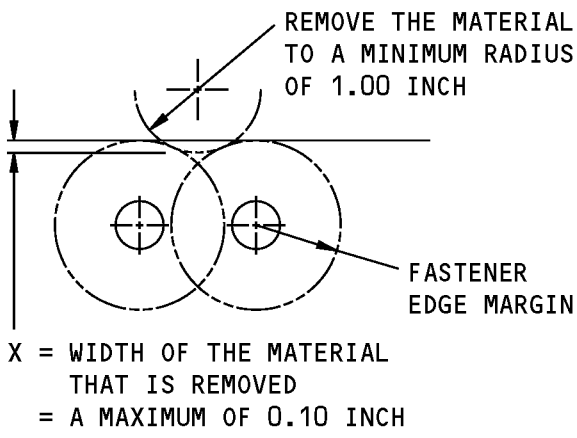
B. Zone 2

(1) Damage is not permitted.



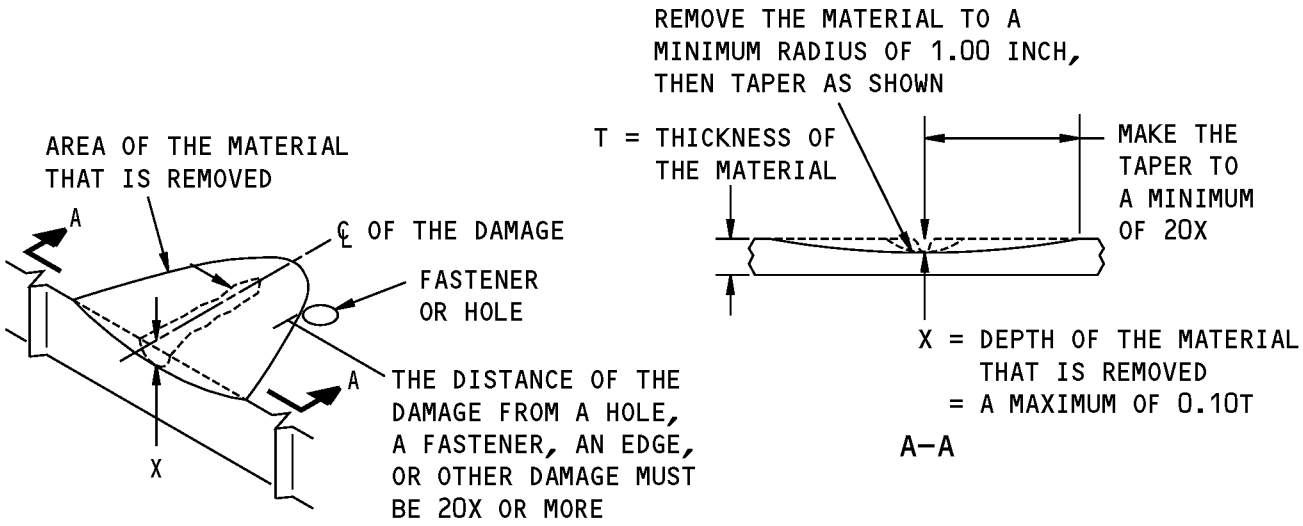
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

(A)



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

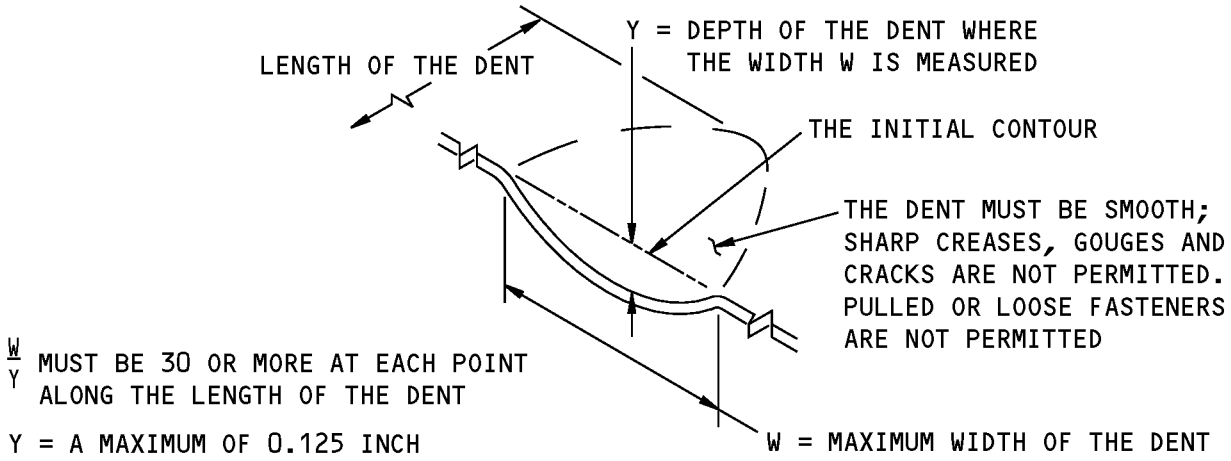
(B)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

(C)

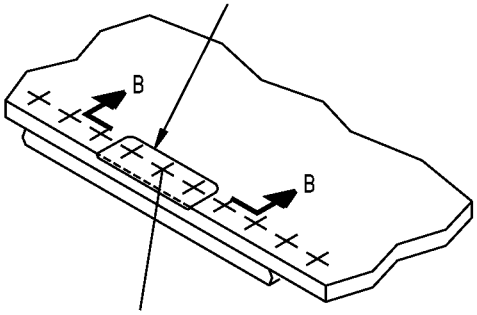
Allowable Damage Limits
Figure 103 (Sheet 1 of 3)



DENT THAT IS PERMITTED

D

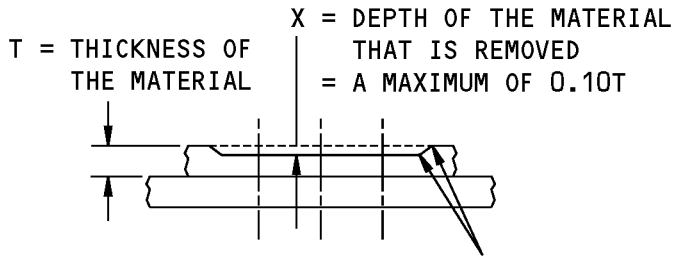
THE REMOVAL OF MATERIAL AROUND THREE FASTENERS IN ALL GROUPS OF TEN IS PERMITTED TO A MAXIMUM DEPTH OF X



REMOVE THE FASTENERS BEFORE THE DAMAGE IS REMOVED. INSTALL THE FASTENERS AFTER THE DAMAGE IS REMOVED

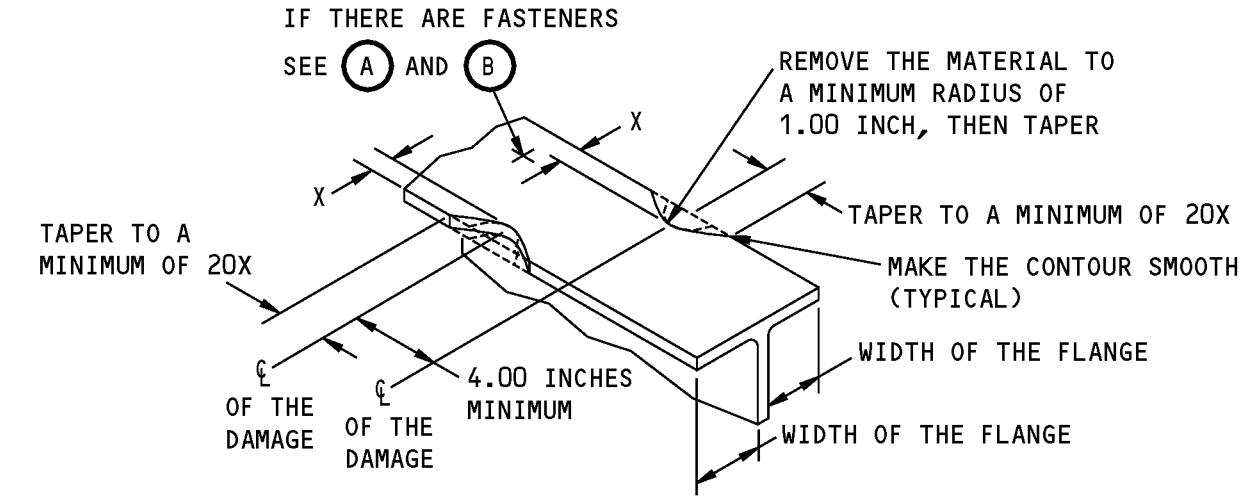
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E



B–B

Allowable Damage Limits
Figure 103 (Sheet 2 of 3)



X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

F

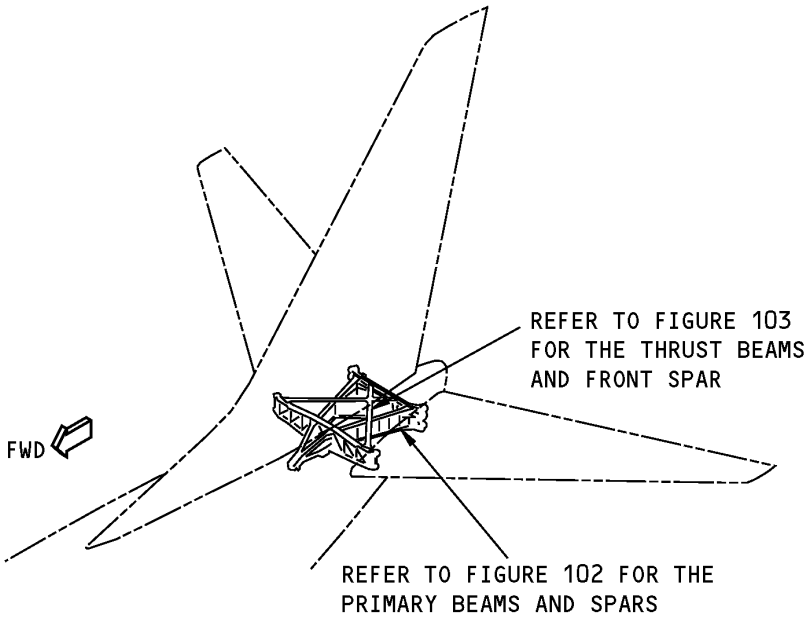
Allowable Damage Limits
Figure 103 (Sheet 3 of 3)

ALLOWABLE DAMAGE 2 - HORIZONTAL STABILIZER CENTER SECTION

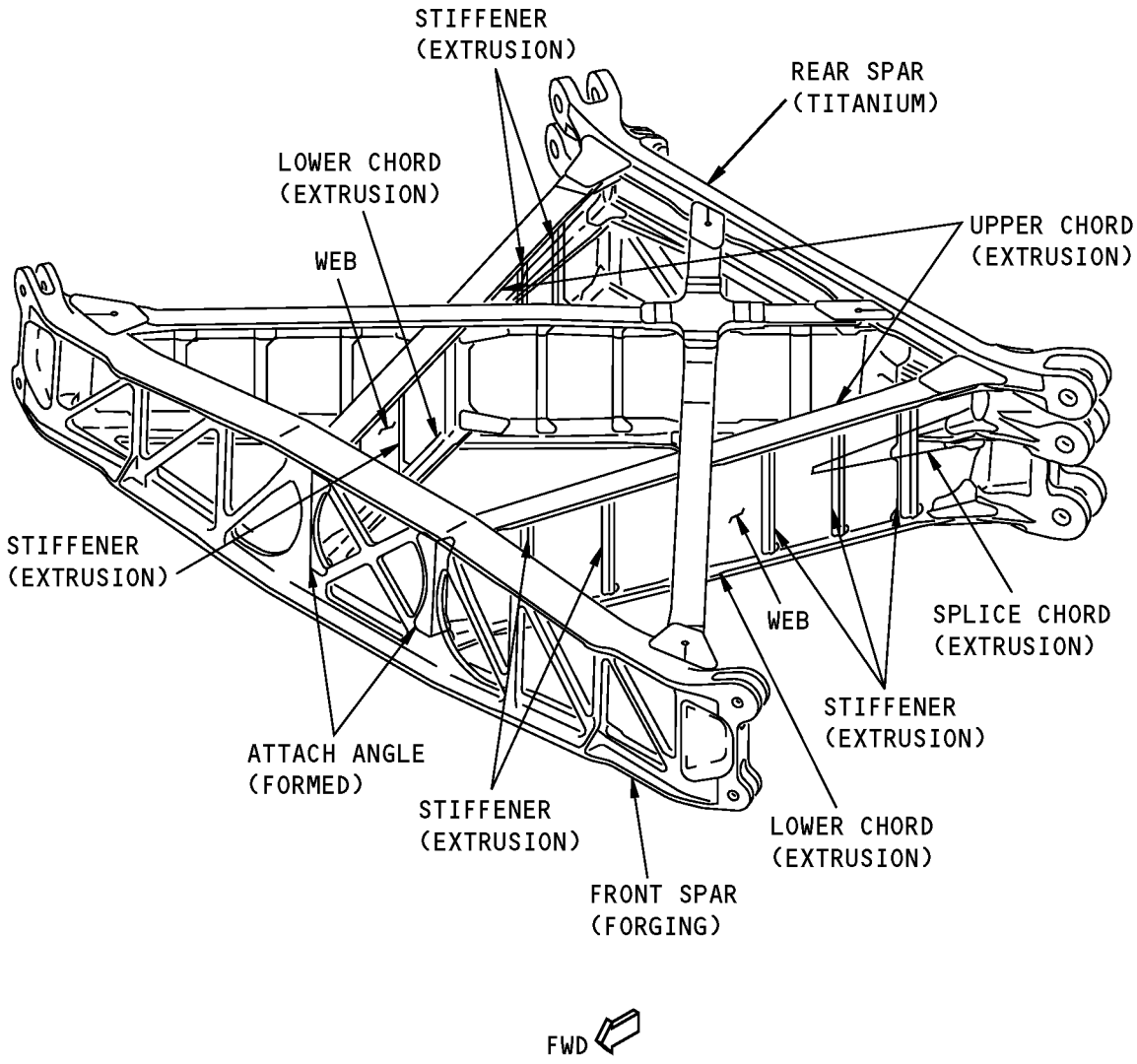
1. Applicability

A. This subject gives the allowable damage limits for the center section beams and front spar shown in Horizontal Stabilizer Center Section Location, Figure 101/ALLOWABLE DAMAGE 2.

B. Contact The Boeing Company for damage to the rear spar chord.

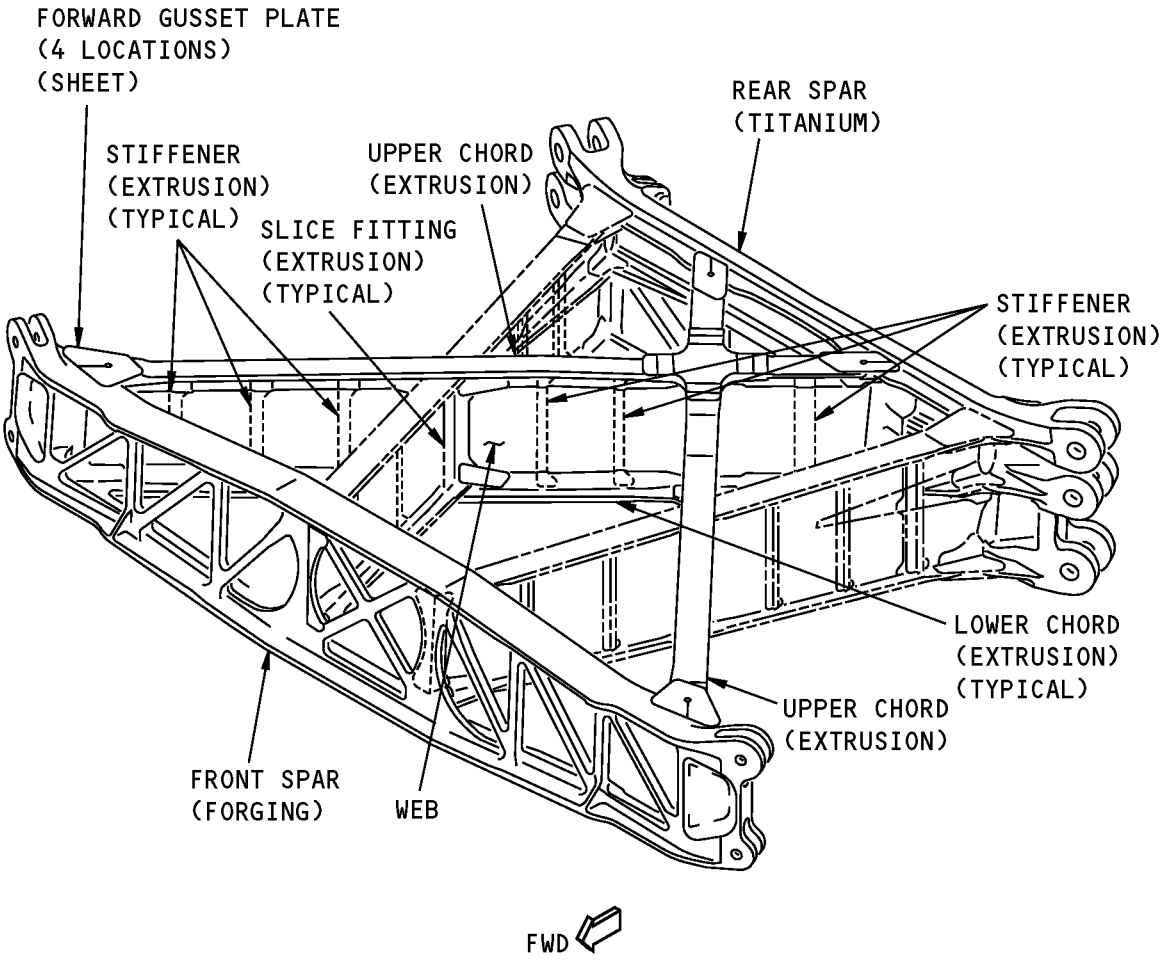


Horizontal Stabilizer Center Section Location
Figure 101



NOTE: ALL PARTS OTHER THAN THE REAR SPAR ARE MADE OF ALUMINUM.

Horizontal Stabilizer Center Section - Primary Beams
Figure 102



NOTE: ALL PARTS OTHER THAN THE REAR SPAR ARE MADE OF ALUMINUM.

Horizontal Stabilizer Center Section - Thrust Beams
Figure 103

2. General

A. Remove the damaged aluminum material as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) Make sure there is a surface smoothness of 63 microinches Ra or better on the damaged parts.

B. After you remove the damage, do the procedures that follow:

(1) Do a High Frequency Eddy Current (HFEC) or dye penetrant inspection to the damaged parts to make sure that all the damage is removed. Refer to 737 NDT Part 6, 51-00-00, Figure 4 .

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(2) Flap peen the reworked areas of the front spar chord and splice angles as given in SOPM 20-10-03 and 51-20-06.

C. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

D. Apply two layers of BMS 10-11, Type I, primer to the reworked areas. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
737 NDT Part 6, 51-00-00	Structures - General

4. Allowable Damage Limits

A. Front Spar Chord

(1) Cracks are not permitted.

(2) Nicks, Gouges, and Scratches:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Detail G.

NOTE: This only applies to damage caused by the sliding seal (part number 181A8004). If the cause of damage cannot be determined then contact The Boeing Company.

(3) Corrosion is not permitted.

(4) Dents are not permitted.

(5) Holes and Punctures are not permitted.

B. Attach Angles

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Forward Gusset Plates and Splice Angles

(1) Cracks are not permitted.

(2) Nicks, Gouges, and Scratches:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Detail G.

NOTE: This only applies to damage caused by the sliding seal (part number 181A8004). If the cause of damage cannot be determined then contact The Boeing Company.

(3) Corrosion is not permitted.

(4) Dents are not permitted.

(5) Holes and Punctures are not permitted.

D. Stiffeners

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A, B, and E.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are permitted as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Detail F.

E. Webs

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A, B, C, D, and E.

(b) Damage that does not go through the clad surface is permitted.

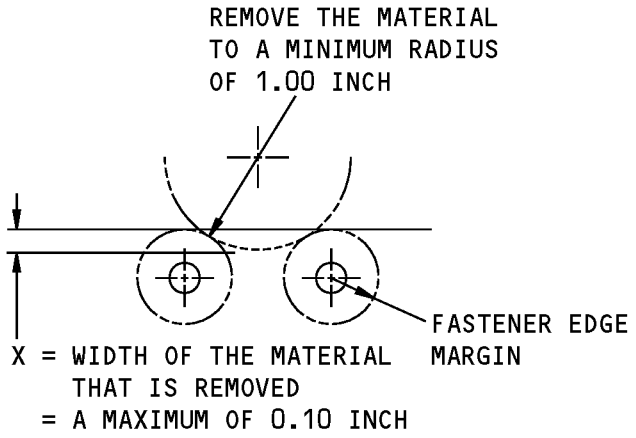
(3) Dents are not permitted.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 0.25 inch in diameter.

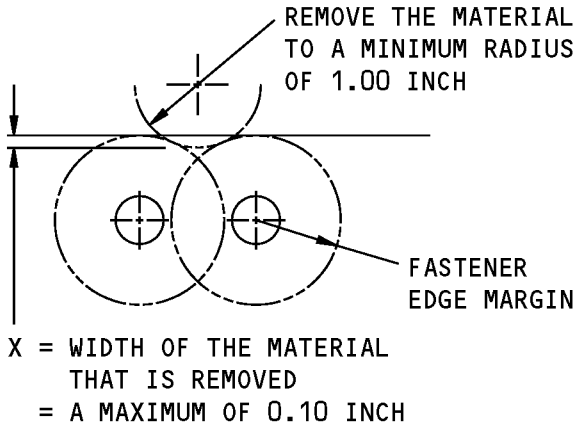
(b) A minimum of 4D (D = the diameter of the damage) away from a hole, other damage, or the part edge.

(c) Filled with a 2117-T3 or 2117-T4 aluminum rivet installed without sealant.



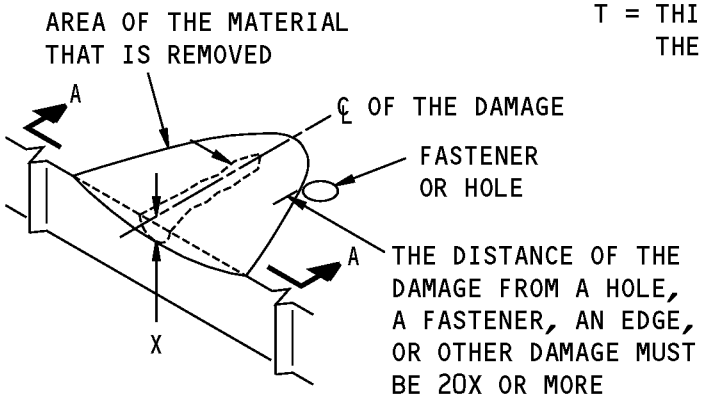
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

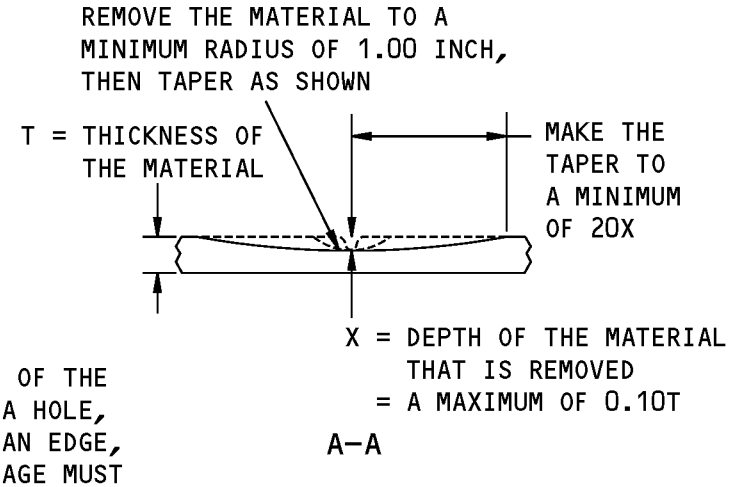
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

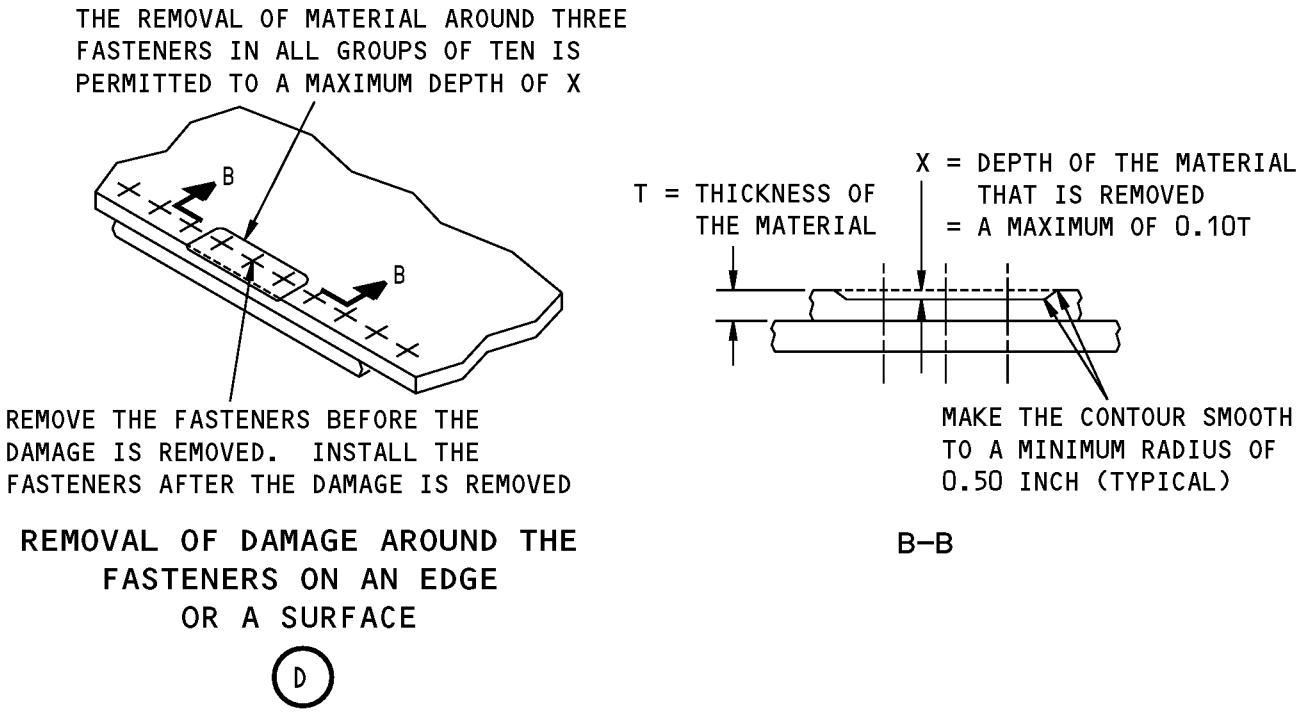




REMOVAL OF DAMAGED MATERIAL ON A SURFACE

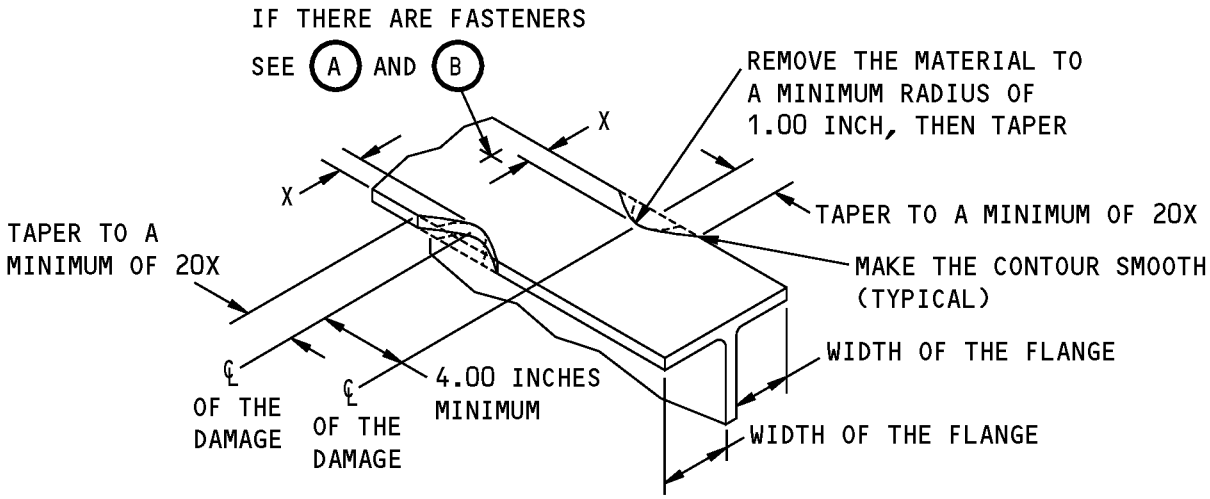
C

Allowable Damage Limits
Figure 104 (Sheet 1 of 4)



REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

D

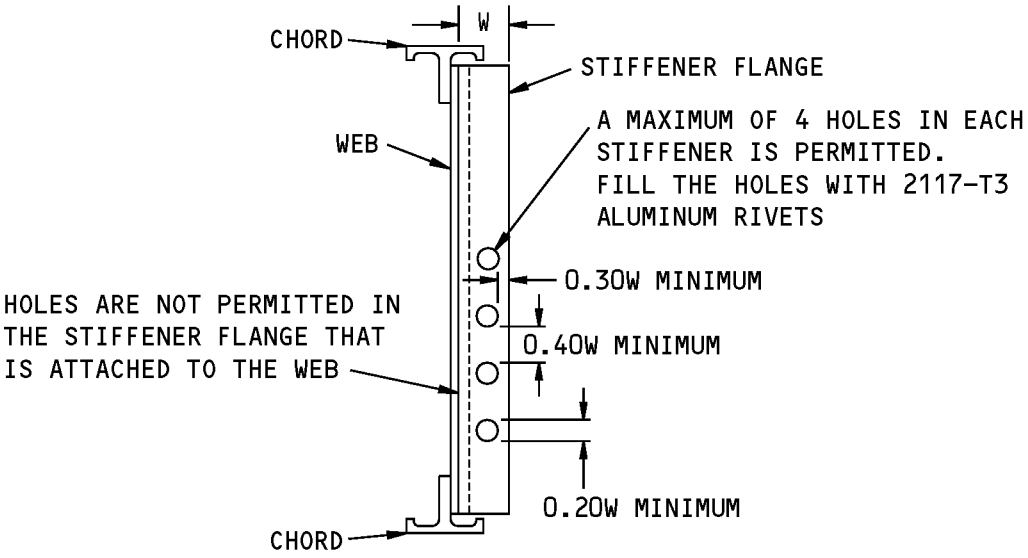


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

E

Allowable Damage Limits
Figure 104 (Sheet 2 of 4)

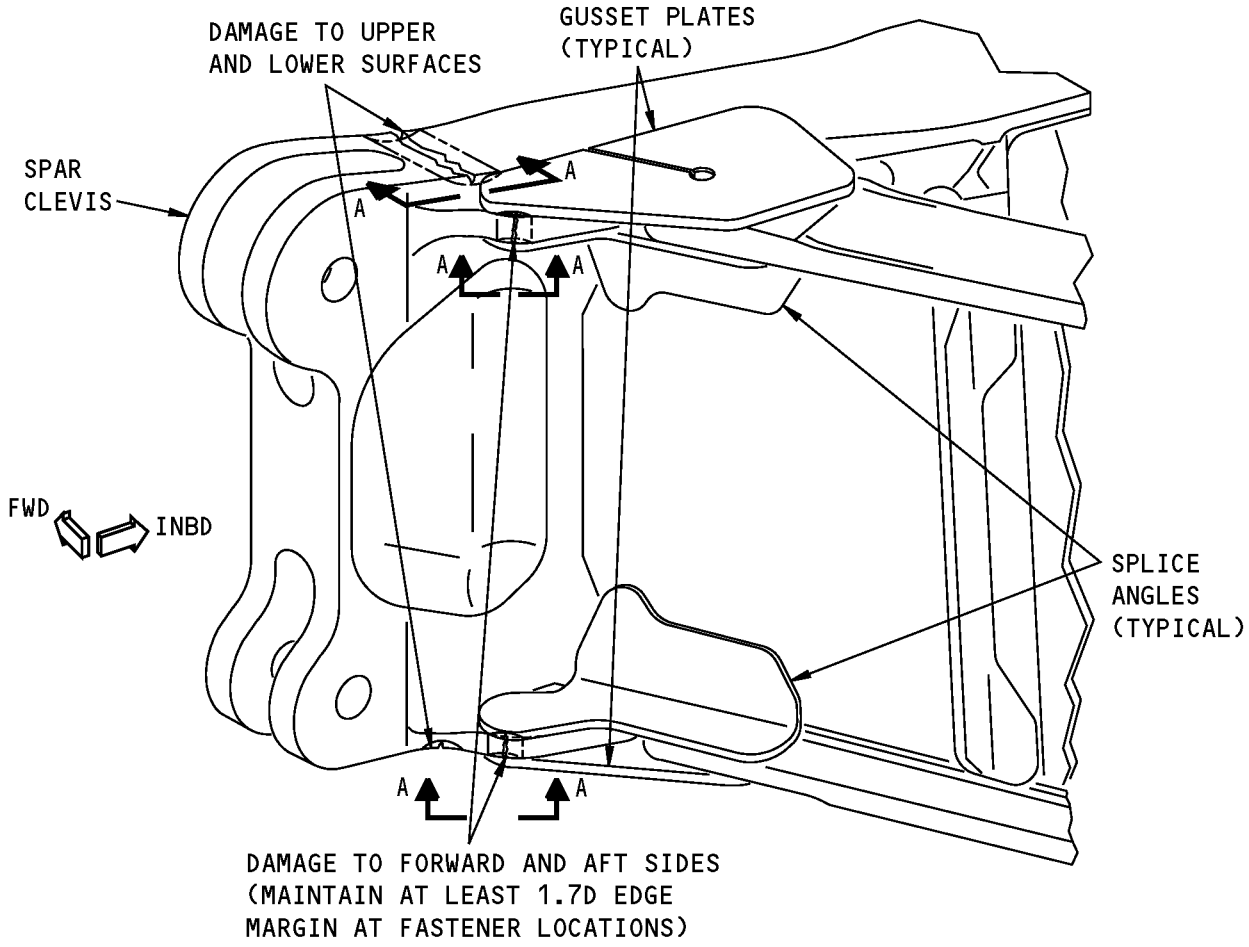


W = THE WIDTH OF THE STIFFENER FLANGE

HOLES THAT ARE PERMITTED TO REMOVE DAMAGED MATERIAL IN WEB STIFFENERS

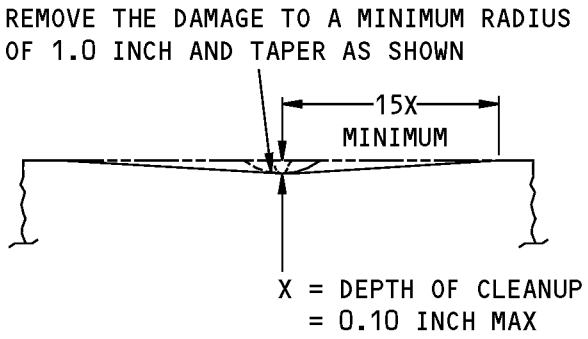
F

Allowable Damage Limits
Figure 104 (Sheet 3 of 4)



DAMAGE CLEANUP OF THE SPAR, GUSSETS AND SPLICE ANGLES AS SHOWN

(G)



SECTION A–A

Allowable Damage Limits
Figure 104 (Sheet 4 of 4)

REPAIR 1 - HORIZONTAL STABILIZER TRAILING EDGE BEAMS

1. Applicability

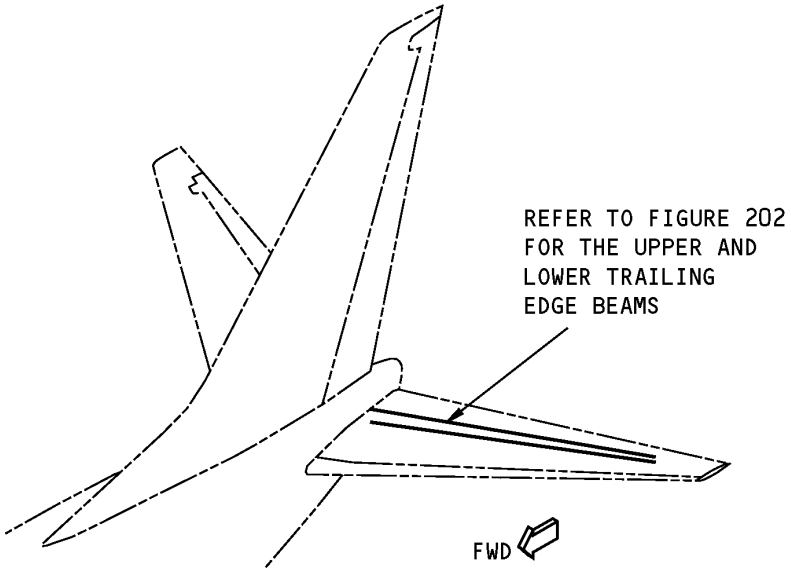
A. Repair 1 is applicable to damage to the trailing edge beams outboard of Elevator Station 176.64 as shown in Horizontal Stabilizer Beam Location, Figure 201/REPAIR 1 and Horizontal Stabilizer Beam Locations, Figure 202/REPAIR 1.

2. References

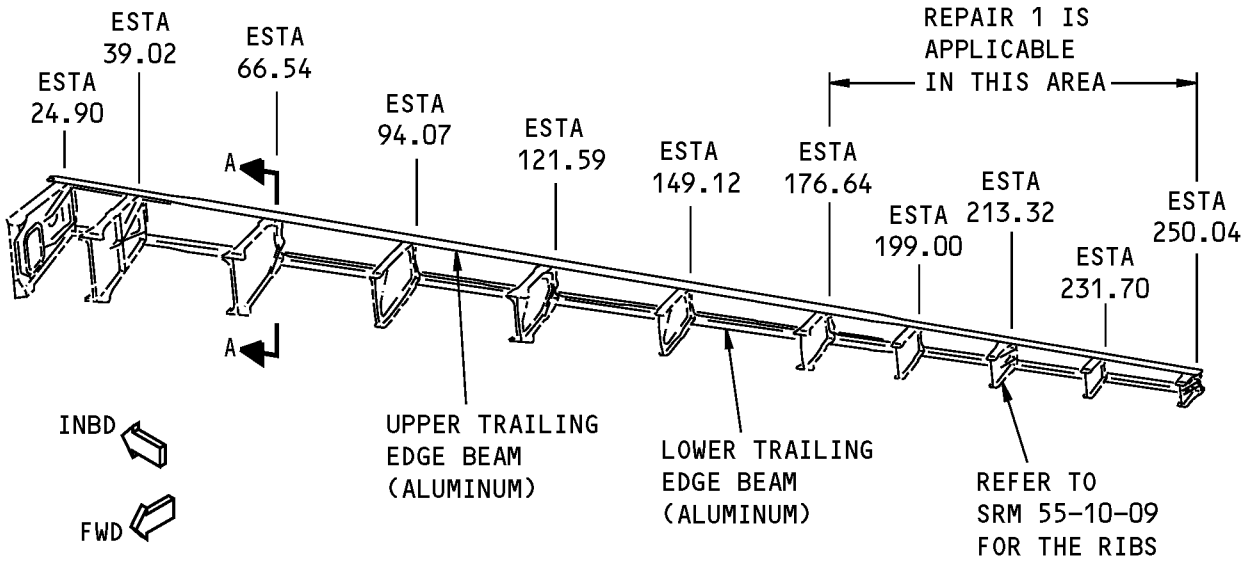
Reference	Title
51-70-12	EXTRUDED SECTION REPAIRS

3. Repair Instructions

A. Refer to 51-70-12 to repair the trailing edge beams outboard of Elevator Station 176.64.

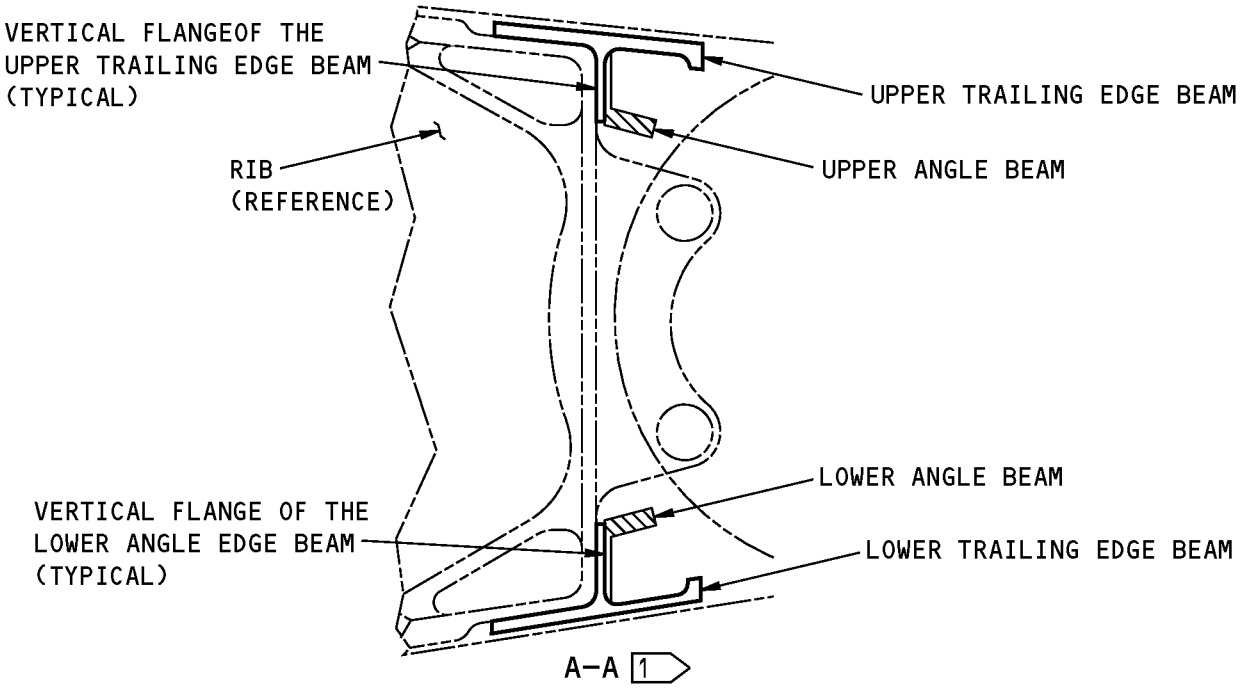


Horizontal Stabilizer Beam Location
Figure 201



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

HORIZONTAL STABILIZER BEAMS



NOTES

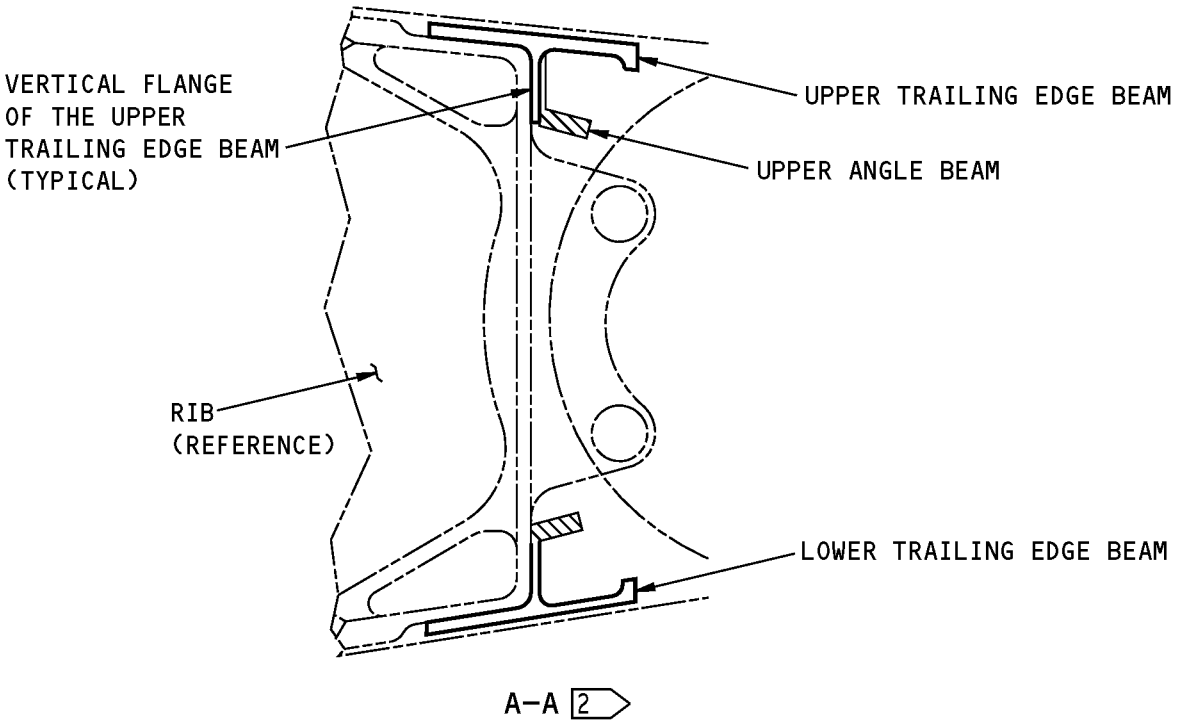
1 FOR CUM LINE NUMBERS 1 THRU 215

2 FOR CUM LINE NUMBERS 216 AND ON

ZONE 1 - REPAIR IS PERMITTED OUTBOARD OF ELEVATOR STA 176.64

ZONE 2 - REPAIR IS NOT PERMITTED

Horizontal Stabilizer Beam Locations
Figure 202 (Sheet 1 of 2)



Horizontal Stabilizer Beam Locations
Figure 202 (Sheet 2 of 2)

REPAIR 2 - HORIZONTAL STABILIZER CENTER SECTION BEAMS

1. Applicability

A. Repair 2 is applicable to damage to the center section beams shown in Horizontal Stabilizer Center Section Beam Location, Figure 201/REPAIR 2.

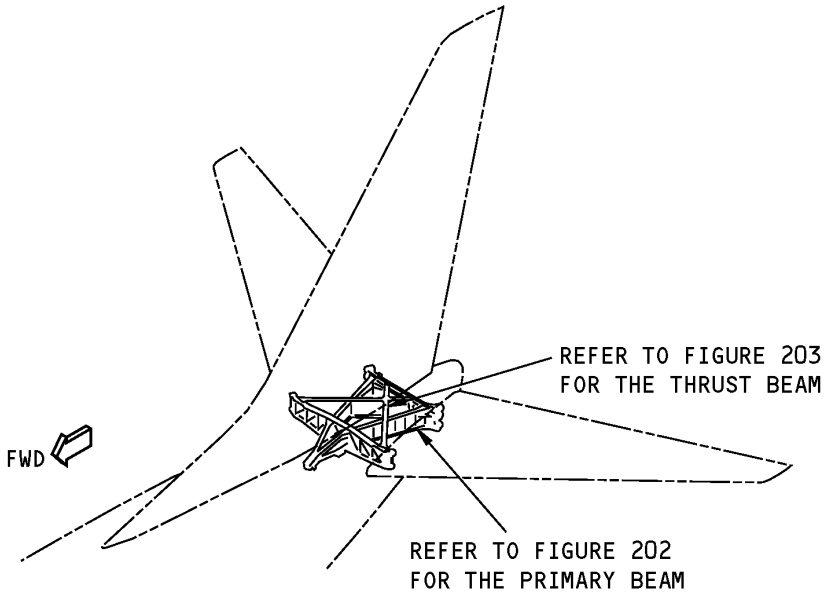
2. References

Reference	Title
51-70-11	TYPICAL FORMED SECTION REPAIRS
51-70-12	EXTRUDED SECTION REPAIRS

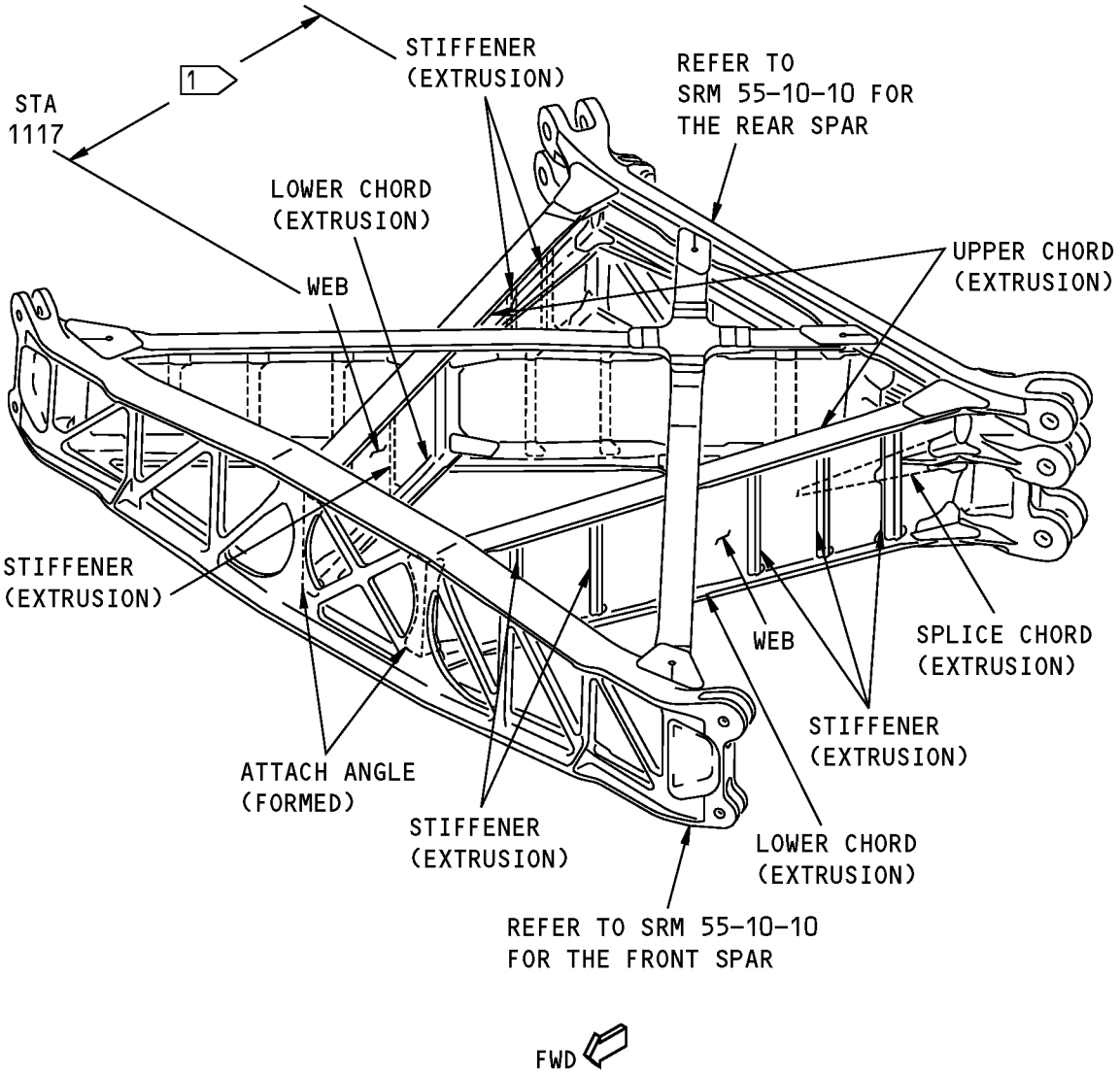
3. Repair Instructions

A. Refer to 51-70-11 to repair the formed parts.

B. Refer to 51-70-12 to repair the extruded parts.



Horizontal Stabilizer Center Section Beam Location
Figure 201

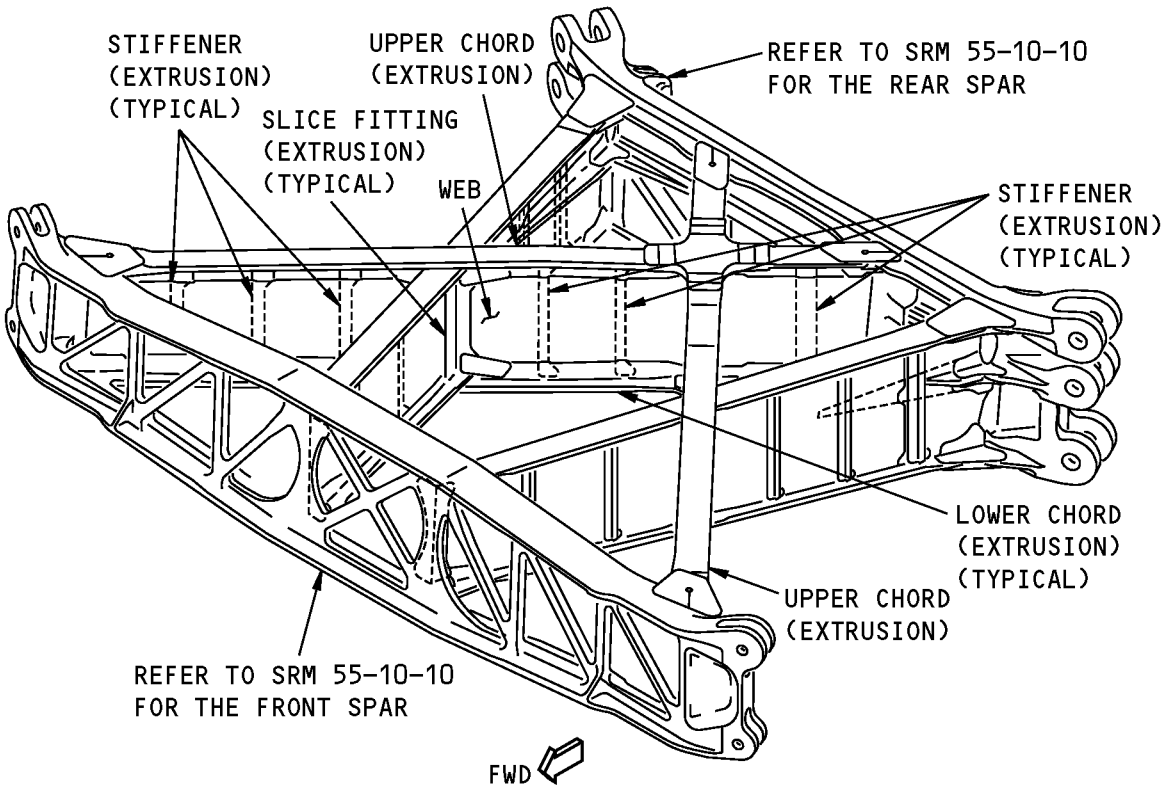


NOTES

- ALL PARTS ARE MADE FROM ALUMINUM.

1 FOR THE PRIMARY BEAMS, NO REPAIRS ARE PERMITTED TO THE UPPER OR LOWER CHORDS AFT OF STA 1117.

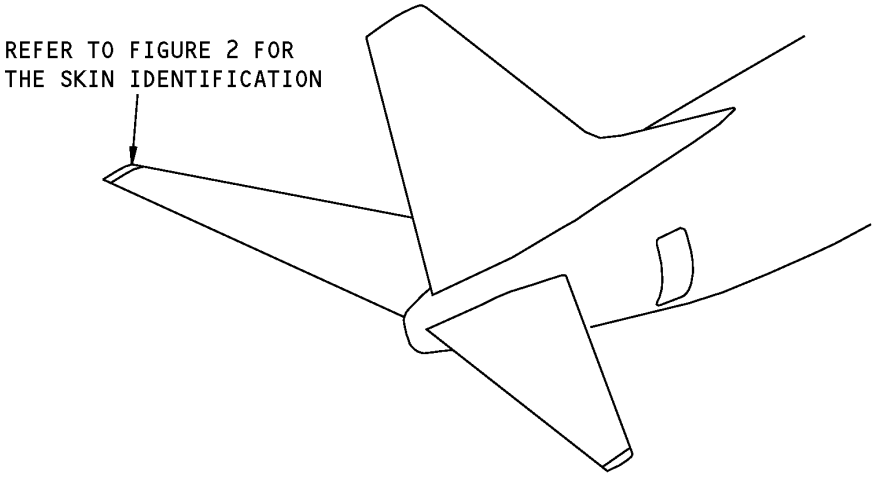
Horizontal Stabilizer Center Section - Primary Beams
Figure 202



NOTE: ALL PARTS ARE MADE OF ALUMINUM.

Horizontal Stabilizer Center Section - Thrust Beams
Figure 203

IDENTIFICATION 1 - HORIZONTAL STABILIZER TIP

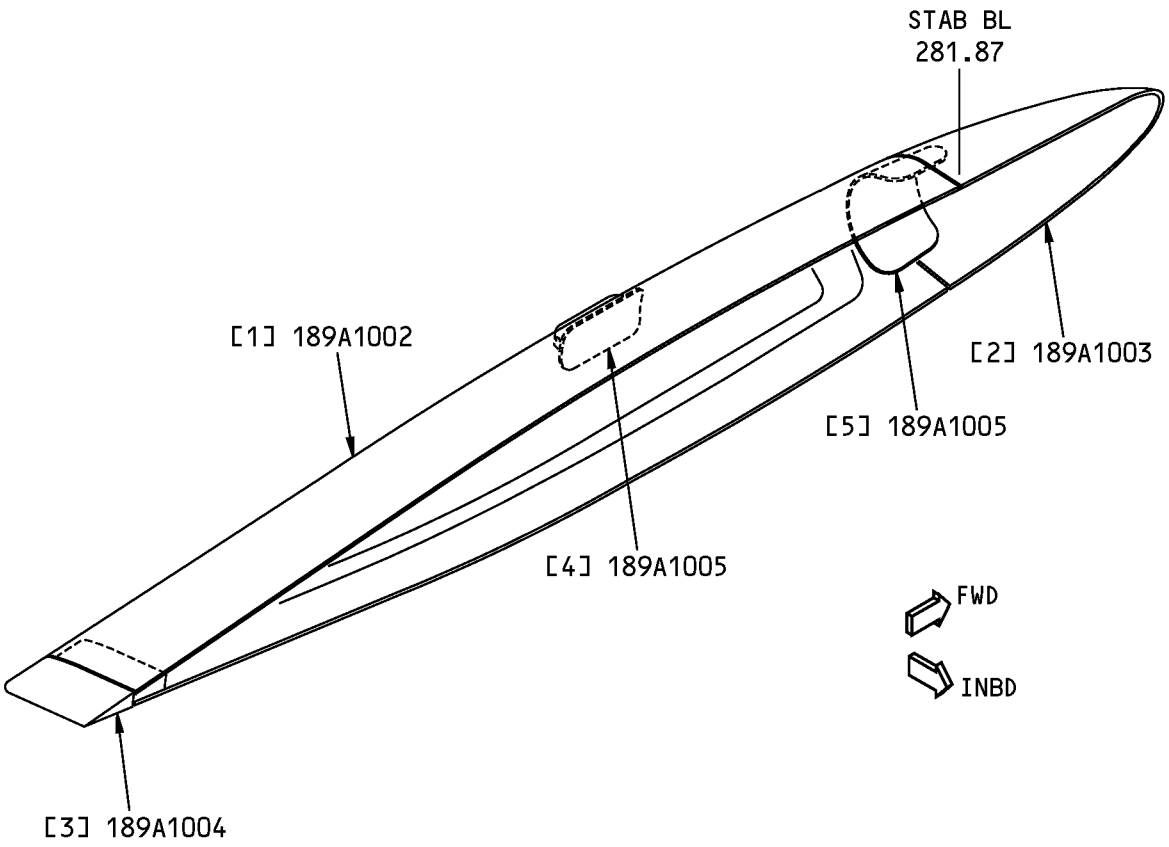


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Tip Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
186A0001	Left Horizontal Stabilizer Collector
186A0002	Right Horizontal Stabilizer Collector
189A1001	Tip Cap Installation/Assembly - Horizontal Stabilizer



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

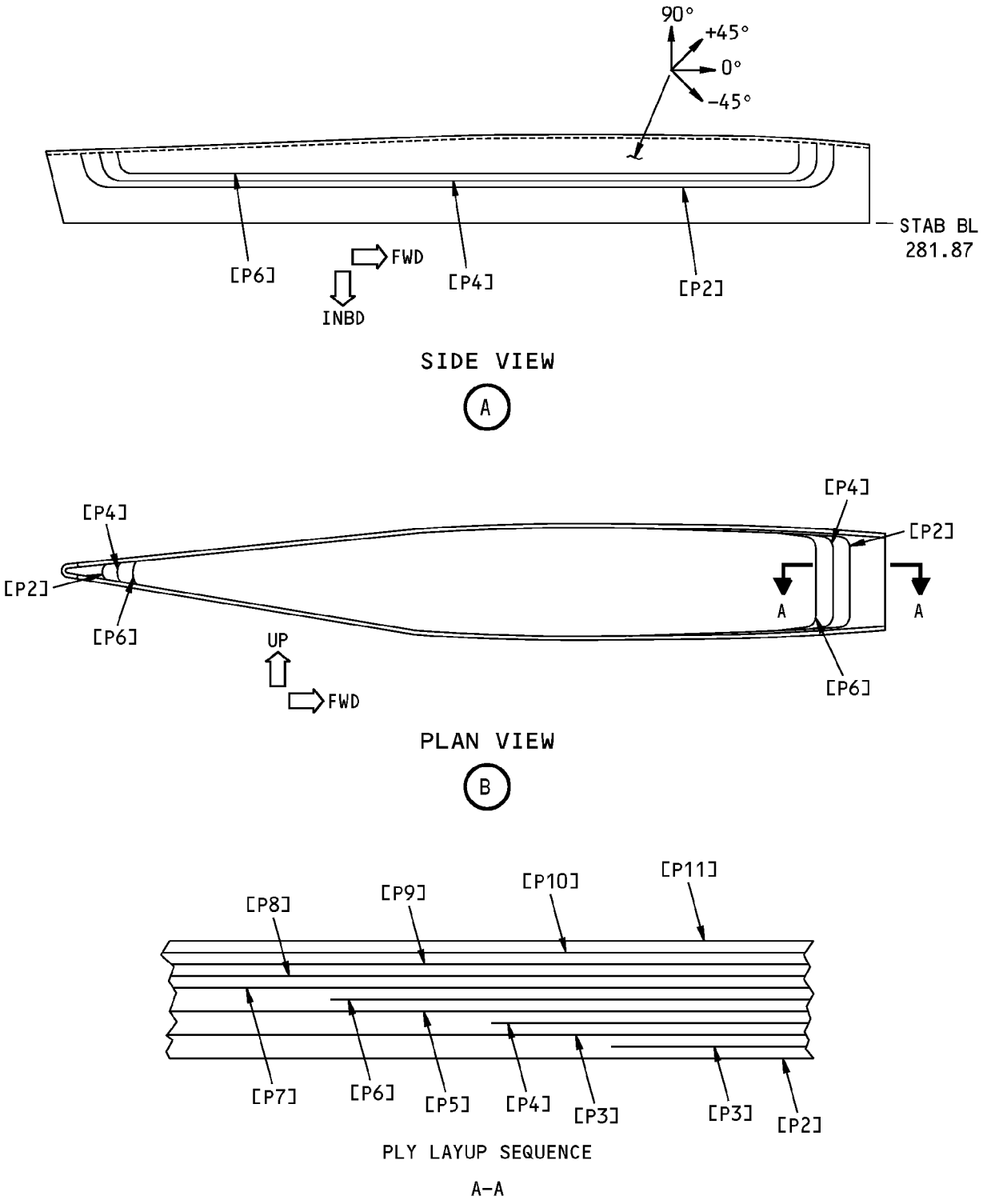
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Horizontal Stabilizer Tip Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Composite Tip Cap		Refer to Figure 3	
[2]	Leading Edge Cap	0.090 (2.3)	2024-T42 clad sheet as given in QQ-A-250/5	
[3]	Trailing Edge Tip		A356.0-T6 aluminum casting as given in AMS 4218 with C30 cast roughness	
[4]	Ground Strap	0.020 (0.51)	2024-T3 clad sheet as given in QQ-A-250/5	
[5]	Splice Strap	0.063 (1.60)	2024-T3 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

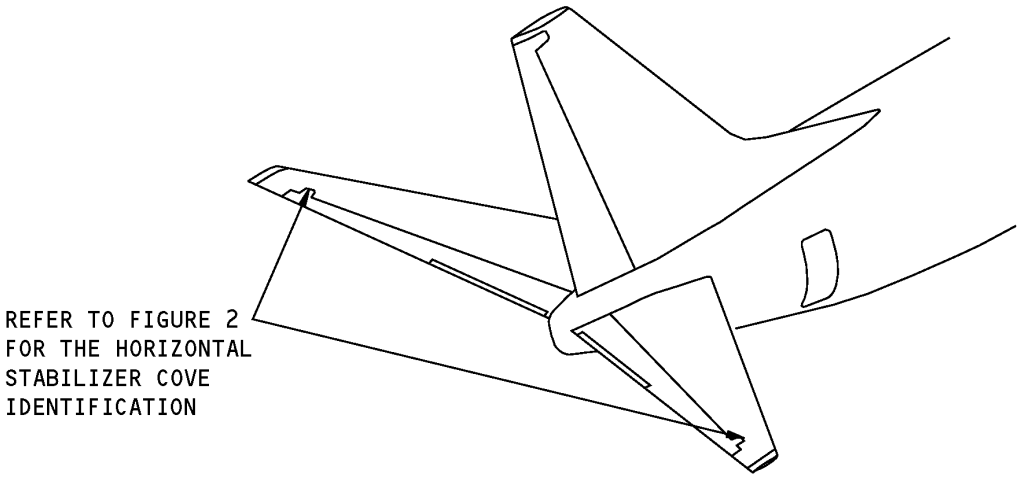


Ply Sequence for Figure 2, Item [1]
Figure 3

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1, P2, P5, P6, P7, P9	0 or 90 degrees	Glass Fiber Reinforced Plastic (GFRP) as given in BMS 8-79, Class III, Grade B, Style 1581. Style 7781 is optional
P3, P4, P8	+ or - 45 degrees	GFRP as given in BMS 8-79, Class III, Grade B, Style 1581. Style 7781 is optional
P10	0 or 90 degrees	Expanded metal foil as given in BMS 8-336, Type I, Class 1, Grade 016, Form A. Aluminum coated epoxy impregnated glass fiber cloth as given in BMS 8-278, Type I, Class 250 is an alternative.
P11	——	0.001 inch thick composite surfacing film as given in BMS 8-341, Type III

IDENTIFICATION 2 - HORIZONTAL STABILIZER COVE

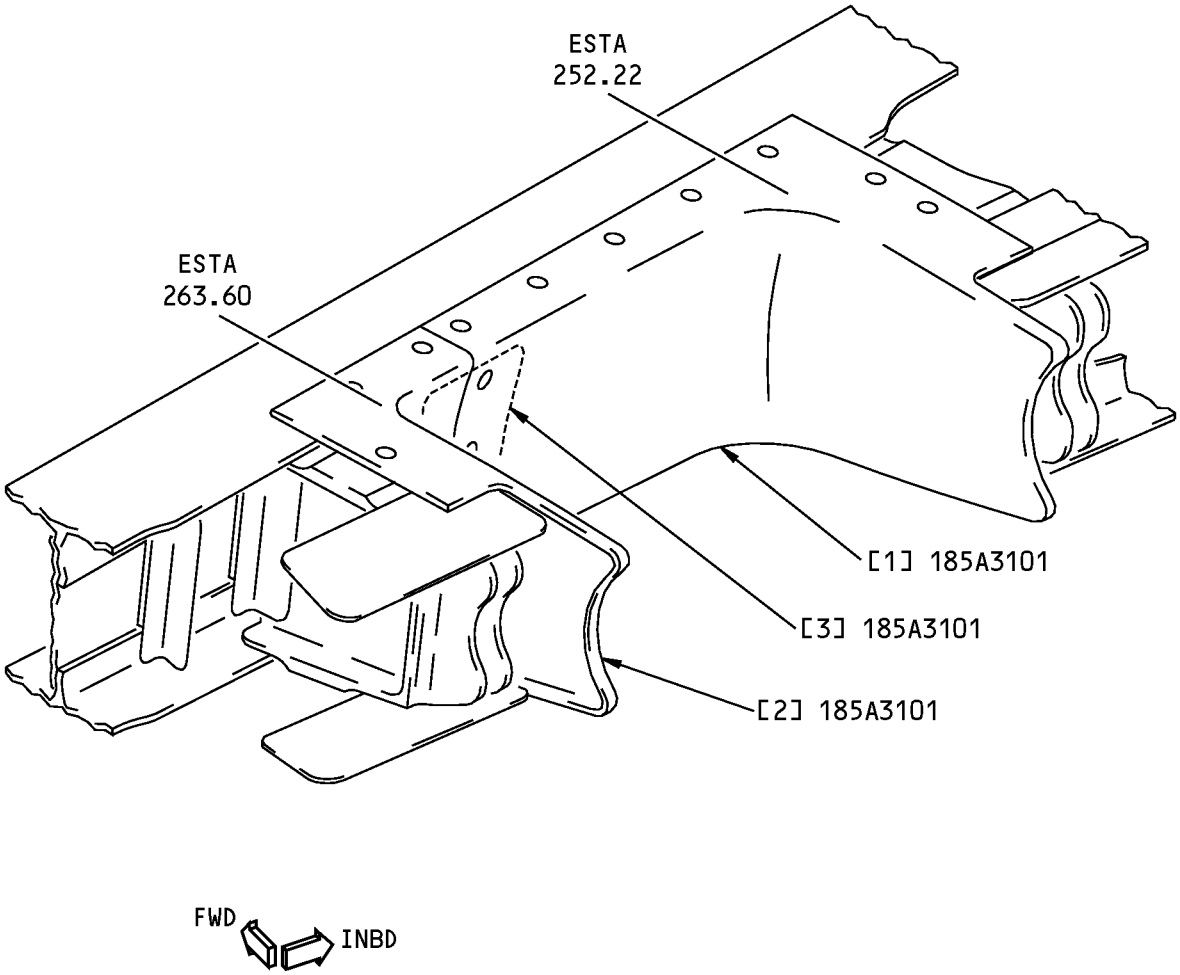


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Cove Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
185A0001	Trailing Edge Functional Collector - Left, Horizontal Stabilizer
185A0002	Trailing Edge Functional Collector - Right, Horizontal Stabilizer
185A3100	Installation - Cove Horizontal Stabilizer



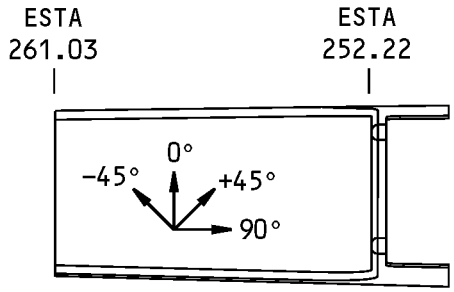
LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE

Horizontal Stabilizer Cove Identification
Figure 2

Table 2:

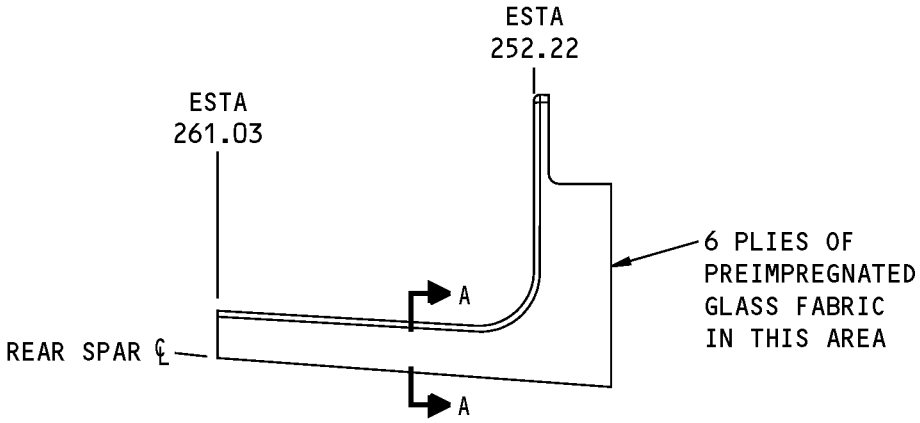
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Inboard Panel		Preimpregnated Glass Fabric Refer to Figure 3	
[2]	Outboard Panel		Preimpregnated Glass Fabric Refer to Figure 4	
[3]	Splice Plate	0.050	Clad 2024-T3 as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



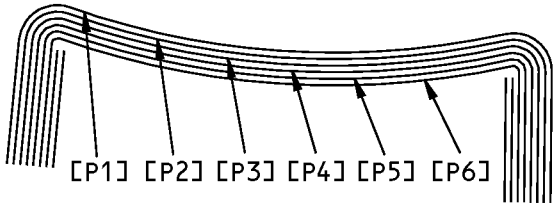
AFT VIEW

LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE



PLAN VIEW

LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE

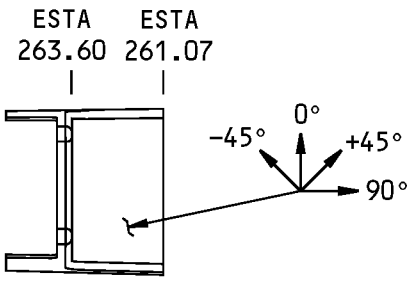


A–A

Ply Direction and Ply Sequence for Horizontal Stabilizer Cove, Figure 2, Item [1]
Figure 3

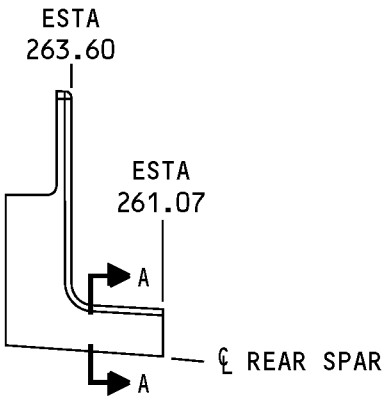
Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1, P6	90 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781
P2, P5	+ or - 45 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781
P3, P4	0 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781



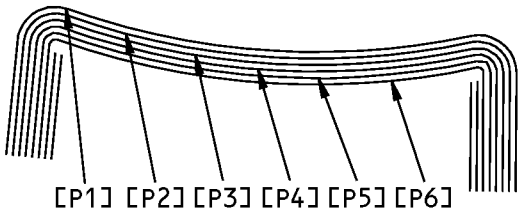
AFT VIEW

LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE



PLAN VIEW

LEFT SIDE SHOWN,
RIGHT SIDE OPPOSITE



A–A

Ply Direction and Ply Sequence for Horizontal Stabilizer Cove, Figure 2, Item [2]
Figure 4

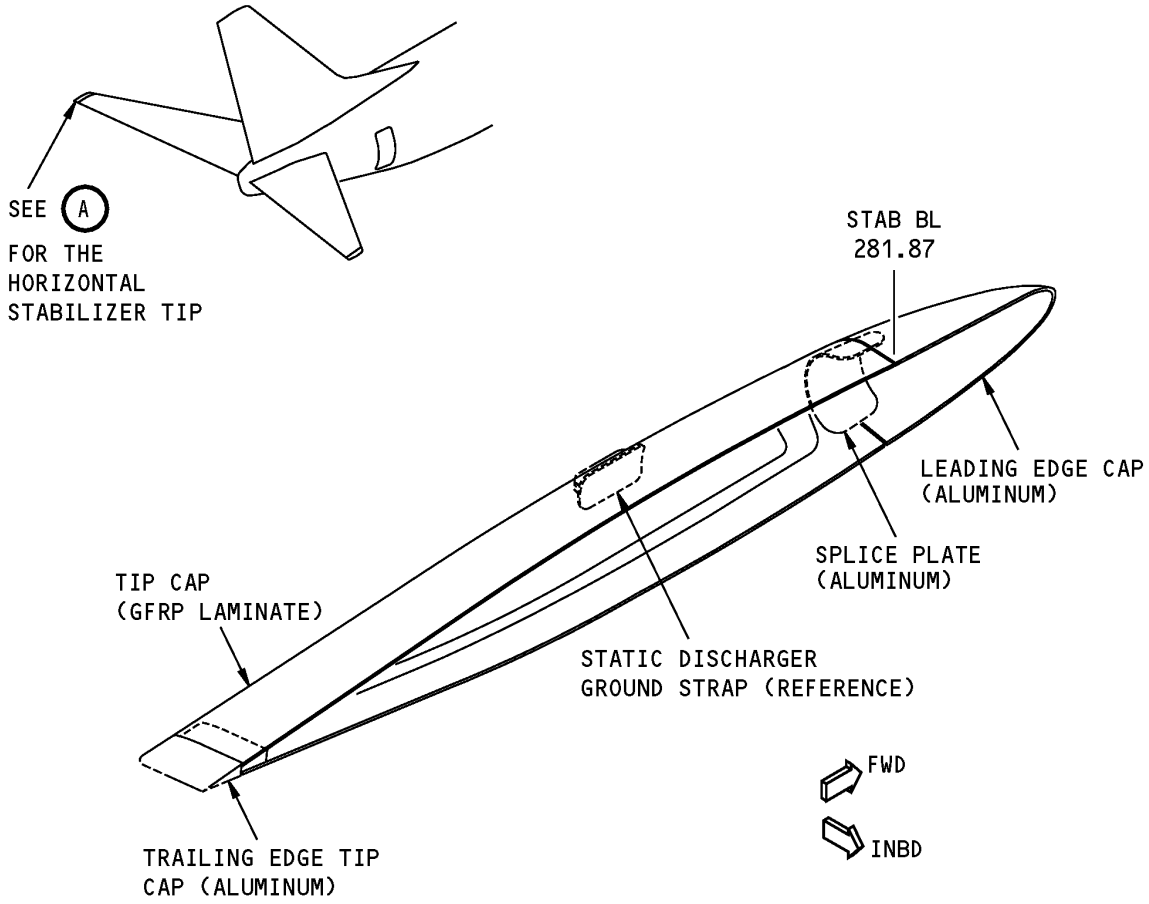
Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [2]		
PLY	**DIRECTION**	**MATERIAL**
P1, P6	90 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781
P2, P5	+ or - 45 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781
P3, P4	0 degrees	Preimpregnated Glass Fabric as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781

ALLOWABLE DAMAGE 1 - HORIZONTAL STABILIZER TIP

1. Applicability

A. Allowable Damage 1 is applicable to damage on the horizontal stabilizer tip as shown in Horizontal Stabilizer Tip, Figure 101/ALLOWABLE DAMAGE 1.



Horizontal Stabilizer Tip
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for the inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Definitions of the Damage Size, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

B. Do the steps that follow if you have damage to the tip cap made of Glass Fabric Reinforced Plastic (GFRP).

(1) Remove all the contamination and water from the structure.

(a) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(b) Refer to 51-70-04 for the damage removal procedures.

(2) The tip cap has a layer of BMS 8-336 expanded aluminum foil mesh. If damage occurs to the expanded aluminum foil mesh, do the steps that follow:

(a) Refer to 51-70-14 for the allowable damage limits for the expanded aluminum foil mesh.

(b) Seal the damaged area as given in 51-70-14.

C. Do the steps that follow if you have damage to the leading edge cap or the trailing edge tip cap made of aluminum.

(1) Remove the damage.

(a) Refer to 51-10-02 for the investigation and cleanup procedures.

(b) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(c) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(d) Make the surface texture roughness for all cut surfaces 125 microinches Ra or smoother.

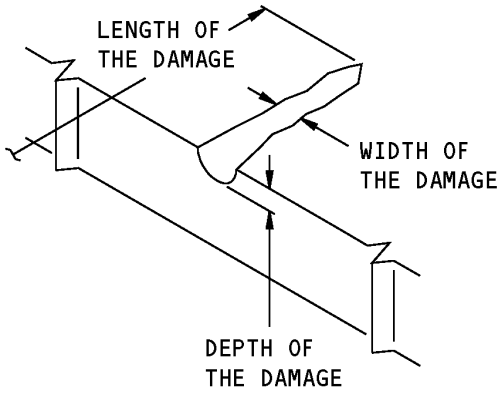
(2) After you remove the damage, do the steps that follow:

(a) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(b) Apply one layer of BMS 10-11, Type I primer to the conversion coated, reworked areas. Refer to SOPM 20-41-02.

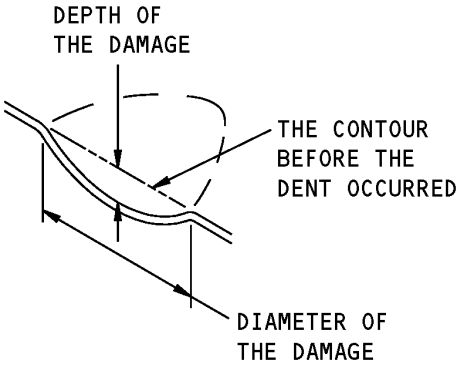
(c) Apply a decorative finish if necessary. Refer to AMM PAGEBLOCK 51-21-99/701.

D. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane. Refer to 51-10-01.



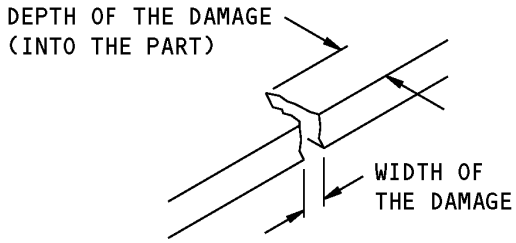
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 102

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-01, REPAIR GENERAL	Procedures to Rework or Fill Allowable Dents on the External Aerodynamic Surfaces of Metallic Parts
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08, GENERAL	Resin Sweep-Fair Procedures

(Continued)

Reference	Title
51-70-14	STRUCTURES WITH ALUMINUM COATINGS AND FOILS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Tip Cap (GFRP)

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A maximum of 0.25 inch in width

(d) A minimum of 0.50 inch away from the edge of a fastener hole

(e) A minimum of 0.50 inch away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragrah 2.

(3) Dents are permitted if:

(a) They are a maximum of 2.0 inch in diameter.

(b) The edge of the damage is a minimum of 4D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragrah 2.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 1.50 inch in diameter

(b) A minimum of 4D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragrah 2.

(5) Delaminations are permitted if they are:

(a) A maximum of 1.5 inch in diameter

(b) A minimum of 4D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragrah 2.

(6) Edge damage is permitted if it is:

(a) A maximum of 0.10 in depth

(b) A maximum of 0.50 inch in width

(c) A minimum of 2.5D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragrah 2.

(7) Edge Erosion is permitted as shown in Cleanup and Sealing of Edge Erosion, Figure 103/ALLOWABLE DAMAGE 1.

B. Leading Edge Cap and Trailing Edge Tip Cap (Aluminum)

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Details A, B, C, D, and E.

(b) Damage that does not go through the clad surface is permitted.

(3) Dents:

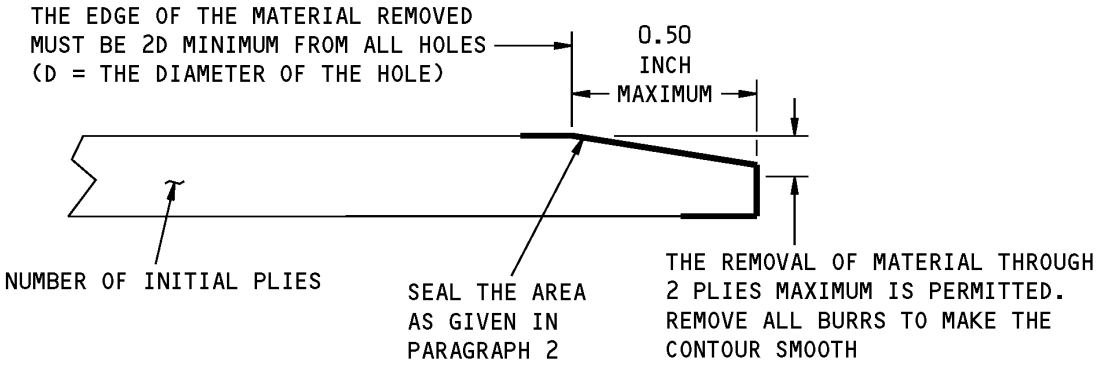
(a) Dents are permitted if they agree with the conditions shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Detail F.

(4) Holes and Punctures are permitted if:

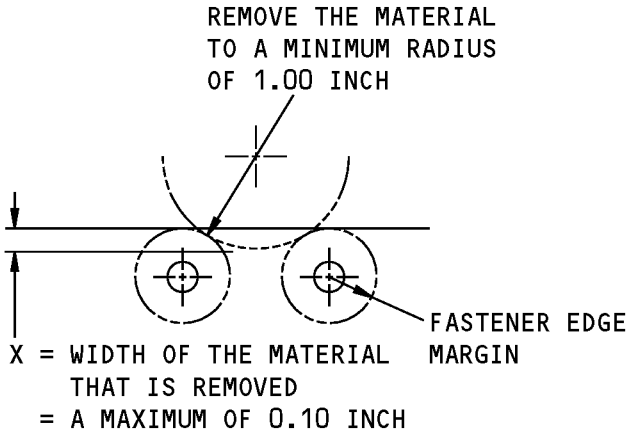
(a) They are 0.25 inch in diameter or less

(b) The edge of the damage is a minimum of 1.0 inch away from another hole, an edge, or other damage

(c) They are filled with a 2017-T3 or 2117-T4 aluminum protruding head rivet. Install the rivet dry.

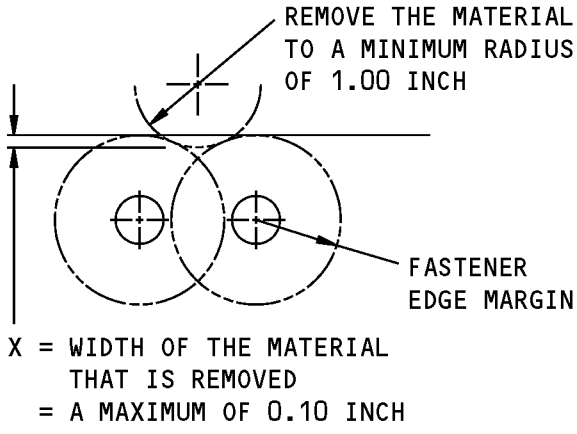


Cleanup and Sealing of Edge Erosion
Figure 103



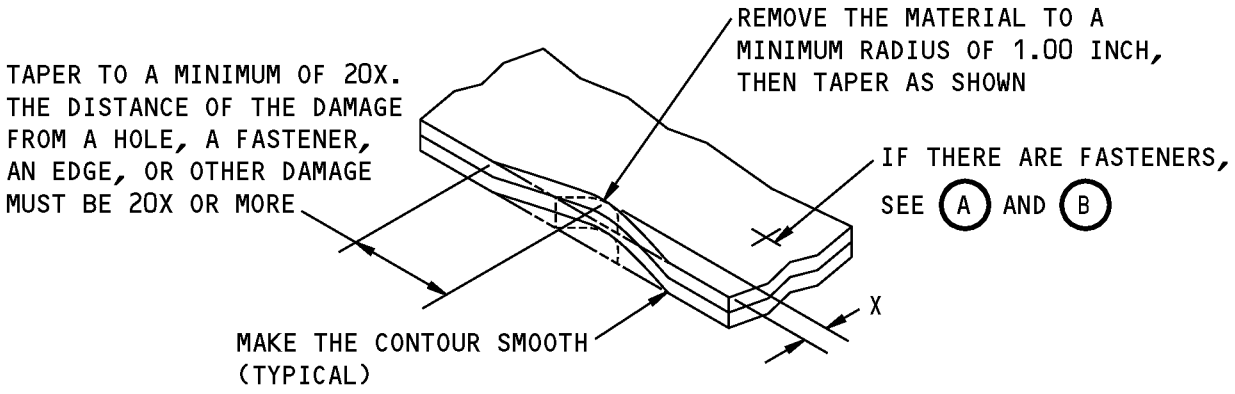
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

(A)



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

(B)

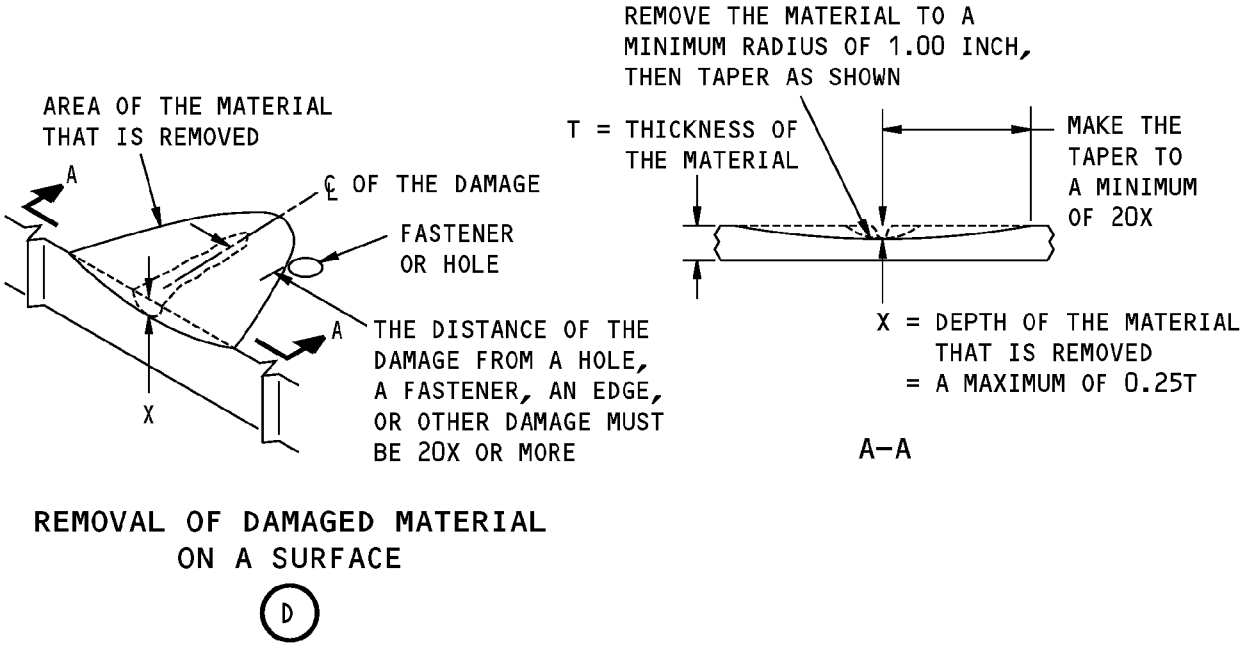


X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH

REMOVAL OF DAMAGED MATERIAL ON AN EDGE OF BONDED METAL SKINS AND WEBS

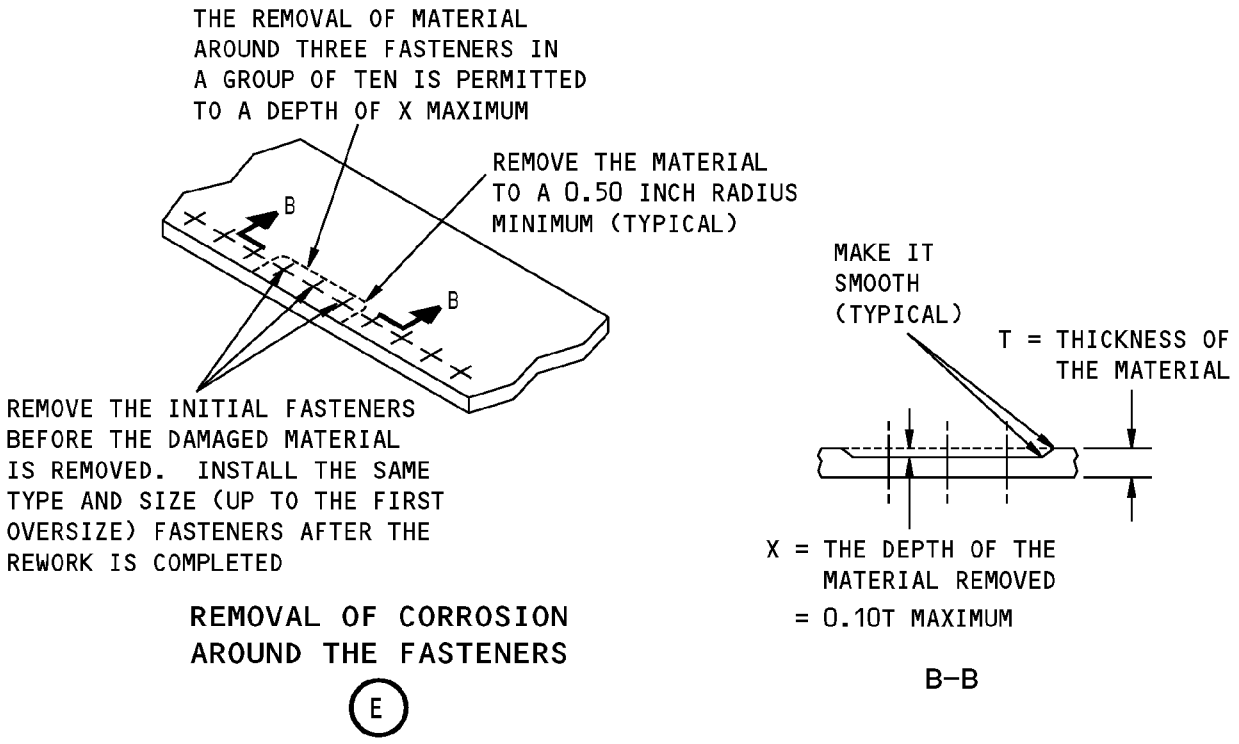
(C)

Allowable Damage Limits
Figure 104 (Sheet 1 of 3)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

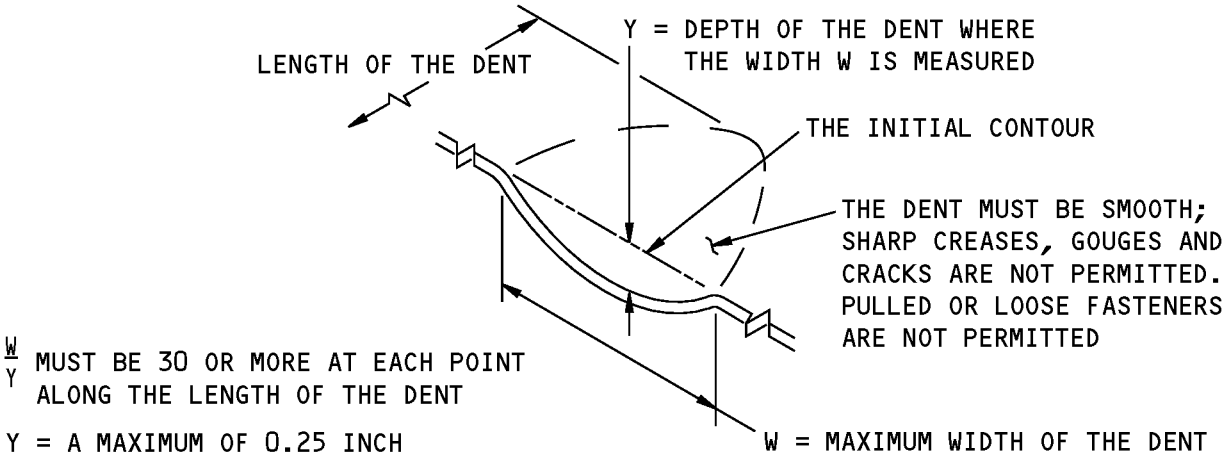
(D)



REMOVAL OF CORROSION AROUND THE FASTENERS

(E)

Allowable Damage Limits
Figure 104 (Sheet 2 of 3)



DENT THAT IS PERMITTED

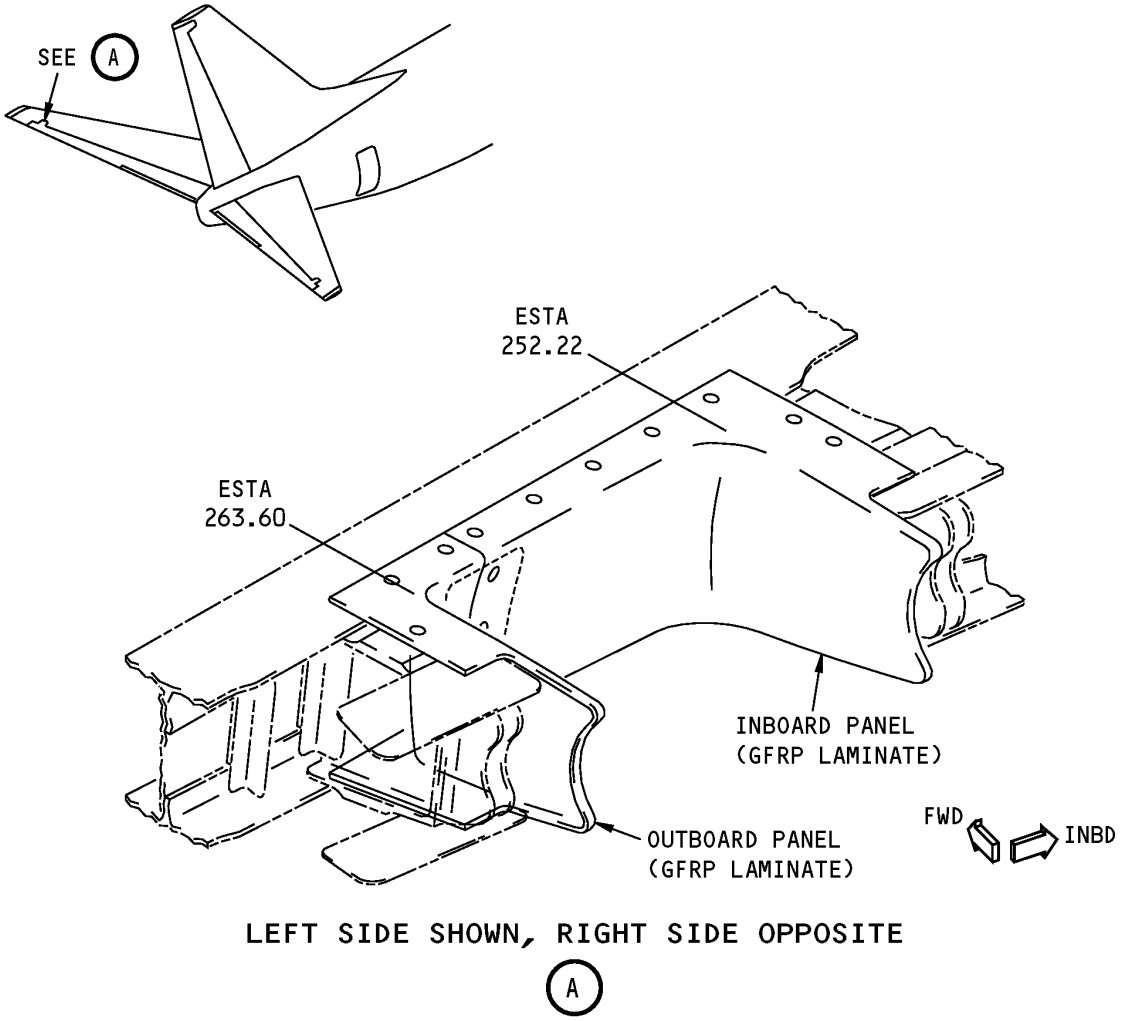
F

Allowable Damage Limits
Figure 104 (Sheet 3 of 3)

ALLOWABLE DAMAGE 2 - HORIZONTAL STABILIZER COVE

1. Applicability

A. Allowable Damage 2 is applicable to damage on the horizontal stabilizer cove panels shown in Horizontal Stabilizer Cove, Figure 101/ALLOWABLE DAMAGE 2.



Horizontal Stabilizer Cove
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Definitions of the Damage Size, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and C for the definitions of the length, width, and depth of the damage.

B. Do the steps that follow for the cove panels made of Glass Fabric Reinforced Plastic (GFRP).

(1) Remove all the contamination and water from the structure.

(a) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(b) Refer to 51-70-04 for the damage removal procedures.

(2) Seal the damaged areas with the steps that follow.

(a) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2

1) Make a temporary seal.

a) Apply aluminum foil tape (speed tape).

b) Keep a record of the location.

c) Make sure the tape is in satisfactory condition every 400 flight hours.

d) Seal the damage permanently at or before 5000 flight hours.

2) Make a permanent seal.

a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

b) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

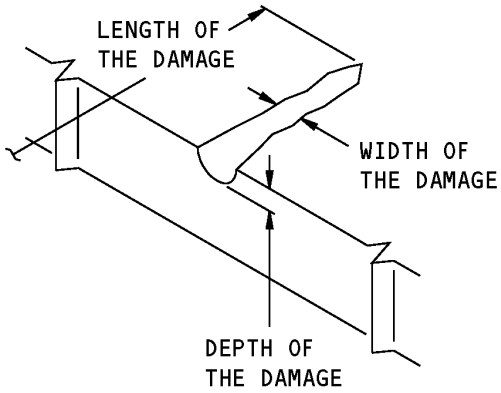
(b) Seal the damaged areas that are more than one ply deep and that agree with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2

1) Use a vacuum and heat to remove moisture from the solid laminate or the honeycomb cells. Refer to 51-70-04.

2) Make a temporary seal with aluminum foil tape (speed tape).

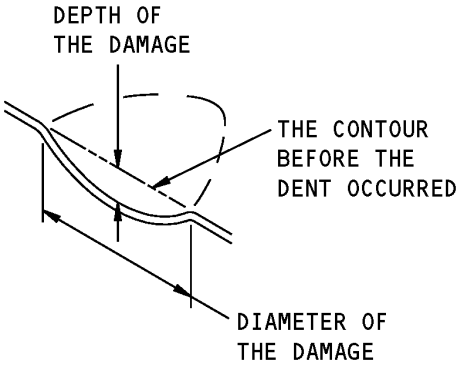
3) Keep a record of the location.

4) Repair the damage at or before 400 flight hours.



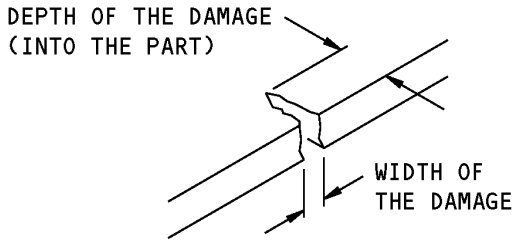
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 102

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Inboard and Outboard Panels (GFRP Laminate)

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A maximum of 0.25 inch in width

(d) A minimum of 0.50 inch away from the edge of a fastener hole

(e) A minimum of 0.50 inch away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in paragraph 2.

(3) Dents are permitted if:

(a) They are a maximum of 2.0 inch in diameter.

(b) The edge of the damage is a minimum of 2.5D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in paragraph 2.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inch in diameter

(b) A minimum of 2.5D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in paragraph 2.

(5) Delaminations are permitted if they are:

(a) A maximum of 2.0 inch in diameter

(b) A minimum of 2.5D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in paragraph 2.

(6) Edge damage is permitted if it is:

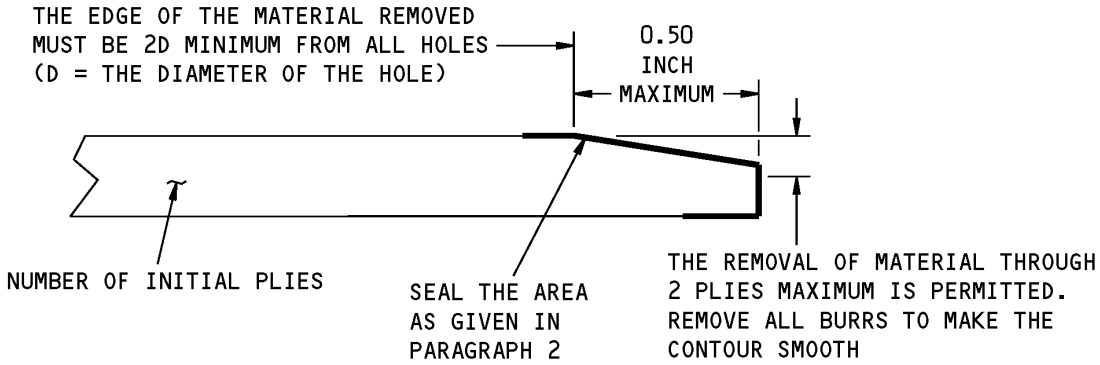
(a) A maximum of 0.25 in depth

(b) A maximum of 1.00 inch in width

(c) A minimum of 2.5D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies
2) Are sealed as given in paragraph 2.

(7) Edge Erosion is permitted as shown in Cleanup and Sealing of Edge Erosion, Figure 103/ALLOWABLE DAMAGE 2.



Cleanup and Sealing of Edge Erosion
Figure 103

REPAIR 1 - HORIZONTAL STABILIZER TIP

1. Applicability

A. Repair 1 is applicable to the horizontal stabilizer tip cap made of Glass Fiber Reinforced Plastic (GFRP) shown in Horizontal Stabilizer Tip Cap Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.

2. General

A. Repair 1 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the tip cap.

(2) Refer to 51-40-02 for information on fastener removal.

C. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

D. Refer to Definitions of the Damage Size, Figure 202/REPAIR 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

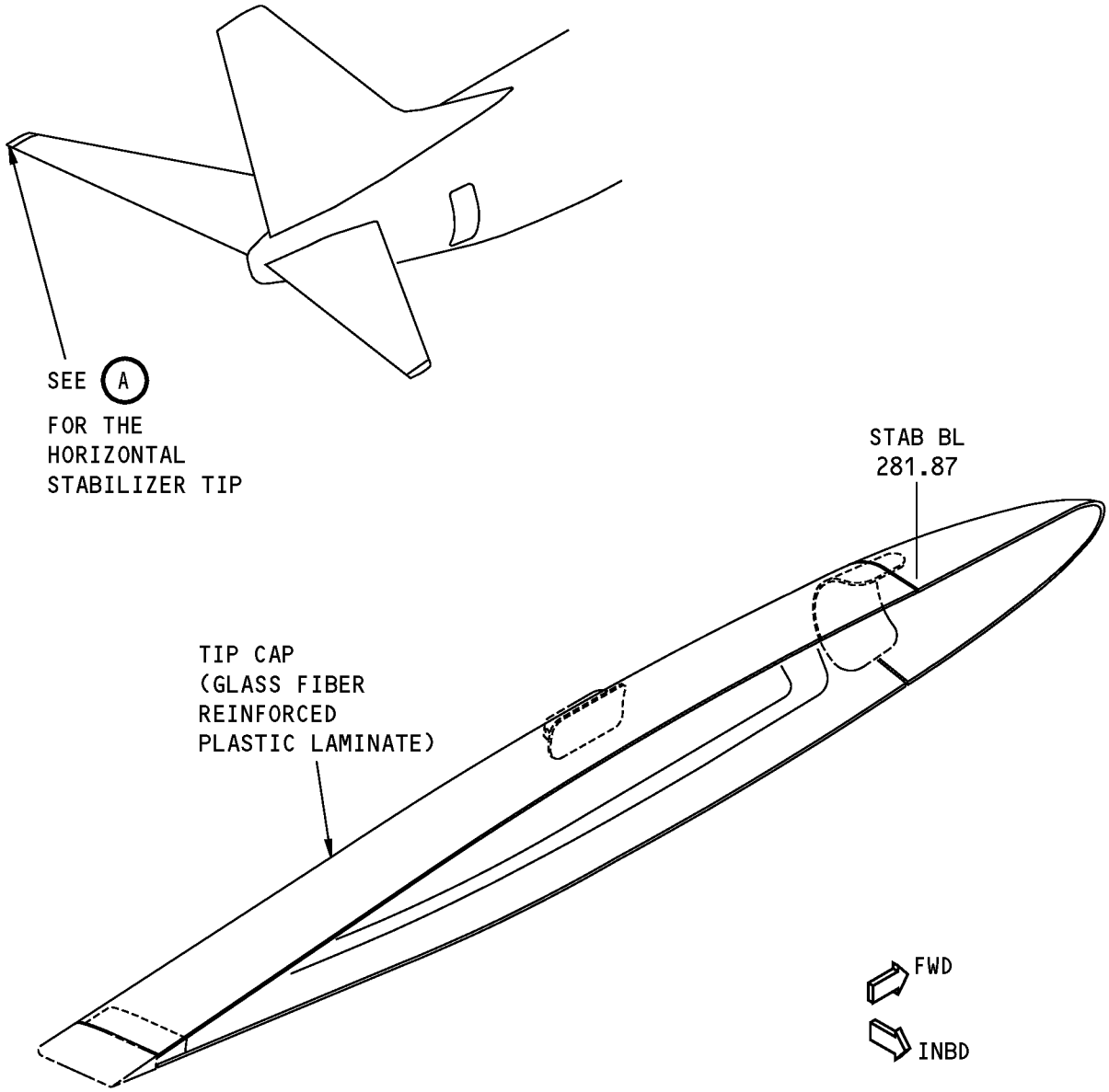
E. Do the repair as given in Paragraph 4./REPAIR 1

F. Put the tip cap back to the initial condition, as applicable.

(1) Install the tip cap, if it was removed.

(a) Refer to 51-40-02 for information on fastener installation.

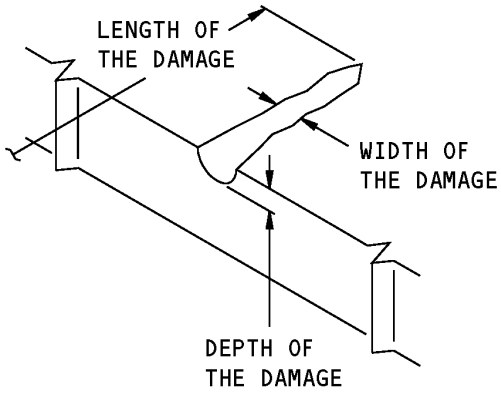
(2) Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the airplane. Refer to 51-10-01.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

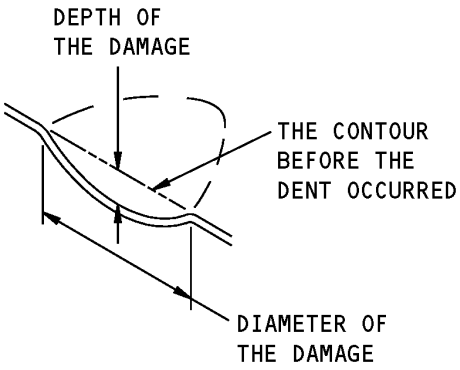
(A)

Horizontal Stabilizer Tip Cap Location
Figure 201



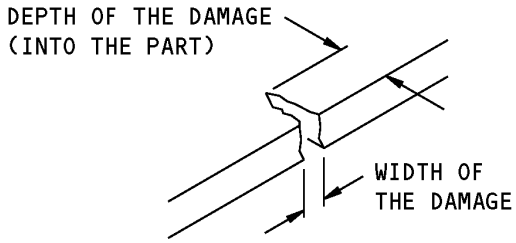
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS
55-10-30, ALLOWABLE DAMAGE 1	Horizontal Stabilizer Tip
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

B. For dents that are not permitted by Paragraph 4.A./REPAIR 1 and for other damage that is not permitted by Allowable Damage 1, refer to Table 201/REPAIR 1.

C. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) The edges of the repair must be 3 inches or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 1.

Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE TIP CAP				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	Room Temperature	150°F (66°C)	200°F (93°C)	250°F (121°C)
REPAIR SIZE	Damage that is a maximum of: - 1.5 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location	Damage that is a maximum of: - 3.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	There are no limits on the dimension of the repair	There are no limits on the dimensions of the repair
REPAIR INSTRUCTIONS	SRM 51-70-06 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

(2) Repair the damage as given in 51-70-06.

(3) Use the same number of repair plies as the number of initial plies that were removed.

(4) Do an inspection of the repair each 800 flight hour interval or more frequently.

(a) If deterioration is found, replace the repair with a Category A repair.

D. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.

(1) The edges of the repair must be 3 inches or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 1.

(2) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

(b) Add one structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.

(1) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

(b) Add one structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

F. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

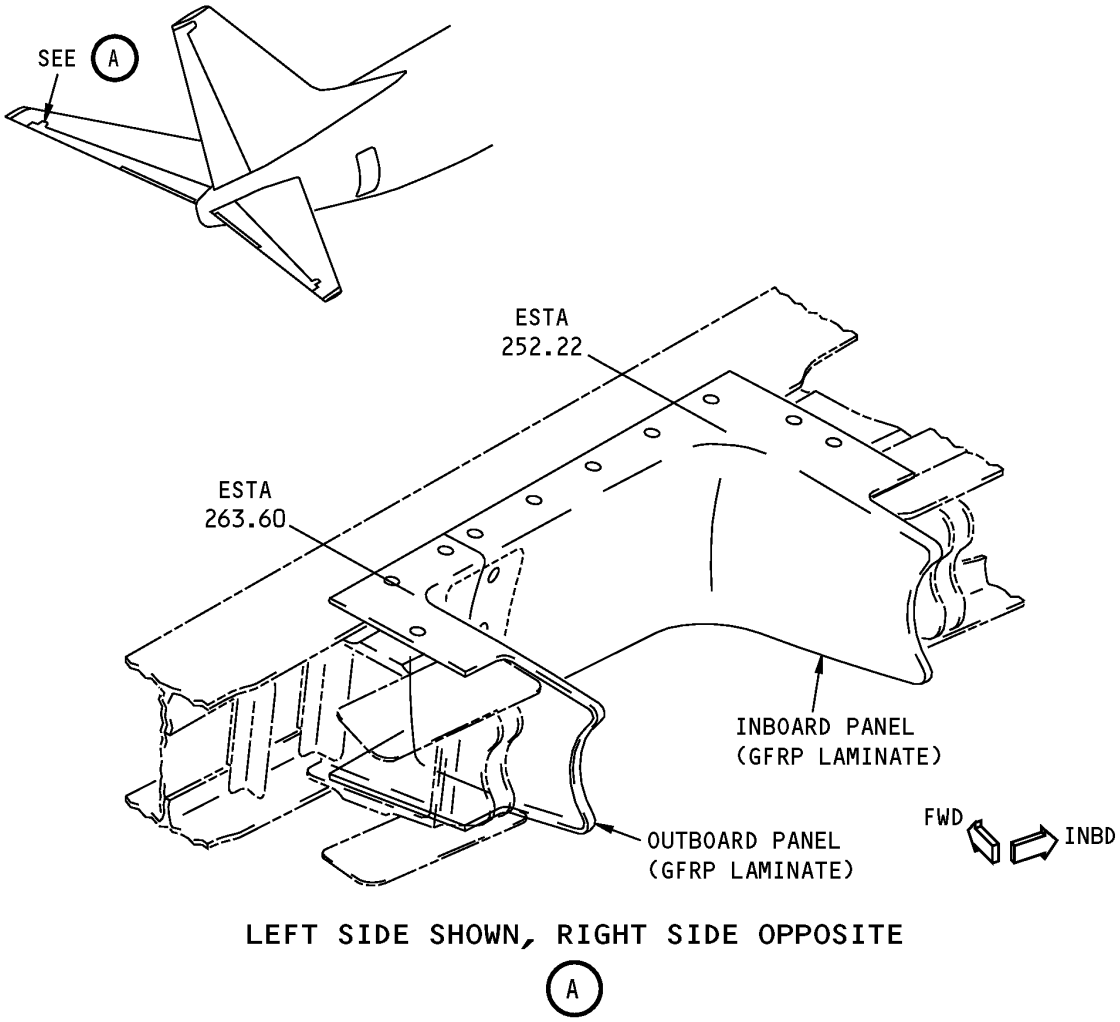
(1) Use the same number of repair plies as the number of initial plies that were removed.

REPAIR 2 - HORIZONTAL STABILIZER COVE

1. Applicability

A. Repair 2 is applicable to the cove panels of the horizontal stabilizer made of Glass Fiber Reinforced Plastic (GFRP) shown in Horizontal Stabilizer Cove, Figure 201/REPAIR 2.

B. Repair 2 is applicable to damage that is more than the limits permitted in Allowable Damage 2. Refer to Allowable Damage 2 for the type and size of damage that is permitted.



Horizontal Stabilizer Cove
Figure 201

2. General

A. Repair 2 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the cove panels

(2) Refer to 51-40-02 for information on fastener removal.

C. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

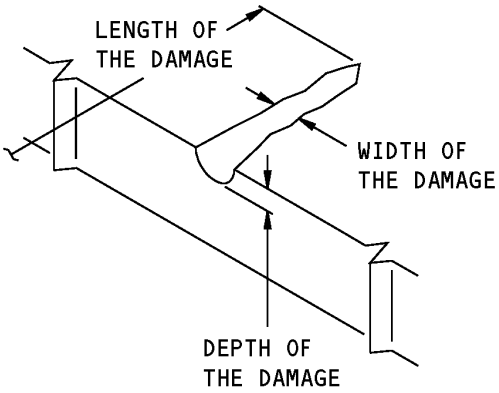
D. Refer to Definitions of the Damage Size, Figure 202/REPAIR 2, Details A, B, and C for the definitions of the length, width, and depth of damage.

E. Do the repair as given in Paragraph 4./REPAIR 2

F. Put the cove panels back to the initial condition, as applicable.

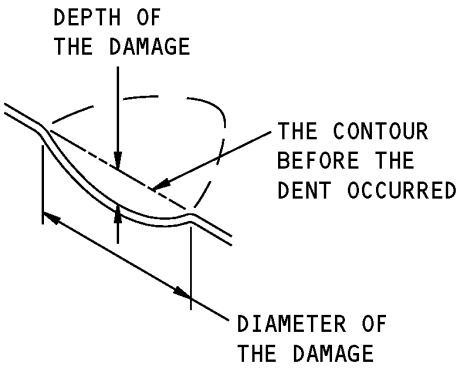
(1) Install the cove panels, if they were removed.

(a) Refer to 51-40-02 for information on fastener installation.



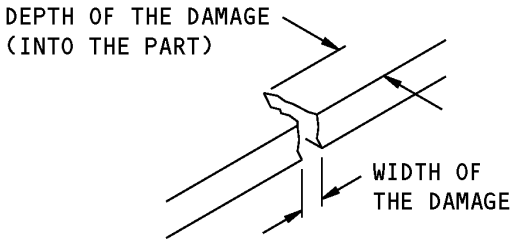
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02, GENERAL	Inspection and Removal of Damage
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS
55-10-30, ALLOWABLE DAMAGE 2	Horizontal Stabilizer Cove
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

B. For dents that are not permitted by Paragraph 4.A./REPAIR 2 and for other damage that is not permitted by Allowable Damage 1, refer to Table 201/REPAIR 2.

C. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) The edges of the repair must be 3.0 inch or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 2.

(2) Repair the damage as given in 51-70-06.

(3) Use the same number of repair plies as the number of initial plies that were removed.

(4) Do an inspection of the repair each 800 flight hour interval or more frequently.

(a) If deterioration is found, replace the repair with a Category A repair.

Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE COVE PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	Room Temperature	150°F (66°C)	200°F (93°C)	250°F (121°C)
REPAIR SIZE	Damage that is a maximum of: - 1.5 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location One repair is permitted for each 144 square inches of panel area	Damage that is a maximum of: - 3.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location One repair is permitted for each 144 square inches of panel area	There are no limits on the dimensions of the repair	There are no limits on the dimensions of the repair
REPAIR INSTRUCTIONS	SRM 51-70-06 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

D. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.

(1) The edges of the repair must be 3.0 inch or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 2.

(2) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

(b) Add one structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.

(1) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

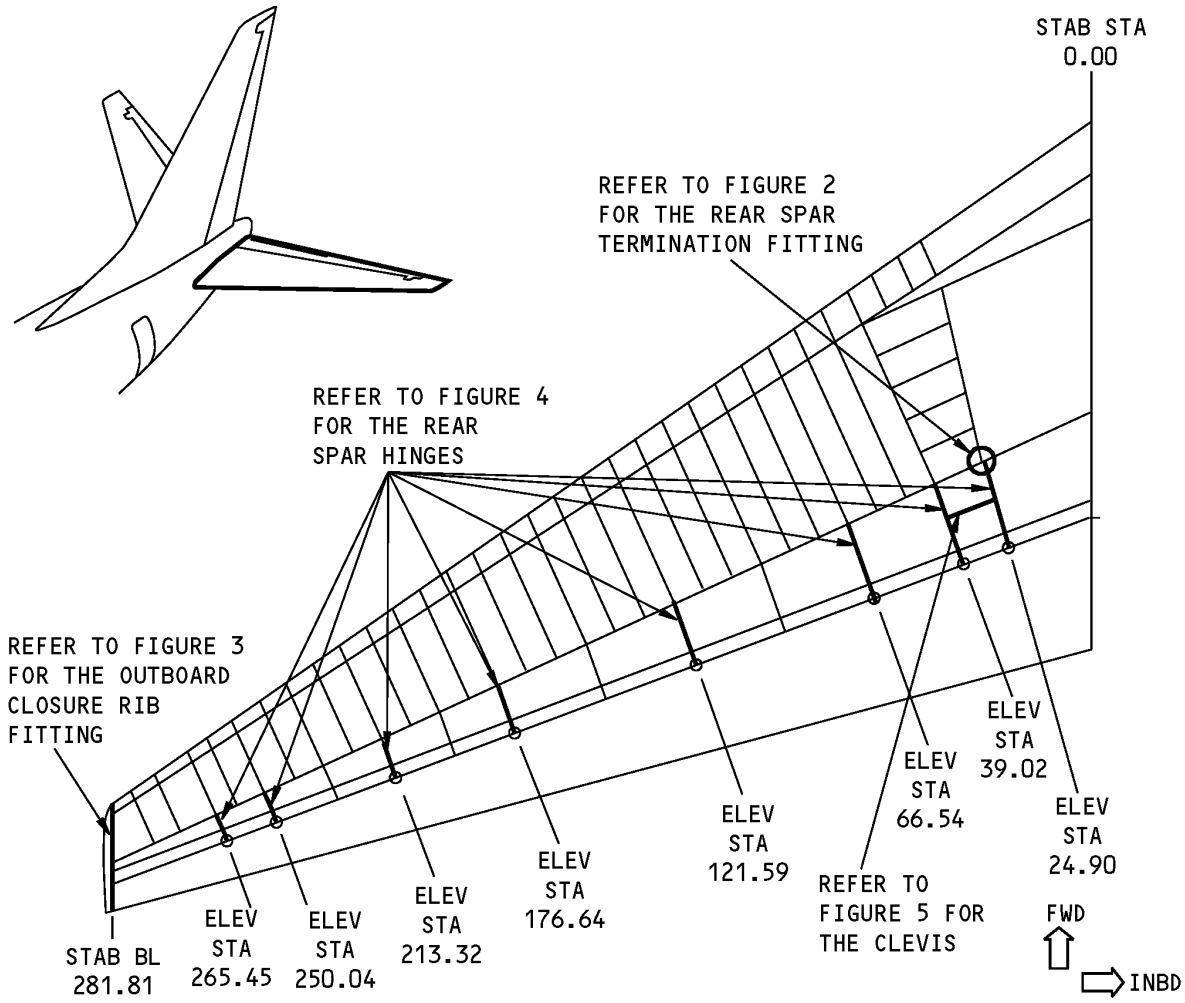
(b) Add one structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

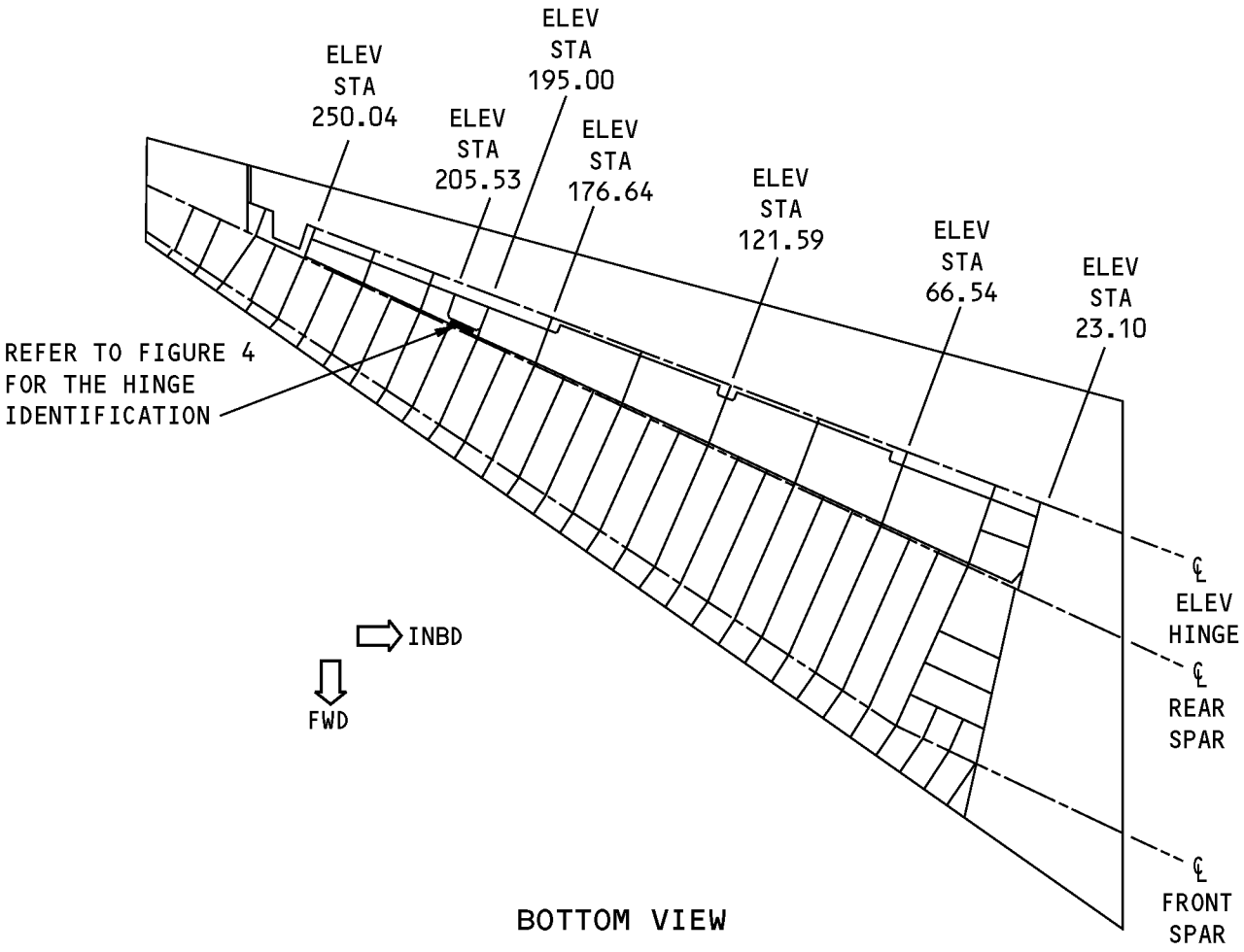
F. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

IDENTIFICATION 1 - HORIZONTAL STABILIZER FITTINGS



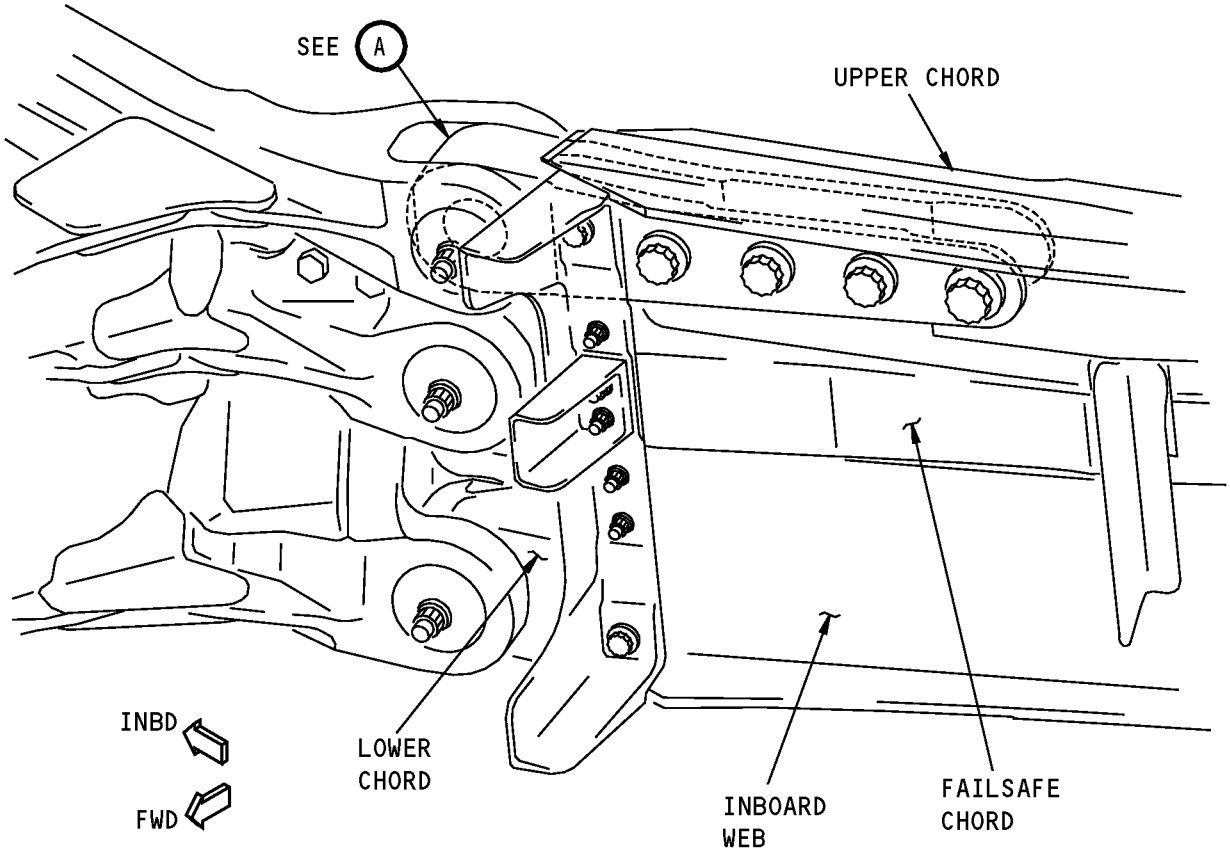
Horizontal Stabilizer Fitting Location
Figure 1 (Sheet 1 of 2)



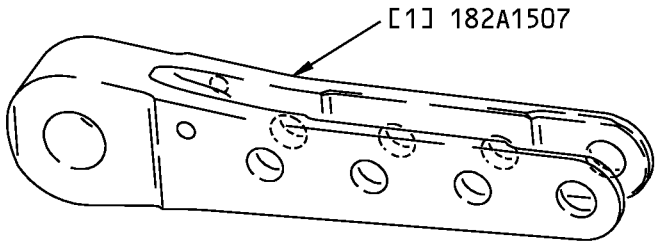
Horizontal Stabilizer Fitting Location
Figure 1 (Sheet 2 of 2)

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A8001	Section 82 Left Horizontal Stabilizer - Product Collector
182A1500	Rear Spar Assembly/Installation - Horizontal Stabilizer
185A0001	Trailing Edge Functional Collector - Left, Horizontal Stabilizer
185A0003	Horizontal Stabilizer Rework Collector - Left Side
185A1210	Clevis Installation - Trim Tab Lock, Horizontal Stabilizer
185A1335	Rib Installation - Trailing Edge, Elevator Station 66.54, Rework
185A1345	Rib Installation - Trailing Edge, Elevator Station 94.07, Rework
185A1355	Rib Installation - Trailing Edge, Elevator Station 121.59, Rework
185A1365	Rib Installation - Trailing Edge, Elevator Station 149.12, Rework
185A1415	Rib Installation - Trailing Edge, Elevator Station 195.00, Rework
185A1435	Rib Installation - Trailing Edge, Elevator Station 231.70, Rework
186A0001	Leading Edge and Miscellaneous Functional Collector - Left Horizontal Stabilizer
186A1000	Left Hand Horizontal - (Premodule)
186A3000	Left Hand Horizontal Stabilizer Assembly - I/R



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE



TERMINATION FITTING

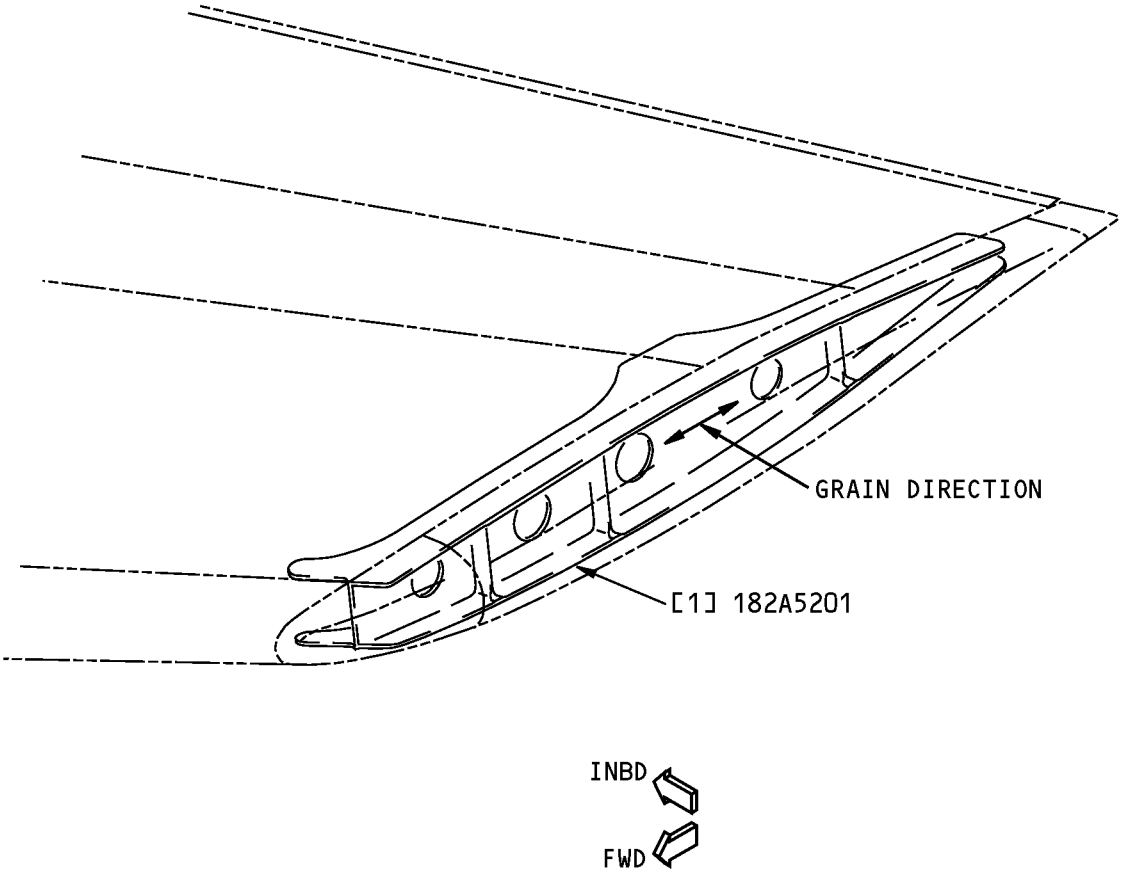
A

Horizontal Stabilizer Rear Spar Termination Fitting Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Termination Fitting		Ti-6Al-4V machined titanium bar as given in MIL-T-9047, in the annealed condition. Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

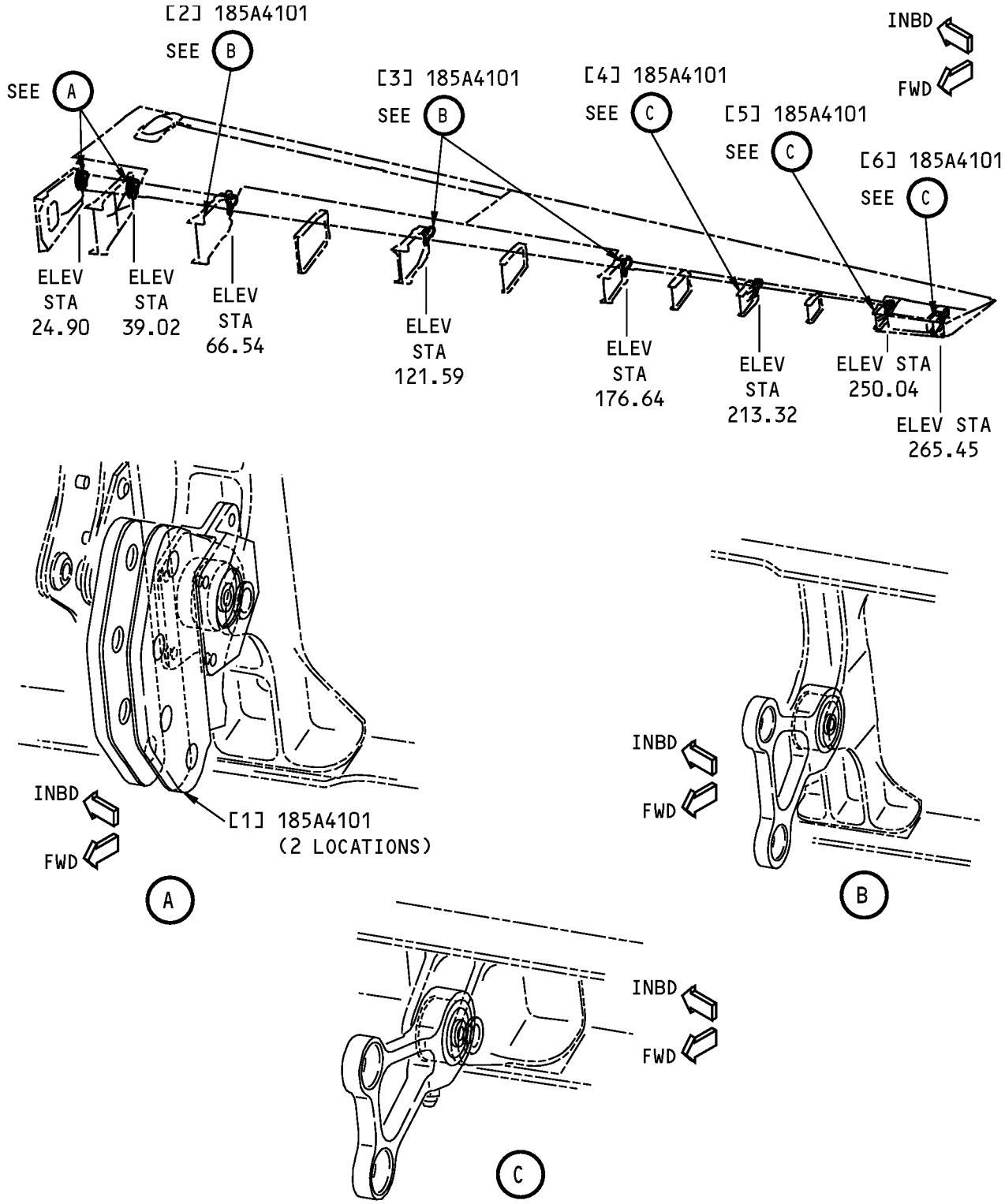


Horizontal Stabilizer Outboard Closure Rib Fitting Identification
Figure 3

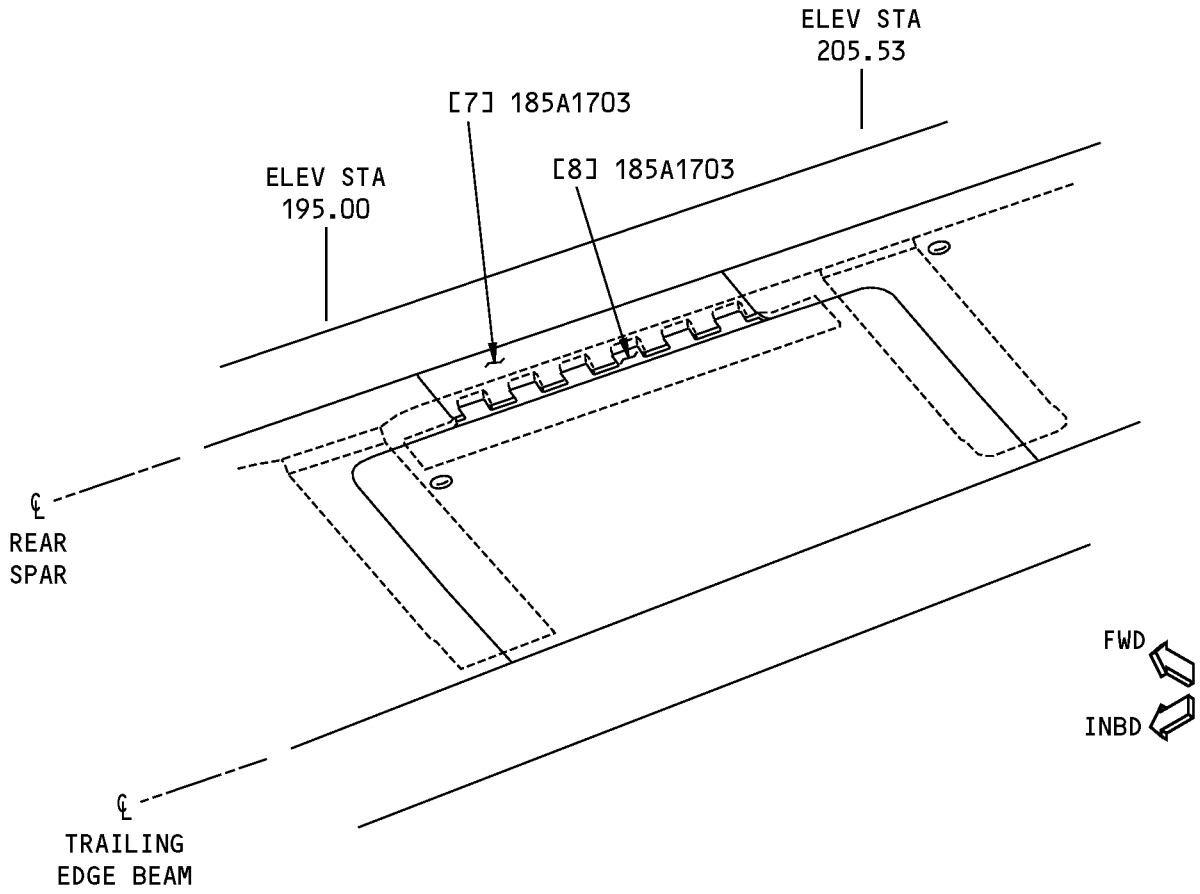
Table 3:

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Fitting		7075-T7351 plate as given in QQ-A-250/12 (Grain direction controlled part) Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



Horizontal Stabilizer Hinge Plate Identification
Figure 4 (Sheet 1 of 2)



BOTTOM VIEW

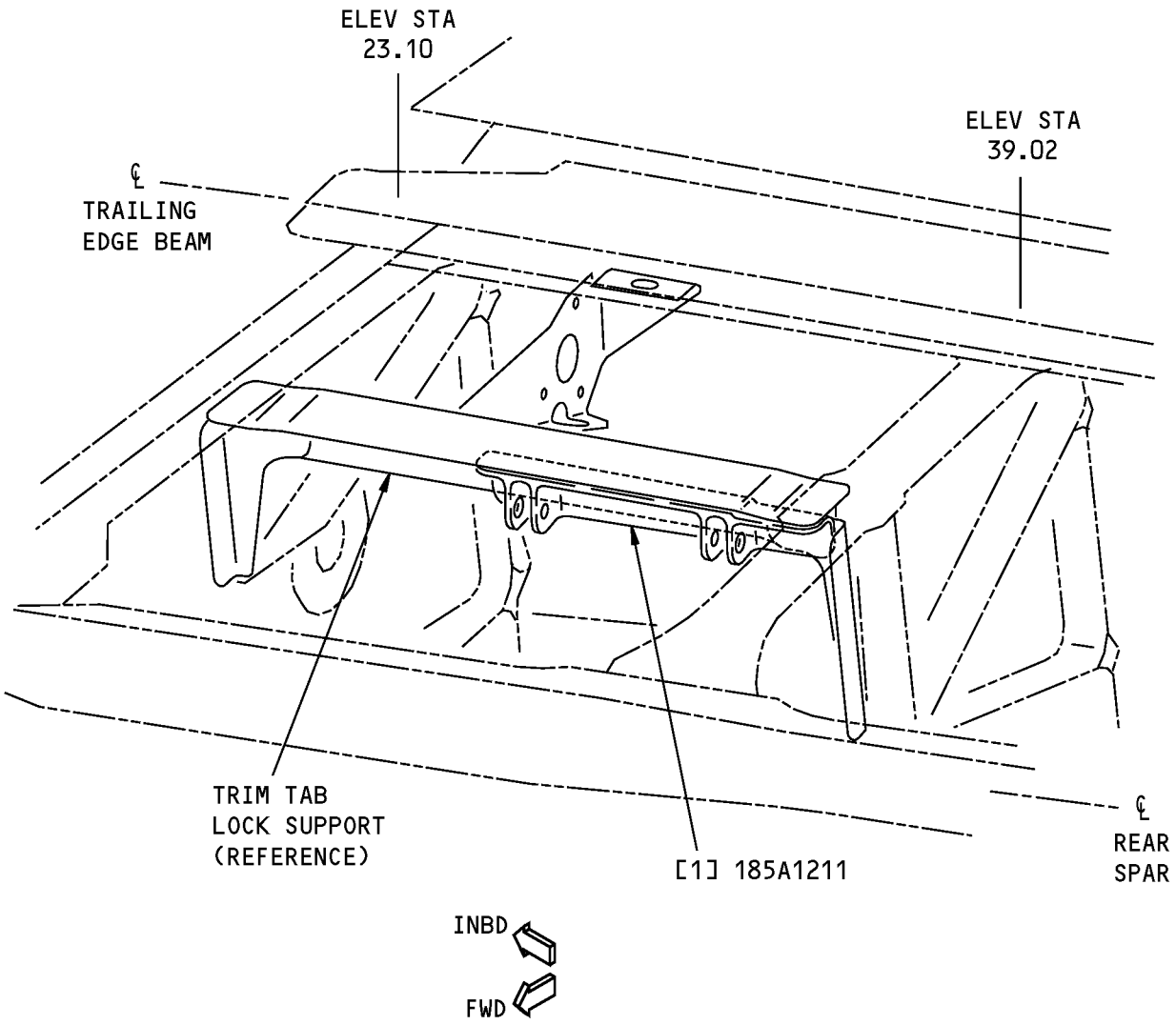
HORIZONTAL STABILIZER ACCESS DOOR HINGE

Horizontal Stabilizer Hinge Plate Identification
Figure 4 (Sheet 2 of 2)

Table 4:

LIST OF MATERIALS FOR FIGURE 4				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Hinge Plate (2)		7075-T7351 rolled plate as given in QQ-A-250/12. Refer to the production drawing for the material thickness (Grain direction controlled part)	
[2]	Hinge Plate	0.70 (17.8)	7075-T7351 rolled plate as given in QQ-A-250/12 (Grain direction controlled part)	Cum Line Numbers 1 thru 84
		0.70 (17.8)	7050-T7451 rolled plate as given in BMS 7-323	Cum Line Numbers 1 1 thru 84 with SB 1067 incorporated and Cum Line Number 85 and on
[3]	Hinge Plate (2)	0.70 (17.8)	7075-T7351 rolled plate as given in QQ-A-250/12 (Grain direction controlled part)	Cum Line Numbers 1 thru 84
		0.70 (17.8)	15-5PH CRES plate as given in BMS 7-240 Type I, heat treated to 150 to 170 KSI	Cum Line Numbers 1 thru 84 with SB 1067 incorporated and Cum Line Number 85 and on
[4]	Hinge Plate	0.50 (12.7)	7075-T7351 plate hogout as given in QQ-A-250/12 (Optional: 2024-T3511 extrusion as given in QQ-A-200/3)	Cum Line Numbers 1 thru 84
		0.50 (12.7)	15-5PH CRES plate as given in BMS 7-240 Type I, Heat Treated to 150 to 170 KSI	Cum Line Numbers 1 thru 84 with SB 1067 incorporated and Cum Line Number 85 and on
[5]	Hinge Plate	0.50 (12.7)	7075-T7351 rolled plate as given in QQ-A-250/12 (Grain direction controlled part)	Cum Line Numbers 1 thru 84
		0.50 (12.7)	15-5PH CRES plate as given in BMS 7-240 Type I, Heat Treated to 150 to 170 KSI	Cum Line Numbers 1 thru 84 with SB 1067 incorporated and Cum Line Number 85 and on
[6]	Hinge Plate	0.50 (12.7)	7075-T7351 rolled plate as given in QQ-A-250/12 (Grain direction controlled part)	Cum Line Numbers 1 thru 84
		0.50 (12.7)	7050-T7451 rolled plate as given in BMS 7-323 (Grain direction controlled part)	Cum Line Numbers 1 thru 84 with SB 1067 incorporated and Cum Line Number 85 and on
[7]	Hinge Half	0.50 (12.7)	7075-T7351 plate hogout as given in QQ-A-250/12 (Optional: 2024-T3511 extrusion as given in QQ-A-200/3)	
[8]	Hinge Half		BAC1520-2321 7075-T73511 extrusion as given in QQ-A-200/11 (Optional: 2024-T3511 extrusion as given in QQ-A-200/3 or 7075-T7351 plate as given in QQ-Q-250/12 that is 0.50 inch (12.7 mm) thick)	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



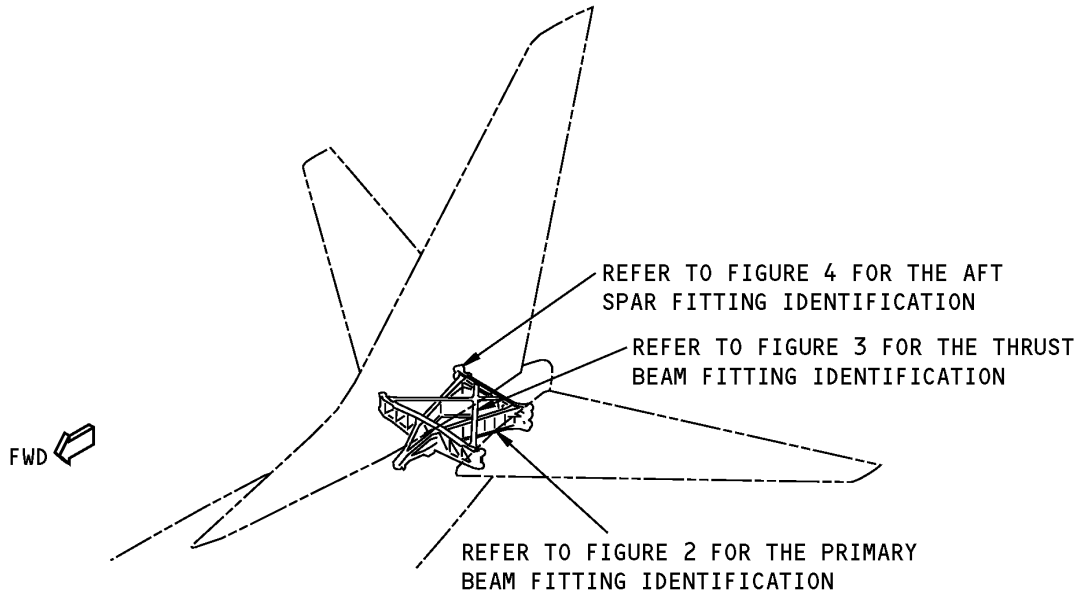
Trim Tab Lock Clevis Identification
Figure 5

Table 5:

LIST OF MATERIALS FOR FIGURE 5				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Clevis		7050-T7451 plate as given in AMS 4050	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - HORIZONTAL STABILIZER CENTER SECTION BEAM FITTINGS

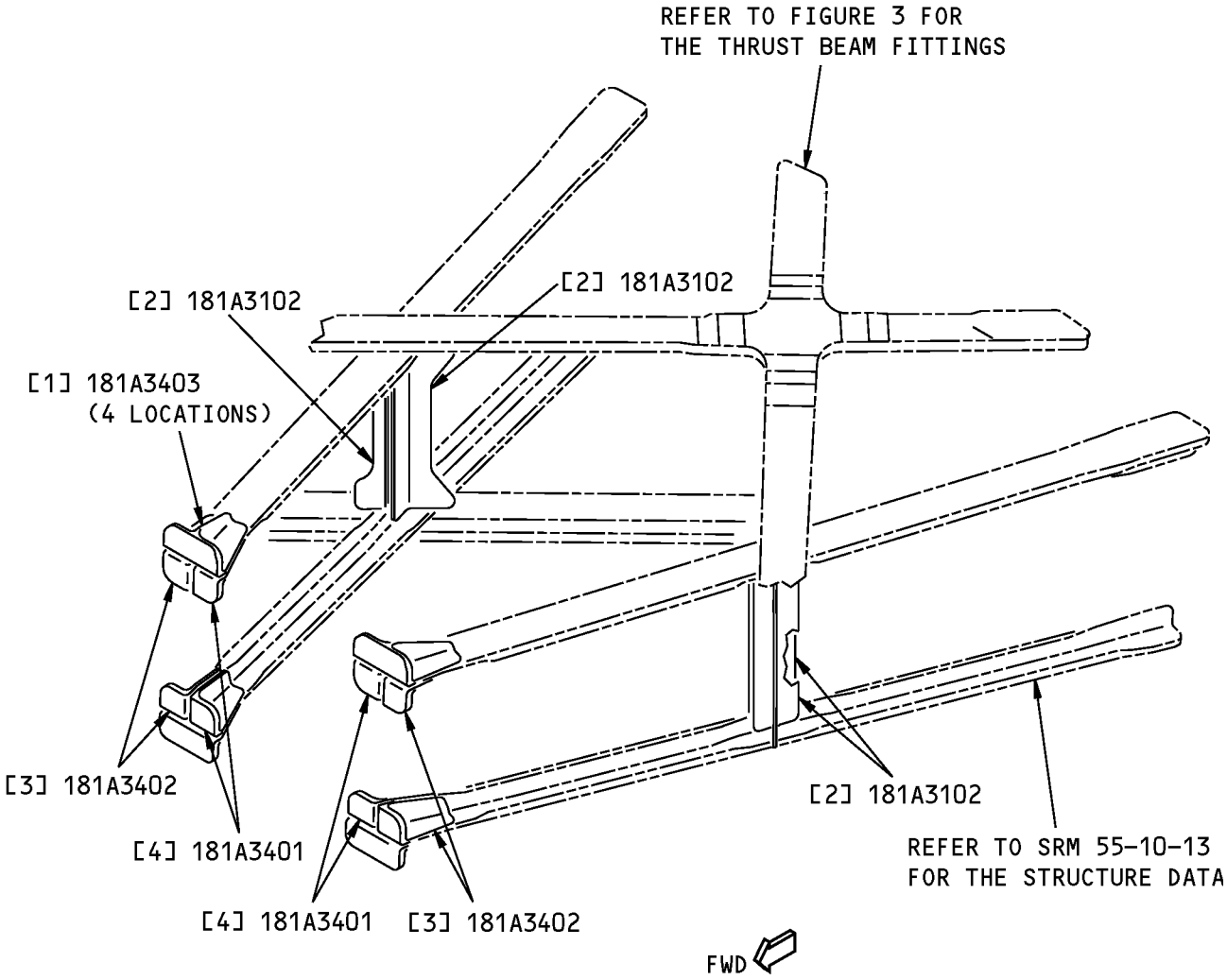


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Horizontal Stabilizer Center Section Beam Fitting Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
181A3000	Beam Installation - Center Section Horizontal Tail
181A3102	Extruded Details - Primary Beam, Center Section Horizontal Tail



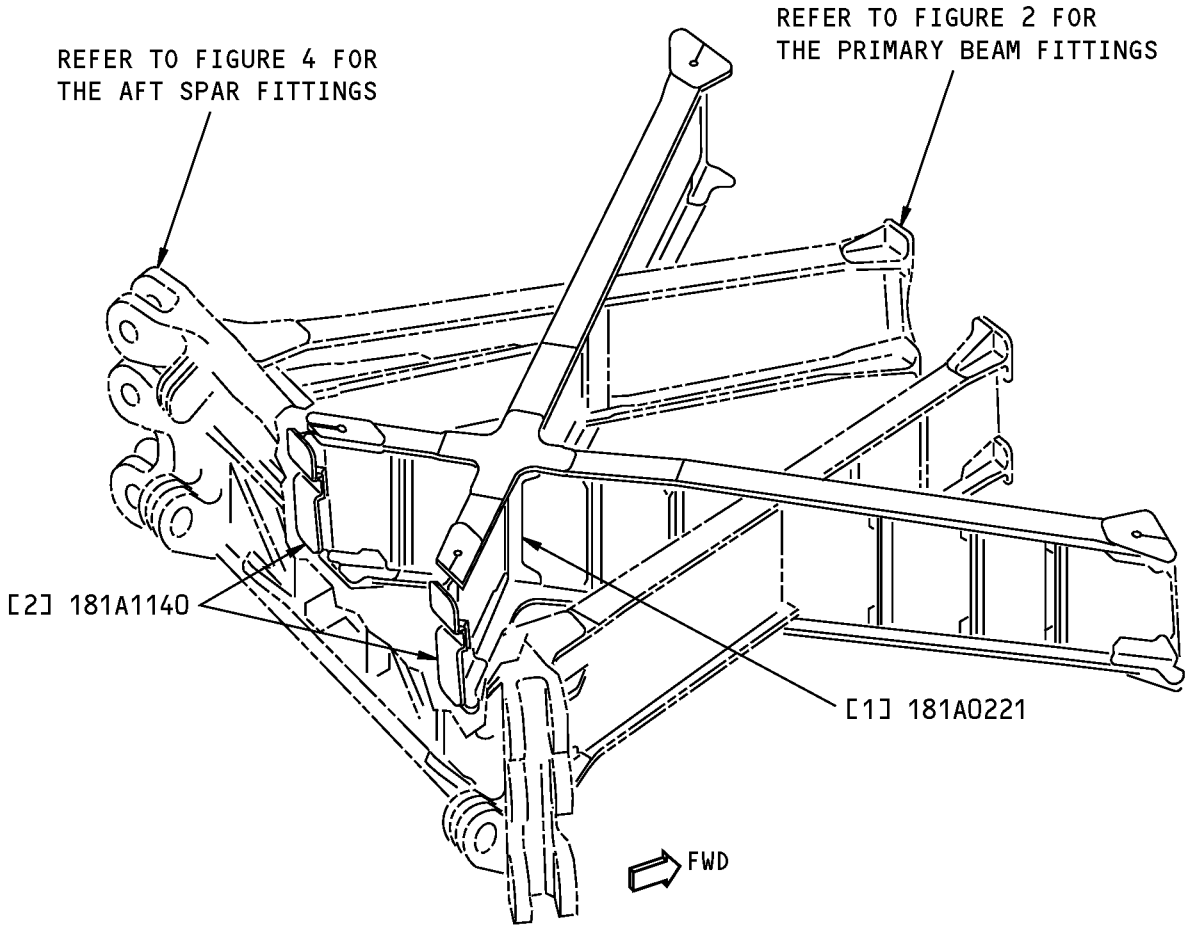
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Center Section Primary Beam Fittings Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Attach Fitting (2)		Ti-6Al-4V machined titanium bar as given in MIL-T-9047, in the annealed condition. Refer to the production drawing for the machined thicknesses	
[2]	Splice Fitting (2)		7075-T73511 extruded bar, as given in QQ-A-200/11, Class A. Refer to the production drawing for the machined thicknesses	
[3]	Attach Fitting (2)		Ti-6Al-4V machined titanium bar as given in MIL-T-9047, in the annealed condition. Refer to the production drawing for the machined thicknesses	
[4]	Attach Fitting (2)		Ti-6Al-4V machined titanium bar as given in MIL-T-9047, in the annealed condition. Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



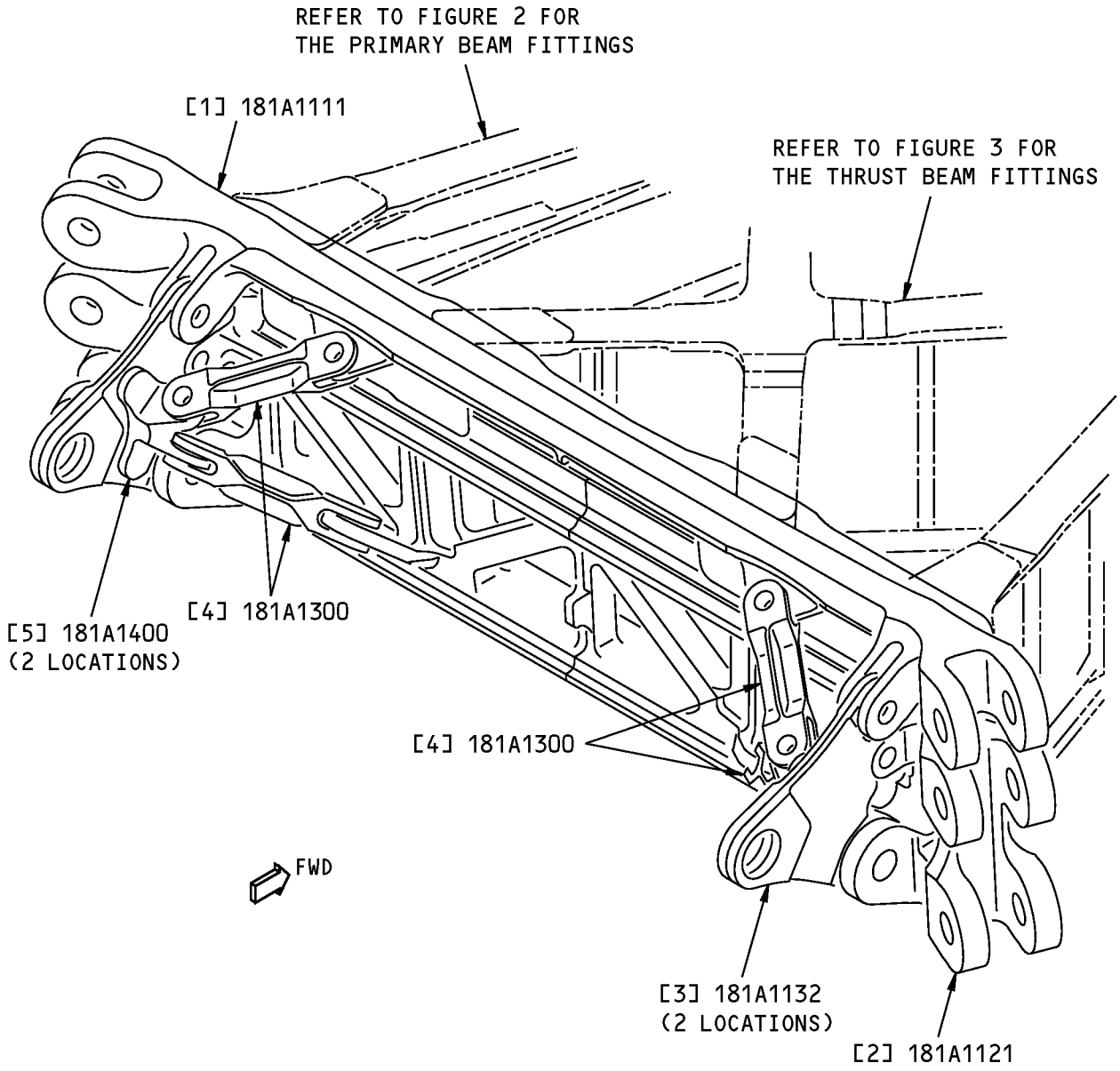
NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

Horizontal Stabilizer Center Section Thrust Beams Fittings Identification
Figure 3

Table 3:

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Splice Fitting		BAC1520-1387 7075-T73511 extrusion as given in QQ-A-200/11. (Optional: 7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses and grain direction)	
[2]	Shear Tie Fitting (2)		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses and grain direction	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



Horizontal Stabilizer Center Section Aft Spar Fittings Identification
Figure 4

Table 4:

LIST OF MATERIALS FOR FIGURE 4				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Upper Fitting		Ti-6Al-4V titanium forging as given in BMS 7-247, in the annealed condition. Refer to the production drawing for the machined thicknesses and grain direction	
[2]	Lower Fitting		7050-T74 forging as given in BMS 7-214, Class A. Refer to the production drawing for the machined thicknesses and grain direction	
[3]	Hinge Housing (2) Fitting		Ti-6Al-4V titanium as given in MIL-T-9046, Composition AB-1. Refer to the production drawing for the machined thicknesses and grain direction	
[4]	Brace Fitting (4)		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses and grain direction	
[5]	Attach Fitting (2)		Ti-6Al-4V machined titanium bar as given in MIL-T-9047, in the annealed condition. Refer to the production drawing for the machined thicknesses and grain direction	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

REPAIR 1 - HORIZONTAL STABILIZER OUTBOARD CLOSURE RIB LIGHTNING STRIKE REPAIR

1. Applicability

A. Repair 1 is applicable to damage from a lightning strike to the aft end of the horizontal stabilizer outboard closure rib upper and lower flange and to the tip cap attachment fasteners and nutplates.

2. General

A. Repair 1 is a Category A Repair. Refer to 51-00-06 for the definitions of the different types of repairs.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-20-06	SHOT PEENING
51-30-01, GENERAL	Sheet Metal Materials
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
737 NDT Part 6, 51-00-00, Figure 3	Investigation of Fire Damage on Aircraft Structure
737 NDT Part 6, 51-00-00, Figure 4	Surface Inspection of Aluminum Parts
737 NDT Part 6, 51-00-00, Figure 8	Inspection of Subsurface Cracks in Aluminum Structure
737 NDT Part 6, 51-00-00, Figure 9	Inspection of Subsurface Cracks at Fastener Holes in Aluminum Structure

4. Repair Instructions

A. Get access to the damaged area.

(1) Remove the necessary fasteners in the area of the damaged skin. Refer to 51-40-02, GENERAL.

(2) Remove the horizontal stabilizer outboard closure rib tip cap, as necessary.

(3) Remove the upper and/or lower horizontal stabilizer outboard aft trailing edge skin panels, as necessary.

(4) Remove the nutplates, as necessary, to install the Part [1] repair channel, as shown in Figure 201/REPAIR 1.

B. Cut and remove the damaged part of the horizontal stabilizer outboard closure rib upper and/or lower aft flange, if necessary, as shown in Figure 201/REPAIR 1. Refer to 51-10-02, GENERAL.

(1) Make the cut as shown in Figure 201/REPAIR 1.

(a) Refer to 51-10-02 for the inspection and removal of damage.

(b) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(c) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(d) Make sure the surface smoothness for all cut surfaces is 63 microinches (Ra) or smoother.

C. Do a High Frequency Eddy Current (HFEC) inspection of the repair area to make sure that all of the damage is removed. Do a 0.040 inch (1.02 mm) insurance cut if no further damage is found. Refer to 737 NDT Part 6, 51-00-00, Figure 3, 737 NDT Part 6, 51-00-00, Figure 4, 737 NDT Part 6, 51-00-00, Figure 8 and 737 NDT Part 6, 51-00-00, Figure 9.

D. Flap peen or shot peen the cut edges of the horizontal stabilizer outboard closure rib flange.

(1) Refer to 51-20-06 for shot peen intensity and shot number.

(2) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

E. Make the repair parts as given in Table 201.

F. Make the contour of the repair parts the same as the contour of the initial parts, as necessary. Refer to 51-30-01, GENERAL.

G. Remove the horizontal stabilizer outboard closure rib finish that is common to the Part [1] repair channel.

H. Assemble the repair parts as shown in Figure 201/REPAIR 1.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Repair Channel	1	7075–T7351 plate, machined to a final thickness of 0.080 inch (0.20 cm), as given in drawing 182A5201, or 7075–0 sheet, 0.080 inch (0.20 cm) thick, heat treat to T73 after forming
[2]	Filler	1	7075–T73 bare sheet, 0.050 inch (0.13 cm) thick
[3]	Filler	1	7075–T73 bare sheet, 0.050 inch (0.13 cm) thick

I. Drill the necessary fastener holes in the repair parts. Use the initial fastener type, diameter and locations in the upper and lower flanges at the aft end of the horizontal stabilizer outboard closure rib. Refer to 51-40-05 for the fastener hole dimensions.

(1) Do not countersink the fastener holes more than 76 percent of the initial flange thickness.

(a) This will prevent a knife-edge condition of the initial flange.

J. Disassemble the repair parts.

K. Remove all the nicks, scratches, burrs, and sharp edges from the repair parts and bare surfaces of the initial parts.

L. Install the repair parts dry.

(1) Do not apply sealant to the mating surfaces.

(2) Install the repair fasteners without sealant.

M. Apply a chemical conversion coating to the repair parts and to the bare surfaces of the initial parts. Refer to 51-20-01.

N. Apply two layers of BMS 10-11, Type I primer to the repair parts and to the bare surfaces of the initial parts, other than at areas common to the static wicks. Refer to SOPM 20-41-02.

O. Fillet seal the repair parts and fill all gaps with BMS 5-95 sealant. Refer to 51-20-05.

P. Attach the initial nutplates from 4.A.(4) above to the repair parts as shown in Figure 201/REPAIR 1.

(1) The initial nutplate fasteners will go through the Part [1] repair channel and the initial horizontal stabilizer outboard closure rib or the repair fillers, as shown in Figure 201/REPAIR 1.

Q. Do a resistance check between the Part [1] repair channel and the initial horizontal stabilizer outboard closure rib as given in BAC 5117–6. Maximum resistance permitted is 0.010 ohms.

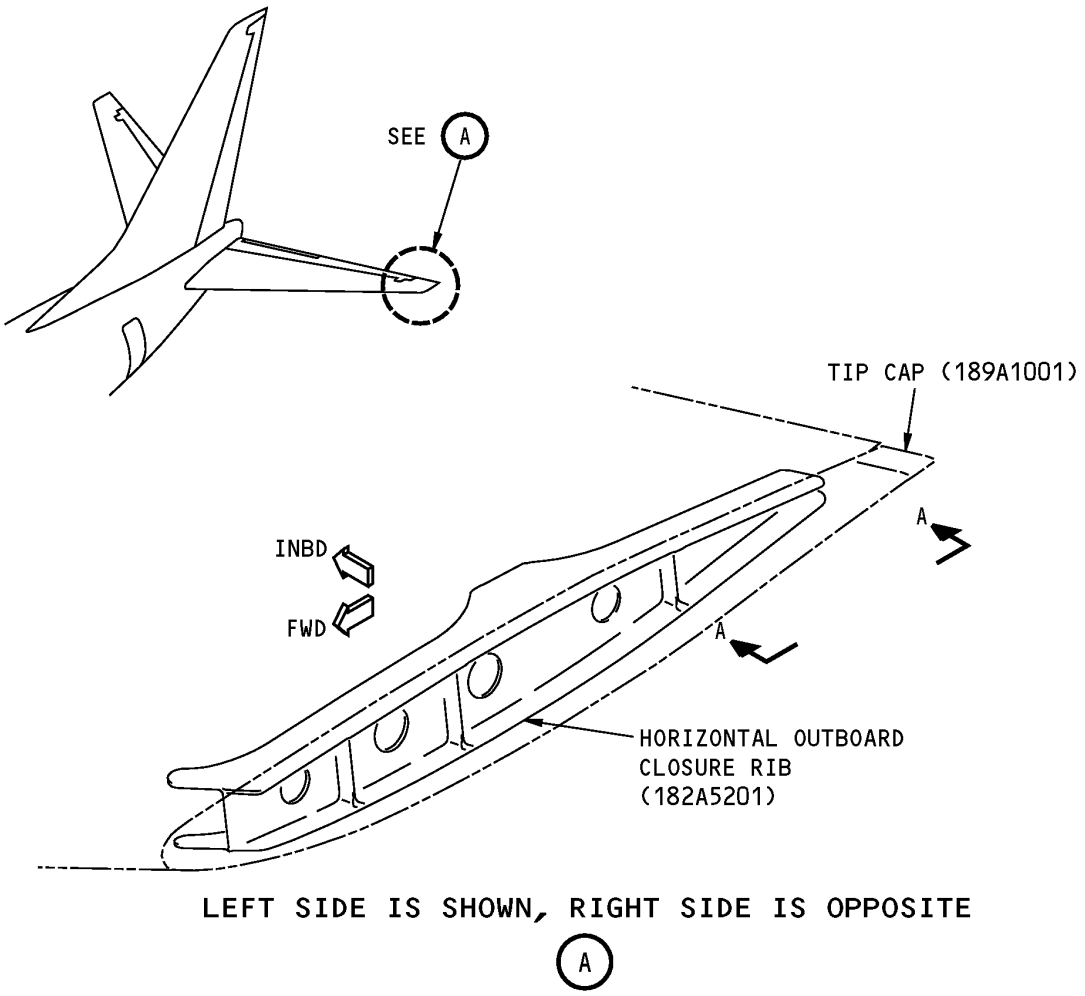
R. Apply a layer of BMS 3-23, corrosion inhibiting compound, to all the interior structure of the repair area.

S. Install the initial horizontal stabilizer outboard closure rib tip cap as given in drawing 189A1001.

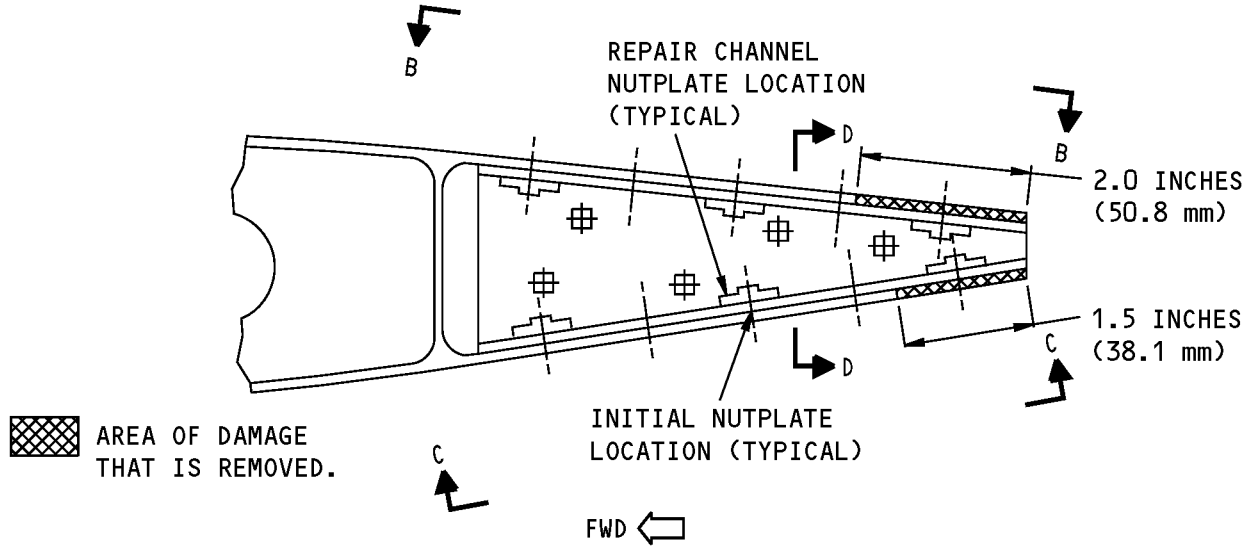
T. Install the initial upper and/or lower horizontal stabilizer outboard aft trailing edge skin panels as given in drawing 185A1801.

U. Do a resistance check between the fastener head and the initial structure as given in BAC 5117–6. Maximum resistance permitted is 0.010 ohms.

V. Apply a decorative finish if necessary. Refer to AMM PAGEBLOCK 51-21-99/701.

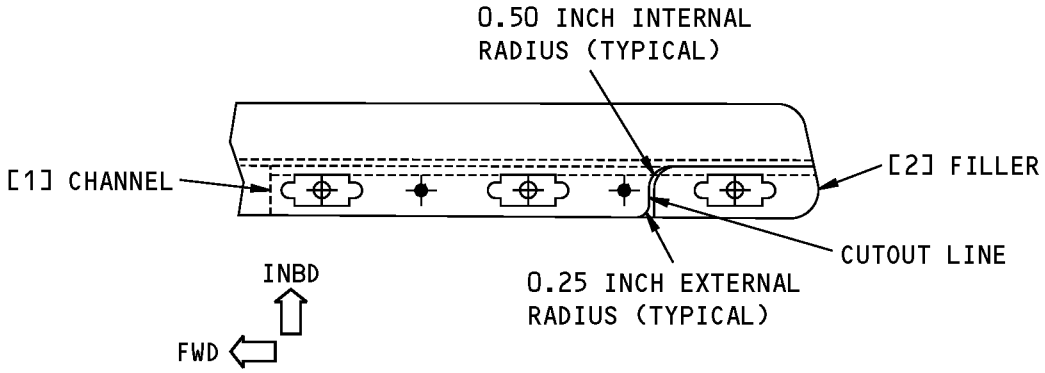


Layout of the Repair Parts
Figure 201 (Sheet 1 of 3)

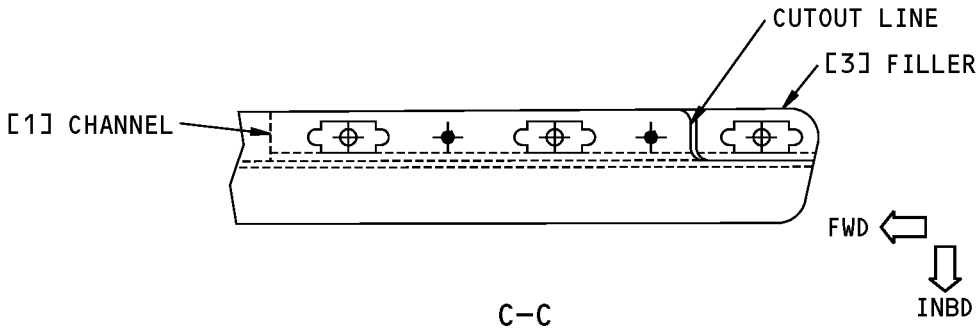


VIEW WHEN YOU LOOK INBOARD

A–A

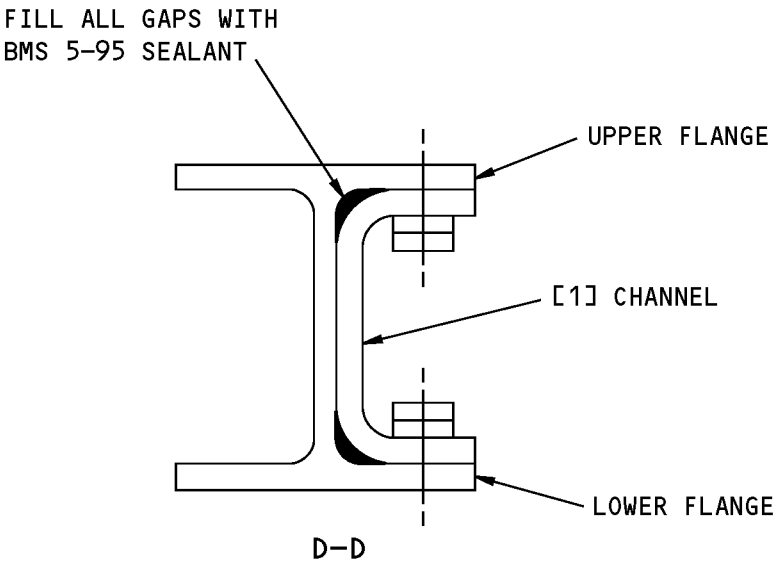


B–B



C–C

Layout of the Repair Parts
Figure 201 (Sheet 2 of 3)



NOTES

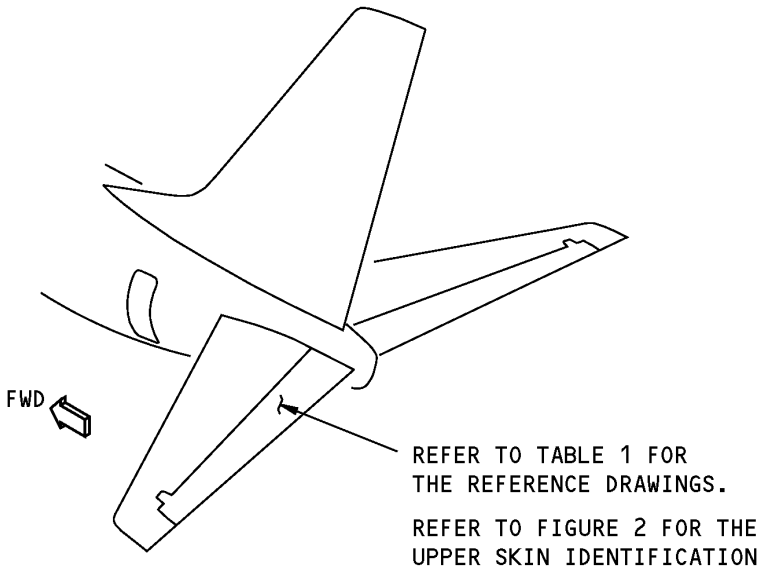
1. MAKE SURE THERE IS A MINIMUM OF 2D EDGE MARGIN.
2. MAKE SURE THERE IS A MINIMUM OF 3D TO 5D FASTENER SPACING FOR ALL NEW FASTENERS.
3. MAKE SURE THERE IS A MINIMUM OF 4D TO 6D FASTENER SPACING FOR ALL NEW FASTENERS.
4. MAKE SURE THERE IS A MAXIMUM OF 0.010 INCH GAP BETWEEN THE INITIAL PARTS AND THE REPAIR PARTS.

FASTENER SYMBOLS

- INITIAL FASTENER LOCATION. INSTALL THE SAME TYPE AND SIZE AS THE INITIAL FASTENER. REPLACE ANY DAMAGED NUT PLATES OR FASTENERS.
- REFERENCE FASTENER LOCATION
- REPAIR FASTENER LOCATION. INSTALL A BACB30VT6 BOLT AND A BACC30BL COLLAR WITH COLLAR OUTBOARD. 1 3 4
- REPAIR FASTENER LOCATION. INSTALL A BACR15CE6 RIVET. 1 2 4

Layout of the Repair Parts
Figure 201 (Sheet 3 of 3)

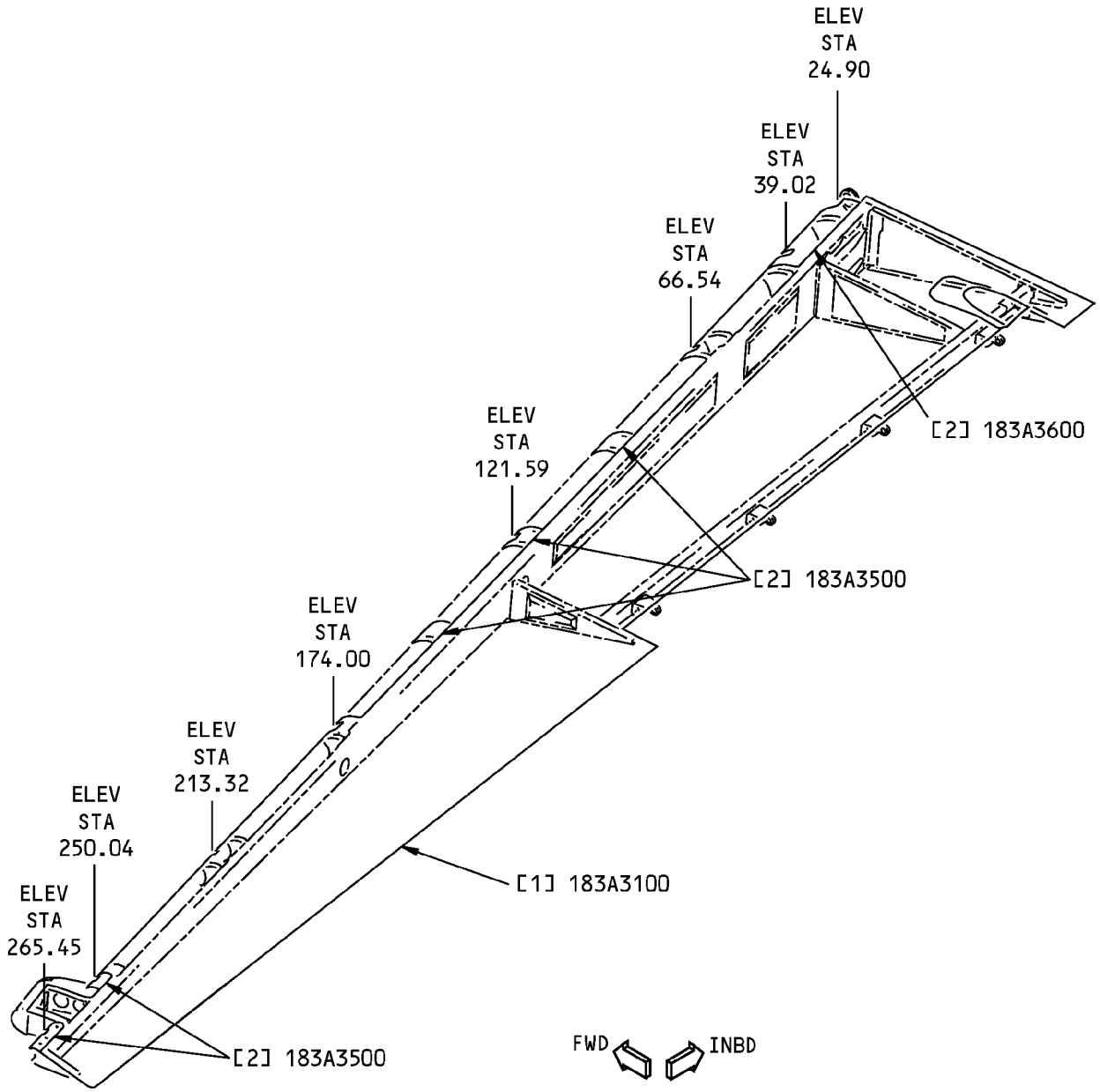
IDENTIFICATION 1 - ELEVATOR UPPER SKIN



Elevator Upper Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A0000	Elevator Installation
183A0001	Elevator Integration Functional Product Collector
183A0101	Elevator Assembly Functional Product Collector
183A3000	Upper Skin Panel Installation - Elevator



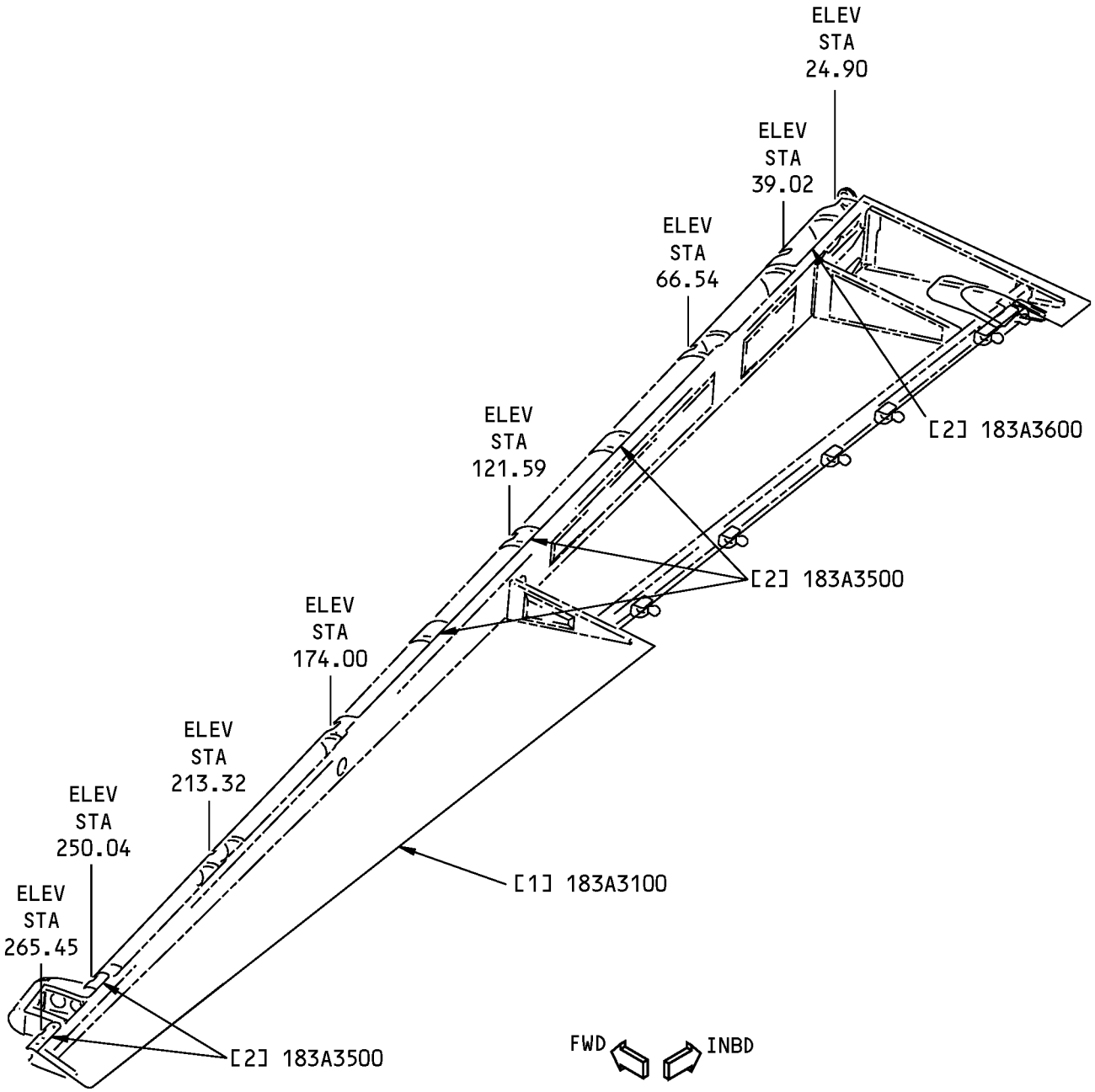
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)

NOTES

- REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Elevator Upper Skin Identification
Figure 2 (Sheet 1 of 2)



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

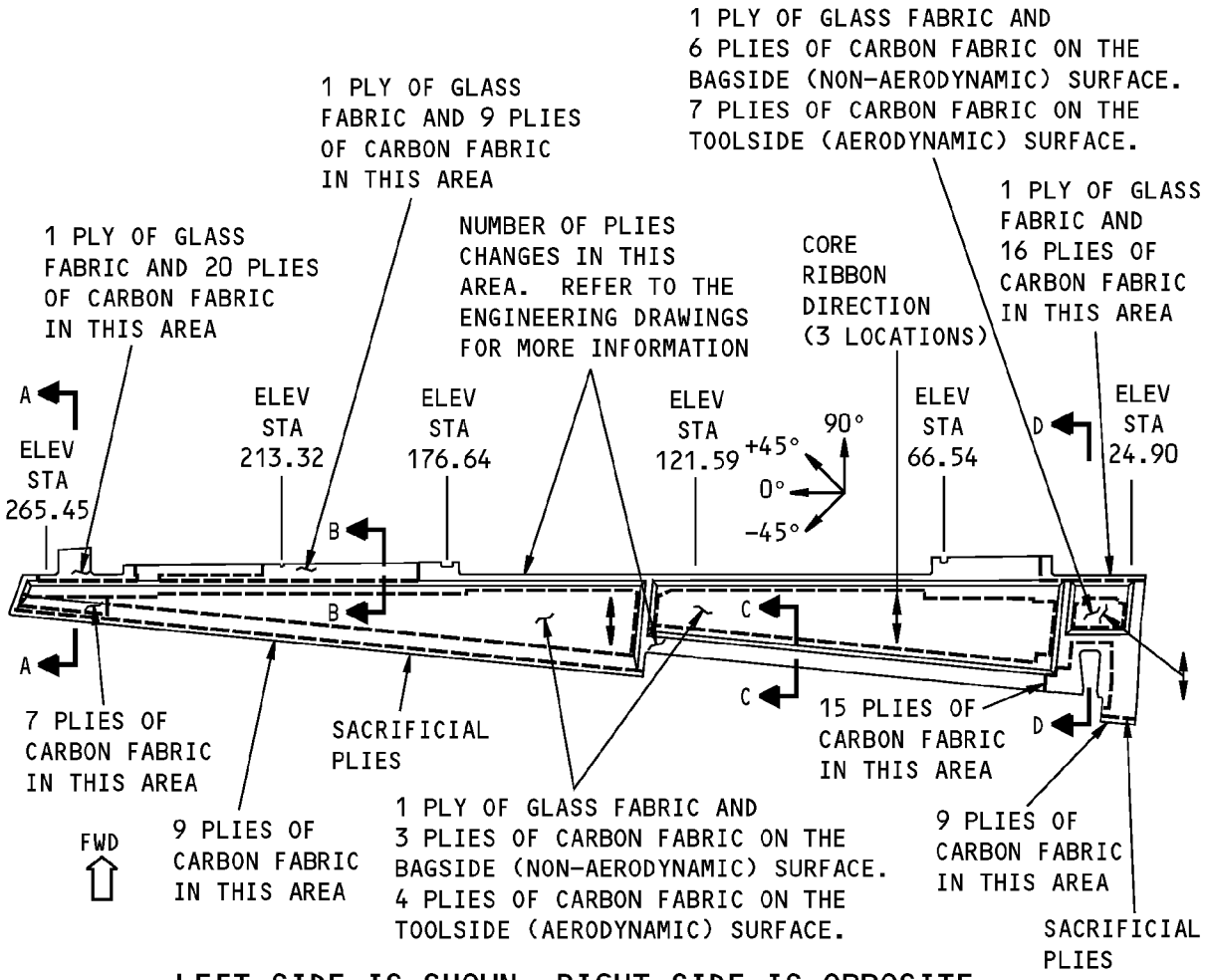
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Upper Skin Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Elevator Upper Skin - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) woven fabric as given in BMS 8-256, Type IV, Class II, Style 3K-70-PW	
	Skin		Refer to Figure 3	
	Core (Inboard closure rib to ELEV STA 39.020)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core (ELEV STA 39.020 to ELEV STA 132.39)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core (Elev STA 132.39 to outboard closure rib)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Hinge Cover		Epoxy sheet molding compound as given in BMS 8-327, Type I, Lytex 9063	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

VIEW IS ON THE BAGSIDE (NON-AERODYNAMIC) SURFACE

PLY LAYUP AND CORE RIBBON DIRECTION

(A)

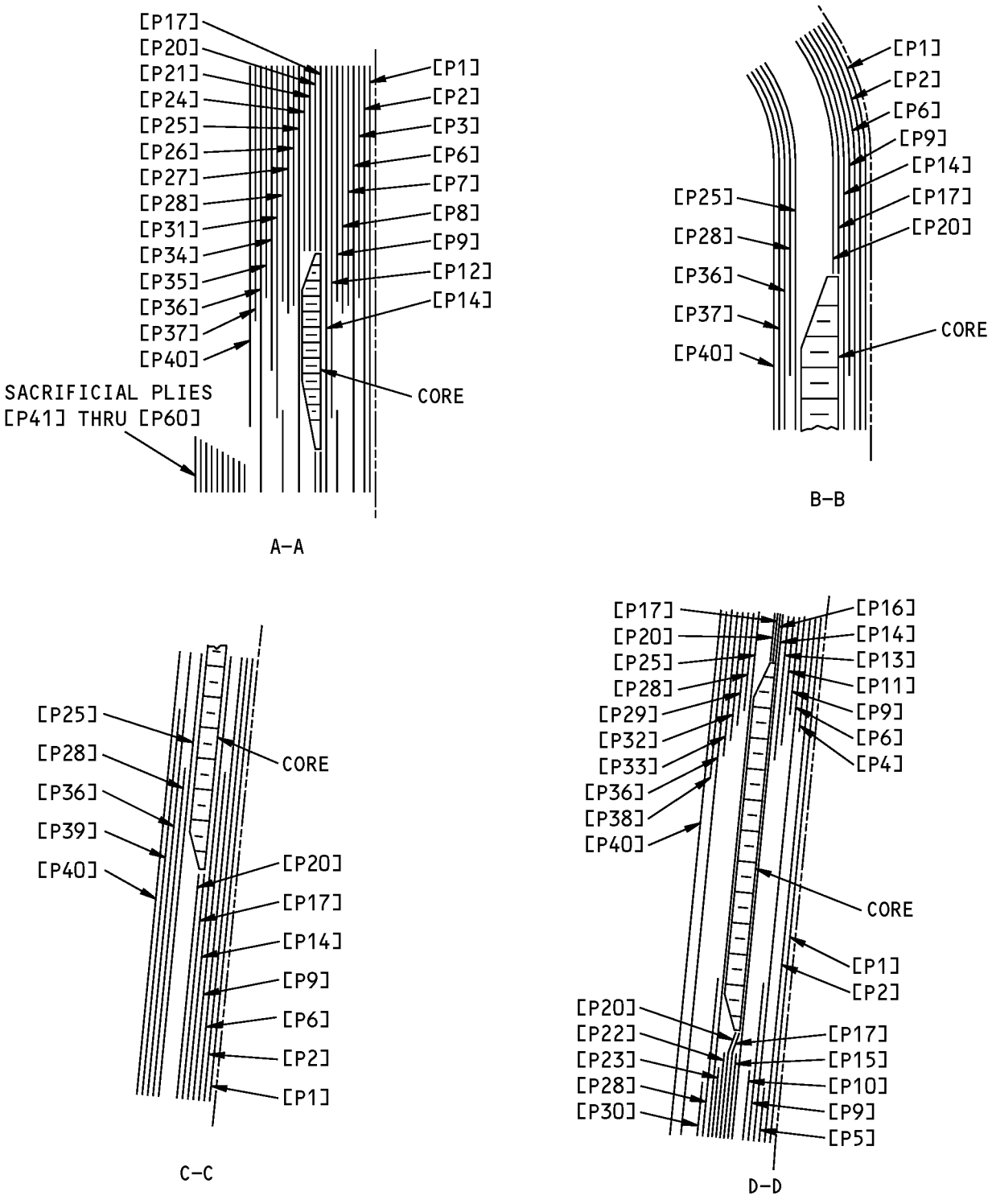
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.

  REFER TO SECTION A-A, B-B, C-C, AND D-D FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE INFORMATION.

  REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTIONS A-A, B-B, C-C, AND D-D.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Elevator Upper Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 1 of 2)

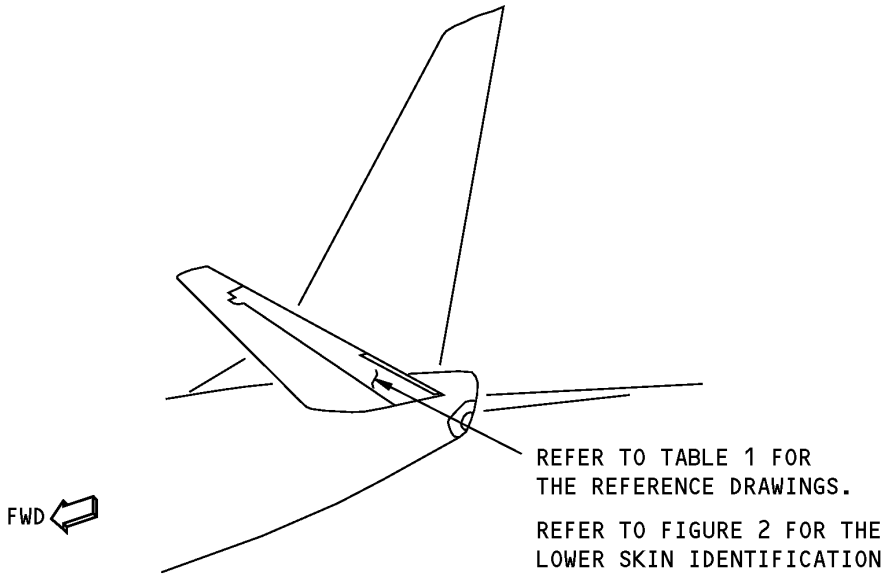


Ply Direction, Core Ribbon Direction, and Ply Sequence for the Elevator Upper Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 2 of 2)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1	———	Surface composite film as given in BMS 8-341 Type II
P2, P6, P8, P10, P11, P12, P16, P17, P18, P19, P23, P24, P26, P28, P32, P34, P36, P43, P44, P45, P46, P51, P52, P57, P58, P59, P60	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P4, P5, P7, P9, P13, P14, P15, P20, P21, P22, P25, P27, P29, P30, P31, P33, P35, P41, P42, P47, P48, P49, P50, P53, P54, P55, P56	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P37, P38, P39	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-139, Style 108
P40	———	1 mil White Tedlar as given in BAC 5317-4

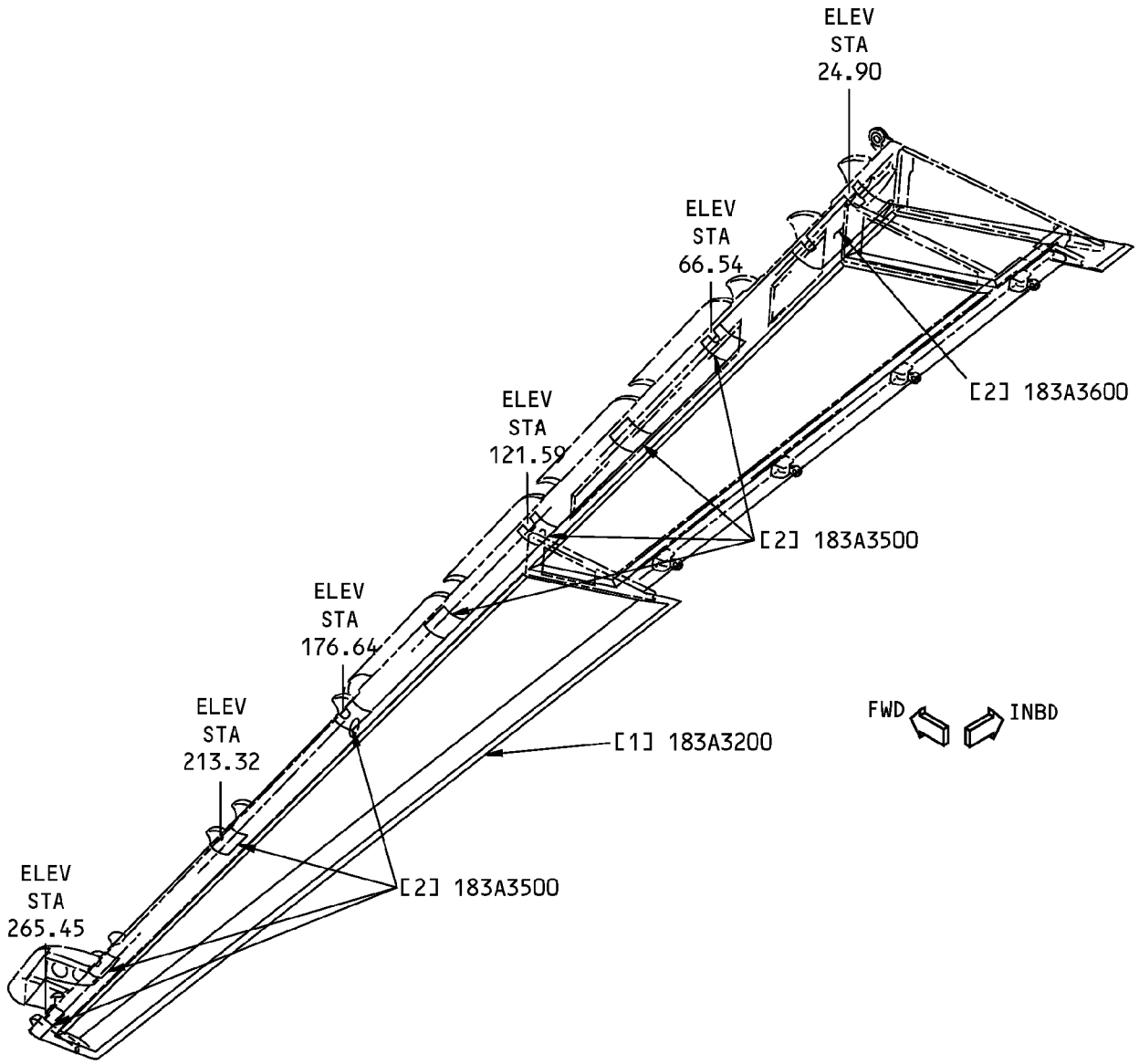
IDENTIFICATION 2 - ELEVATOR LOWER SKIN



Elevator Lower Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A0000	Elevator Installation
183A0001	Elevator Integration Functional Product Collector
183A0101	Elevator Assembly Functional Product Collector
183A3010	Lower Skin Panel Installation - Elevator



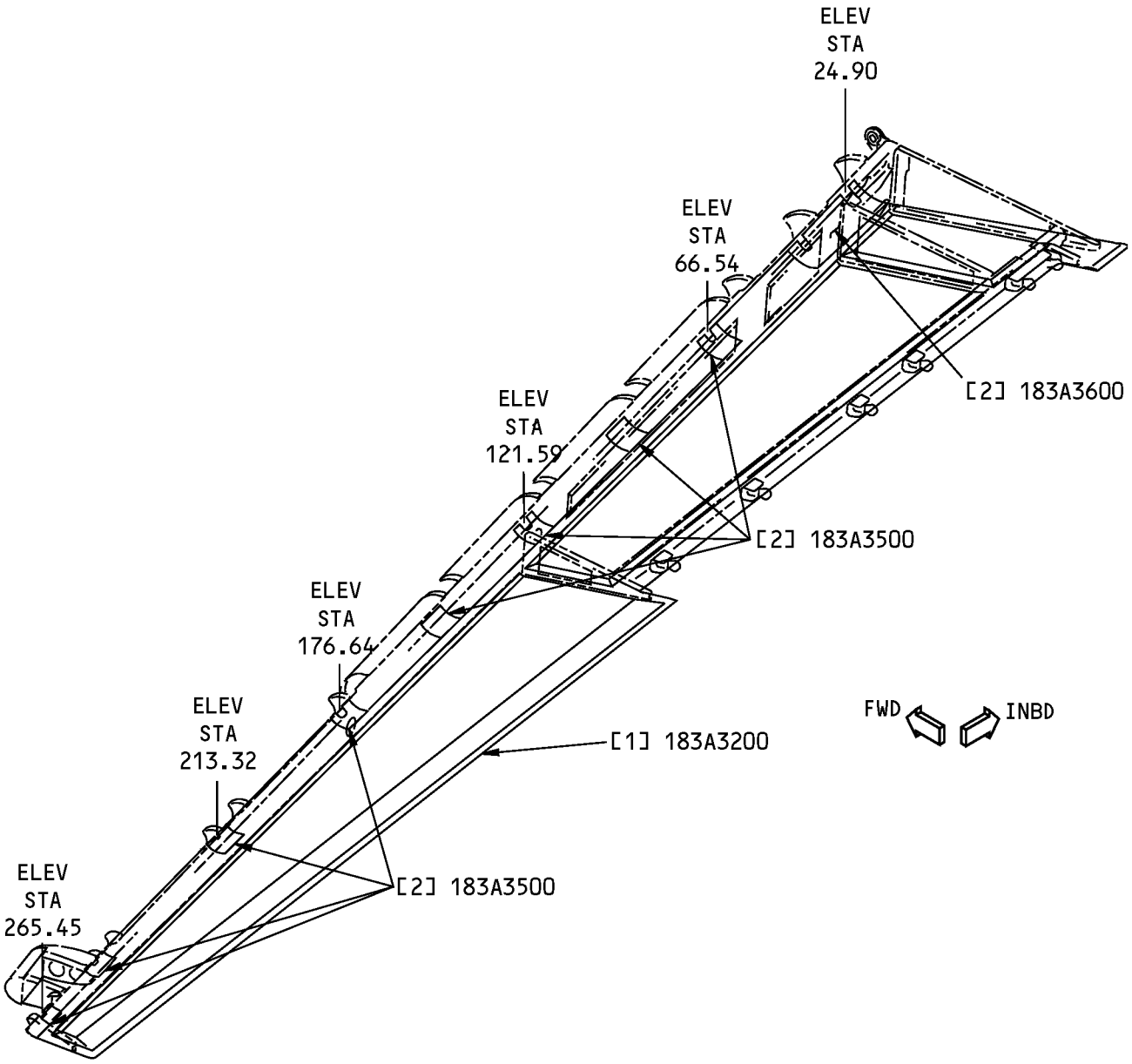
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)

NOTES

- REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Elevator Lower Skin Identification
Figure 2 (Sheet 1 of 2)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

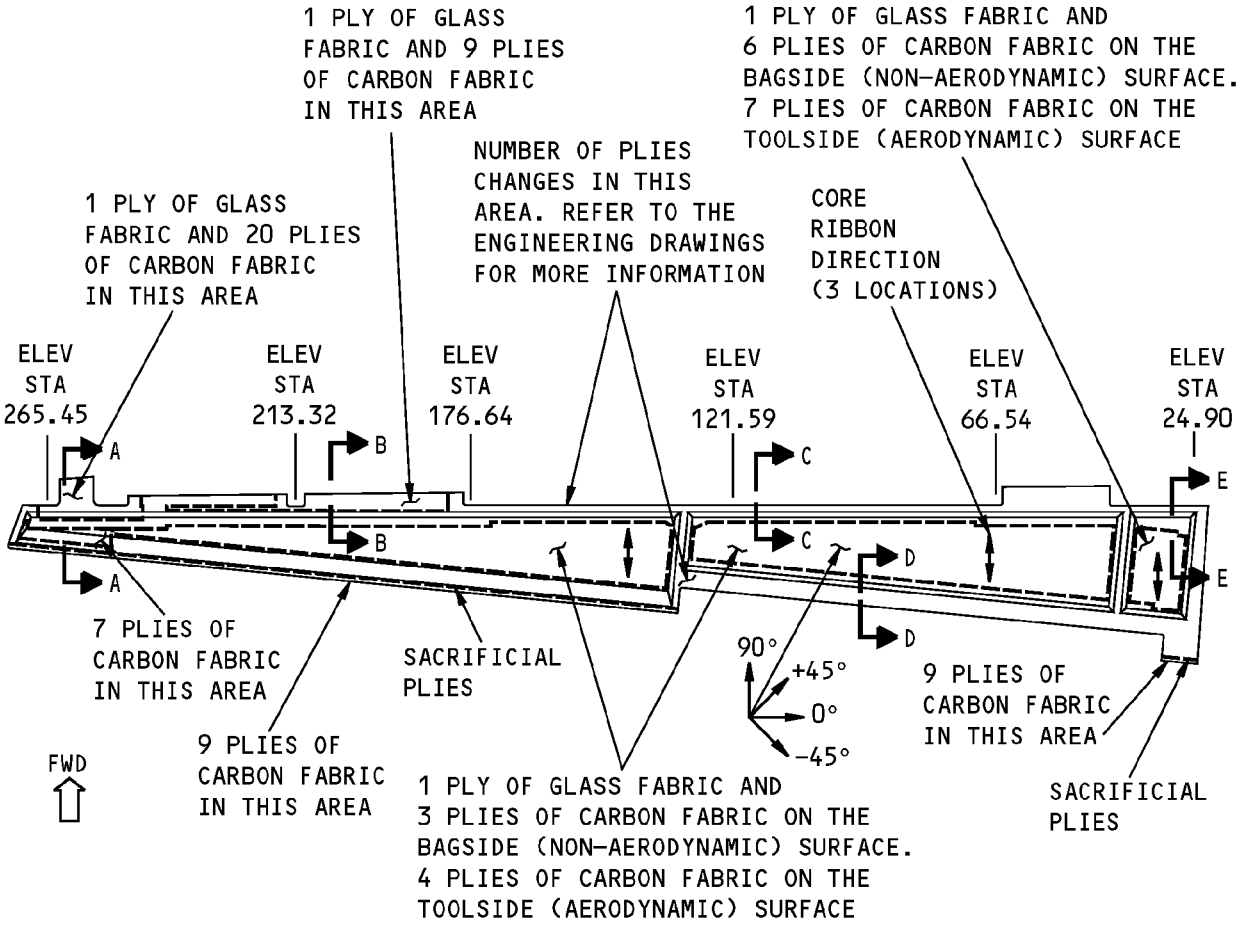
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Lower Skin Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Elevator Lower Skin - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW	
	Skin		Refer to Figure 3	
	Core (Inboard closure rib to ELEV STA 39.02)		Aramid honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core (ELEV STA 39.02 to ELEV STA 132.39)		Aramid honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core (ELEV STA 132.39 to outboard closure rib)		Aramid honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Hinge Cover		Epoxy sheet molding compound as given in BMS 8-327, Type I, Lytex 9063	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

VIEW IS ON THE BAGSIDE (NON-AERODYNAMIC) SURFACE

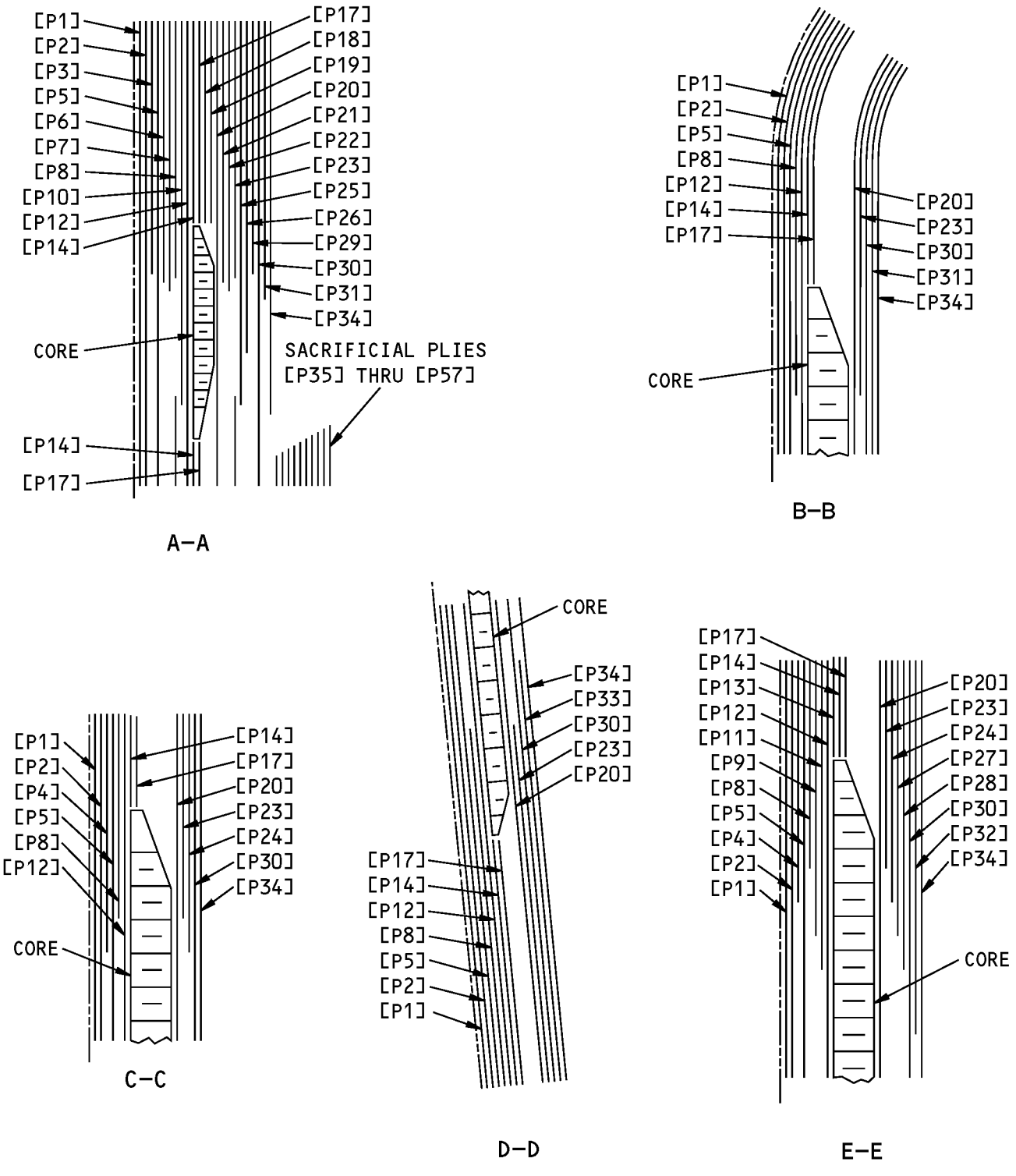
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTIONS A-A, B-B, C-C, D-D, AND E-E FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE INFORMATION.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTIONS A-A, B-B, C-C, D-D, AND E-E.

**Ply Direction, Core Ribbon Direction, and Ply Sequence for the Elevator Upper Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 1 of 2)**

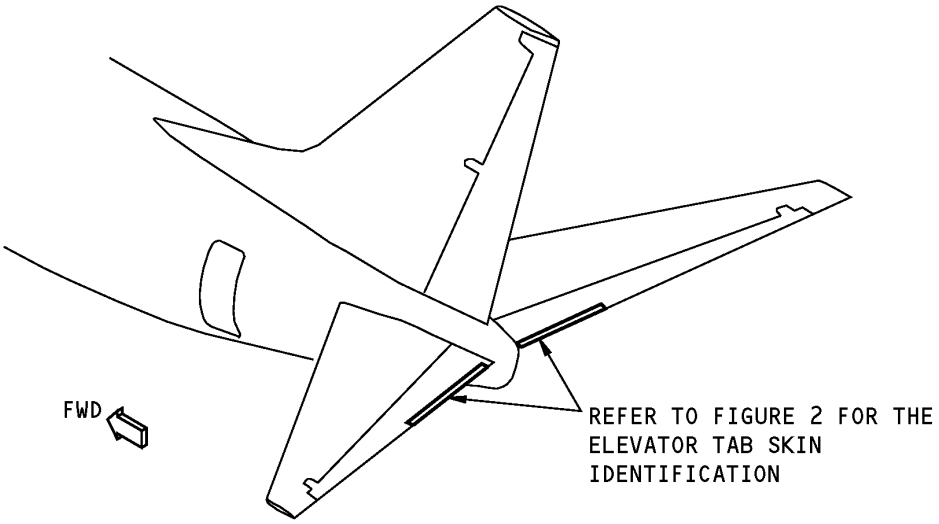


Ply Direction, Core Ribbon Direction, and Ply Sequence for the Elevator Upper Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 2 of 2)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1	———	Composite surfacing film as given in BMS 8-341, Type II
P2, P5, P7, P9, P10, P13, P14, P15, P16, P19, P21, P23, P26, P27, P30, P37, P38, P39, P40, P44, P45, P46, P51, P52, P53, P56, P57	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P4, P6, P8, P11, P12, P17, P18, P20, P22, P24, P25, P28, P29, P35, P36, P41, P42, P43, P47, P48, P49, P50, P54, P55	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P31, P32, P33	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-139, Style 108
P34	———	1 mil White Tedlar as given in BAC5317-4

IDENTIFICATION 3 - ELEVATOR TAB SKINS

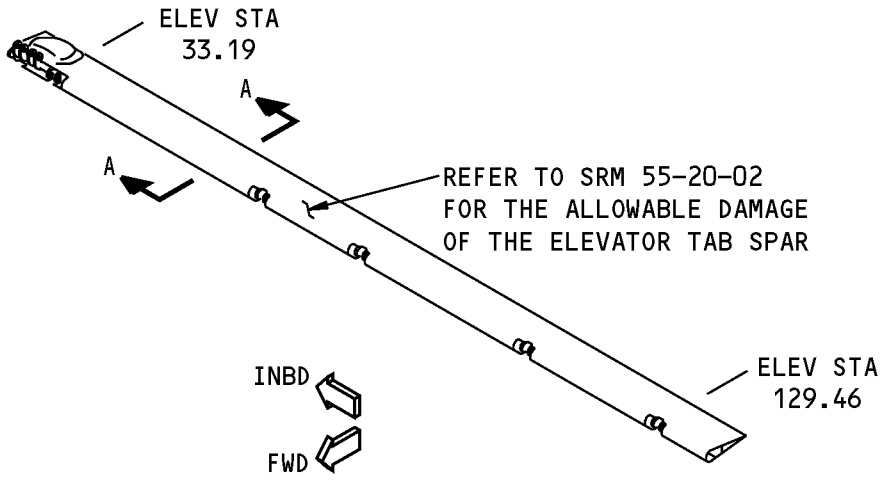


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Elevator Tab Skin Locations
Figure 1

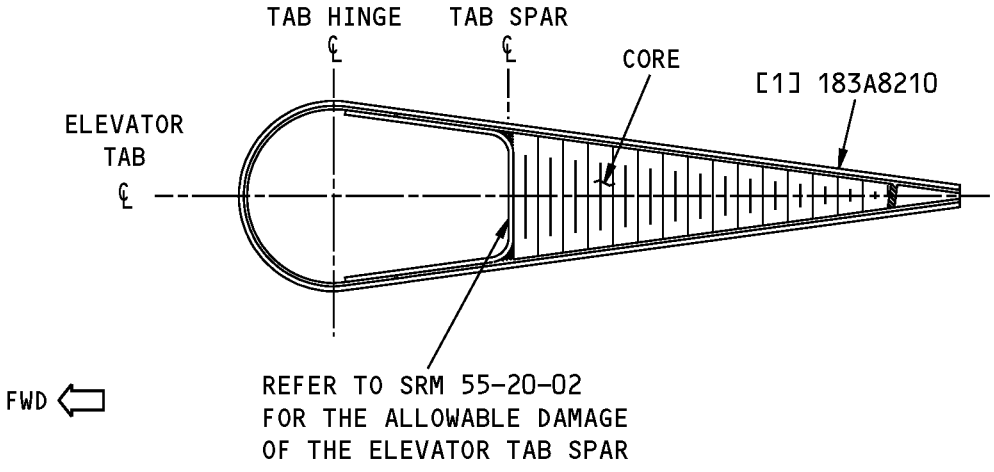
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A8000	Elevator Tab Installation
183A8100	Elevator Tab Assembly
183A8200	Elevator Tab Bonded Part
183A8210	Elevator Tab Skins Bonded Part
183A8220	Elevator Tab Spar and Leading Edge Bonded Part
183A8230	Elevator Tab End Closures



ELEVATOR TAB SKIN
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

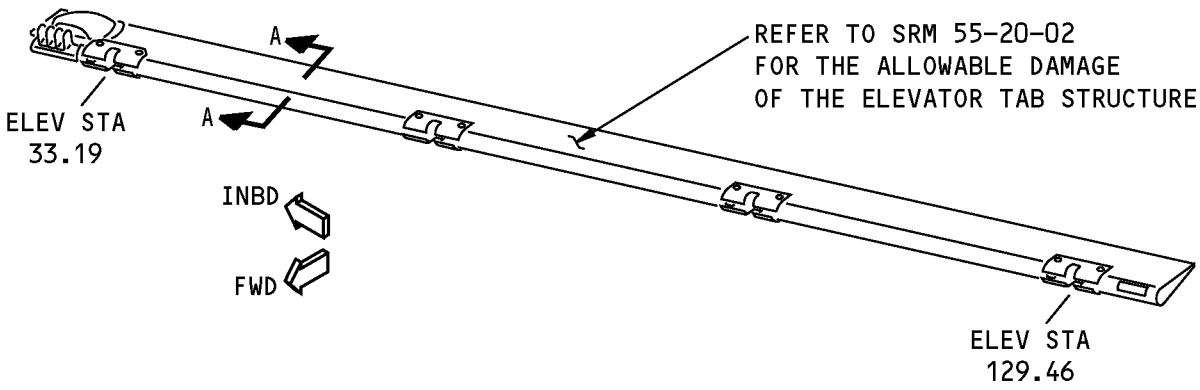
A



A-A

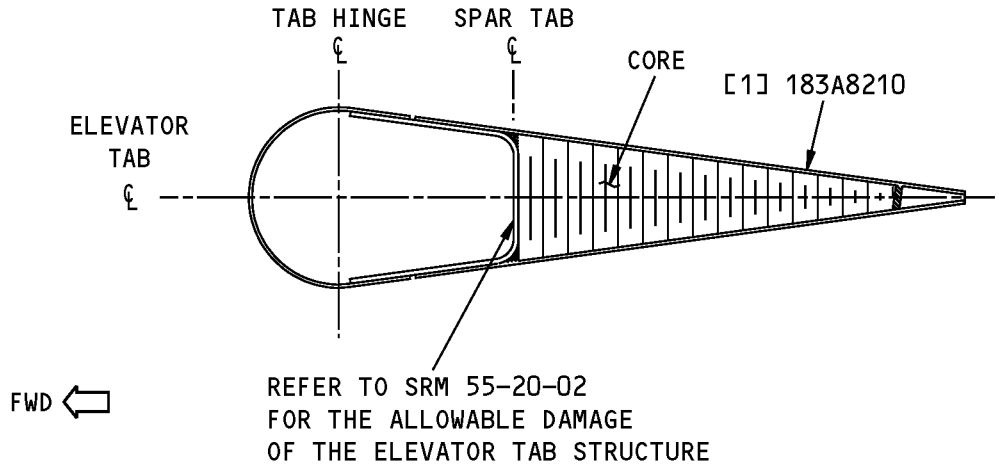
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Elevator Tab Skin Identification
Figure 2 (Sheet 1 of 2)



ELEVATOR TAB SKIN
(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

A



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

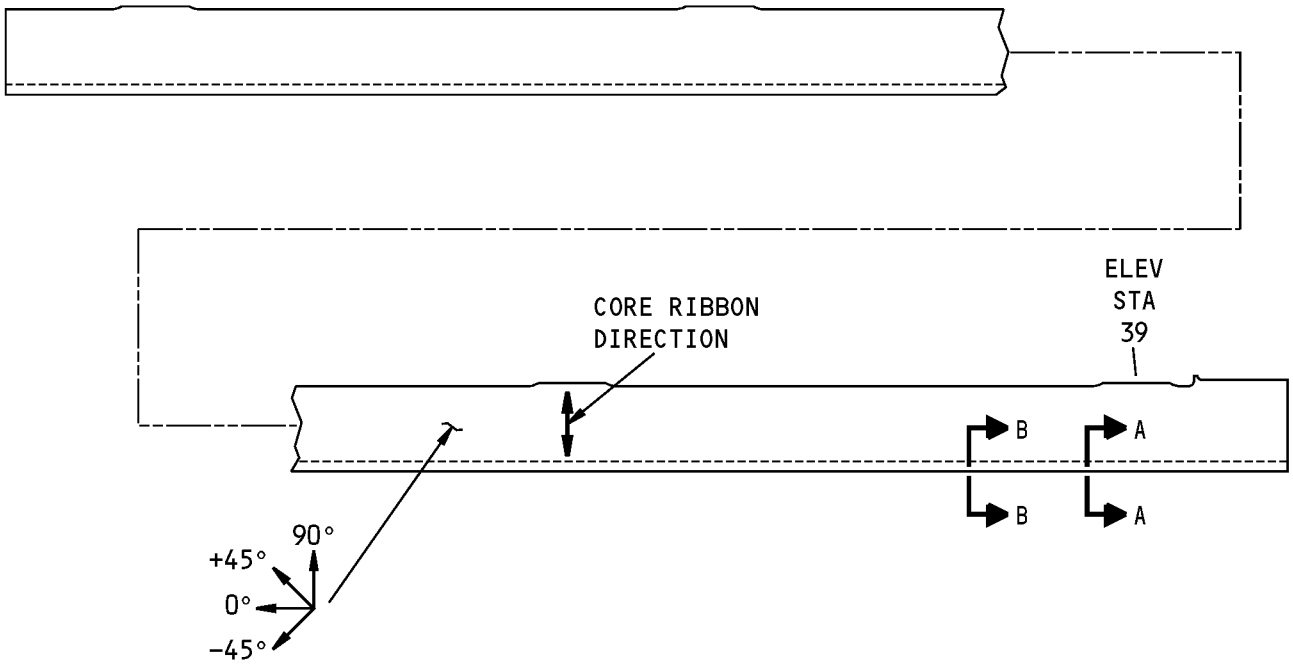
A-A

Elevator Tab Skin Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Elevator Tab Skin Assembly - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW	
	Upper Skin		Refer to Figure 3	
	Lower Skin		Refer to Figure 4	
	Leading Edge Skin		Refer to Figure 5	
	Outer Skin		Refer to Figure 6	For airplane line numbers 1175 and on
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

VIEW IS ON THE TOOLSIDE (AERODYNAMIC) SURFACE

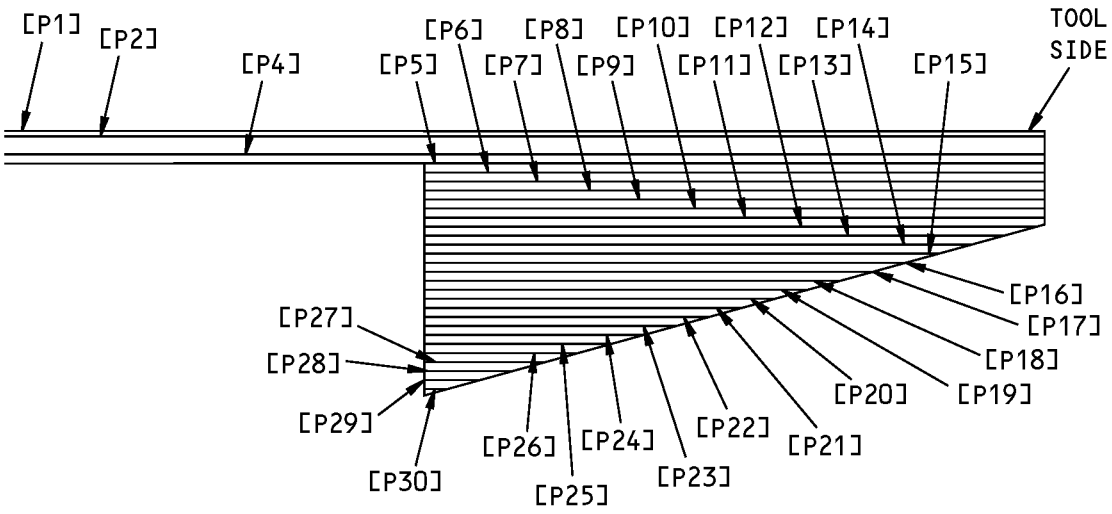
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

NOTES

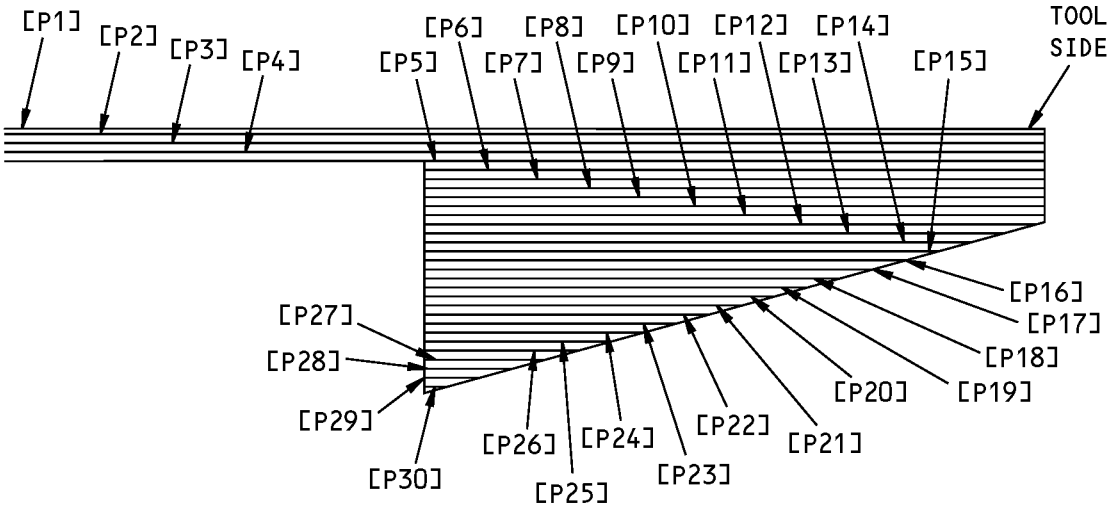
- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE FOR THOSE LOCATIONS.
- REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Direction and Ply Sequence for the Elevator Tab Upper Skin, Figure 2, Item [1]
Figure 3 (Sheet 1 of 2)



VIEW IS ROTATED 90° COUNTERCLOCKWISE

PLY LAYUP SEQUENCE
A–A



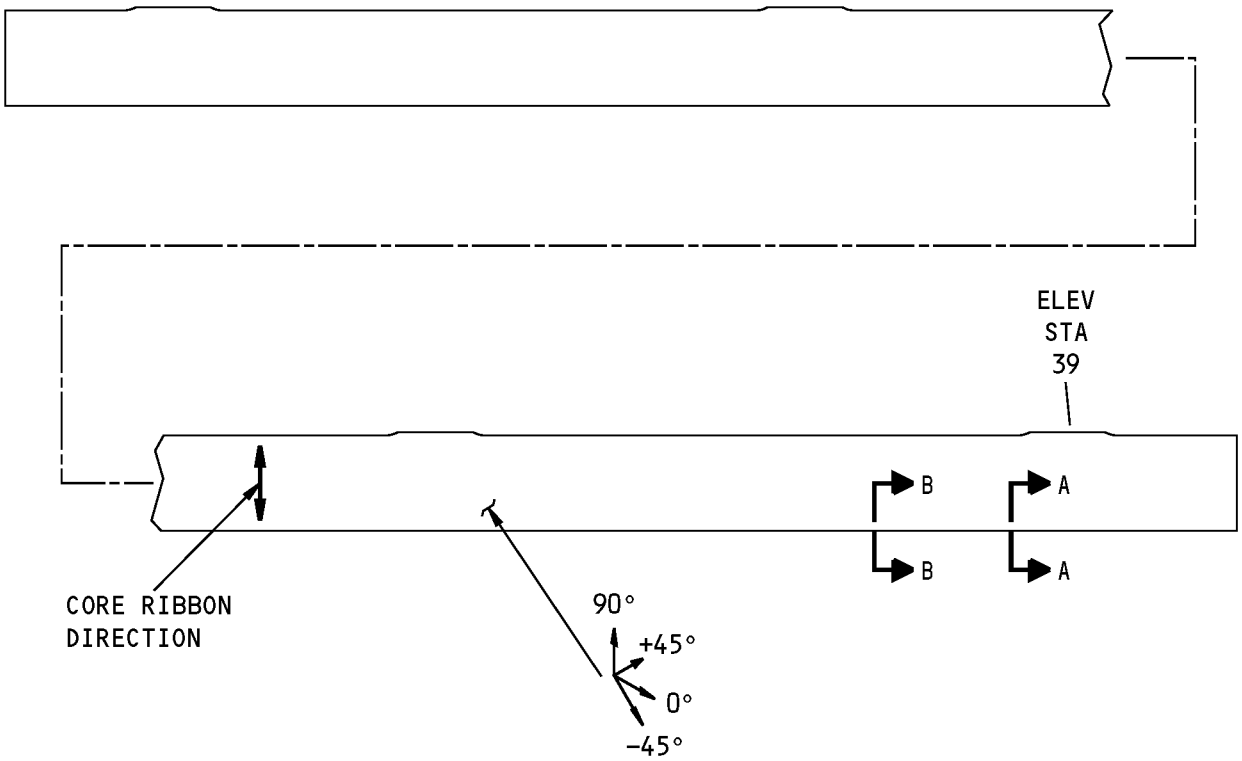
VIEW IS ROTATED 90° COUNTERCLOCKWISE

PLY LAYUP SEQUENCE
B–B

**Ply Direction, Core Ribbon Direction and Ply Sequence for the Elevator Tab Upper Skin, Figure 2, Item [1]
Figure 3 (Sheet 2 of 2)**

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1, P4	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW.
P2, P3	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW.
P5 through P30	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

VIEW IS ON THE TOOLSIDE (AERODYNAMIC) SURFACE

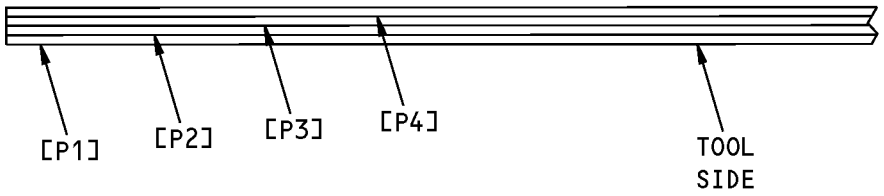
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

NOTES

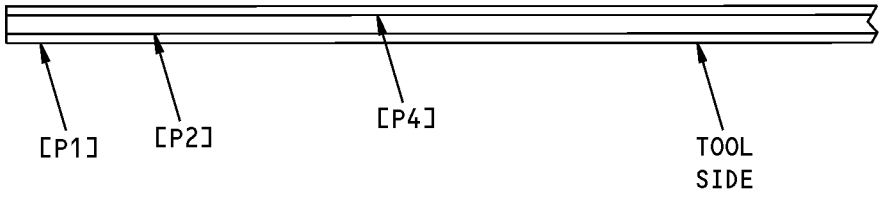
- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE FOR THOSE LOCATIONS.
- REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF EACH PLY.

Ply Direction, Core Ribbon Dirction and Ply Sequence for the Elevator Tab Lower Skin, Figure 2, Item [1]
Figure 4 (Sheet 1 of 2)



VIEW IS ROTATED 90° COUNTERCLOCKWISE

PLY LAYUP SEQUENCE
A–A



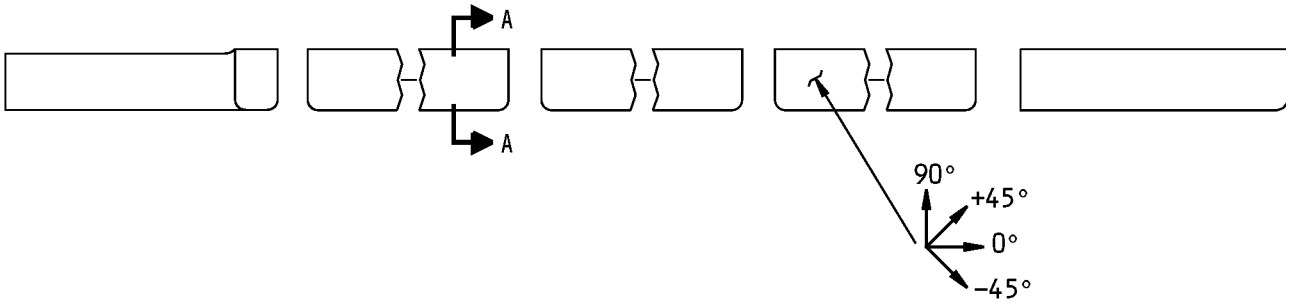
VIEW IS ROTATED 90° COUNTERCLOCKWISE

PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Dirction and Ply Sequence for the Elevator Tab Lower Skin, Figure 2, Item [1]
Figure 4 (Sheet 2 of 2)

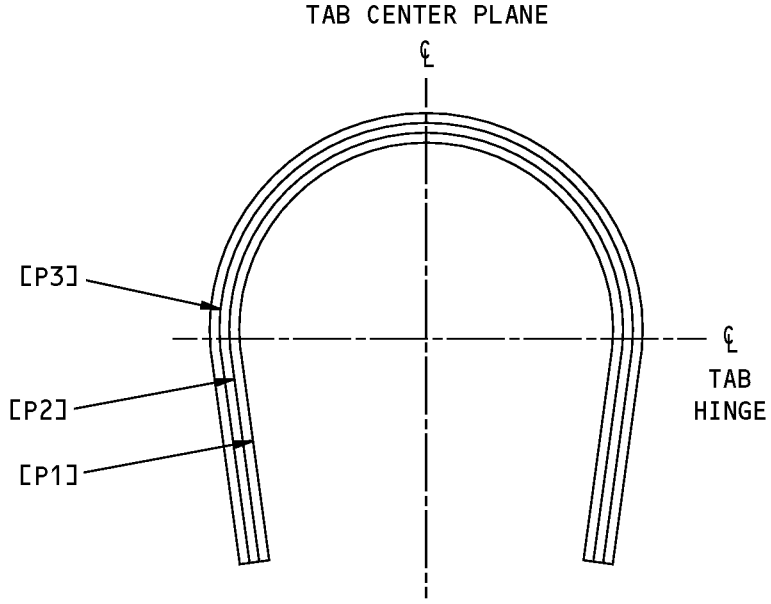
Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P4	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW.
P2, P3	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW.



PLY LAYUP DIRECTION

A



PLY LAYUP SEQUENCE (TYPICAL)
A–A

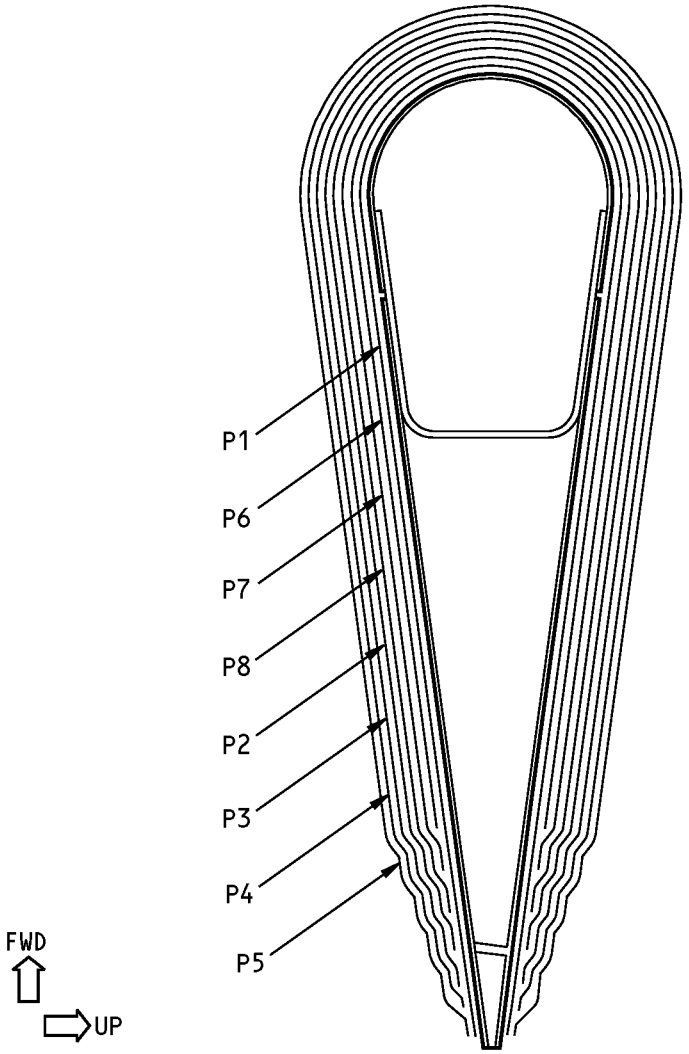
NOTES

- THE PLY DIRECTION IS THE WRAP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PANEL.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE FOR THAT LOCATION.
- REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 5 FOR THE DIRECTION AND THE MATERIAL OF EACH PLY.

Ply Direction and Ply Sequence for the Elevator Tab Leading Edge Skin Figure 2, Item [1]
Figure 5

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 5		
PLY	**DIRECTION**	**MATERIAL**
P1, P3	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



PLY DIRECTION AND PLY SEQUENCE FOR THE ELEVATOR TAB SKIN - FIGURE 2, ITEM 1
(TYPICAL SECTION AT HINGES 3 AND 4)
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

NOTES

- 11 PLIES AT HINGES 1 AND 2
- 10 PLIES AT HINGES 3 AND 4
- 7 PLIES AT HINGES 5 AND 6

Ply Direction and Ply Sequence for the Elevator Tab Outer Skin
Figure 6

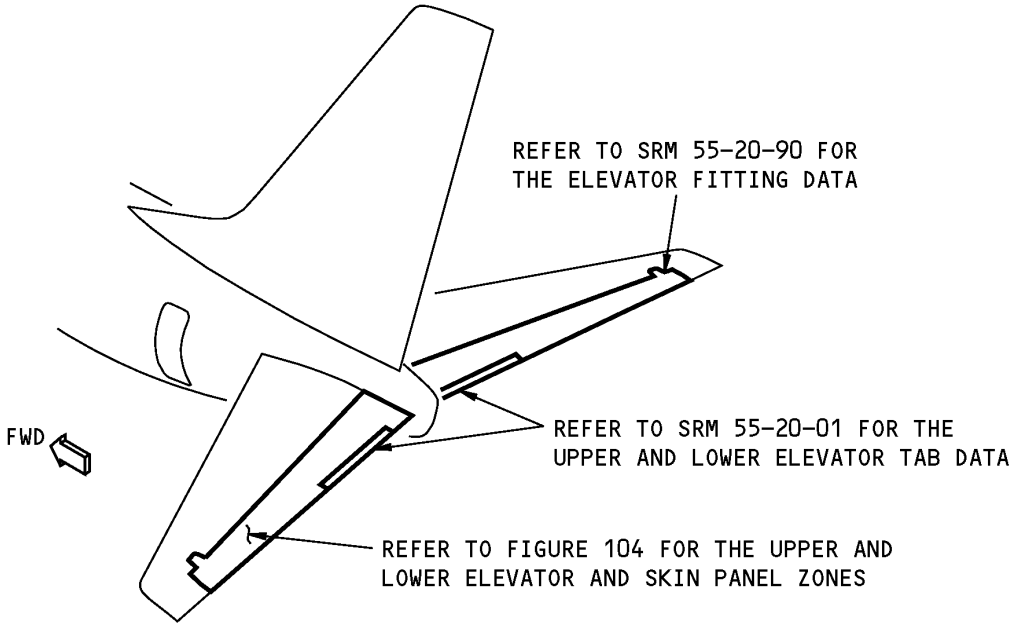
Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 6 (REFER TO THE PRODUCTION DRAWING FOR THE OTHER HINGE LOCATIONS)		
PLY	**DIRECTION**	**MATERIAL**
P1	————	Structural Adhesive as given in BMS 5-129, Type 4, Grade 5
P4, P7, P10	+45 degrees	CFRP unidirectional tape as given in BMS 8-256, Type II, Class 1, Grade 190
P3, P8, P11	-45 degrees	CFRP unidirectional tape as given in BMS 8-256, Type II, Class 1, Grade 190
P2, P5, P6, P9	+/- 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

ALLOWABLE DAMAGE 1 - UPPER AND LOWER ELEVATOR SKIN PANELS

1. Applicability

A. Allowable Damage 1 is applicable to damage on the Upper and Lower Elevator Skin made of carbon fiber reinforced plastic (CFRP) shown in Upper and Lower Elevator Skin Location, Figure 101/ALLOWABLE DAMAGE 1.



Upper and Lower Elevator Skin Location
Figure 101

2. General

A. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for the inspection procedures

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Damage Definitions, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

(3) Refer to Definitions of the Facesheets, Figure 103/ALLOWABLE DAMAGE 1 for the definitions of the facesheets of a honeycomb core area.

B. Remove all the contaminates and water from the structure. Refer to 51-30-05 and 51-70-04 for the tools and the cleanup procedures.

C. Seal all damaged areas with the steps that follow.

(1) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits as given in Paragraph 4./ALLOWABLE DAMAGE 1

(a) Make a temporary seal.

1) Apply aluminum foil tape (speed tape).

2) Keep a record of the location.

3) Make sure the tape is in satisfactory condition at normal maintenance intervals.

(b) Make a permanent seal.

1) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

2) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

3) Apply one layer of BMS 10-60, Type II enamel to the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

(2) Seal all permitted damaged areas that are more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 1 for the allowable damage limits. Seal the damage as follows:

(a) Use a vacuum and heat to remove moisture from the solid laminate and the honeycomb cells. Refer to 51-70-04.

(b) Make a temporary seal with aluminum foil tape (speed tape).

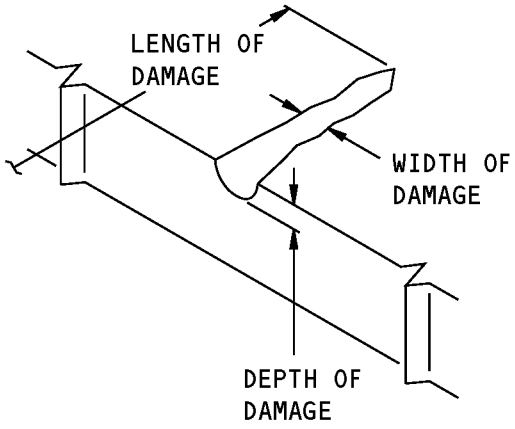
(c) Keep a record of the location.

(d) Repair the damage at or before 250 flight cycles from the time the seal was made.

(3) Refer to Upper and Lower Elevator Skin Panel Zones, Figure 104/ALLOWABLE DAMAGE 1 for the location of the elevator skin panel zones.

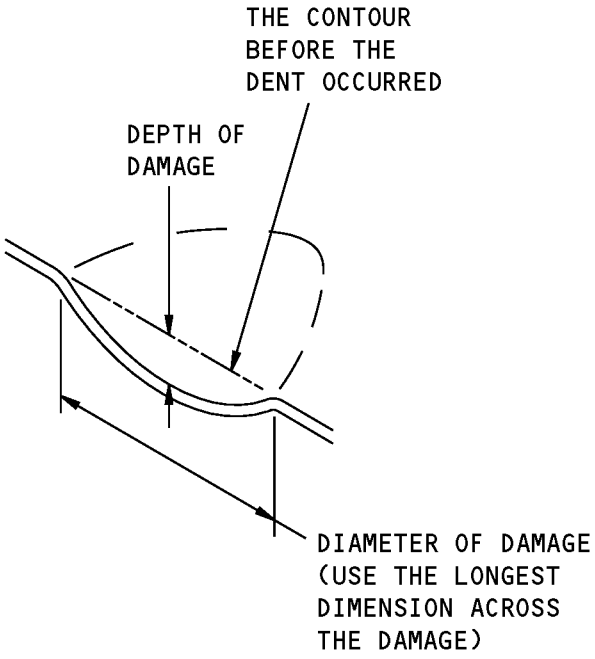
(4) The definition of the words "other damage" as used in the allowable damage limit, does not include nicks, gouges, and scratches that do not cause carbon fiber damage are sealed.

(5) Make sure the elevator is balanced. Refer to 51-60-04 for the balance procedures.



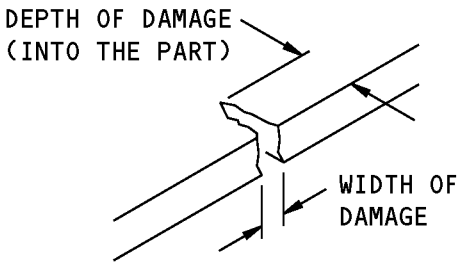
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

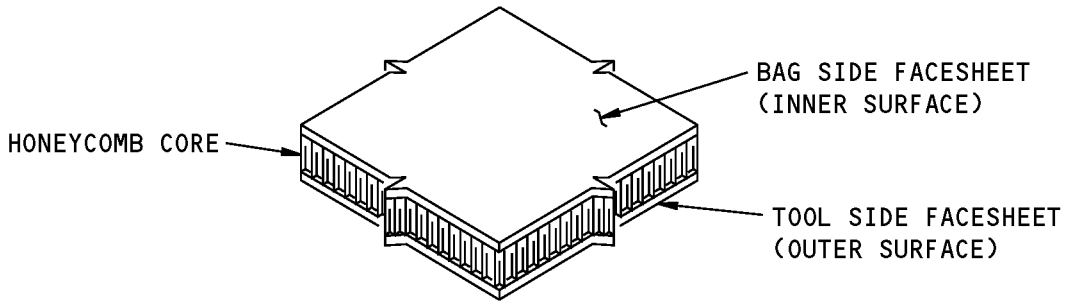
B



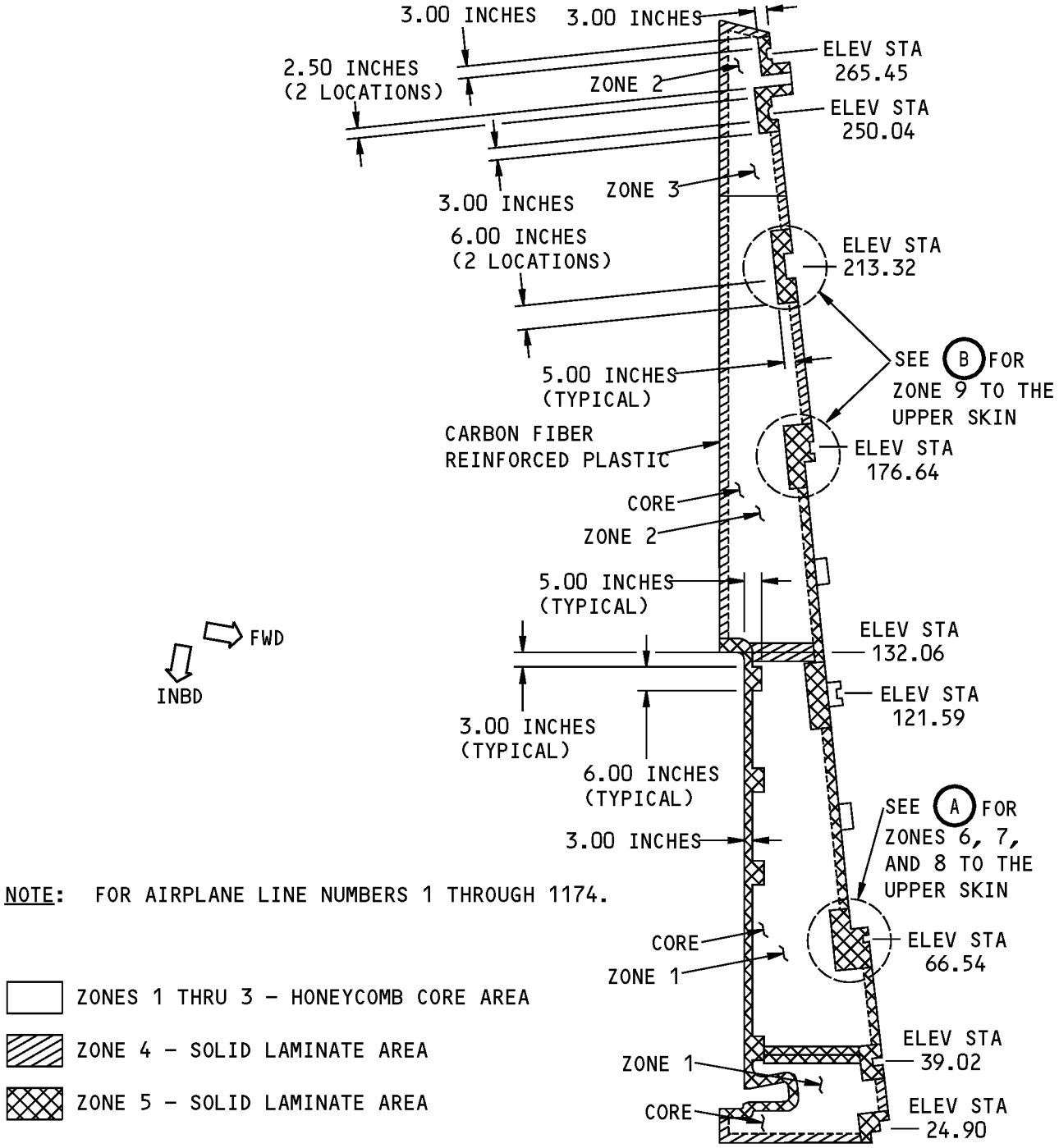
DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 102



Definitions of the Facesheets
Figure 103



NOTE: FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174.

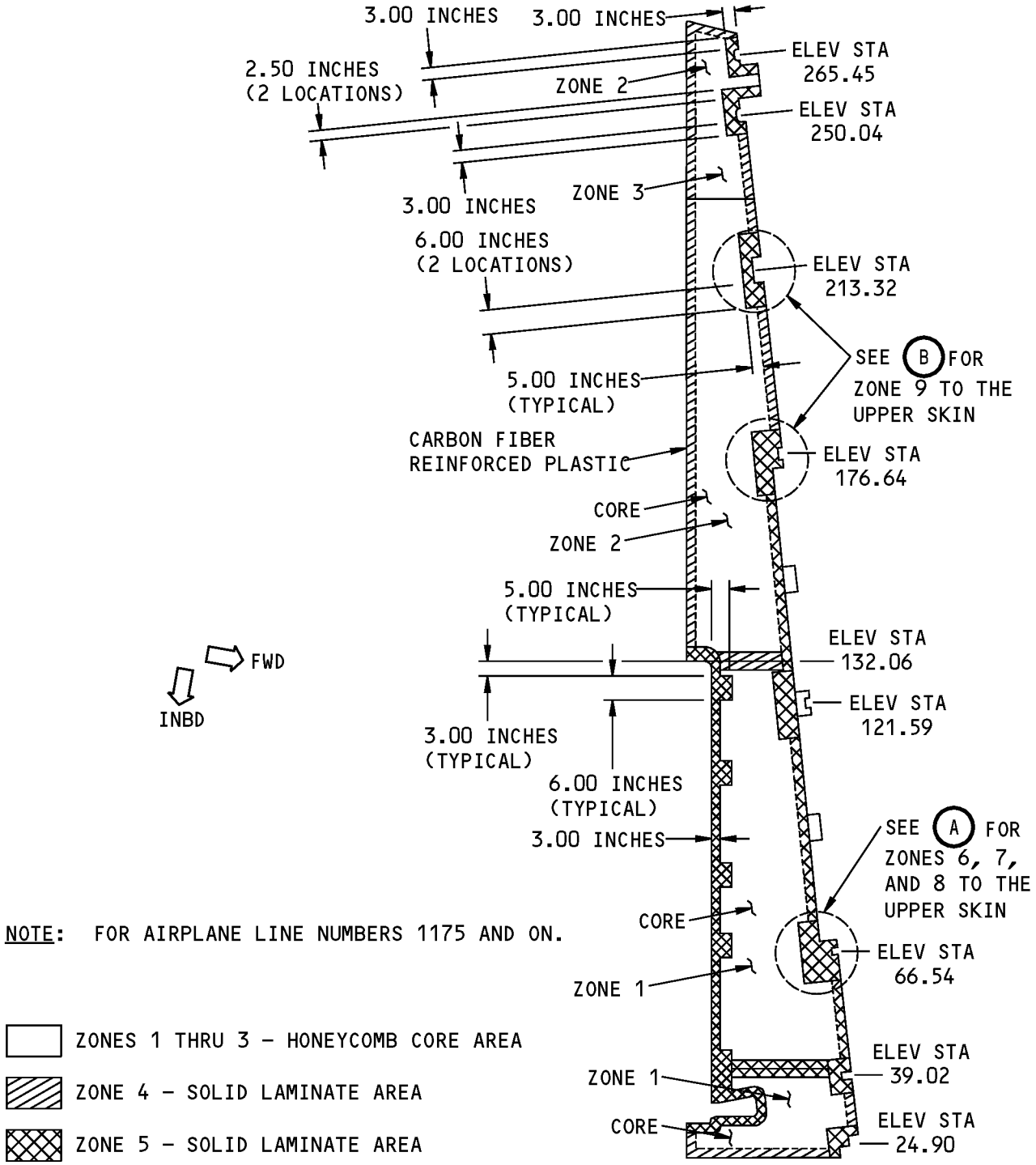
ZONES 1 THRU 3 - HONEYCOMB CORE AREA

ZONE 4 - SOLID LAMINATE AREA

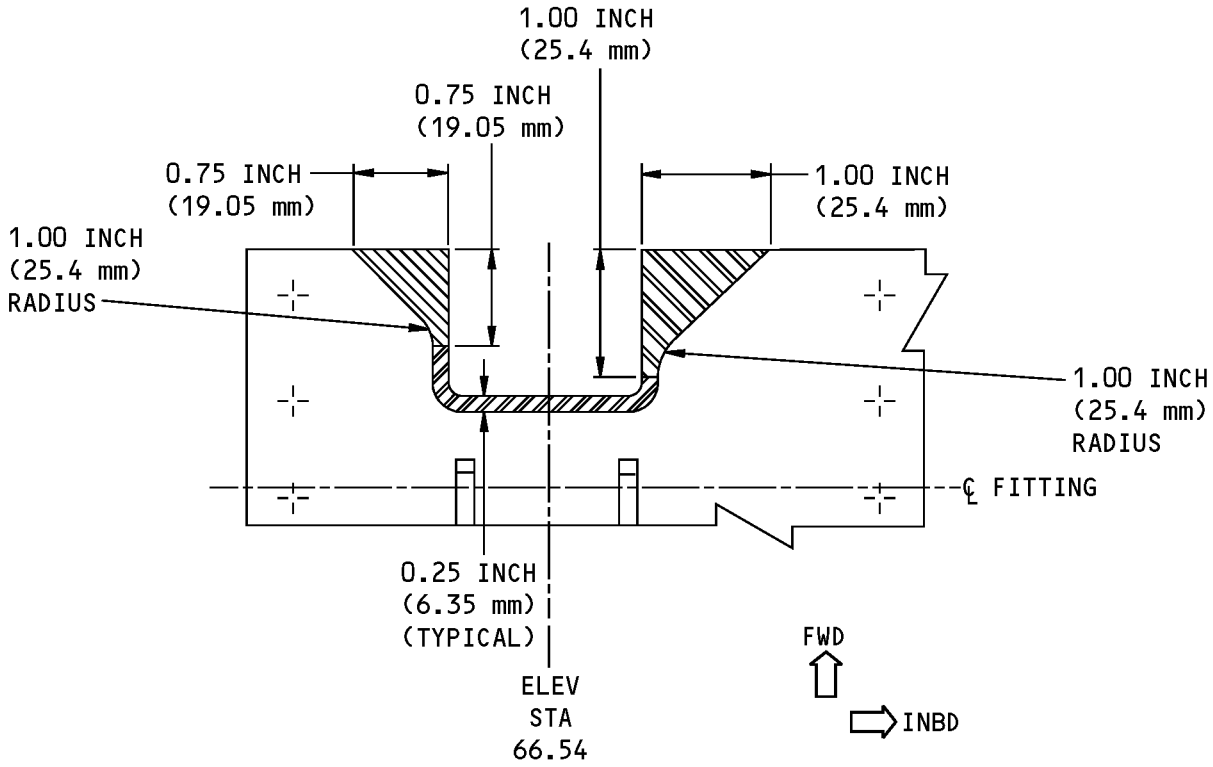
ZONE 5 - SOLID LAMINATE AREA

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
UPPER SKIN PANEL IS SHOWN, LOWER SKIN PANEL IS ALMOST THE SAME

Upper and Lower Elevator Skin Panel Zones
Figure 104 (Sheet 1 of 4)



Upper and Lower Elevator Skin Panel Zones
Figure 104 (Sheet 2 of 4)

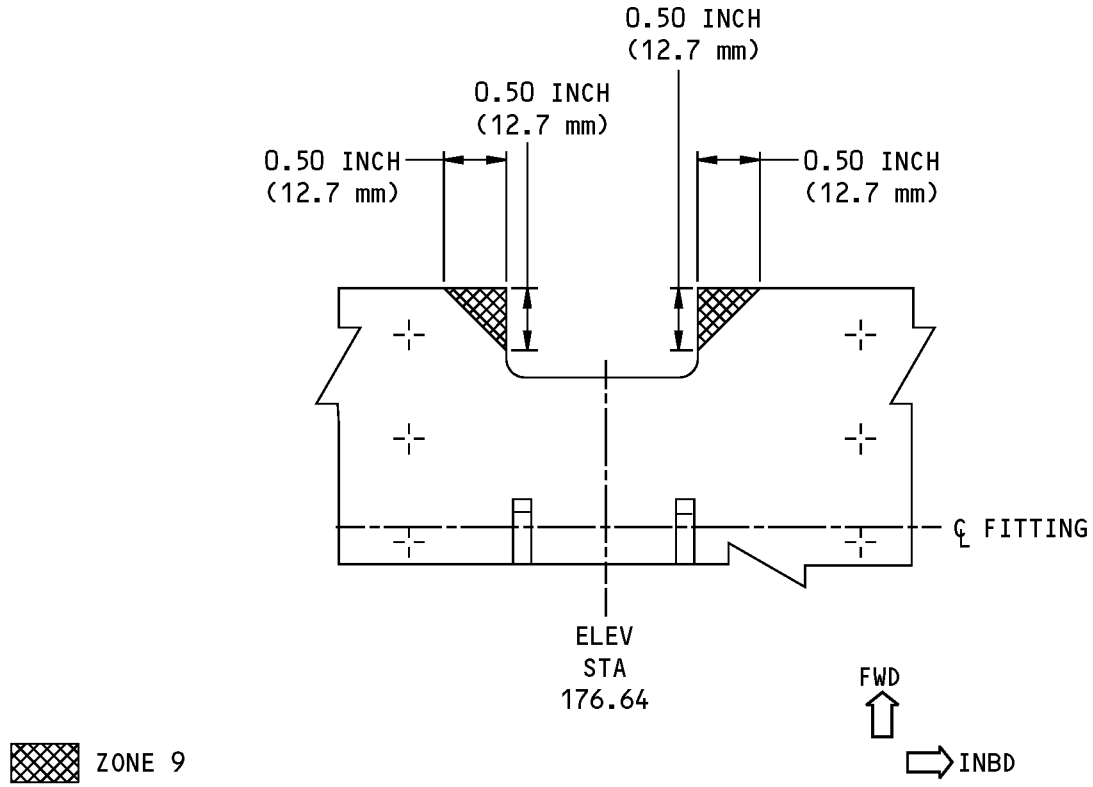


ELEV STA 66.54 IS SHOWN

UPPER SKIN HINGE CUTOUT

A

Upper and Lower Elevator Skin Panel Zones
Figure 104 (Sheet 3 of 4)



ELEV STA 176.64 IS SHOWN, ELEV STA 213.32 IS SIMILAR

UPPER SKIN HINGE CUTOUT

B

Upper and Lower Elevator Skin Panel Zones
Figure 104 (Sheet 4 of 4)

3. References

Reference	Title
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-06, REPAIR GENERAL	Room Temperature Cure Repairs With Wet Layup Materials For Glass Fabric Reinforced Plastic Solid Laminates and Honeycomb Core Panels
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Zone 1, 2 and 3 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.00 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragraph 2.

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one carbon ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one carbon ply in depth.

(b) A maximum of 2.00 inches in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragraph 2.

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.00 inches in diameter

(b) A minimum of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragraph 2.

(6) Delaminations are permitted if they are:

(a) A maximum of 2.00 inches in diameter of the carbon ply

(b) A minimum distance of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass or carbon fiber plies and

2) Are sealed as given in Paragraph 2.

B. Zone 4 and 5 - CFRP Solid Laminate Area

(1) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one ply.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth

(b) The length is a maximum of 0.625 inch

(c) The width is a maximum of 0.25 inch

(d) Not more than one fastener or fastener hole in eight is damaged

(e) The edge of other damage is a minimum of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the fiber plies and

2) Are sealed as given in Paragraph 2.

(4) Dents are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) They are a maximum of 1 ply in depth

(c) They are a maximum of 0.625 inch in diameter

(d) They are a minimum of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the fiber plies and

2) Are sealed as given in Paragraph 2.

(5) Holes and Punctures are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) They are a maximum of 0.625 inch in diameter

(c) They are a minimum distance of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies and

2) Are sealed as given in Paragraph 2.

(6) Delaminations are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) They are a maximum of 0.625 inch in diameter

(c) They are a minimum of 5.00 inches away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(7) Edge Erosion is permitted as shown in Upper and Lower Elevator Skin Panel Allowable Damage, Figure 105/ALLOWABLE DAMAGE 1.

(8) Edge damage is permitted if it is:

(a) A maximum of one carbon ply in depth

(b) A maximum of 0.25 inch in width.

C. Zone 6 - Solid Laminate Area (Upper Skin)

(1) Damage is permitted provided:

(a) The maximum cross sectional area loss is not more than 0.30 square inches

(b) It is sealed as given in Paragraph 2.

D. Zone 7 - Solid Laminate Area (Upper Skin)

(1) Damage is permitted for the entire thickness of the part provided:

(a) The maximum length of damage away from the cutout is not more than 0.25 inch

(b) It is sealed as given in Paragraph 2.

E. Zone 8 - Solid Laminate Area (Upper Skin)

(1) Damage is permitted provided:

(a) The maximum cross sectional area loss is not more than 0.50 square inches.

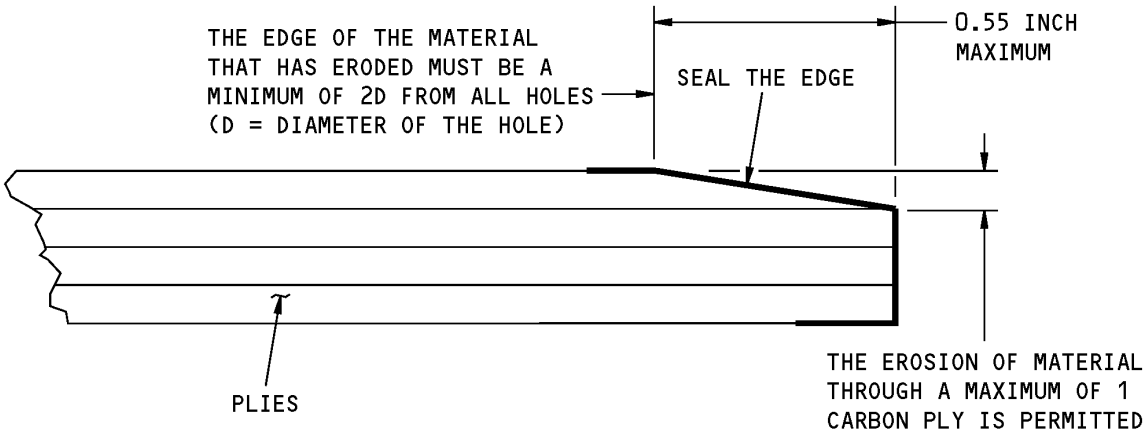
(b) It is sealed as given in Paragraph 2.

F. Zone 9 - Solid Laminate Area (Upper Skin)

(1) Damage is permited provided:

(a) The maximum cross sectional area loss is not more than 0.15 square inches.

(b) It is sealed as given in Paragraph 2.



SEALING OF EROSION DAMAGE AT AN EDGE OF COMPOSITE PARTS

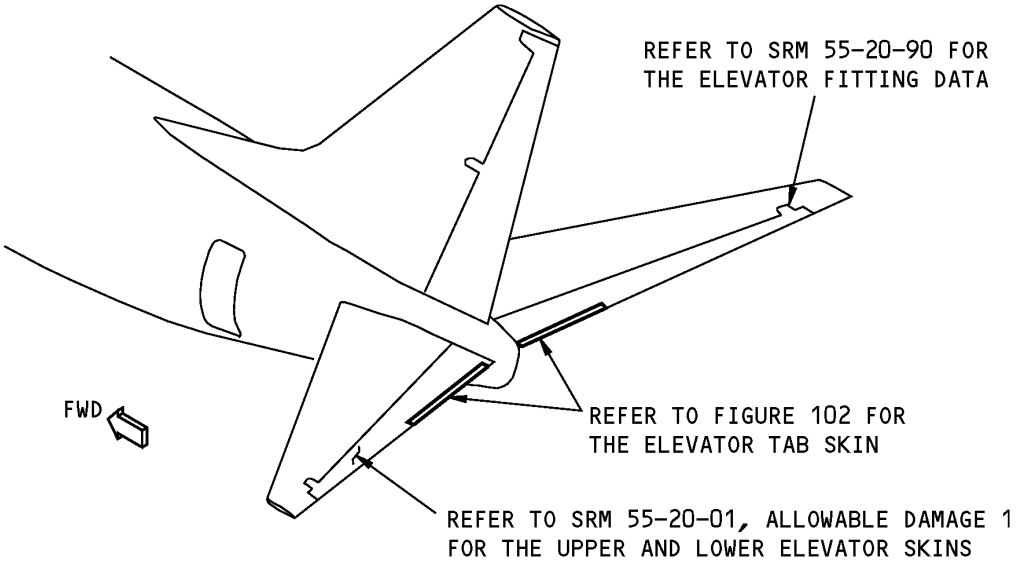
Upper and Lower Elevator Skin Panel Allowable Damage
Figure 105

ALLOWABLE DAMAGE 2 - ELEVATOR TAB SKINS

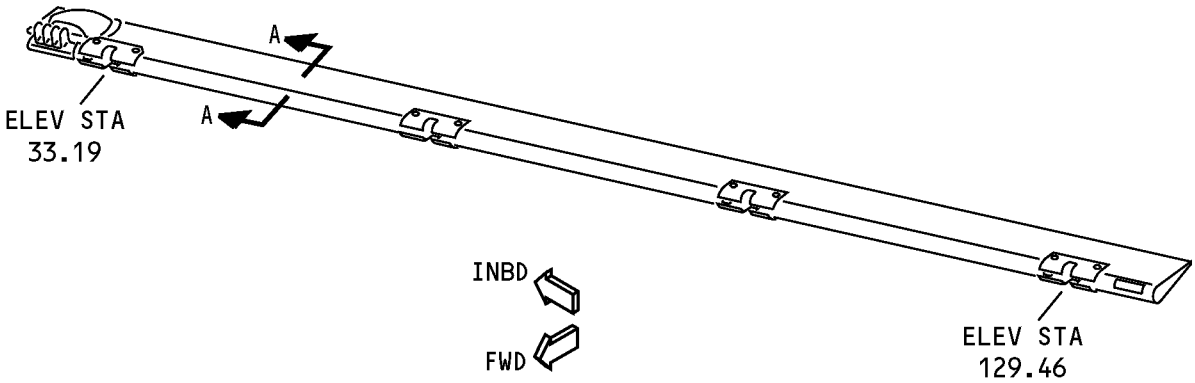
1. Applicability

A. The allowable damage limits are only applicable if they are sealed as given in in Paragraph 2.C.

NOTE: THIS ALLOWABLE DAMAGE IS APPLICABLE TO AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-01, ALLOWABLE DAMAGE 3 FOR AIRPLANE LINE NUMBERS EQUAL TO OR GREATER THAN 1175 AND FOR ALL LINE NUMBERS WITH COMPLETIONS OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

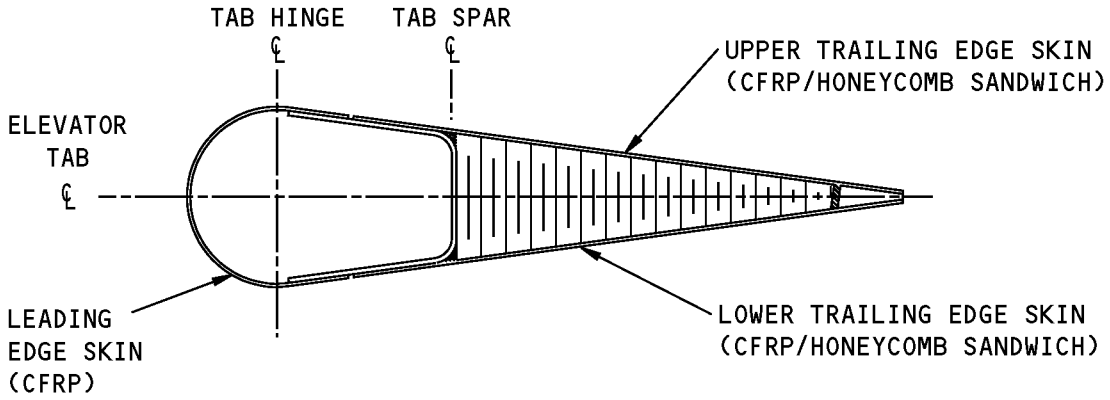


Elevator Tab Skin Location
Figure 101



ELEVATOR TAB SKIN

(A)



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)

A–A

Elevator Tab Skin
Figure 102

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Damage Definitions, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C for the definitions of the length, width, and depth of damage.

(3) Refer to Definitions of the Facesheets, Figure 104/ALLOWABLE DAMAGE 2 for the definitions of the facesheets of a honeycomb core area.

B. Remove all the contamination and water from the structure.

(1) Refer to 51-30-03 for possible sources of the abrasive and other materials.

(2) Refer to 51-30-05 for possible sources of the equipment and tools.

(3) Refer to 51-70-04 for the cleanup procedures.

CAUTION: DO NOT EXCEED A MAXIMUM OF FOUR PERMITTED DAMAGE LOCATIONS THAT ARE SEALED OR ONE REPAIR LOCATION AS GIVEN IN SRM 55-20-01, REPAIR 2. REPAIRS ARE NOT PERMITTED INBOARD OF ELEVATOR STA 45.0. FOR ANY REPAIRS INBOARD OF ELEVATOR STATION 45.0, CONTACT BOEING. IF YOU DO NOT OBEY, THEN DAMAGE TO STRUCTURE COULD OCCUR.

C. Seal all damaged areas with the steps that follow.

(1) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2

(a) Make a temporary seal.

1) Apply aluminum foil tape (speed tape).

2) Keep a record of the location.

3) Make sure the tape is in satisfactory condition at normal maintenance intervals.

(b) Make a permanent seal.

1) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

2) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

3) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

(2) Seal all permitted damaged areas that are more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 2 for the allowable damage limits. Seal the damage as follows:

(a) Use a vacuum and heat to remove moisture from the solid laminate or the honeycomb cells. Refer to 51-70-04.

(b) Make a temporary seal with aluminum foil tape (speed tape).

(c) Keep a record of the location.

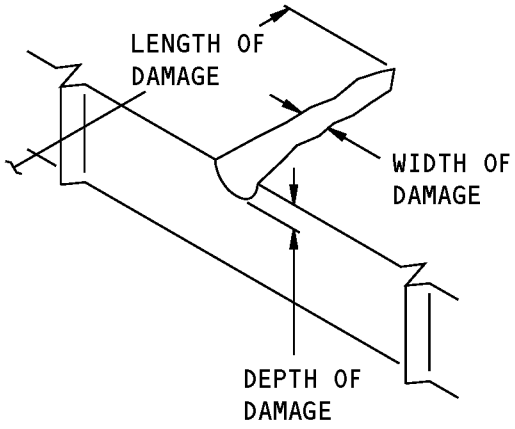
(d) Repair the damage before 250 flight cycles have occurred.

D. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane.

E. Restore the aircraft exterior paint system in the area where damage has been removed, as applicable. Refer to AMM PAGEBLOCK 51-21-99/701.

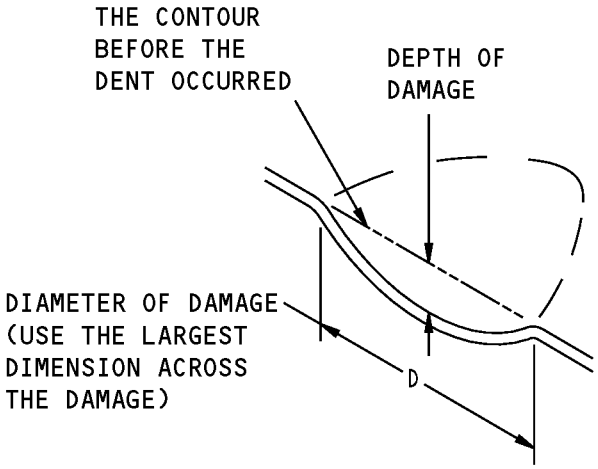
NOTE: Wherever the elevator tab skins need to be refinished, the initial finishes including paint, primer, and/or surface filler, must be removed before application of new exterior paint system. Make sure the finish thicknesses are as given in AMM PAGEBLOCK 51-21-99/701.

F. Sealing of damage as given in Allowable Damage 2 is an Alternate Method of Compliance (AMOC) to the Federal Aviation Administration (FAA) Airworthiness Directive (AD) 2001-08-09, Paragraph (d).



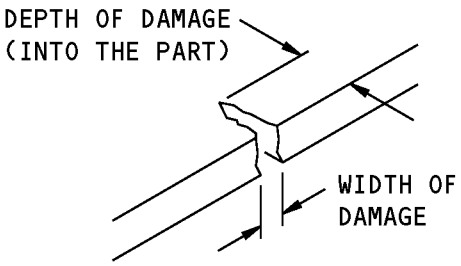
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

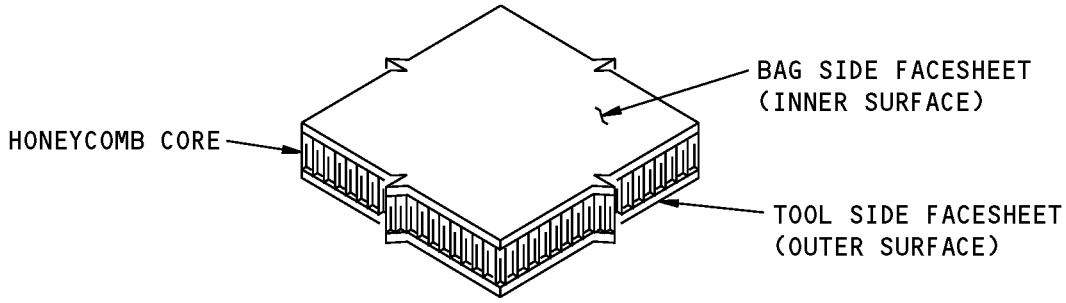
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 103



Definitions of the Facesheets
Figure 104

3. References

Reference	Title
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
55-20-01	ELEVATOR SKIN
AMM 27-31-31 P/B 401	ELEVATOR TAB - REMOVAL/INSTALLATION
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Upper and Lower Trailing Edge Skins - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum diameter (D) of 1.0 inch

(c) A minimum of 2.5 X (D) away from a fastener hole or part edge

(d) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C.

(e) Sealed as given in in Paragraph 2.C.

(3) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of 1.0 inch in diameter

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply.

(c) A minimum of 2.5 X (D) away from a fastener hole or part edge

(d) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(e) Sealed as given in in Paragraph 2.C.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A minimum of 2.5 X (D) away from a fastener hole or part edge

(c) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(d) Sealed as given in in Paragraph 2.C.

(5) Delaminations are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A minimum of 2.5 X (D) away from a fastener hole or part edge

(c) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(d) Sealed as given in in Paragraph 2.C.

B. Leading Edge - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 1.00 inch in diameter

(c) A minimum of 2.5 X (D) away from a fastener hole or part edge

(d) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(e) Sealed as given in in Paragraph 2.C.

(3) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of 1.00 inch in diameter

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply in depth.

(c) A minimum of 2.5 X (D) away from a fastener hole or part edge

(d) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(e) Sealed as given in in Paragraph 2.C.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A minimum of 2.5 X (D) away from a fastener hole or part edge

(c) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(d) Are sealed as given in in Paragraph 2.C.

(5) Delaminations are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A minimum of 2.5 X (D) away from a fastener hole or part edge

(c) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in in Paragraph 2.C.

(d) Sealed as given in in Paragraph 2.C.

(6) Edge Erosion is permitted as shown in Elevator Tab Skin Allowable Damage, Figure 105/ALLOWABLE DAMAGE 2, Detail A .

(7) Edge damage not more than one ply in depth is permitted if it is:

(a) A maximum of 2.00 inches in length in the spanwise direction

(b) A maximum of 0.50 inch in width

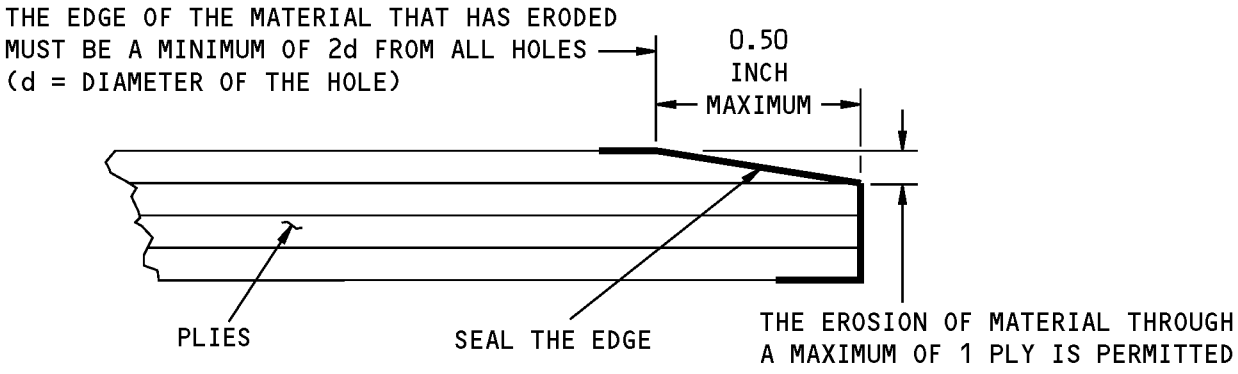
(c) A maximum of 2.0 X (D) edge to edge from any other damage, and no more than one damage site for each 15.0 square inches.

(d) Not more than the limits as shown in Elevator Tab Skin Allowable Damage, Figure 105/ALLOWABLE DAMAGE 2, Detail A .

(8) Edge damage that is more than one ply in depth is permitted if:

(a) It is not more than the limits as shown in Elevator Tab Skin Allowable Damage, Figure 105/ALLOWABLE DAMAGE 2, Details B, C, and D.

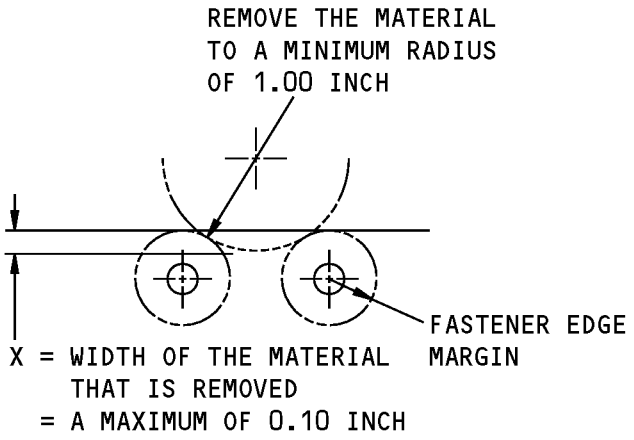
(b) You remove moisture and seal as given in Paragraph 2.B./ALLOWABLE DAMAGE 2 and Paragraph 2.C./ALLOWABLE DAMAGE 2



SEALING OF EROSION DAMAGE AT AN EDGE OF COMPOSITE PARTS

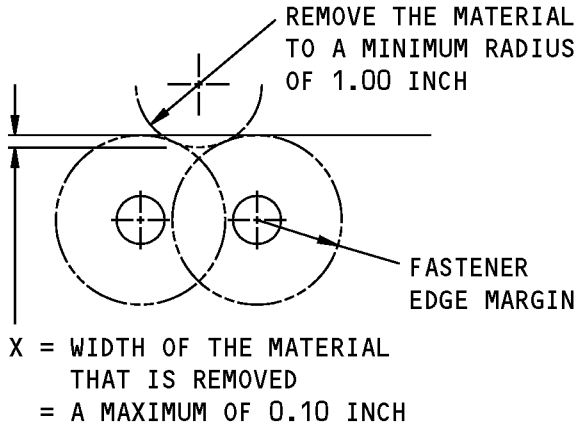
A

Elevator Tab Skin Allowable Damage
Figure 105 (Sheet 1 of 2)



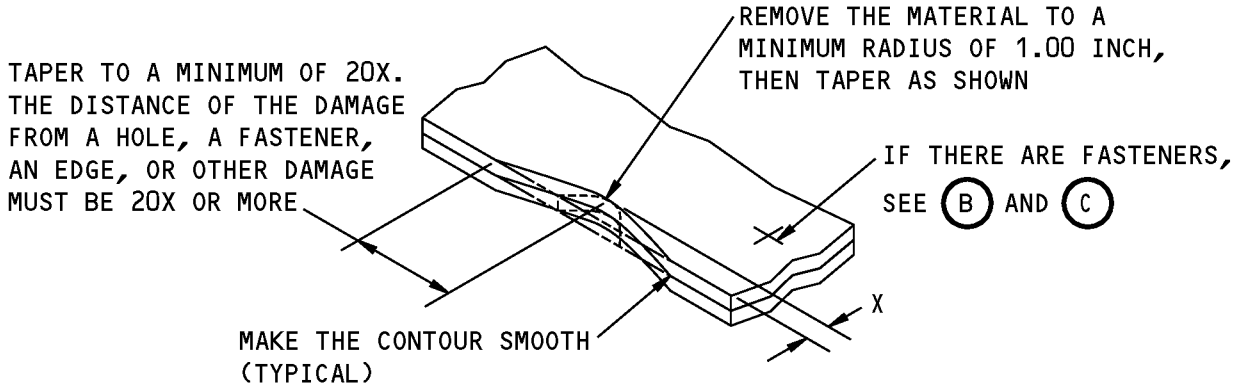
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

C



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

D

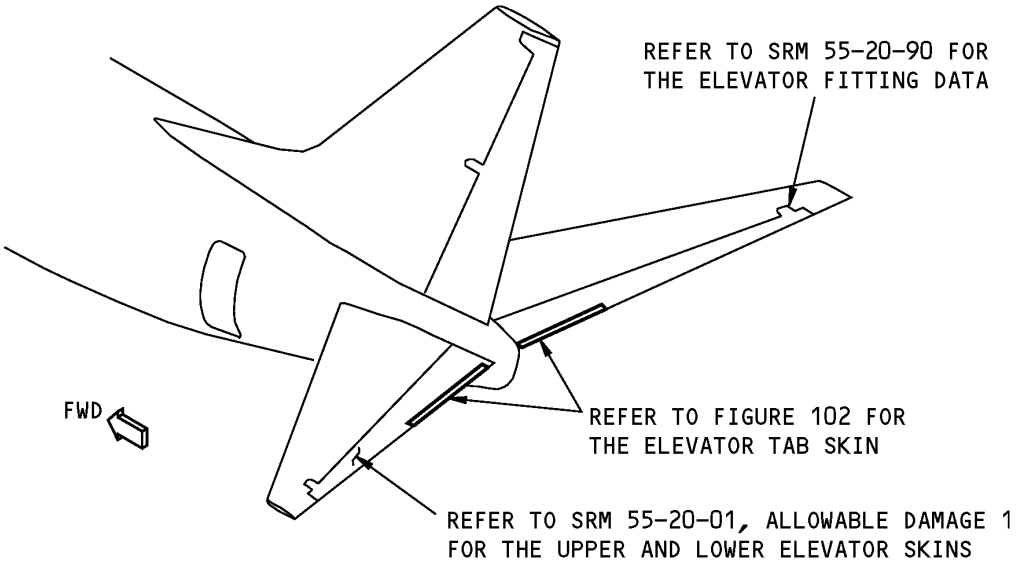
Elevator Tab Skin Allowable Damage
Figure 105 (Sheet 2 of 2)

ALLOWABLE DAMAGE 3 - ELEVATOR TAB SKINS FOR AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082

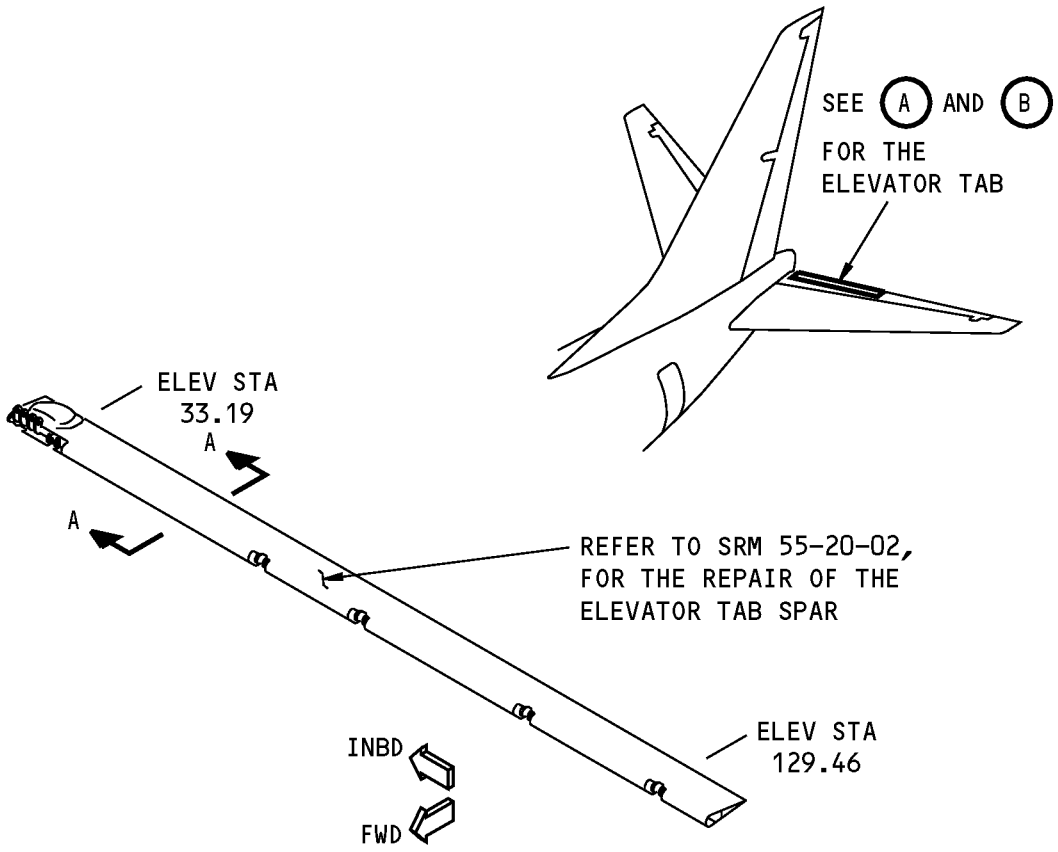
1. Applicability

A. The allowable damage limits are only applicable if they are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

NOTE: THIS ALLOWABLE DAMAGE IS APPLICABLE TO AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-01, ALLOWABLE DAMAGE 2 FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

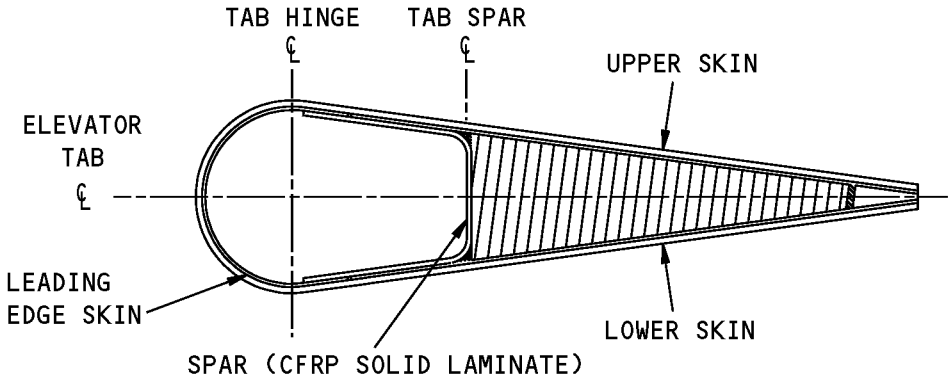


Elevator Tab Skin Location
Figure 101



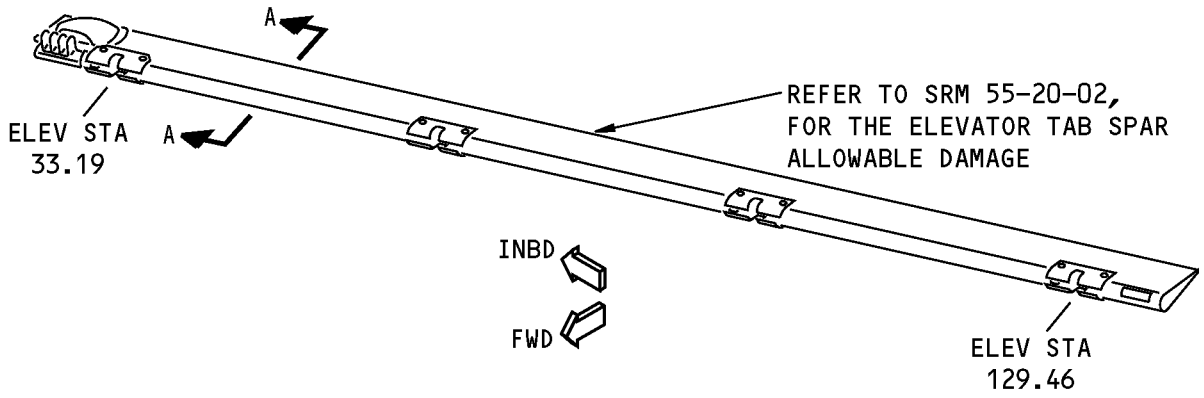
ELEVATOR TAB SKIN

A



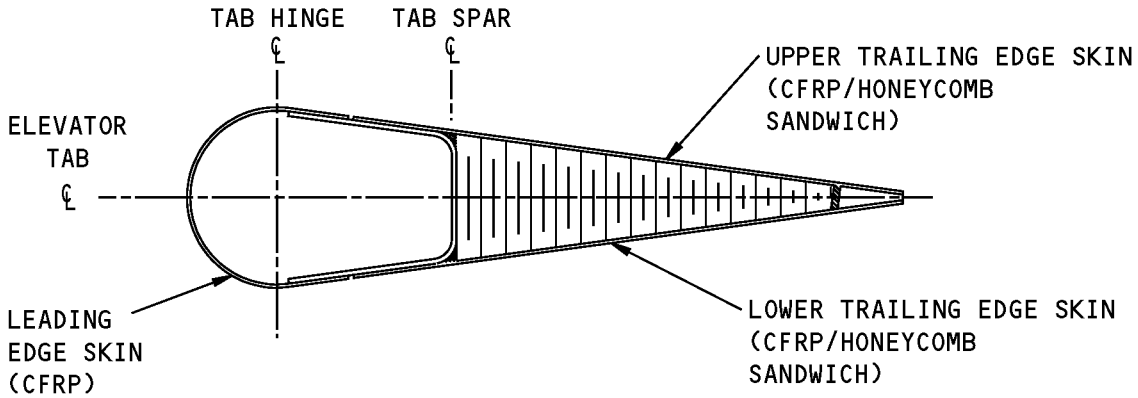
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)
A-A

Elevator Tab Skin Allowable Damage
Figure 102 (Sheet 1 of 2)



ELEVATOR TAB SKIN

(B)



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174
WITH COMPLETION OF SERVICE BULLETINS 737-55-1080
AND 737-55-1082)
A-A

Elevator Tab Skin Allowable Damage
Figure 102 (Sheet 2 of 2)

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Damage Definitions, Figure 103/ALLOWABLE DAMAGE 3, Details A, B, and C for the definitions of the length, width, and depth of damage.

(3) Refer to Definitions of the Facesheets, Figure 104/ALLOWABLE DAMAGE 3 for the definitions of the facesheets of a honeycomb core area.

B. Remove all the contamination and water from the structure.

(1) Refer to 51-30-03 for possible sources of the abrasive and other materials.

(2) Refer to 51-30-05 for possible sources of the equipment and tools.

(3) Refer to 51-70-04 for the cleanup procedures.

C. Seal all damaged areas with the steps that follow.

(1) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 3

(a) Make a temporary seal.

1) Apply aluminum foil tape (speed tape).

2) Keep a record of the location.

3) Make sure the tape is in satisfactory condition at normal maintenance intervals.

(b) Make a permanent seal.

1) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given 51-70-08.

2) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

3) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

(2) Seal all permitted damaged areas that are more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits. Seal the damage as follows:

(a) Use a vacuum and heat to remove moisture from the solid laminate or the honeycomb cells. Refer to 51-70-04.

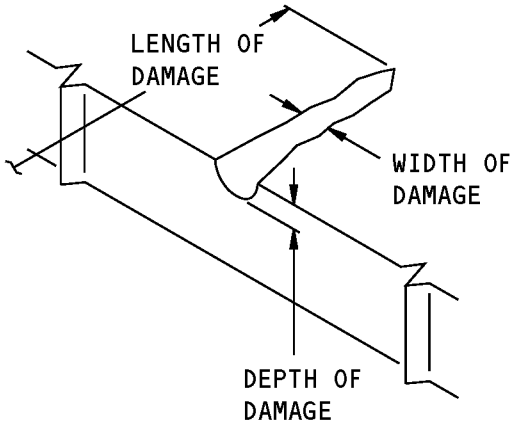
(b) Make a temporary seal with aluminum foil tape (speed tape).

(c) Keep a record of the location.

(d) Repair the damage before 250 flight cycles have occurred.

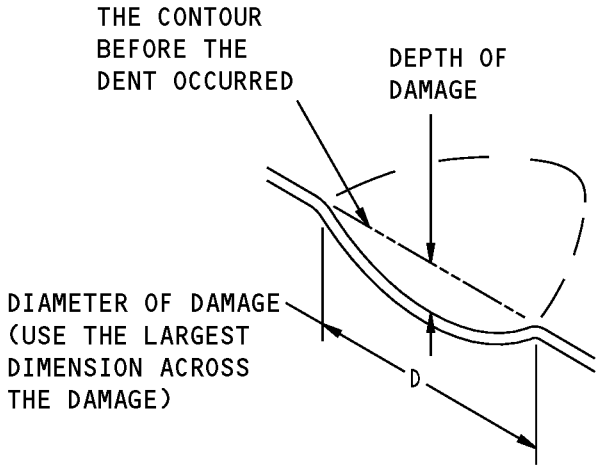
D. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane.

E. Restore the aircraft exterior paint system in the area where damage has been removed, as applicable. Refer to AMM PAGEBLOCK 51-21-99/701.



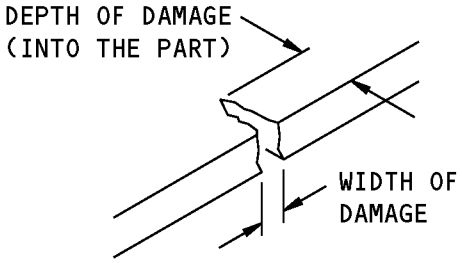
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

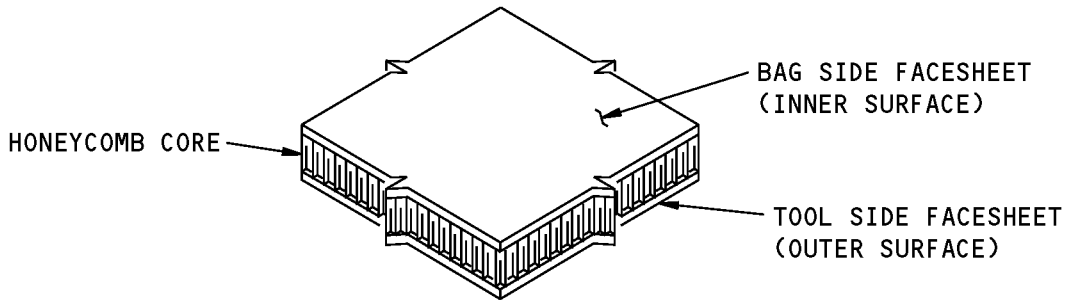
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 103



Definitions of the Facesheets
Figure 104

3. References

Reference	Title
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
55-20-01	ELEVATOR SKIN
AMM 27-31-31 P/B 401	ELEVATOR TAB - REMOVAL/INSTALLATION
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Upper and Lower Trailing Edge Skins - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.50 inch in length

(c) A minimum of 1.00 inch away from a fastener hole or part edge

(d) A minimum of 3.00 inches away from any other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(3) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply.

(c) A minimum of 1.00 inch away from a part edge

(d) A minimum of 3.00 inches away from any other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 0.30 inch in diameter

(b) A minimum of 3.00 inches away from the edge of other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(c) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(5) Delaminations are permitted if they are:

(a) A maximum of 0.50 inch in diameter for each square foot of total area

(b) A minimum distance of 1.00 inch away from a fastener hole or part edge

(c) A minimum distance of 3.00 inches away from the edge of other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(d) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

B. Leading Edge - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.50 inch in length

(c) A minimum of 1.00 inch away from a part edge

(d) A minimum of 3.00 inches away from any other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(3) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply in depth.

(c) A minimum of 1.00 inch away from a part edge

(d) A minimum of 3.00 inches away from any other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 0.30 inch in diameter

(b) A minimum of 1.00 inch from the part edge

(c) A minimum of 3.00 inches away from the edge of other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(d) Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(5) Delaminations are permitted if they are:

(a) A maximum of 0.50 inch in diameter

(b) A maximum of one damage area for each 144 square inches of skin area

(c) A minimum of 1.00 inch away from a part edge

(d) A minimum distance of 3.00 inches away from the edge of other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the carbon fiber plies
- Are sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

(6) Edge Erosion is permitted as shown in Elevator Tab Skin Allowable Damage, Figure 105/ALLOWABLE DAMAGE 3.

(7) Edge damage is permitted if it is:

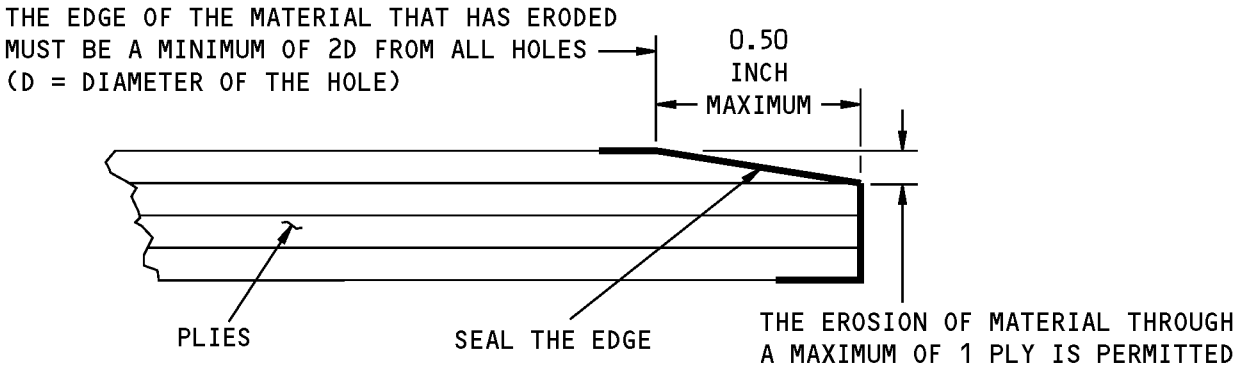
(a) A maximum of 2.00 inches in length in the spanwise direction

(b) A maximum of one ply in depth

(c) A maximum of 0.25 inch in width

(d) A minimum of 3.0 inches away from other damage

(e) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3



SEALING OF EROSION DAMAGE AT AN EDGE OF COMPOSITE PARTS

Elevator Tab Skin Allowable Damage
Figure 105

REPAIR 1 - ELEVATOR SKINS

1. Applicability

A. Repair 1 is applicable to damage to elevator skin panels made of Carbon Fiber Reinforced Plastic (CFRP) as shown in Upper and Lower Elevator Skin Panel Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.

2. General

A. Repair 1 gives repair instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the elevator, as necessary. Refer to AMM 27-31-31/401.

(1) Remove the necessary fasteners. Refer to 51-40-02 for information on fastener removal.

(2) If a fastener hole is damaged, refer to 51-70-04 or 51-70-05, as applicable.

C. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 of the inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator, can be used.

(1) Refer to Definitions of Damage Size, Figure 202/REPAIR 1 for the definitions of diameter and depth of damage.

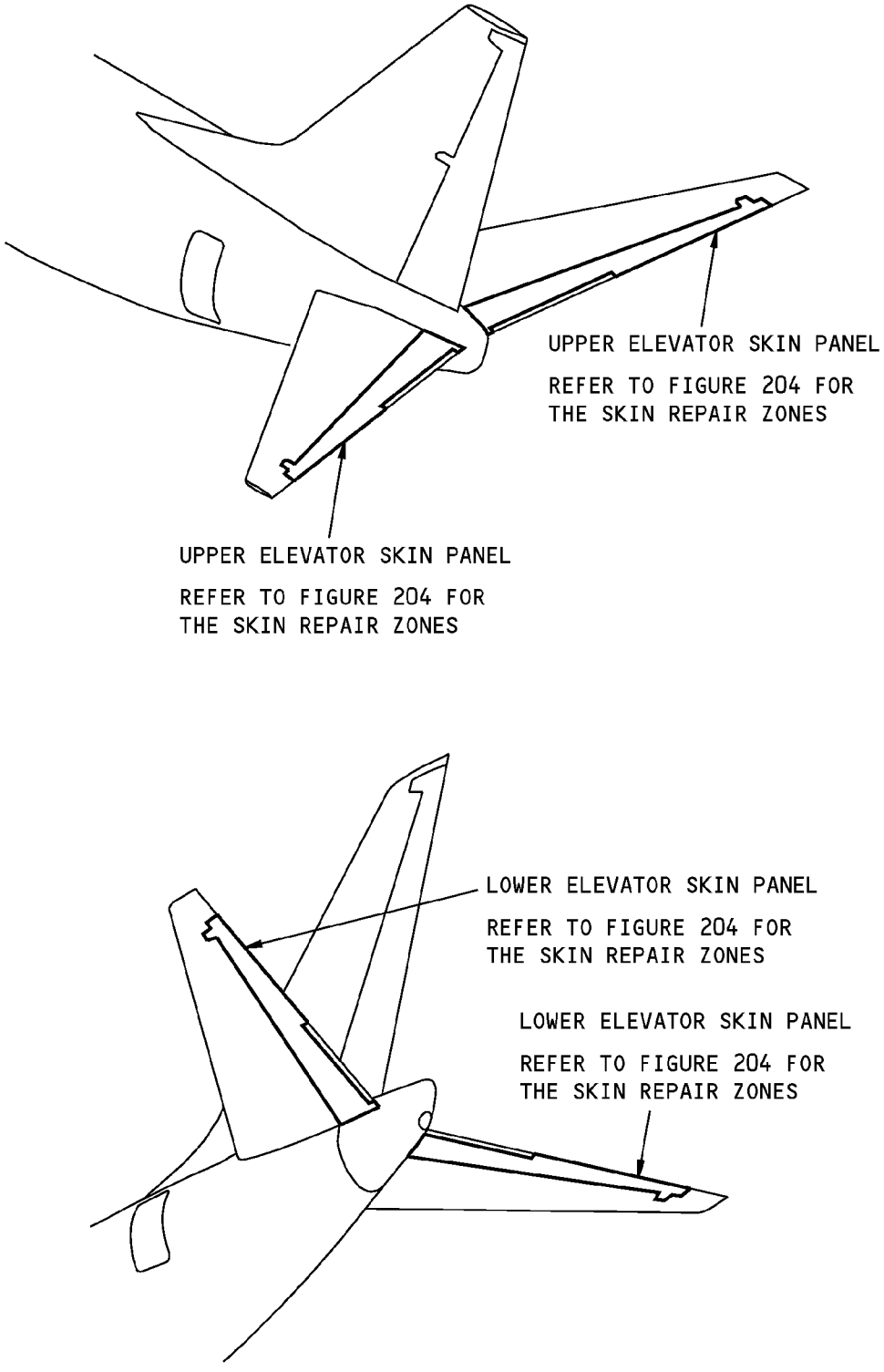
(2) Refer to Definitions of Facesheets, Figure 203/REPAIR 1 for the definitions of the facesheets of a honeycomb core area.

D. Do the repair as given in Paragraph 4./REPAIR 1

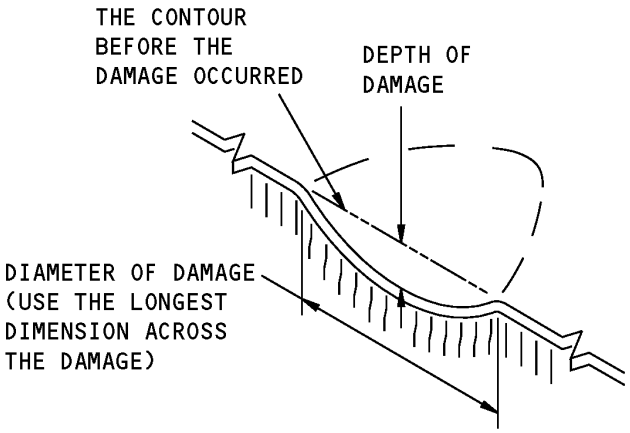
E. Make sure the aerodynamic smoothness is satisfactory or there can be a loss in the airplane safety performance. Refer to 51-10-01.

F. Make sure that the elevator is balanced. Refer to 51-60-04 for the balance procedures.

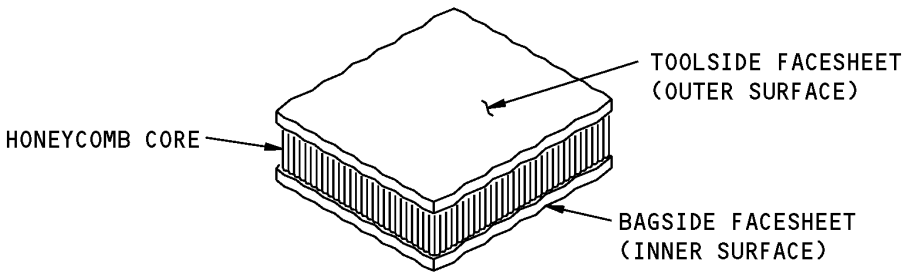
G. Install the elevator, as applicable. Refer to AMM 27-31-31/401.



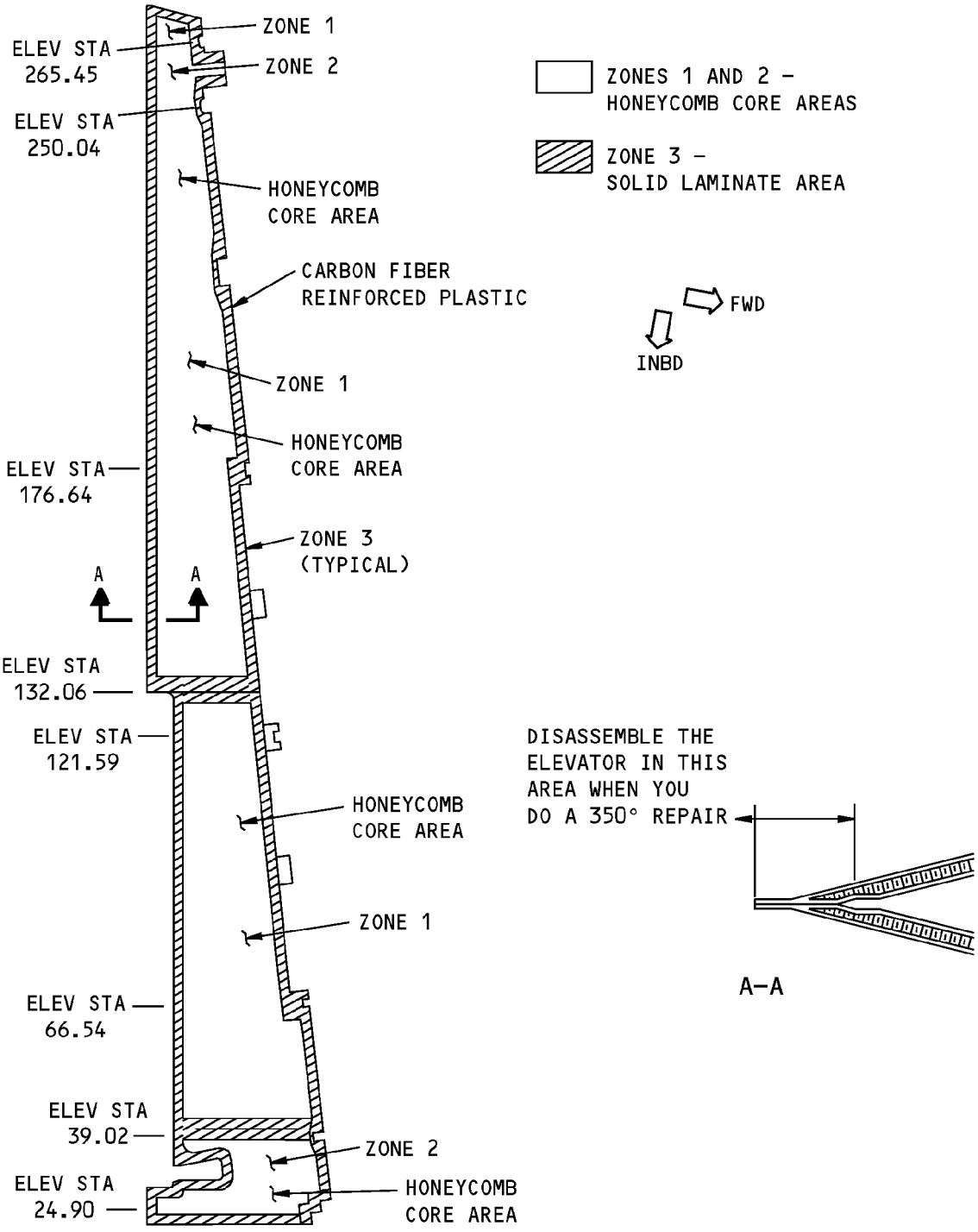
Upper and Lower Elevator Skin Panel Location
Figure 201



Definitions of Damage Size
Figure 202



Definitions of Facesheets
Figure 203



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
UPPER SKIN PANEL IS SHOWN, LOWER SKIN PANEL IS ALMOST THE SAME

Upper and Lower Elevator Skin Zones
Figure 204

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05	REPAIR PROCEDURES FOR PREIMPREGNATED MATERIALS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 27-31-31/401	Elevator Tab - Removal/Installation
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. If a dent is 1.50 inches in diameter or less, and has no fiber damage or delamination, then fill the dent with potting compound and apply a fiberglass patch as given in Repair 14 of 51-70-04.

B. If Paragraph 4.A./REPAIR 1 is not applicable, then refer to:

(1) Table 201/REPAIR 1 for the repair data that is applicable to damage in Zones 1 and 2.

(2) Table 202/REPAIR 1 for the repair data that is applicable to damage in Zone 3.

C. For repairs made with wet layup materials, do as follows:

(1) Use one repair ply of fabric for each initial ply that was damaged. Table 201/REPAIR 1 for panel areas other than the edgebands.

(2) Add two structural plies of fabric for each facesheet that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

NOTE: Repair plies or added plies are not necessary in the repair of delaminations at an edge if the delamination is a minimum of 6D (D = fastener diameter) away from a fastener hole and agrees with the allowable damage limits.

D. Use the instructions that follow to do a Category A repair with preimpregnated layup materials and 250°F (121°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were damaged.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put on structural ply at ±45 degrees to the core ribbon direction and the other a 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with preimpregnated layup materials and 350°F (177°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were damaged.

Table 201:

REPAIR DATA FOR ALL ZONES OF THE HONEYCOMB PANELS 350°F (177°C) CURE ELEVATOR SKINS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	- Contact the Boeing Company for this temperature repair	Damage that is a maximum of: - 5.00 inches in diameter One repair for each 144 square inches 3.0 inches minimum clearance from: - other repairs - fastener holes - panel edges	Damage that is a maximum of: - 5.00 inches in diameter One repair for each 144 square inches 3.0 inches minimum clearance from: - other repairs - fastener holes - panel edges	There are no size limits on the repair.
REPAIR PROCEDURES	———	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.E

Table 202:

REPAIR DATA FOR ZONE 3 OF THE 350°F (177°C) CURE ELEVATOR SKIN PANELS			
REPAIR TYPE	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: - 3.00 inches across largest dimension of damage - 10 percent of the edgeband length on the side of the damage, as applicable	Damage that is a maximum of: - 3.00 inches across largest dimension of damage - 10 percent of the edgeband length on the side of the damage, as applicable	There are no size limits on the repair.
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.E

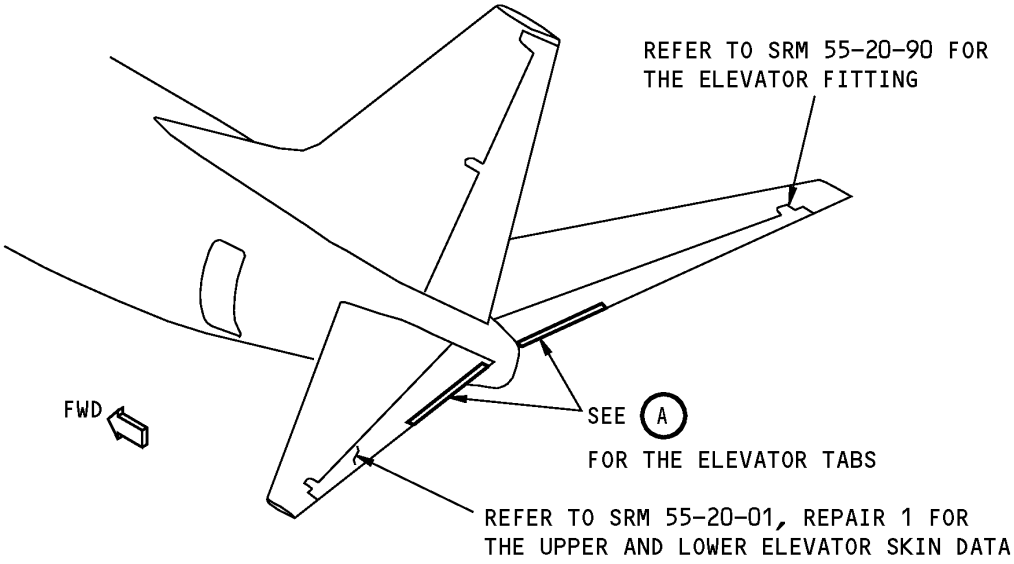
REPAIR 2 - ELEVATOR TAB SKINS

1. Applicability

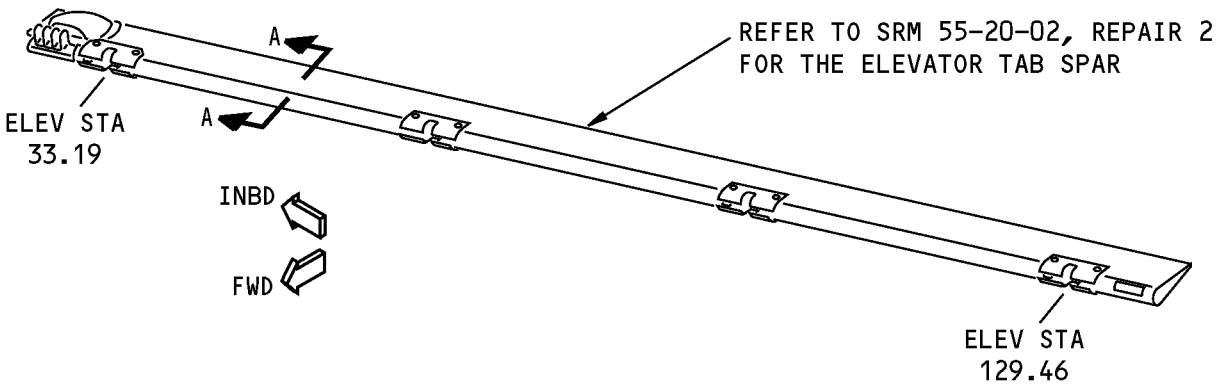
A. Repair 2 is applicable to the elevator tab skins made from Carbon Fiber Reinforced Plastic shown in Elevator Tab Skin, Figure 201/REPAIR 2.

NOTE: THIS REPAIR IS APPLICABLE TO AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-01, REPAIR 3 FOR ALL AIRPLANE LINE NUMBERS EQUAL TO OR GREATER THAN 1175 AND FOR ALL LINE NUMBERS WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

B. Refer to Allowable Damage 2 for the type and dimensions of the damage that is permitted.

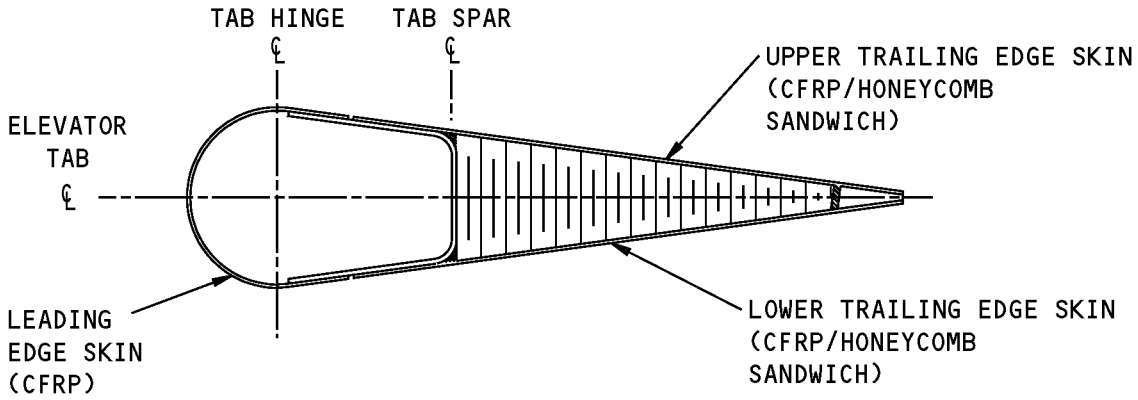


Elevator Tab Skin
Figure 201 (Sheet 1 of 2)



ELEVATOR TAB SKIN

A



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)
A-A

Elevator Tab Skin
Figure 201 (Sheet 2 of 2)

2. General

A. Repairs done as given in Repair 2 are an Alternate Method of Compliance (AMOC) to the Federal Aviation Administration (FAA) Airworthiness Directive (AD) 2001-08-09, Paragraph (d).

B. Repair 2 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

C. Remove the elevator tab, as necessary. Refer to AMM 27-31-31/401.

D. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Figure 202, Details A, B, and C for the definitions of the length, width, and depth of damage.

(3) Refer to Figure 203 for the definitions of the facesheets of a honeycomb core area.

CAUTION: DO NOT EXCEED A MAXIMUM OF FOUR PERMITTED DAMAGE LOCATIONS THAT ARE SEALED AS GIVEN IN SRM 55-20-01, ALLOWABLE DAMAGE 2 OR ONE REPAIR LOCATION. REPAIRS ARE NOT PERMITTED INBOARD OF ELEVATOR STA 45.0. FOR ANY REPAIRS INBOARD OF ELEVATOR STATION 45.0, CONTACT BOEING. IF YOU DO NOT OBEY, THEN DAMAGE TO THE STRUCTURE COULD OCCUR. A REPAIR OF A DAMAGED CORE BY USING POTTING COMPOUND IS NOT PERMITTED.

E. Do the repair as given in Paragraph 4./REPAIR 2

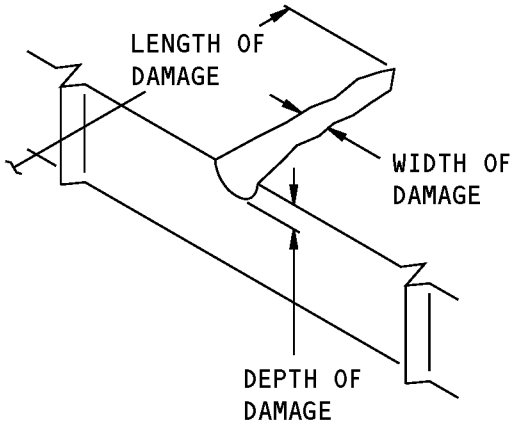
F. Make sure the elevator tab is balanced after all repairs are complete. Refer to 51-60-06.

G. Install the elevator tab, if it was removed. Refer to AMM 27-31-31/401.

H. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane.

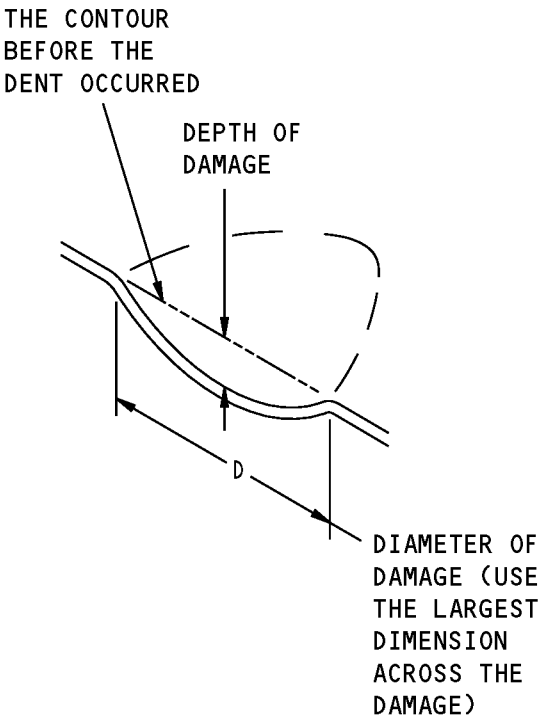
I. Restore the elevator tab exterior finish, as applicable. Refer to AMM PAGEBLOCK 51-21-99/701.

NOTE: Wherever the elevator tab skins need to be refinished, the initial finishes including paint, primer, and/or surface filler, must be removed before application of new exterior paint system. Make sure the finish thicknesses are as given in AMM PAGEBLOCK 51-21-99/701.



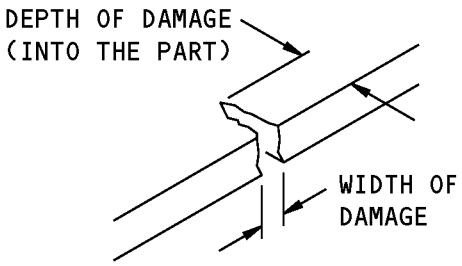
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

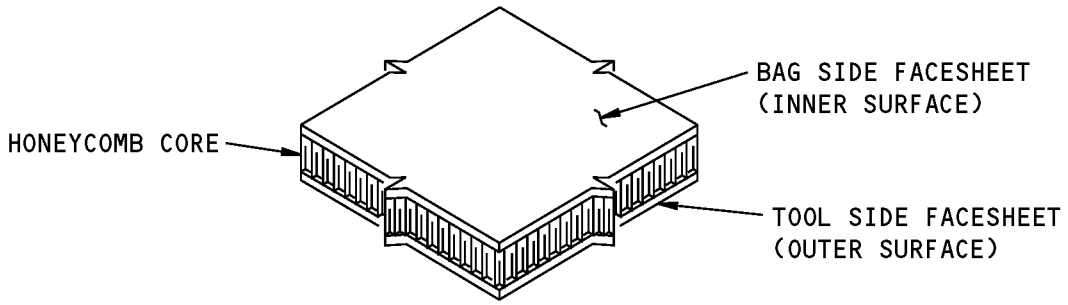
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 202



Definitions of the Facesheets
Figure 203

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-60-06	ELEVATOR TAB BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05	REPAIR PROCEDURES FOR PREIMPREGNATED MATERIALS
55-20-01	ELEVATOR SKIN
55-20-01, ALLOWABLE DAMAGE 2	Elevator Tab Skins
55-20-01, ALLOWABLE DAMAGE 3	Elevator Tab Skins For Airplane Line Numbers 1175 And On And Line Numbers 1 Through 1174 With Completion of Service Bulletins 737-55-1080 and 737-55-1082
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 27-31-31/401	Elevator Tab - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure

4. Repair Instructions

NOTE: If necessary, refer to 55-20-01, Identification 3 to find the material and the build-up of the part of the elevator tab skins that you want to repair.

A. Do as follows when you make a repair:

(1) For the tab honeycomb wedge, it is permitted to wrap the repair plies around the trailing edge to repair the upper and lower skins.

(2) Make the size of the repair plies with overlap as given in 51-70-04 and 51-70-05 and with a tolerance of ±0.1 inch.

B. Refer to Table 201/REPAIR 2 for the repair data that is applicable to damage to the honeycomb core areas of the elevator tab trailing edge skins.

C. Refer to Table 202/REPAIR 2 for the repair data that is applicable to damage to the solid laminate areas of the elevator tab trailing and leading edge skins.

D. For repairs made with wet layup materials, do as follows:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

(3) Do an inspection of Category B repairs after each 400 flight hour interval or more frequently. Refer to 737 NDT Part 1, 51-01-01 for inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator, can be used.

E. Repairs with preimpregnated layup materials at 250°F (121°C) cure are not permitted.

F. Use the instructions that follow to do a Category A repair with preimpregnated layup materials at 350°F (177°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

Table 201:

REPAIR DATA FOR THE HONEYCOMB CORE AREA ON THE 350°F (177°C) CURE, ELEVATOR TAB TRAILING EDGE SKINS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C) *[1]*[2]**	**200°F (93°C) *[1]*[2]**	**250°F (121°C)**	**350°F (177°C) *[1]*[2]**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Repair is not permitted.	Damage that is a maximum of: - 1.0 inch across the largest dimension of the damage
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.D	——	SRM 51-70-05 and Paragraph 4.F

*[1] Only one repair is permitted for the upper or lower skin plus honeycomb core area on each elevator tab.

*[2] For damage that is more than the limits given in this table, contact The Boeing Company for repair data.

Table 202:

REPAIR DATA FOR THE SOLID LAMINATE AREA ON THE 350°F (177°C) CURE ELEVATOR TAB TRAILING EDGE AND LEADING EDGE SKINS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C) *[1] *[2]**	**200°F (93°C) *[1] *[2]**	**250°F (121°C)**	**350°F (177°C) *[1] *[2]**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Repair is not permitted.	Damage that is a maximum of: - 1.0 inch across the largest dimension of the damage
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.D	——	SRM 51-70-05 and Paragraph 4.F

*[1] Only one repair is permitted for the upper or lower skin plus honeycomb core area on each elevator tab.

*[2] For damage that is more than the limits given in this table, contact The Boeing Company for repair data.

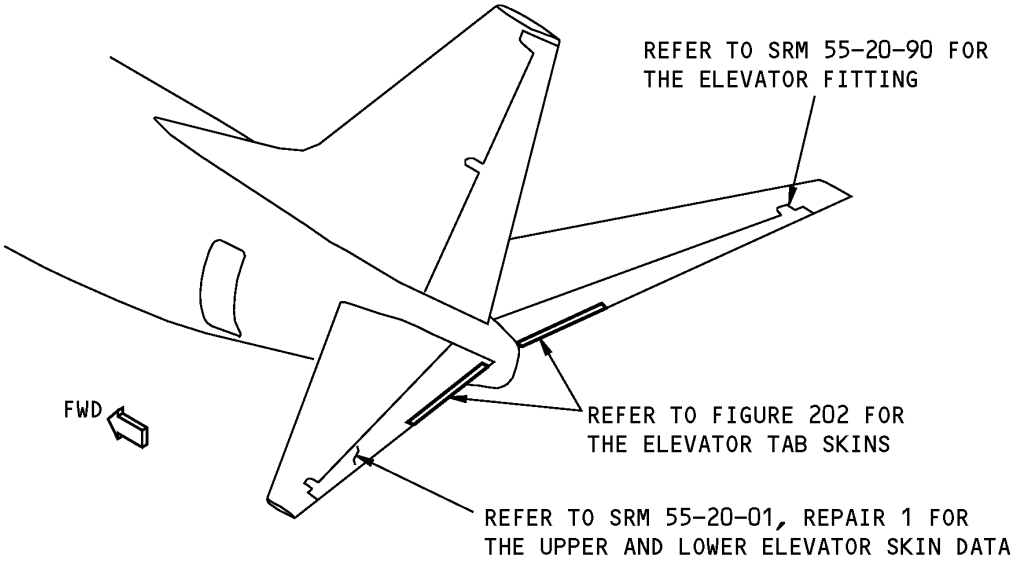
REPAIR 3 - ELEVATOR TAB SKINS FOR AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082

1. Applicability

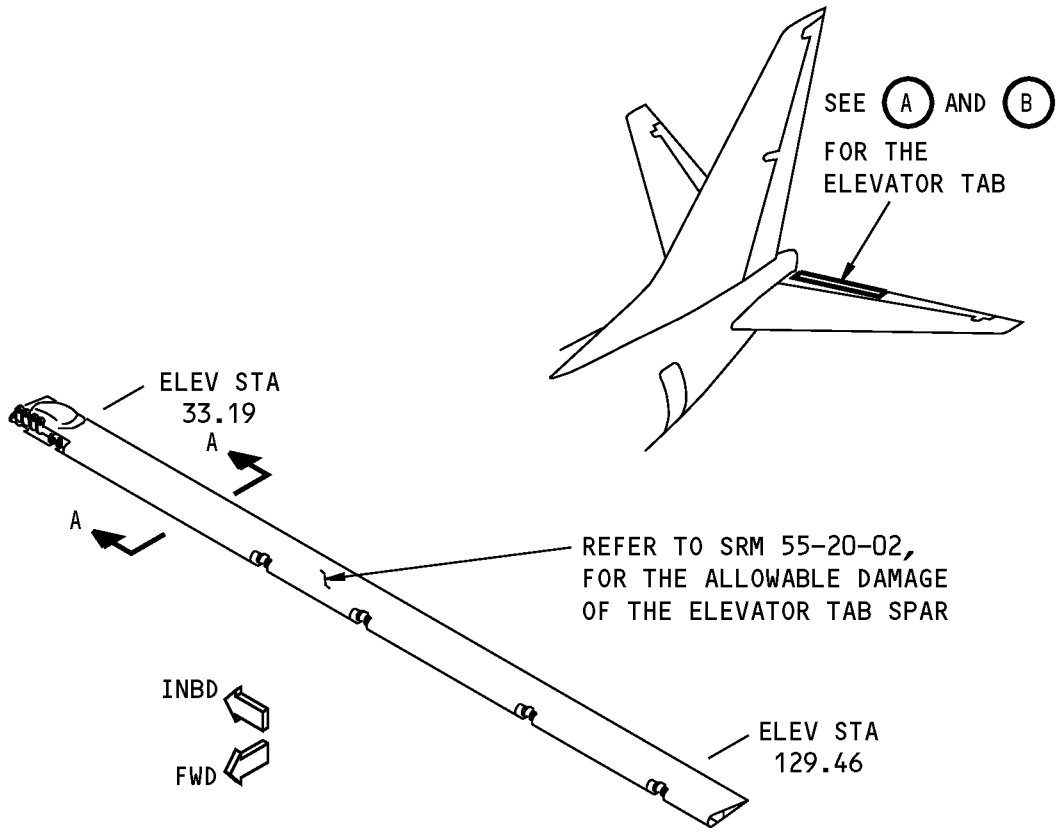
A. Repair 3 is applicable to the elevator tab skins made from Carbon Fiber Reinforced Plastic shown in Elevator Tab Skin, Figure 201/REPAIR 3.

NOTE: THIS REPAIR IS APPLICABLE TO AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-01, REPAIR 2 FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

B. Refer to Allowable Damage 3 for the type and dimensions of the damage that is permitted.

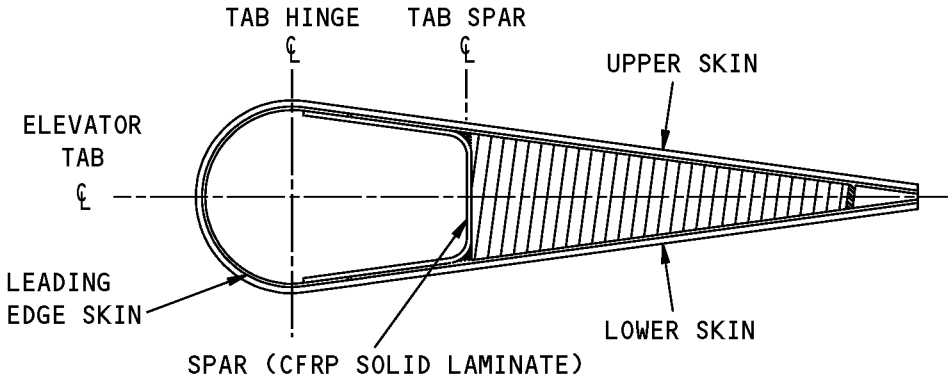


Elevator Tab Skin
Figure 201



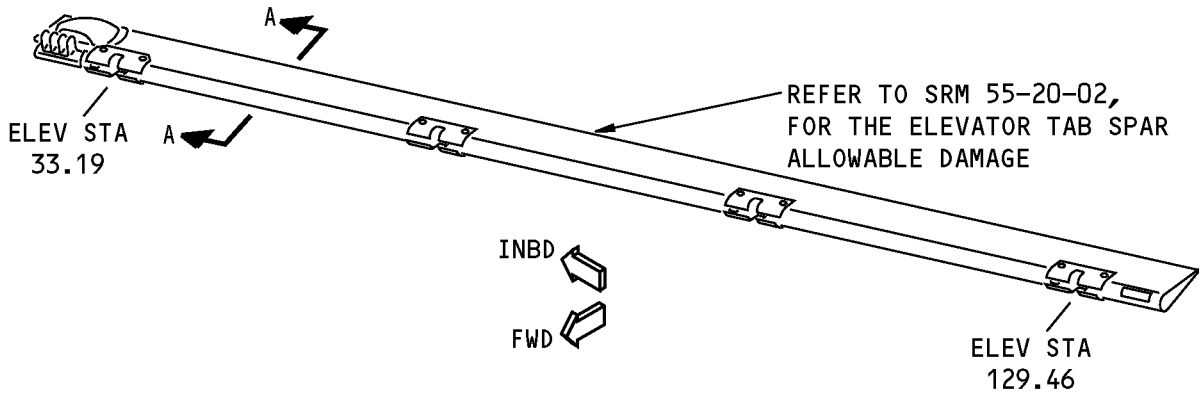
ELEVATOR TAB SKIN

A



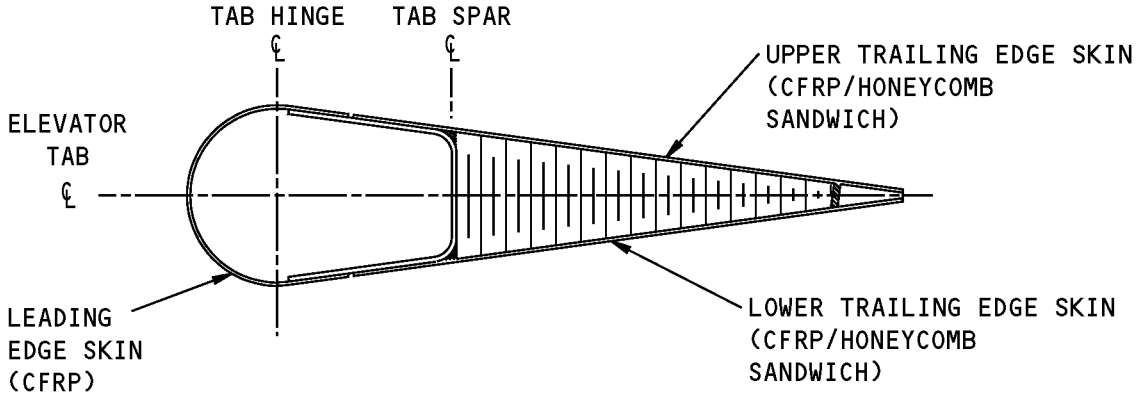
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)
A-A

Elevator Tab Skin Repairs
Figure 202 (Sheet 1 of 2)



ELEVATOR TAB SKIN

B



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174
WITH COMPLETION OF SERVICE BULLETINS 737-55-1080
AND 737-55-1082)
A-A

Elevator Tab Skin Repairs
Figure 202 (Sheet 2 of 2)

2. General

A. Repair 3 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the elevator tab, as necessary. Refer to AMM 27-31-31/401.

C. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Damage Definitions, Figure 203/REPAIR 3, Details A, B, and C for the definitions of the length, width, and depth of damage.

(3) Refer to Definitions of the Facesheets, Figure 204/REPAIR 3 for the definitions of the facesheets of a honeycomb core area.

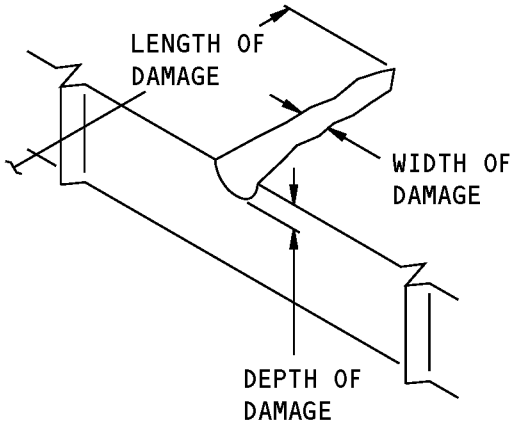
D. Do the repair as given in Paragraph 4./REPAIR 3

E. Make sure the elevator tab is balanced after all repairs are complete. Refer to 51-60-06.

F. Install the elevator tab, if it was removed. Refer to AMM 27-31-31/401.

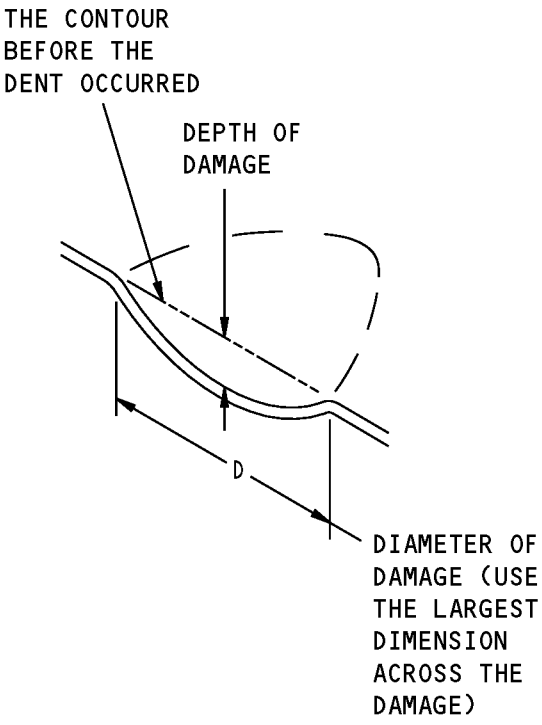
G. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane.

H. Restore the elevator tab exterior finish, as applicable. Refer to AMM PAGEBLOCK 51-21-99/701.



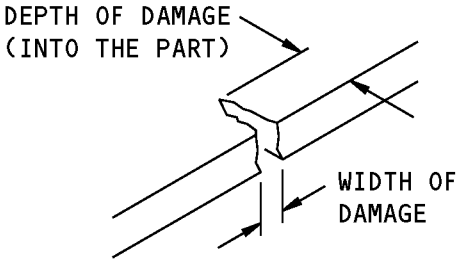
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

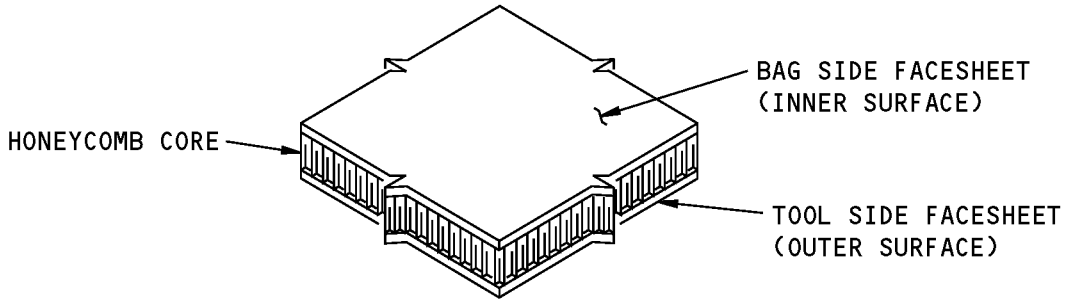
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 203



Definitions of the Facesheets
Figure 204

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-60-06	ELEVATOR TAB BALANCE PROCEDURE
51-70-04, REPAIR GENERAL	Repair Procedures for Wet Layup Materials
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
55-20-01	ELEVATOR SKIN
55-20-01, ALLOWABLE DAMAGE 2	Elevator Tab Skins
55-20-01, ALLOWABLE DAMAGE 3	Elevator Tab Skins For Airplane Line Numbers 1175 And On And Line Numbers 1 Through 1174 With Completion of Service Bulletins 737-55-1080 and 737-55-1082
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 27-31-31/401	Elevator Tab - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure

4. Repair Instructions

NOTE: If necessary, refer to 55-20-01, Identification 3 to find the material and the build-up of the part of the elevator tab skins that you want to repair.

A. Do as follows when you make a repair:
   (1) When you remove the damage, do not cut or make an abrasion into the radius of the structure.
   (2) If the repair plies make an overlap of a hole or cutout, do the steps that follow:
      (a) Cure the repair.
      (b) Drill or cut the plies to the initial diameter of the hole of the cutout.
   (3) If you need clearance with adjacent structure, install a tapered shim on each side of the repair.
   (4) It is permitted to put the repair plies around the full width of the structure.
      (a) Do not make an overlap of the edges of the structure.

B. Refer to Table 201/REPAIR 3 for the repair data that is applicable to damage to the honeycomb core areas of the elevator tab skin.

C. Refer to Table 202/REPAIR 3 for the repair data that is applicable to damage to the solid laminate areas of the elevator tab skin.

D. For repairs made with wet layup materials, do as follows:
   (1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

F. Use the instructions that follow to do a Category A repair with preimpregnated layup materials at 350°F (177°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

Table 201:

REPAIR DATA FOR THE HONEYCOMB AREA ON THE 350°F (177°C) CURE, ELEVATOR TAB SKIN				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	- Contact The Boeing Company for this temperature repair.	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs
REPAIR PROCEDURES	————	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

Table 202:

REPAIR DATA FOR THE SOLID LAMINATE AREA ON THE 350°F (177°C) CURE, ELEVATOR TAB SKIN				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	- Contact The Boeing Company for this temperature repair	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs	Damage that is a maximum of: - 1.5 inches across the largest dimension of the damage - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 1.0 inch minimum clearance from: - fastener holes - panel edges 3.0 inches minimum clearance from other repairs
REPAIR PROCEDURES	————	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

REPAIR 4 - ELEVATOR HINGE COVER CRACK

1. Applicability

A. Repair 4 is applicable to damage to elevator hinge cover panels made of Epoxy Sheet Molding as shown in Elevator Hinge Cover Panel Location, Figure 201/REPAIR 4 and Elevator Hinge Covers, Figure 202/REPAIR 4.

2. General

A. Repair 4 gives repair instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the elevator hinge covers, as necessary. Refer to AMM 06-42-00.

(1) Remove the necessary fasteners. Refer to 51-40-02 for information on fastener removal.

(2) If a fastener hole is damaged, refer to 51-70-04 as applicable.

C. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 of the inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator, can be used.

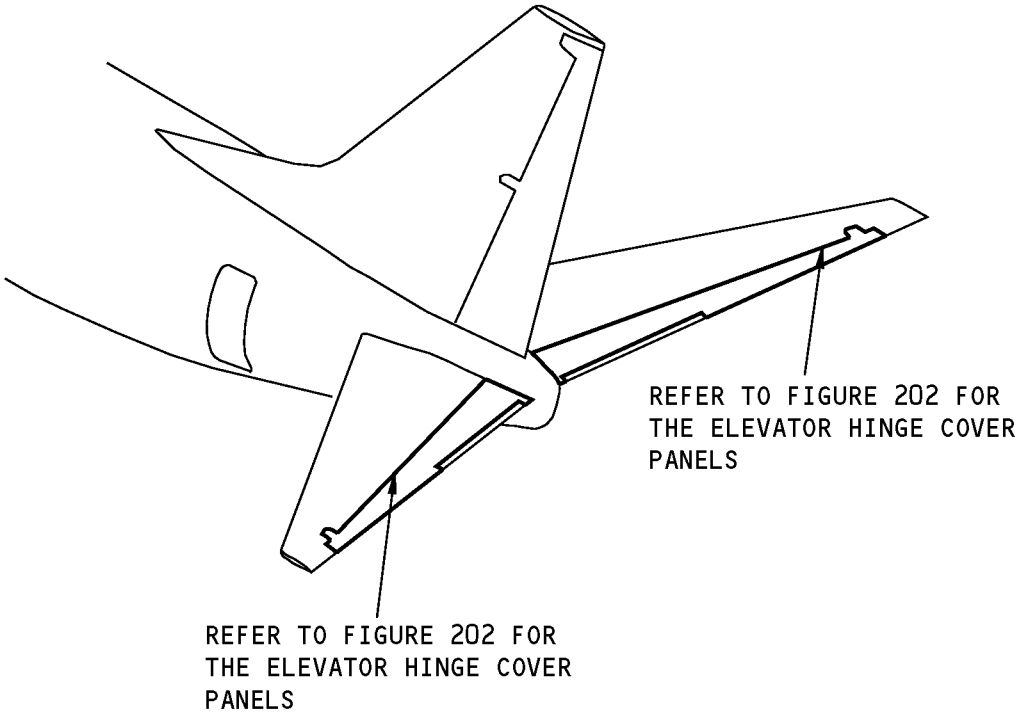
(1) Refer to Damage Definitions, Figure 203/REPAIR 4 for the definitions of width and depth of damage.

D. Do the repair as given in Paragraph 4./REPAIR 4

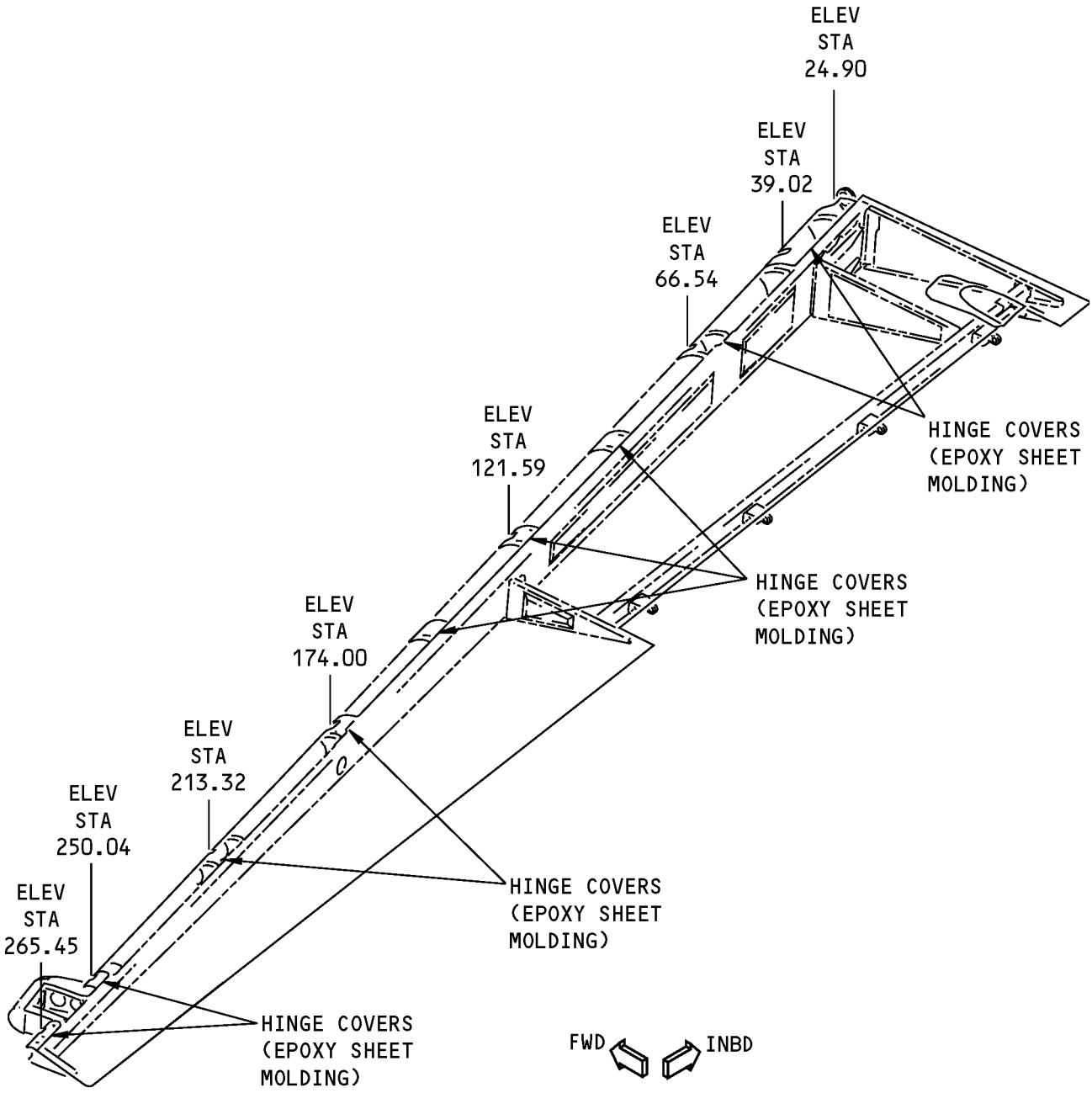
E. Make sure the aerodynamic smoothness is satisfactory or there can be a loss in the airplane safety performance. Refer to 51-10-01.

F. Make sure that the elevator is balanced. Refer to 51-60-04 for the balance procedures.

G. Install the elevator hinge cover, as applicable. Refer to AMM 06-42-00.



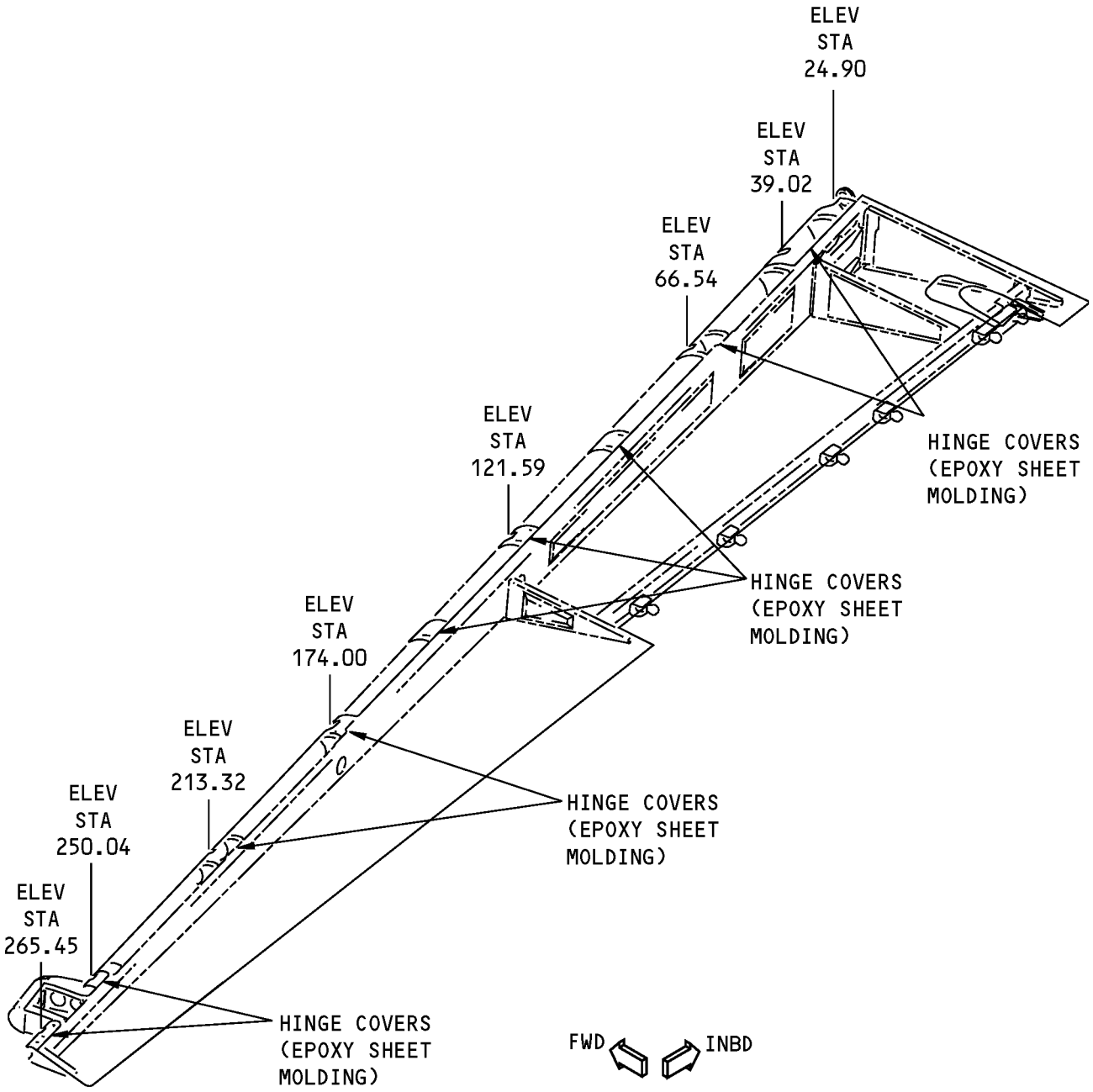
Elevator Hinge Cover Panel Location
Figure 201



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)

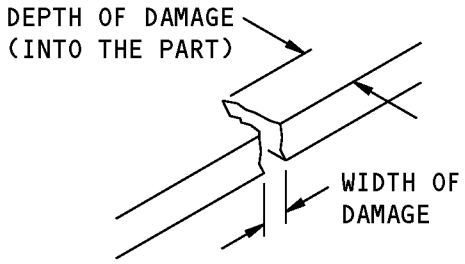
Elevator Hinge Covers
Figure 202 (Sheet 1 of 2)



LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Hinge Covers
Figure 202 (Sheet 2 of 2)



DEFINITIONS FOR
EDGE DAMAGE

A

Damage Definitions
Figure 203

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 06-42-00	Aircraft Maintenance Manual
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. Completely remove the crack damage and blend smooth with the initial edges.

B. Refer to Table 201/REPAIR 4 for the repair data that is applicable to the damage.

C. For repairs made with wet layup materials, do as follows:

(1) Use two repair plies of BMS 9-3, Type H2 or H3 fabric with BMS 8-301, Class 1, Grade 1 resin as given in 51-70-04 to the damaged areas. Put one repair ply at 0 degrees along the long edge of the panel. Extend this ply a minimum of 0.50 inch beyond the damage. Put the next ply at ±45 degrees to the edge of the panel and extend the ply 0.50 inch beyond the first ply end.

(2) On the opposite side, fill the blended area with BMS 8-301, Class 1, Grade 1 resin and milled glass fibers. Add two repair plies of BMS 9-3, Type H2 or H3 fabric with BMS 8-301, Class 1, Grade 1 resin as given in 51-70-04 to the damage area. Put one repair ply at 0 degrees along the long edge of the panel. Extend this ply a minimum of 0.50 inch beyond the damage. Put the next ply at ±45 degrees to the edge of the panel and extend the ply 0.50 inch beyond the first ply end.

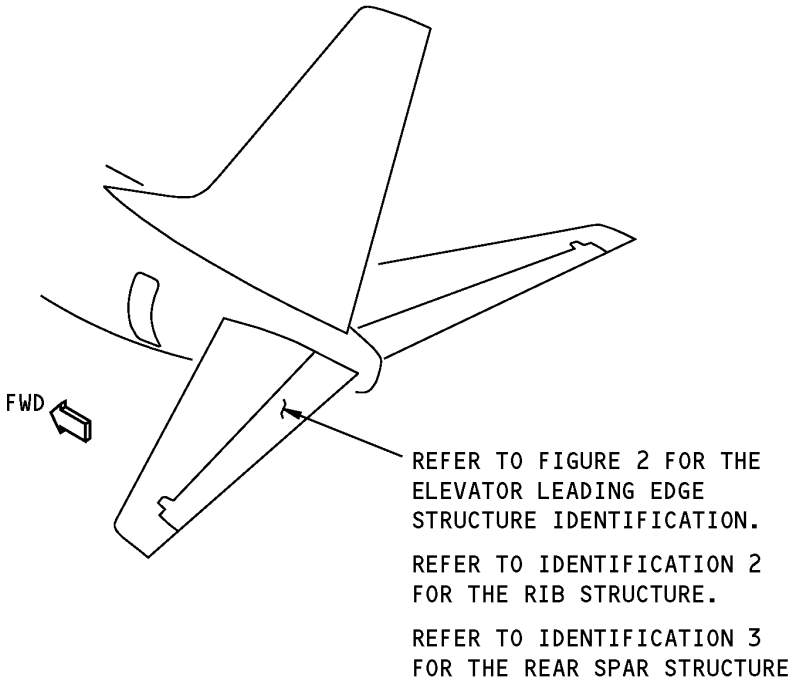
(3) Refinish as given in 51-70-04.

Table 201:

REPAIR DATA FOR THE ELEVATOR HINGE COVERS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS FOR EDGE CRACKS	- Contact the Boeing Company for this temperature repair.	Damage that is a maximum of: - 1.5 inches in length - 2 edge cracks for each panel. The crack must be a minimum of 1.5 inches away from another crack.	This temperature repair is not permitted.	This temperature repair is not permitted.

REPAIR DATA FOR THE ELEVATOR HINGE COVERS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS FOR CRACKS FROM FASTENER HOLES	- Contact The Boeing Company for this temperature repair.	Damage that is a maximum of: - 0.5 inch in length away from a fastener hole edge. - 2 fastener cracks for each panel.	This temperature repair is not permitted.	This temperature repair is not permitted.
REPAIR PROCEDURES	——	SRM 51-70-04 AND PARAGRAPH 4.C	———	———

IDENTIFICATION 1 - ELEVATOR LEADING EDGE STRUCTURE



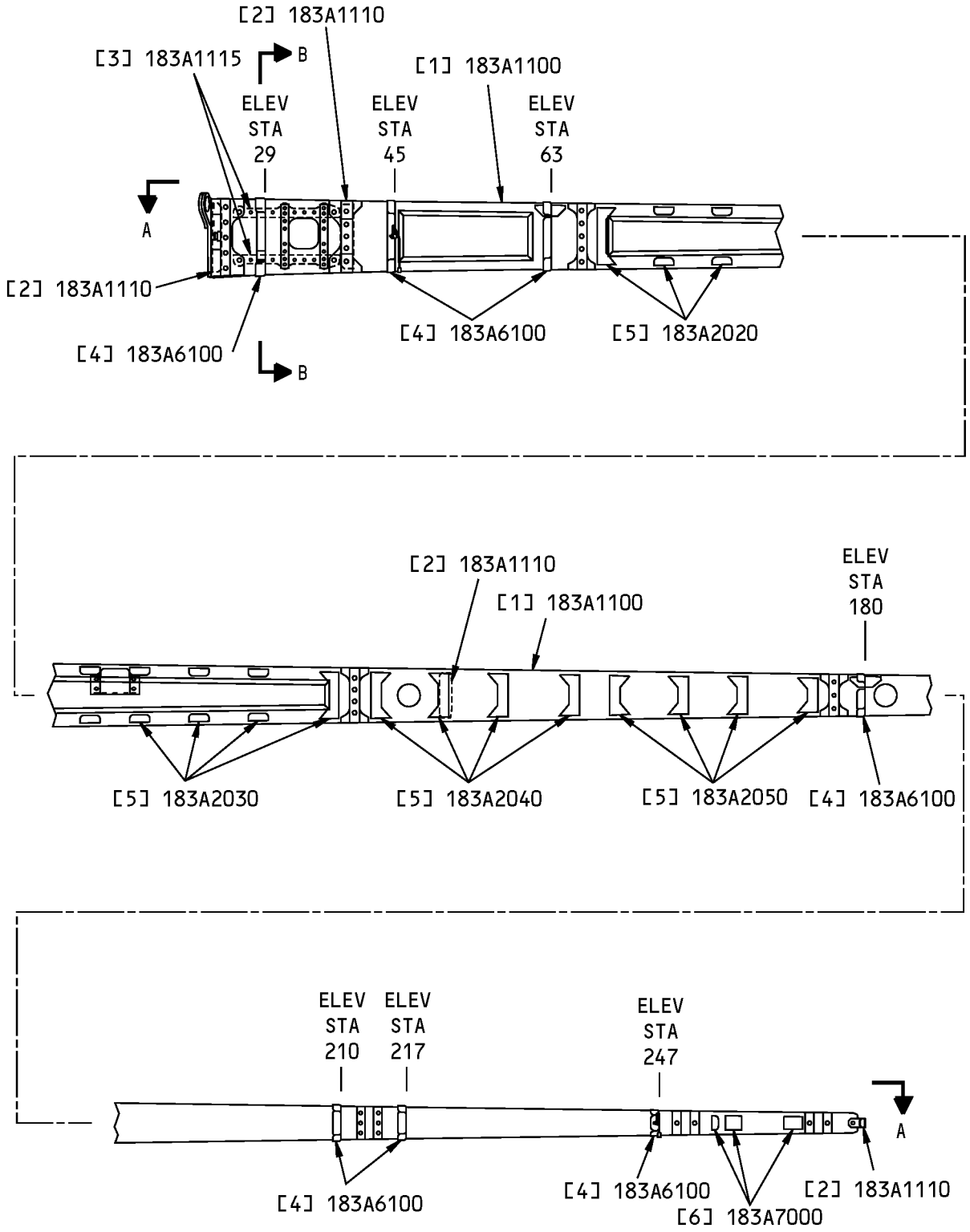
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Elevator Leading Edge Structure Location
Figure 1

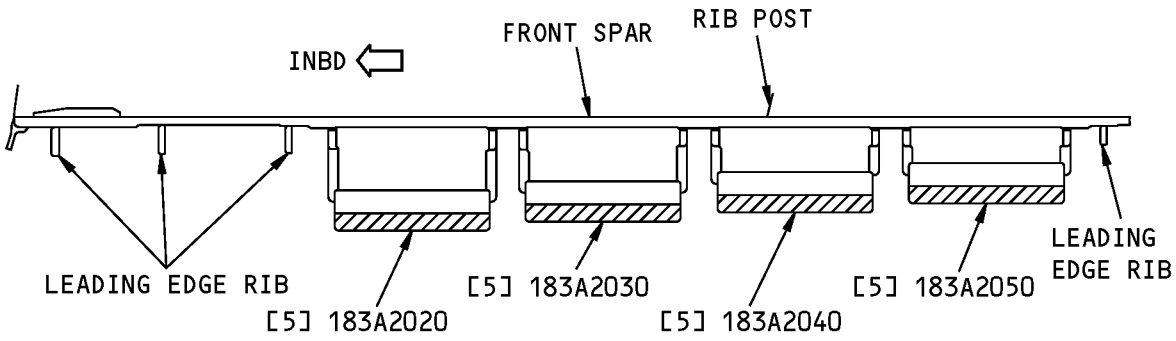
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A1000	Front Spar Assembly - Elevator
183A2020	Balance Panel Assembly - Bay No. 2, Elevator
183A2030	Balance Panel Assembly - Bay No. 3, Elevator
183A2040	Balance Panel Assembly - Bay No. 4, Elevator
183A2050	Balance Panel Assembly - Bay No. 5, Elevator
183A6000	Leading Edge Installation - Elevator

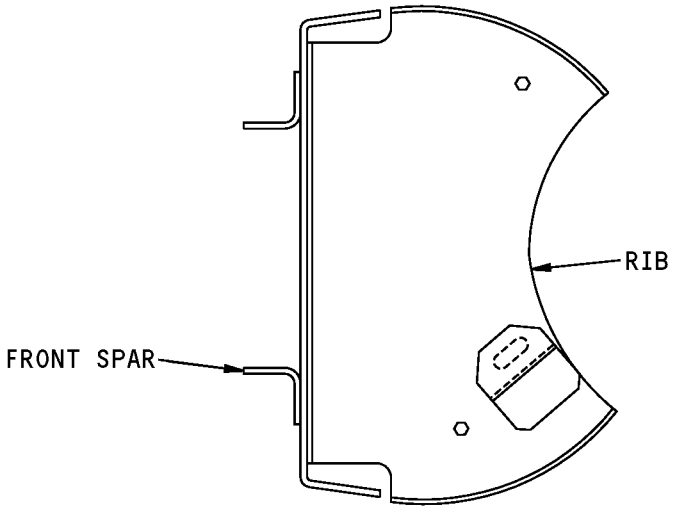
REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A7000	Balance Horn Assembly - Elevator



Leading Edge Structure Identification
Figure 2 (Sheet 1 of 2)



A–A



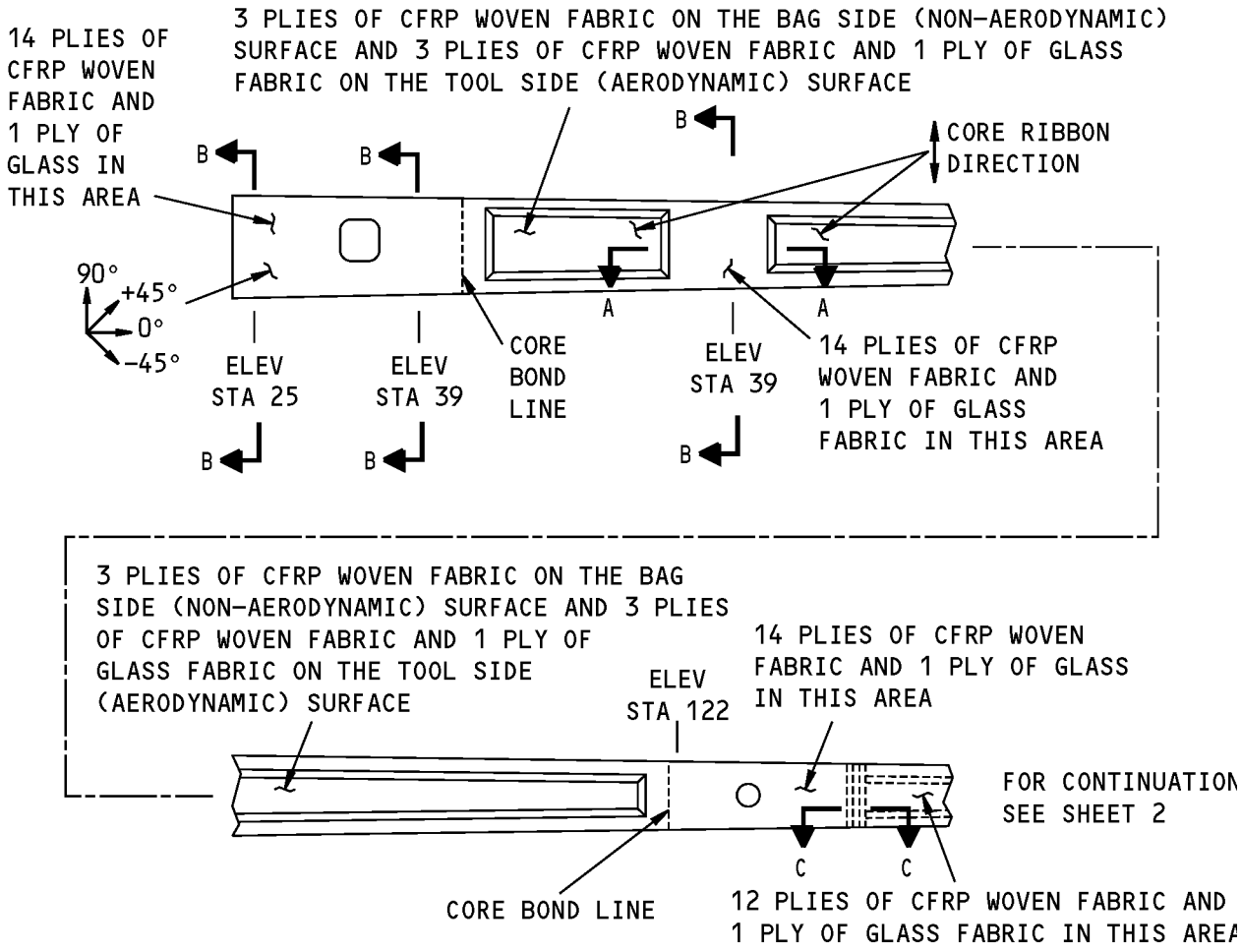
B–B

Leading Edge Structure Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Front Spar - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) honeycomb sandwich with a Glass Fiber Reinforced Plastic (GFRP) isolation ply	
	Skin		Refer to Figure 3	
	Core ELEV STA 39 to 66.5 ELEV STA 66.5 to 121.5		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Rib Post (3)		CFRP solid laminate	
	Skin		Refer to Figure 4 for a typical rib post	
[3]	Stiffener (2)		CFRP solid laminate	
	Skin		Refer to Figure 5 for a typical stiffener	
[4]	Rib, Leading Edge	0.050 (1.27)	2024-T42 clad	
[5]	Balance Panel Assembly		Refer to Figure 6 for a typical Balance Panel	
	Rib, Inboard End		7075-T7351 plate	
	Rib, Outboard End		7075-T7351 plate	
	Rib, Inboard Center		7075-T7351 plate	
	Rib, Outboard Center		7075-T7351 Type V, Grade 3.0	
	Hinge Plate	0.025 (0.64)	7075-T651 plate as given in QQ-A-250/12	
	Stiffener (2)	0.032 (0.81)	2024-T42 clad sheet	
[6]	Balance Horn Assembly		Refer to Figure 7 for the Balance Horn	
	Rib, Inboard End		7075-T7351 plate	
	Rib, Outboard End		7075-T7351 plate	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

VIEW IS ON THE BAG SIDE (NON-AERODYNAMIC) SURFACE

VIEW IS OF THE SPAR LOOKING AFT

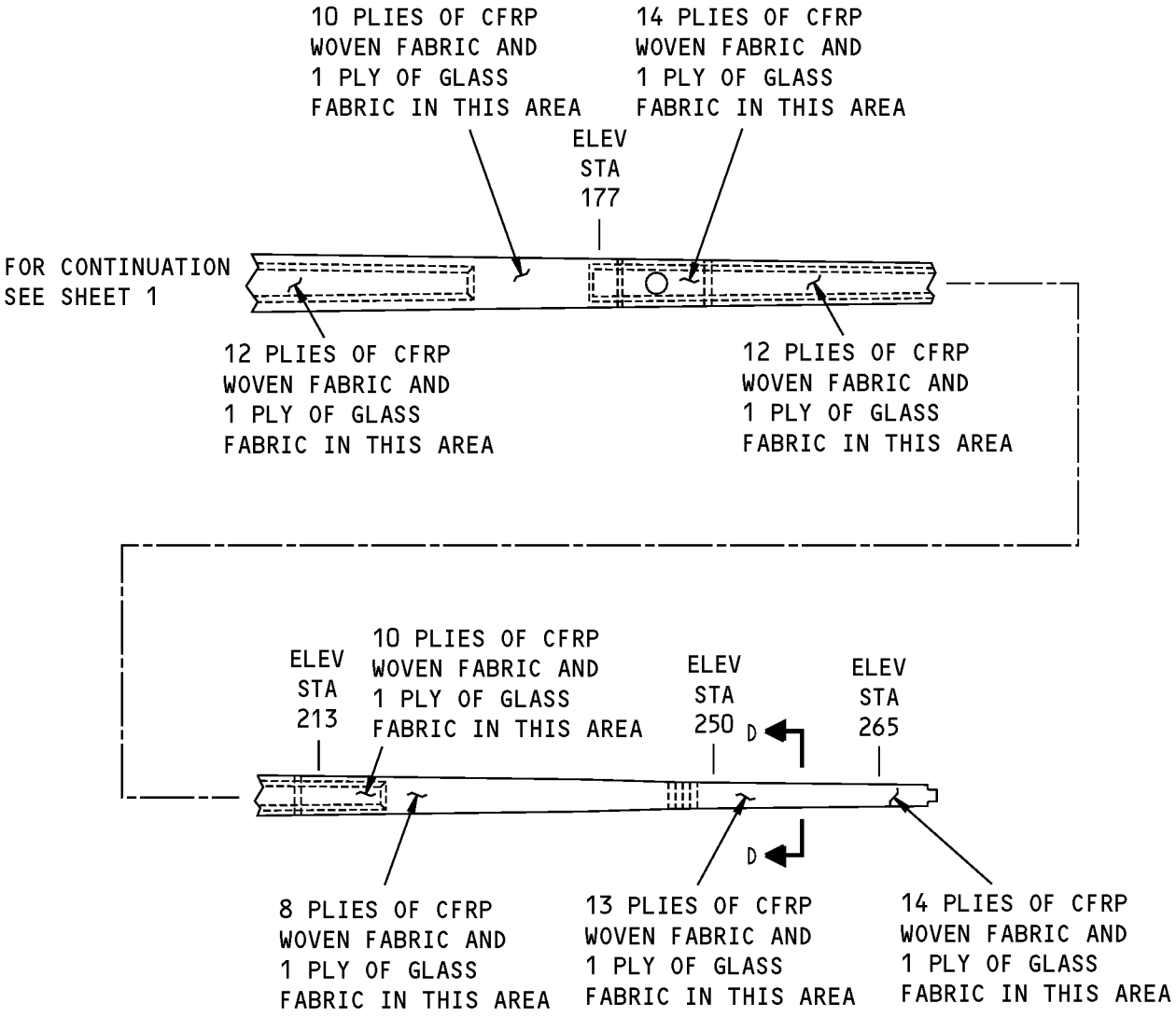
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC, REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTIONS A-A, B-B, C-C, AND D-D FOR THE PLY SEQUENCE AT THOSE LOCATIONS.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL FOR EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Front Spar, Figure 2, Item [1]
Figure 3 (Sheet 1 of 4)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

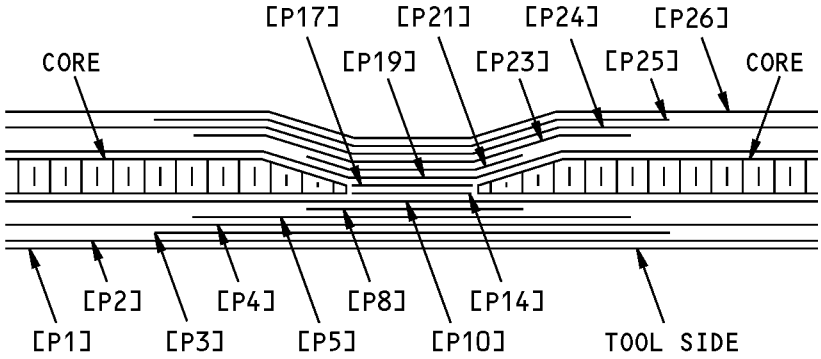
VIEW IS ON THE BAG SIDE (NON-AERODYNAMIC) SURFACE

VIEW IS OF SPAR LOOKING AFT

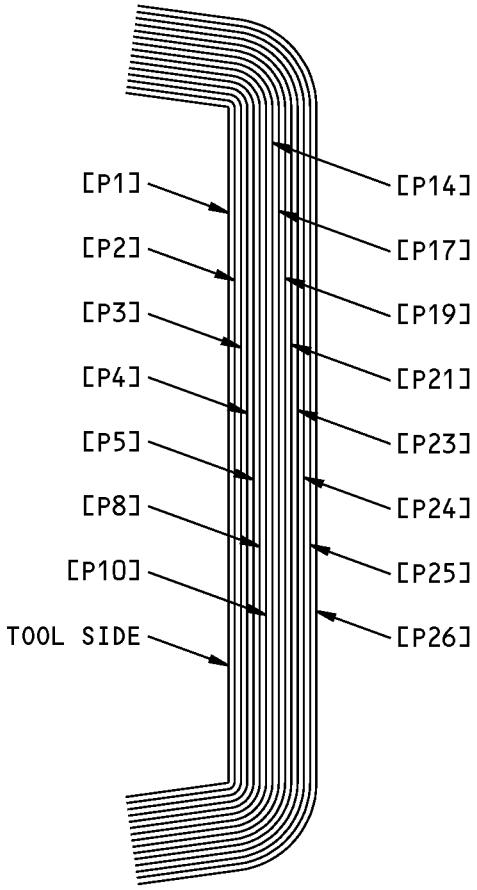
PLY LAYUP AND CORE RIBBON DIRECTION

(A)

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Front Spar, Figure 2, Item [1]
Figure 3 (Sheet 2 of 4)

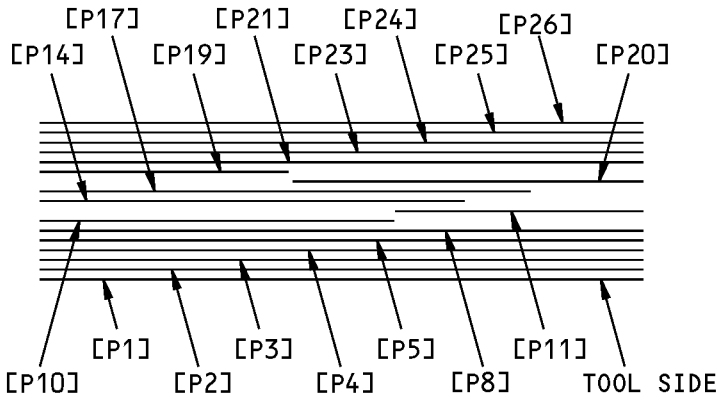


A–A

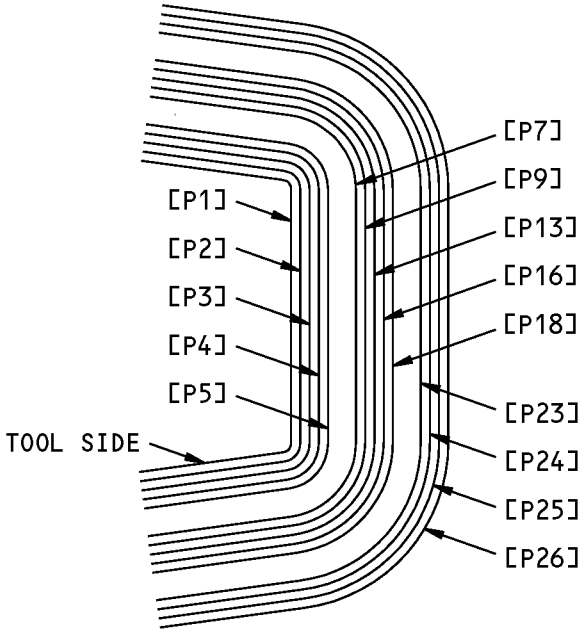


B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Front Spar, Figure 2, Item [1]
Figure 3 (Sheet 3 of 4)



C–C

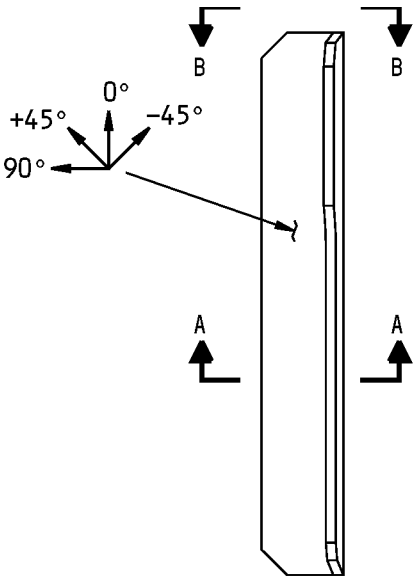


D–D

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Front Spar, Figure 2, Item [1]
Figure 3 (Sheet 4 of 4)

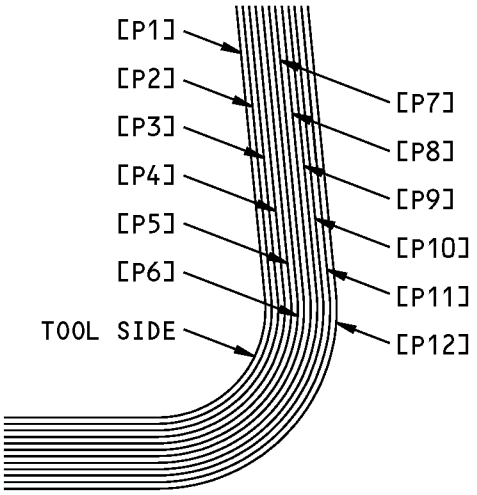
Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Style 108
P2, P4, P6 thru P8, P13, P14, P17, P18, P21, P22, P24, P26	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P5, P9 thru P12, P15, P16, P19, P20, P23, P25	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

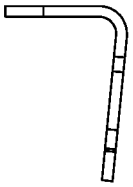


RIB POST PLAN VIEW

A



A–A



B–B

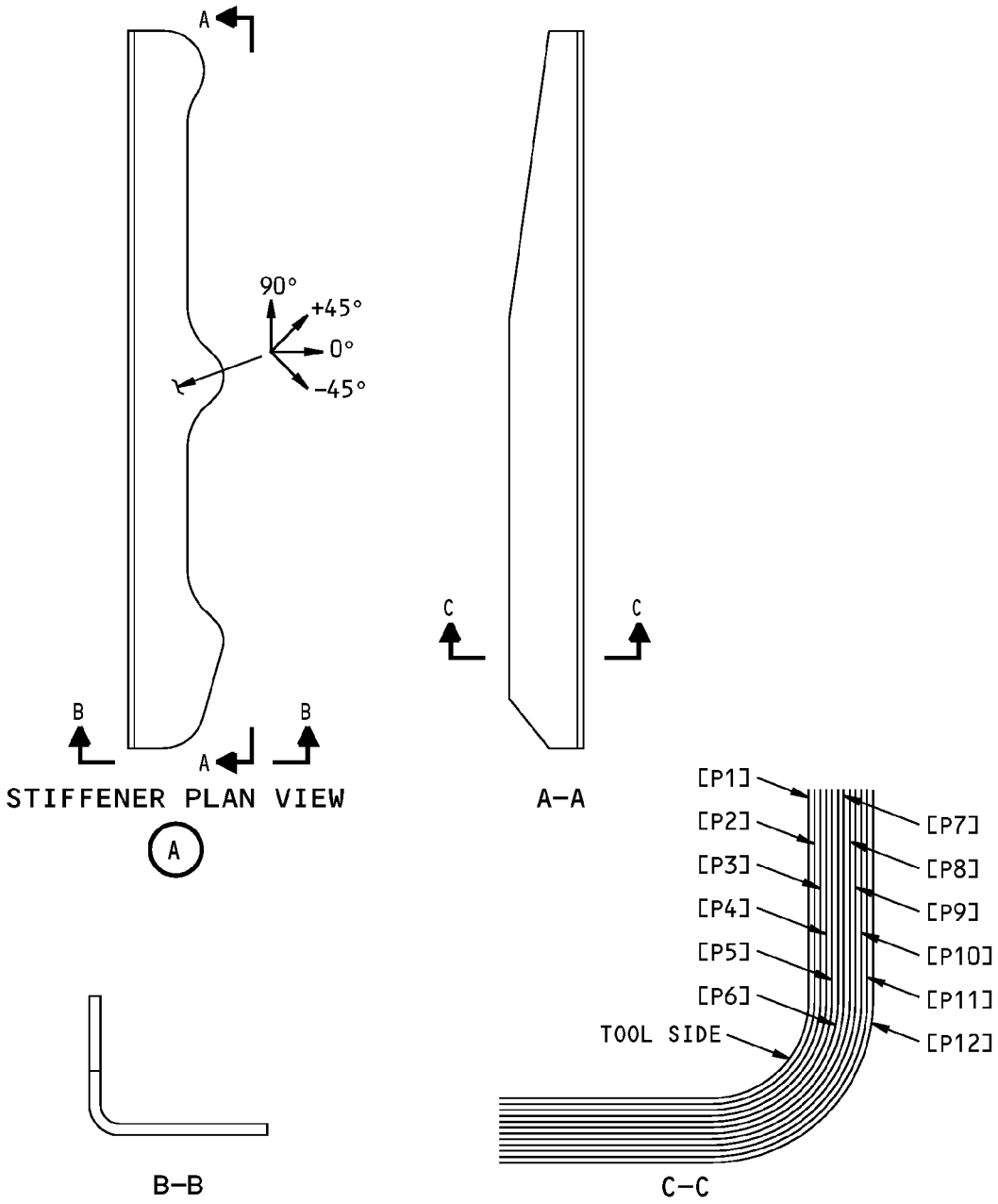
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC, REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION.
- REFER TO SECTIONS A–A AND B–B FOR THE PLY SEQUENCE AT THOSE LOCATIONS.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL FOR EACH PLY.

Ply Direction and Ply Sequence for Rib Post, Figure 2, Item [2]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [2]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



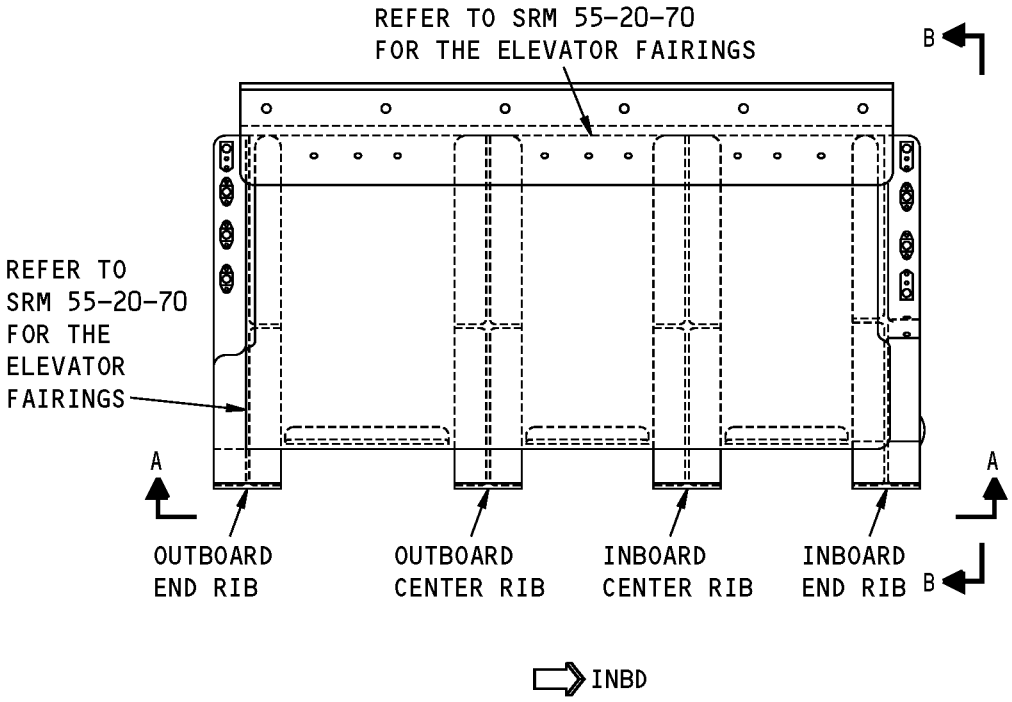
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC, REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION.
- REFER TO SECTIONS A-A THRU C-C FOR THE PLY SEQUENCE AT THOSE LOCATIONS.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL FOR EACH PLY.

Ply Direction and Ply Sequence for Stiffener, Figure 2, Item [3]
Figure 5

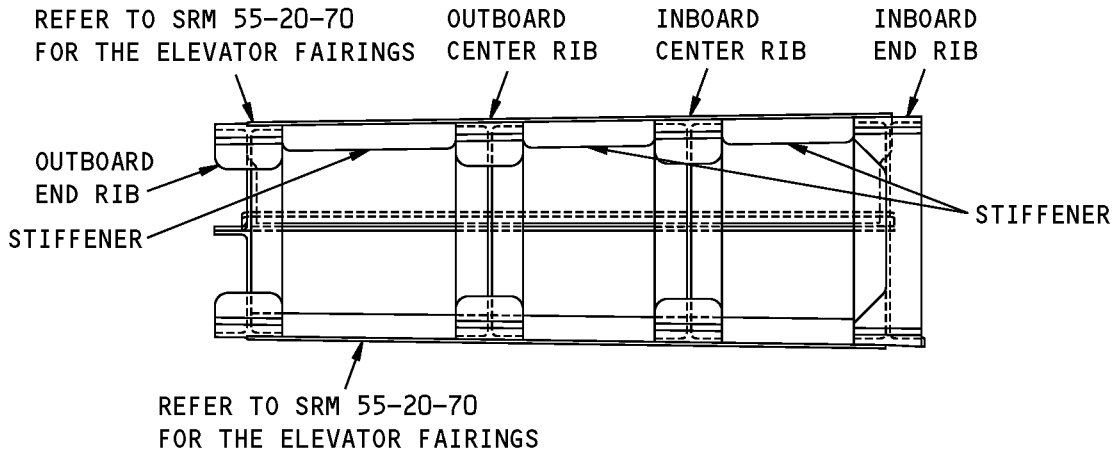
Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [3]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

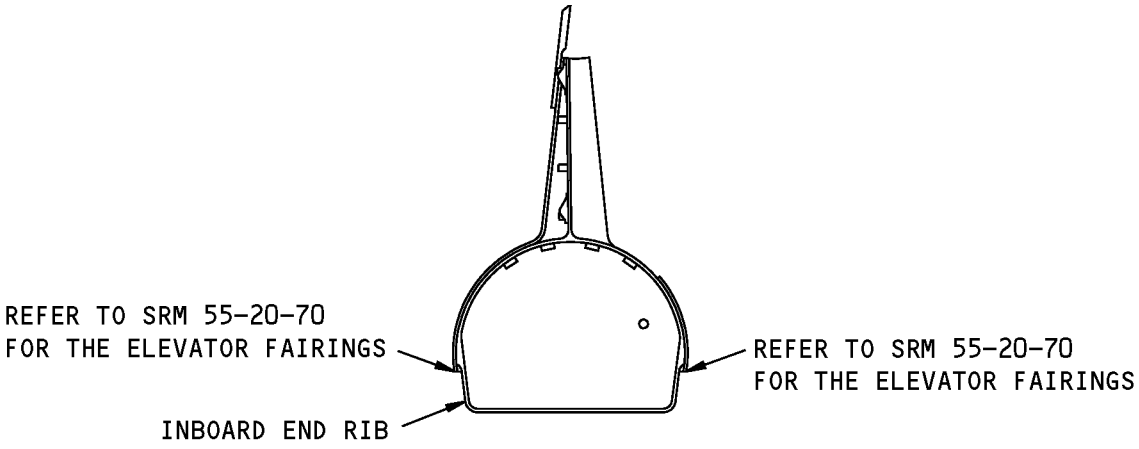


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Balance Panel Assembly for Figure 2, Item [5]
Figure 6 (Sheet 1 of 2)

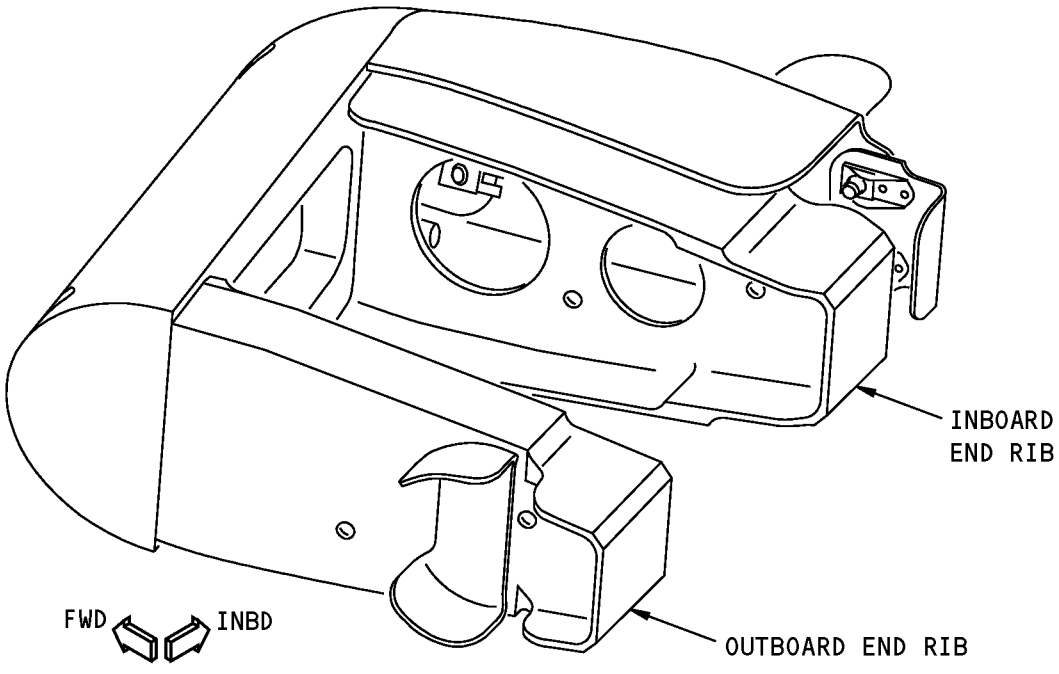


A–A



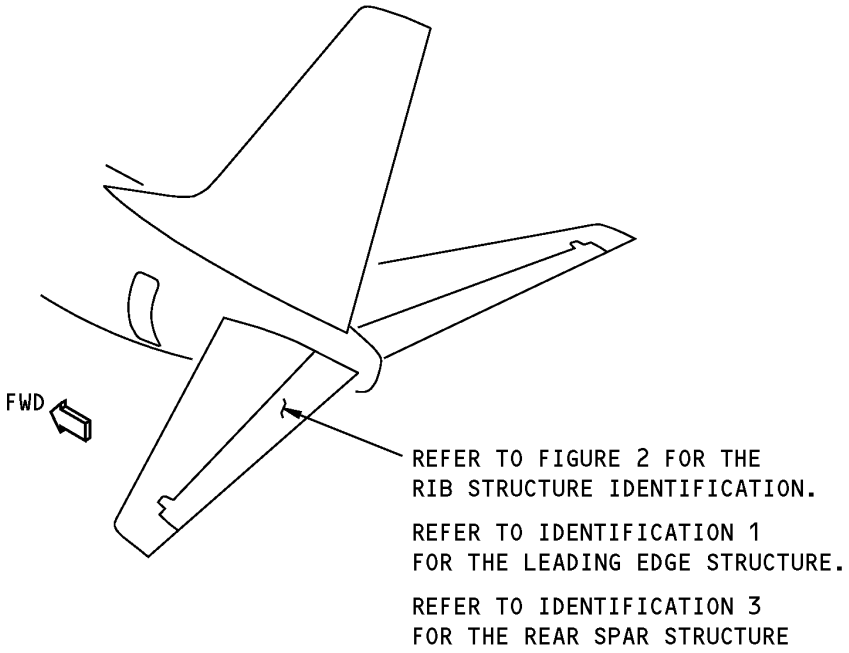
B–B

Balance Panel Assembly for Figure 2, Item [5]
Figure 6 (Sheet 2 of 2)



Balance Horn for Figure 2, Item [2]
Figure 7

IDENTIFICATION 2 - ELEVATOR RIB STRUCTURE

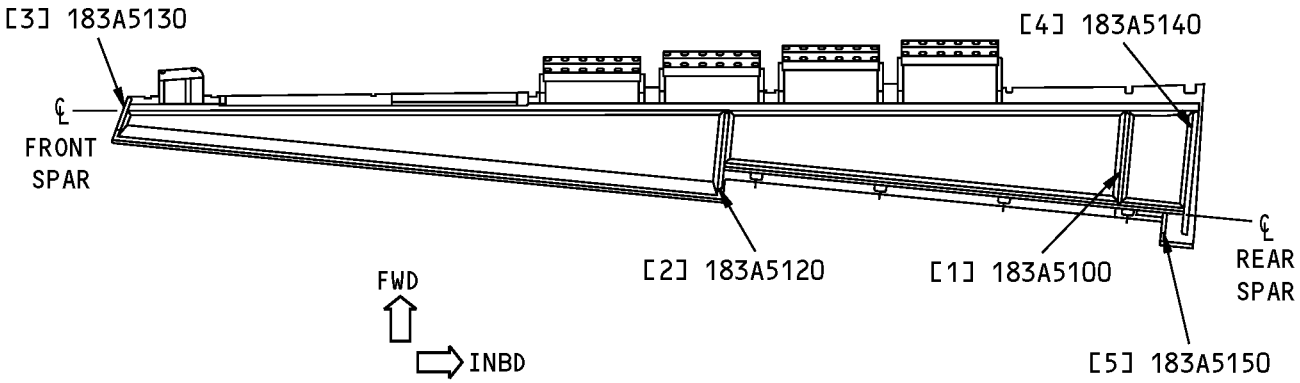


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

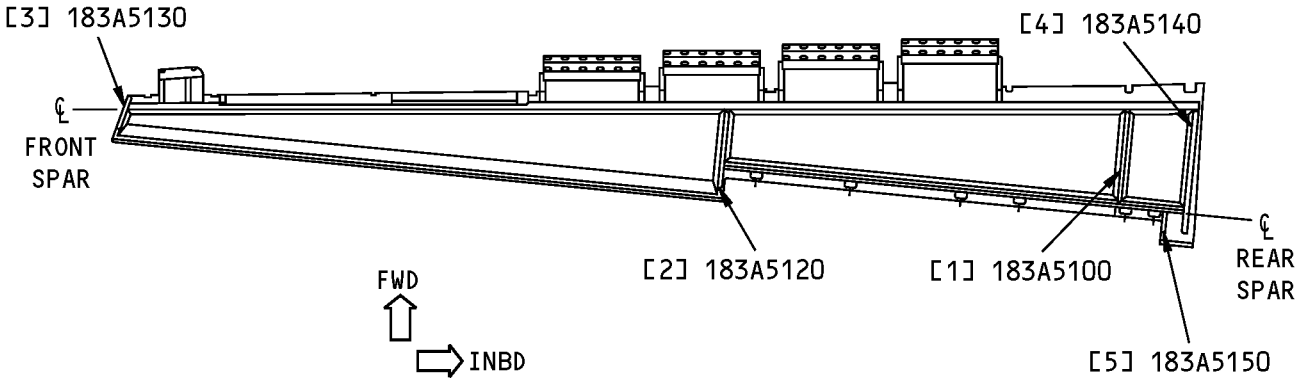
Elevator Rib Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A0101	Elevator Assembly Functional Product Collector
183A5000	Rib Installation - Station 39.6 - 42.6, Elevator
183A5020	Rib Installation - Station 132.39 - 134.51, Elevator
183A5030	Rib Installation - Outboard Closure, Elevator
183A5040	Rib Installation - Inboard Closure, Elevator
183A5050	Rib Installation - Tab Cutout Closure, Elevator



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

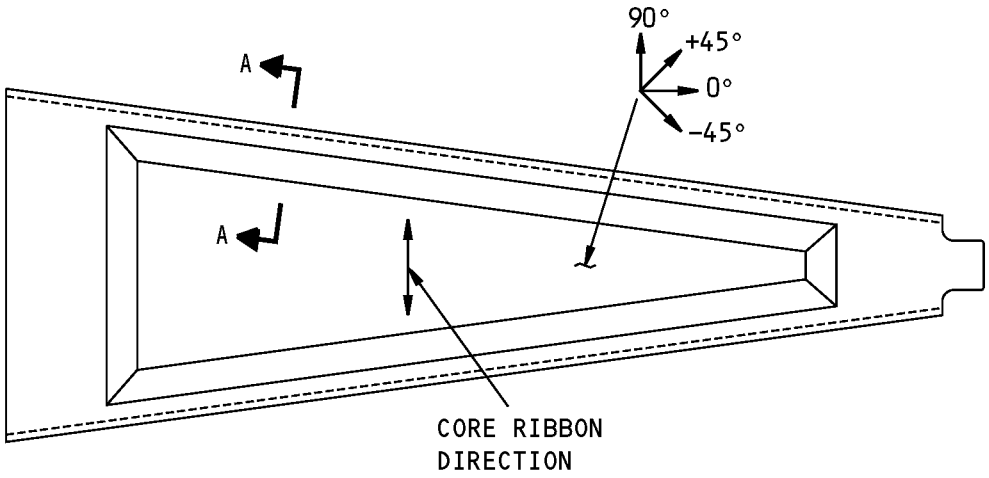
ELEVATOR RIBS

Elevator Rib Structure Identification
Figure 2

Table 2:

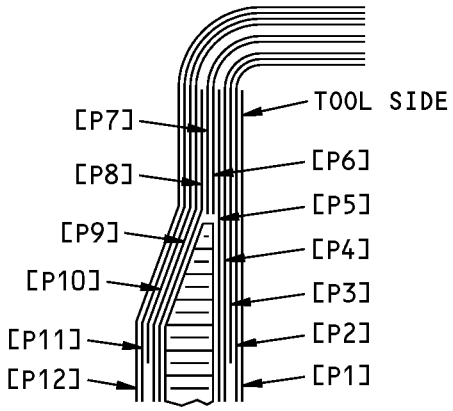
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Station 41 Rib - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) honeycomb sandwich	
	Skin		Refer to Figure 3	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 3	
[2]	Station 133 Rib - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 4	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 4	
[3]	Outboard Closure Rib - Bonded Part		CFRP solid laminate	
	Skin		Refer to Figure 5	
[4]	Inboard Closure Rib - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 6	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 6	
[5]	Tab Cutout Closure Rib - Bonded Part		CFRP solid laminate	
	Skin		Refer to Figure 7	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



PLY LAYUP AND CORE RIBBON DIRECTION

(A)



PLY LAYUP SEQUENCE

A–A

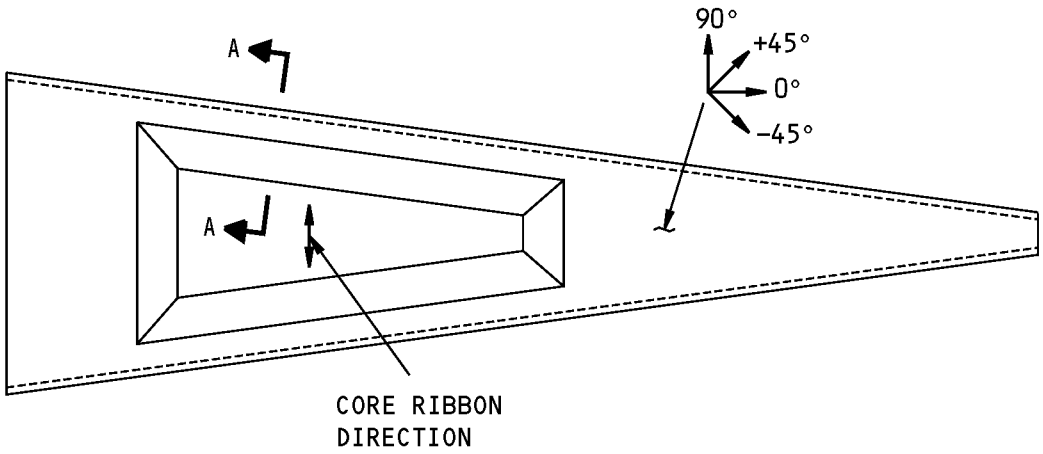
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction, Core Ribbon Direction and Ply Sequence for Figure 2, Item [1]
Figure 3

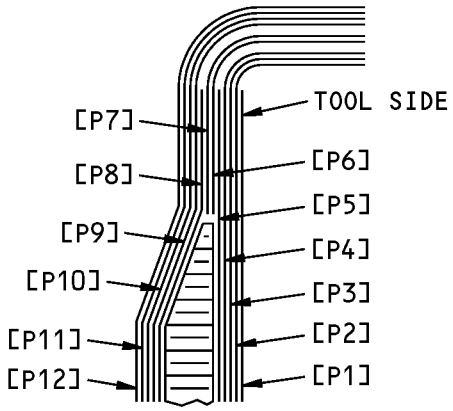
Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1, P12	Optional	1 Mil White Tedlar as given in BAC 5317-4
P2, P6, P7, P11	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P4, P9, P10	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P5, P8	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A



PLY LAYUP AND CORE RIBBON DIRECTION

A



PLY LAYUP SEQUENCE

A–A

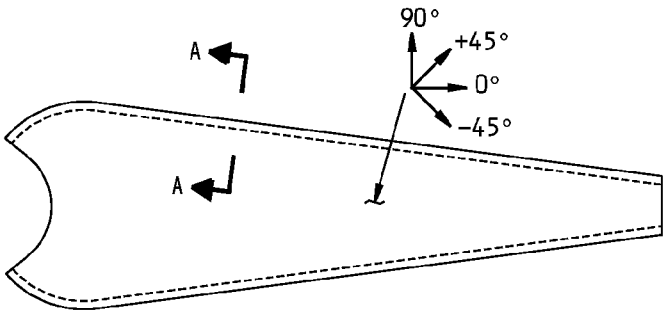
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction, Core Ribbon Direction and Ply Sequence for Figure 2, Item [2]
Figure 4

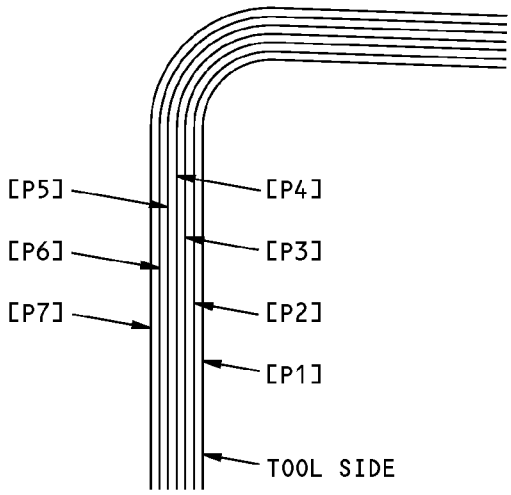
Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [2]		
PLY	**DIRECTION**	**MATERIAL**
P1, P12	Optional	1 Mil White Tedlar as given in BAC 5317-4
P2, P6, P7, P11	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P4, P9, P10	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P5, P8	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A



PLY LAYUP DIRECTION

(A)



PLY LAYUP SEQUENCE

A–A

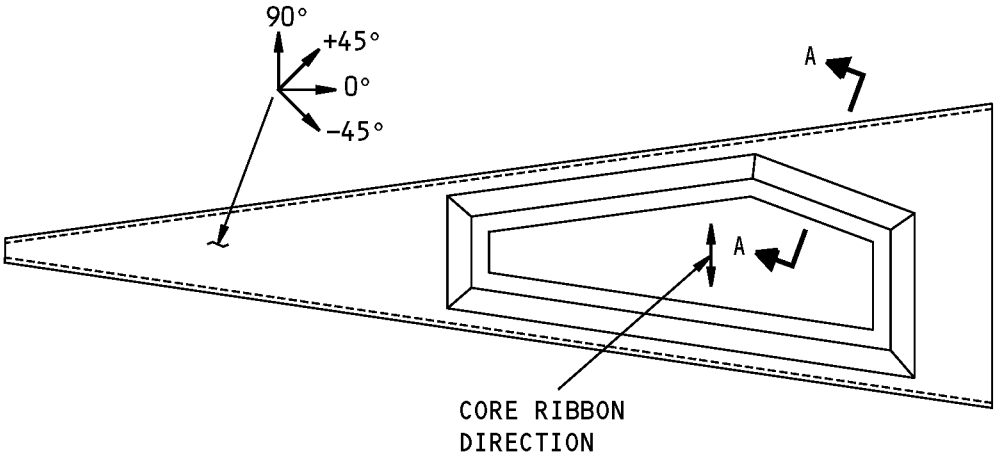
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTION A-A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A-A.

Ply Direction, and Ply Sequence for Figure 2, Item [3]
Figure 5

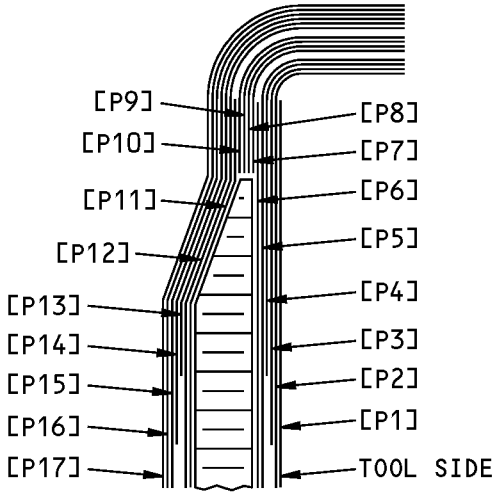
Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [3]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P4, P6	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P5	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P7	Optional	1 Mil white Tedlar as given in BAC 5317-4



PLY LAYUP AND CORE RIBBON DIRECTION

A



PLY LAYUP SEQUENCE

A–A

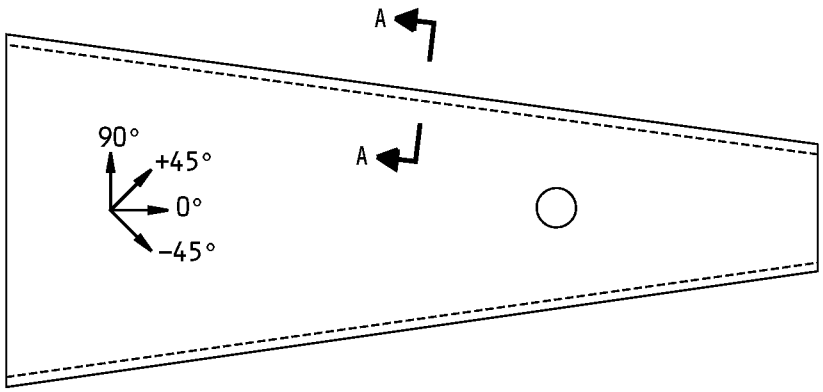
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 6 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

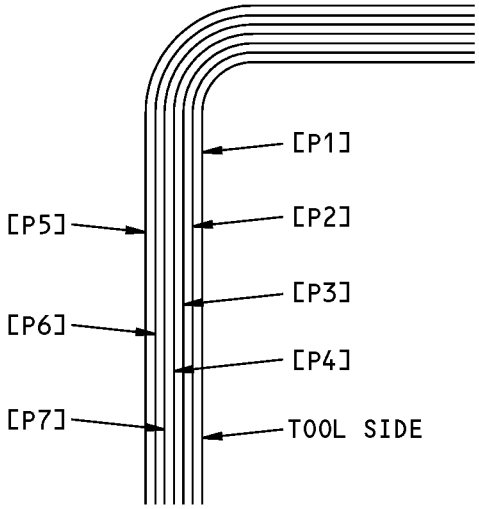
Ply Direction, Core Ribbon Direction and Ply Sequence for Figure 2, Item [4]
Figure 6

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [4]		
PLY	**DIRECTION**	**MATERIAL**
P1, P17	Optional	1 Mil white Tedlar as given in BAC 5317-4
P2, P4, P8, P9, P13, P15	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P5, P7, P10, P12, P14	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P6, P11	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A
P16	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Class 3, Style 108



PLY LAYUP DIRECTION



PLY LAYUP SEQUENCE

A–A

NOTES

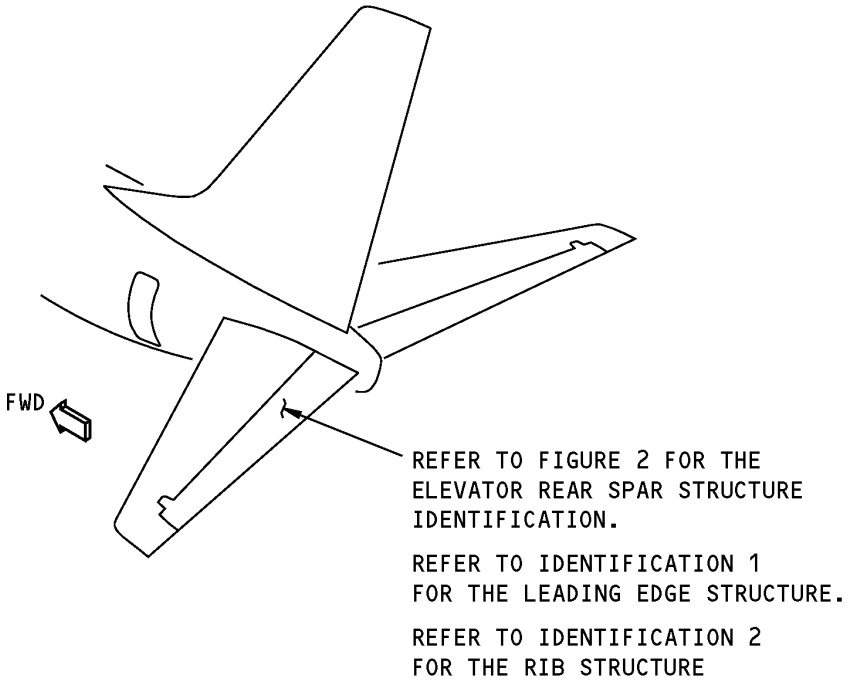
- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE BONDED PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 7 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction and Ply Sequence
Figure 7

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [5]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P4, P6	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P5	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P7	Optional	1 MIL white Tedlar as given in BAC 5317-4

IDENTIFICATION 3 - ELEVATOR REAR SPAR STRUCTURE

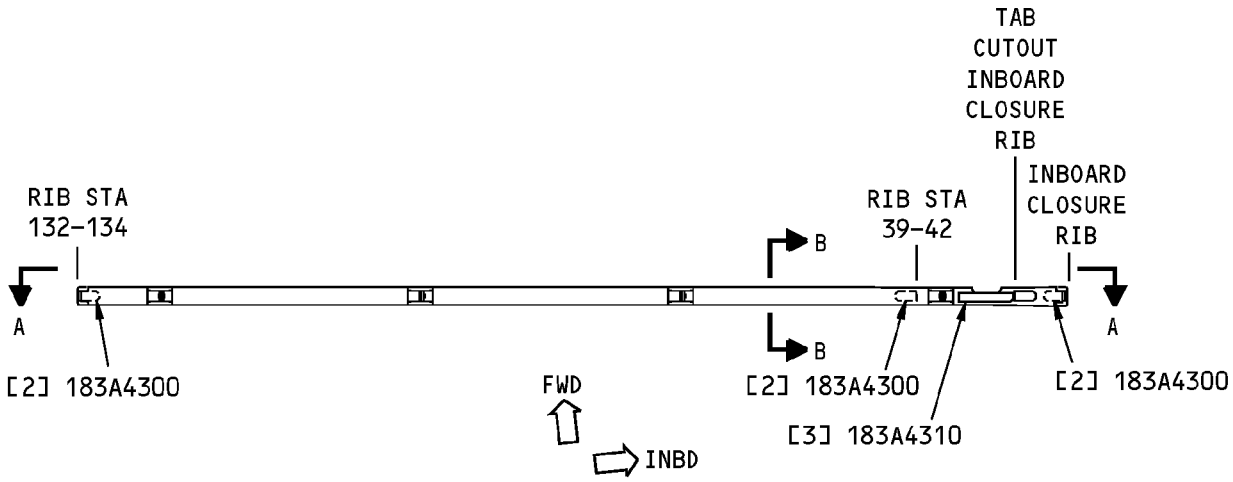


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

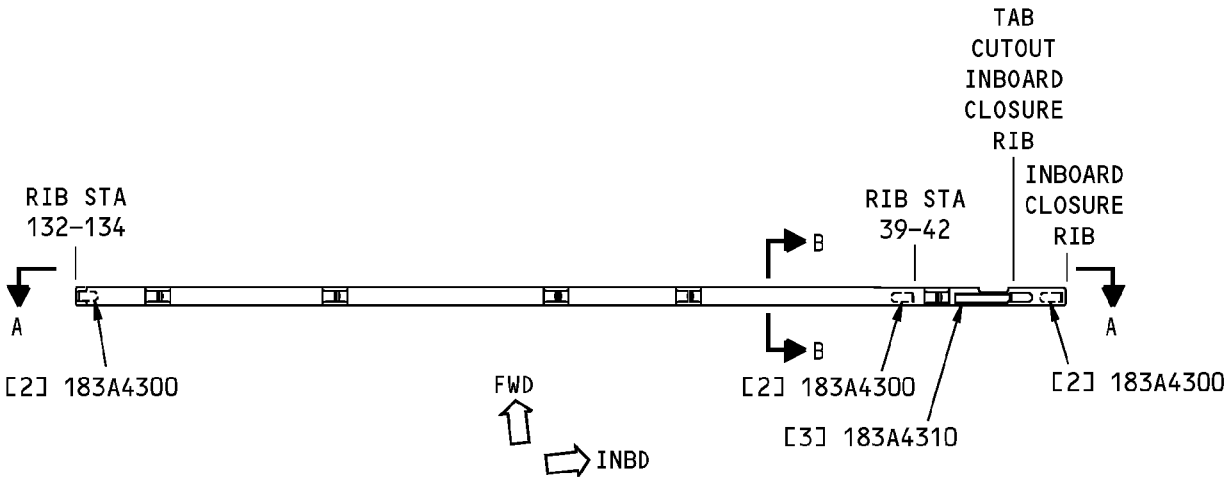
Elevator Rear Spar Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A0009	Elevator Installation - Rework
183A0109	Elevator Assembly - Rework
183A4000	Rear Spar Installation - Elevator



(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

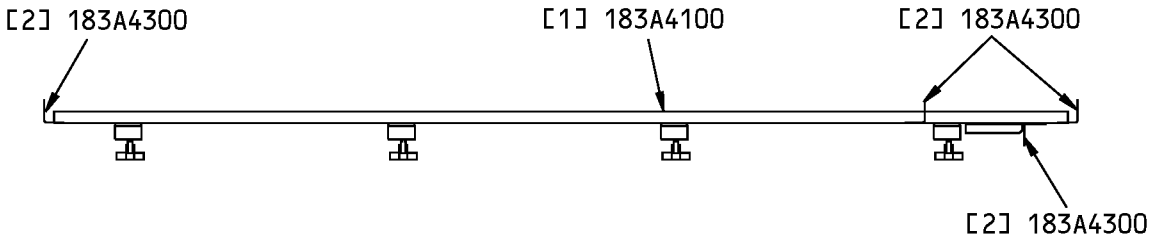
REAR VIEW

(A)

NOTES

- REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Elevator Rear Spar Structure Identification
Figure 2 (Sheet 1 of 2)



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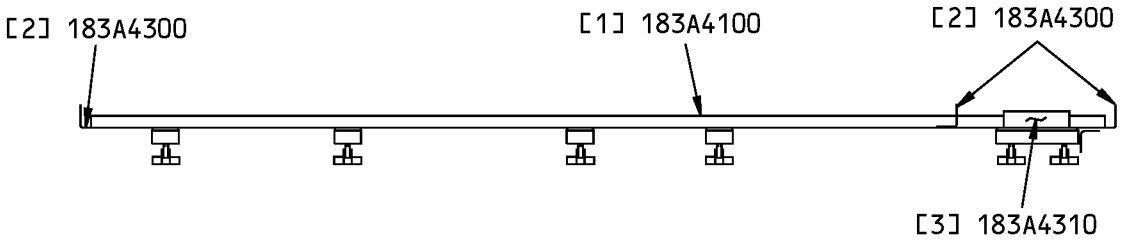
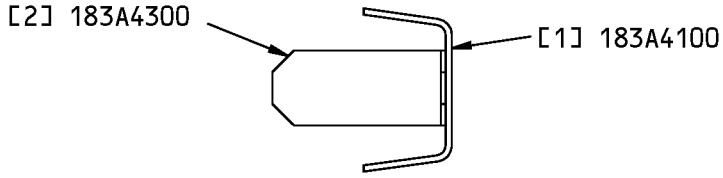


(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

A–A



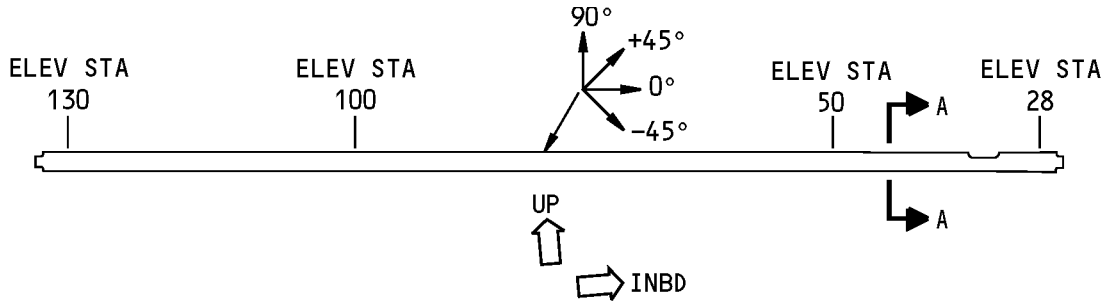
B–B

Elevator Rear Spar Structure Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rear Spar Assembly		Carbon Fiber Reinforced Plastic (CFRP) solid laminate. Refer to Figure 3	
[2]	Rib Post		CFRP solid laminate. Refer to Figure 4	
[3]	Angle		CFRP solid laminate. Refer to Figure 5	

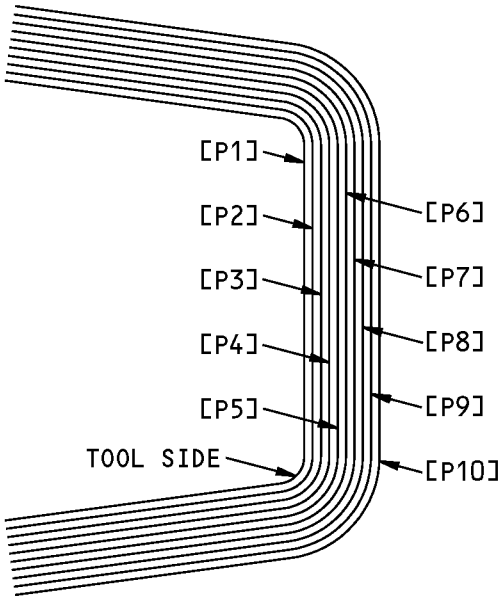
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



REAR VIEW

PLY LAYUP FOR THE REAR SPAR

A



A–A

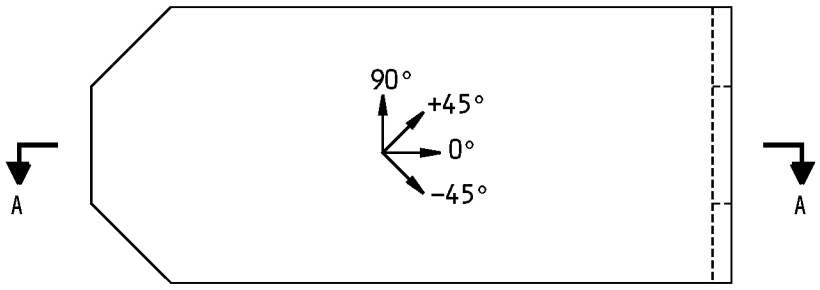
NOTES

- THE PLY DIRECTION IS THE WRAP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction and Ply Sequence for Figure 2, Item [1]
Figure 3

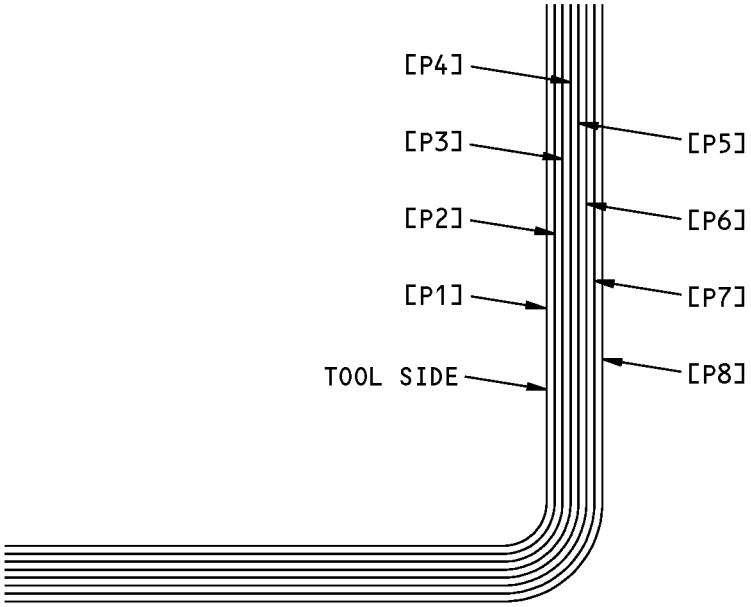
Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7, P9	+ or - 45 degrees	CFRP as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P8	0 or 90 degrees	CFRP as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P10	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Style 108



PLAN VIEW

PLY LAYUP FOR THE RIB POSTS



A–A

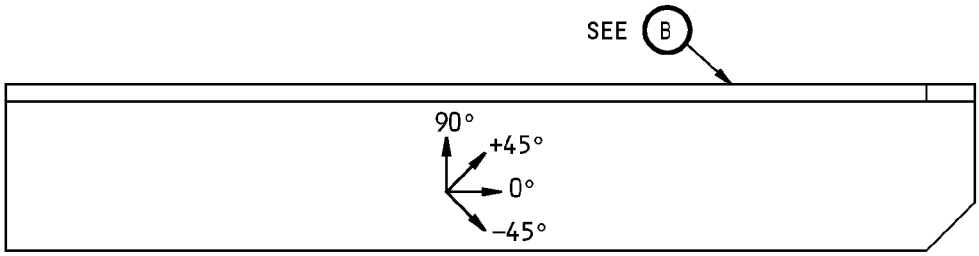
NOTES

- THE PLY DIRECTION IS THE WRAP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction And Ply Sequence for Figure 2, Item [2]
Figure 4

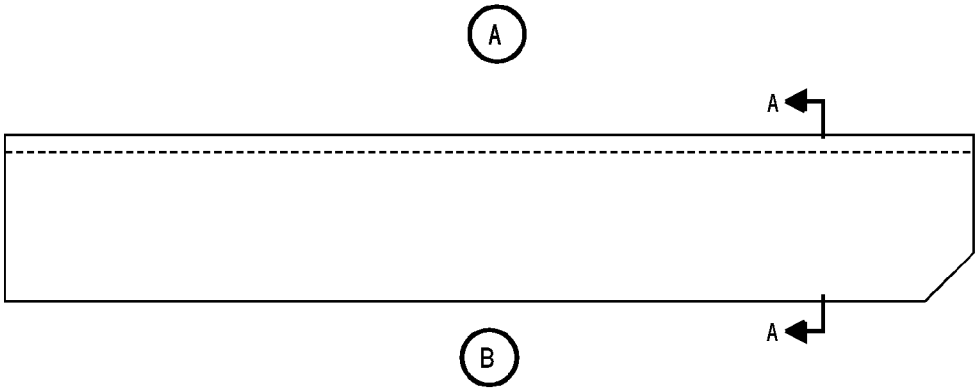
Table 4:

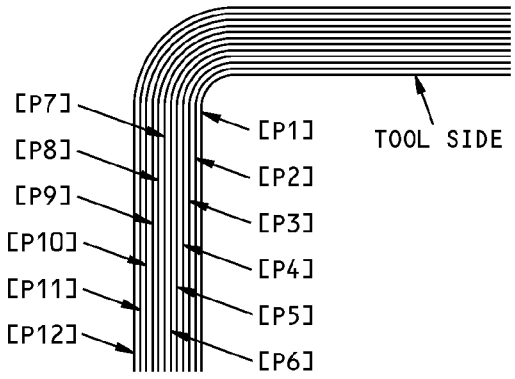
PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [2]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	CFRP solid laminate as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P5, P7	0 or 90 degrees	CFRP solid laminate as given in BMS 8-256, Type I IV, Class 2, Style 3K-70-PW



PLAN VIEW

PLY LAYUP FOR THE ANGLE





A–A

NOTES

- THE PLY DIRECTION IS THE WRAP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION OF THE PART.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE AT THAT LOCATION. REFER TO THE ENGINEERING DRAWING FOR MORE INFORMATION.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction and Play Sequence for Figure 2, Item [3]
Figure 5

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [3]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP solid laminate as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP solid laminate as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

ALLOWABLE DAMAGE 1 - ELEVATOR STRUCTURE

1. Applicability

A. This subject gives the allowable damage limits for the elevator structure shown in Elevator Location, Figure 101/ALLOWABLE DAMAGE 1 and Elevator Structure Allowable Damage, Figure 104/ALLOWABLE DAMAGE 1.

2. General

A. Remove the damaged material from the aluminum parts as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

B. After you remove the damage, do the procedures that follow for the aluminum parts:

(1) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(2) Apply one layer of BMS 10-79, Type III, primer to the reworked areas. Refer to SOPM 20-44-04

C. Do an inspection of the damaged composite area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 and NDT, Part 1, 51-01-03 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT. Refer to NDT, Part 1, 51-05-01 for the inspection procedures.

(2) Refer to Damage Definitions, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

D. Remove all contamination and water from the structure.

(1) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(2) Refer to 51-30-05 for possible sources of equipment and tools you can use to remove the damage.

(3) Refer to 51-70-04 for the damage removal procedures.

E. Seal all permitted damage areas that are not more than one ply deep and agree with the allowable damage limits. Refer to Paragraph 4./ALLOWABLE DAMAGE 1 Seal the damage with one of the two methods that follows:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure that the tape is in satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60, Type II enamel to the exterior surfaces of the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

F. Seal all permitted damage areas that are more than one ply deep and agree with the allowable damage limits as follows:

(1) Use a vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

(4) Repair the damage at or before 250 flight cycles from the time the seal was made.

G. The definition of the words "other damage" as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause carbon fiber damage and are sealed.

H. Make sure that the elevator is balanced. Refer to 51-60-04 for the balance procedures.

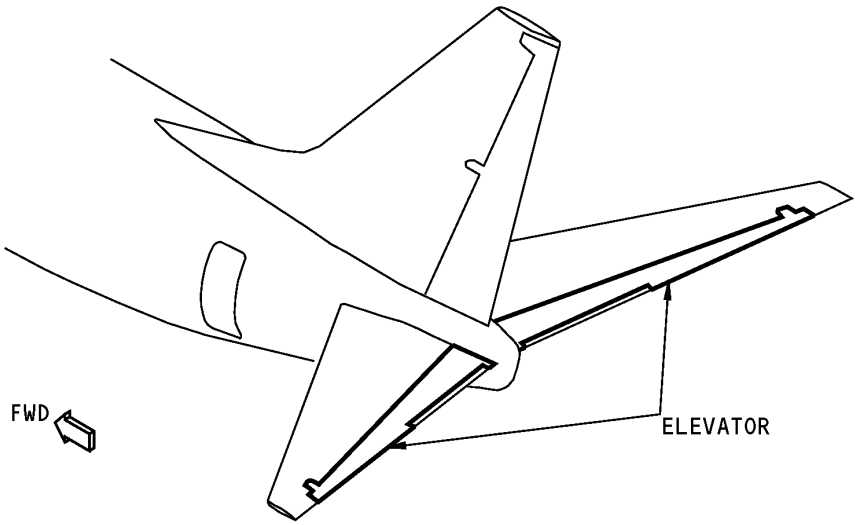
I. Refer to Definitions of the Facesheets, Figure 103/ALLOWABLE DAMAGE 1 for the definitions of the facesheets of a honeycomb core area.

J. Refer to Table 101/ALLOWABLE DAMAGE 1 for the references for the allowable damage limits.

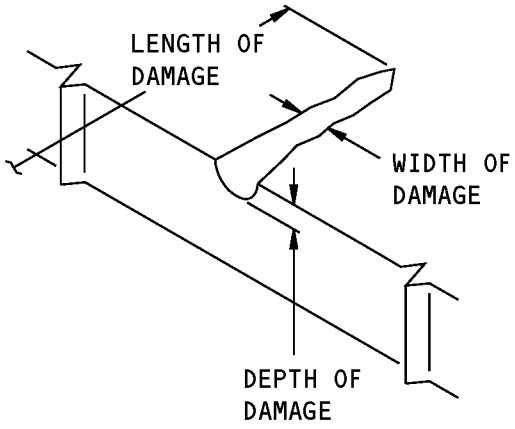
K. Refer to Elevator Structure Allowable Damage, Figure 104/ALLOWABLE DAMAGE 1 for the locations of the allowable damage zones.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS		
TYPE OF STRUCTURE	**ZONE LOCATION**	**PARAGRAPH**
LEADING EDGE RIBS, BALANCE HORN RIBS, BALANCE PANEL RIBS (ALUMINUM)	————	4.A.
SOLID LAMINATE AREAS OF THE FRONT SPAR, REAR SPAR, RIBS, AND CLOSURE RIBS	ZONE 1 ZONE 2 ZONE 3 ZONE 4 ZONE 5 ZONE 6	4.B.
HONEYCOMB CORE AREAS OF THE FRONT SPAR, RIBS, AND INBOARD CLOSURE RIB	ZONE 1 ZONE 2 ZONE 3 ZONE 4 ZONE 5 ZONE 6	4.C.

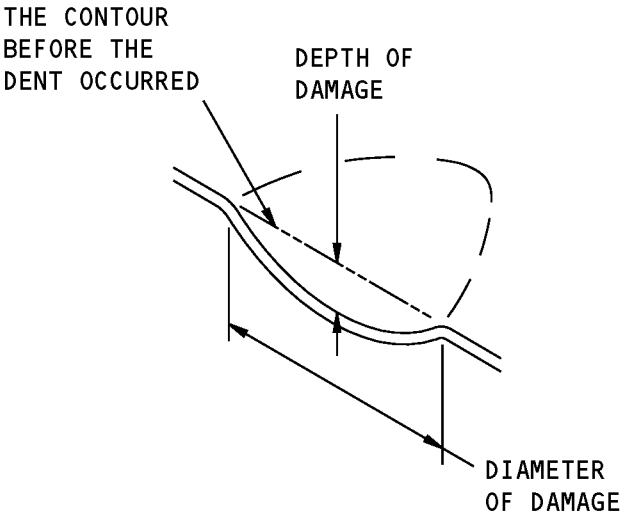


Elevator Location
Figure 101



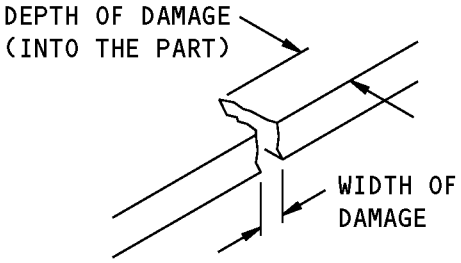
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

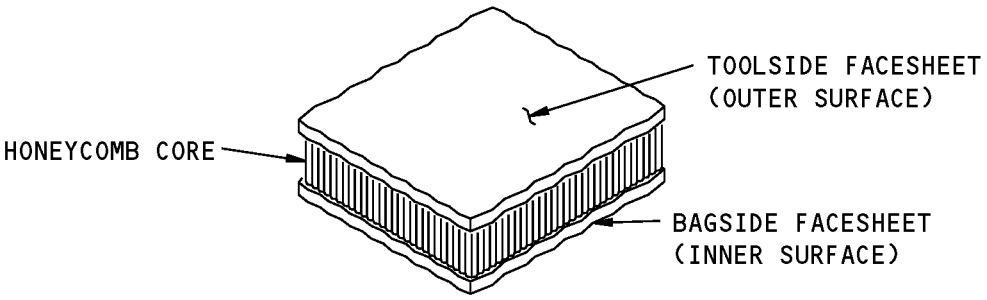
B



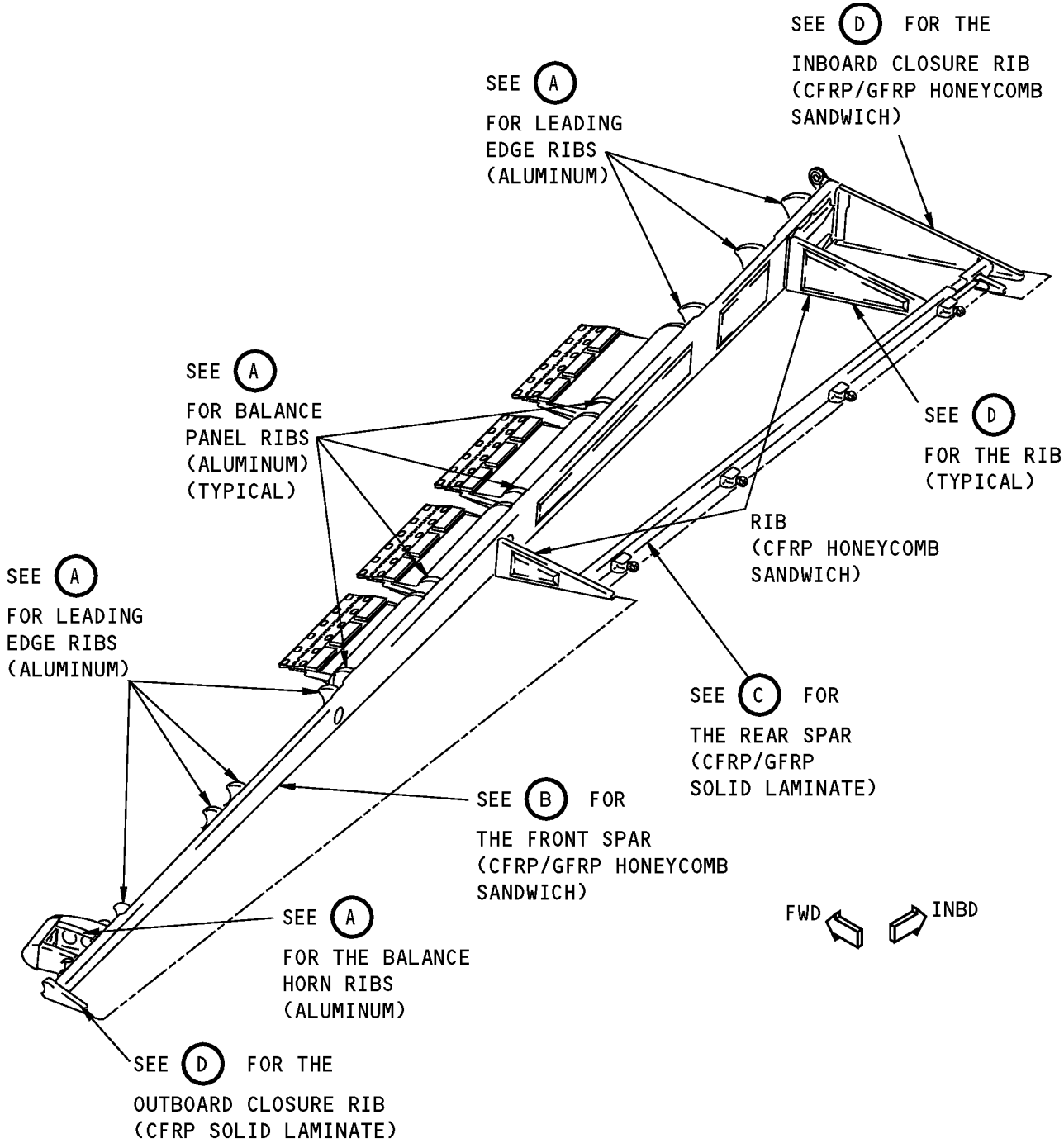
DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 102



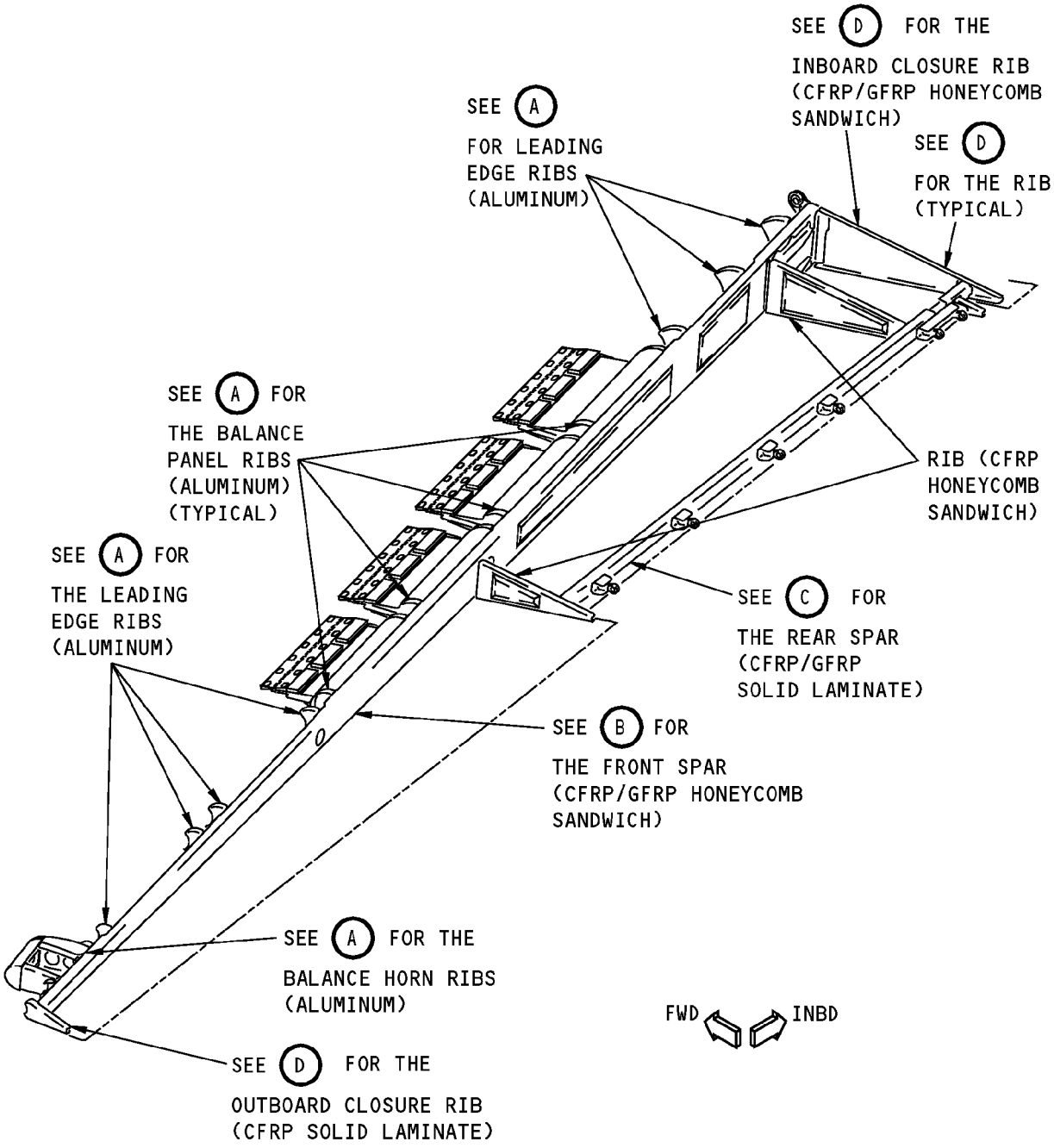
Definitions of the Facesheets
Figure 103



(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

NOTE: REFER TO TABLE 101 FOR THE ALLOWABLE DAMAGE REFERENCES.

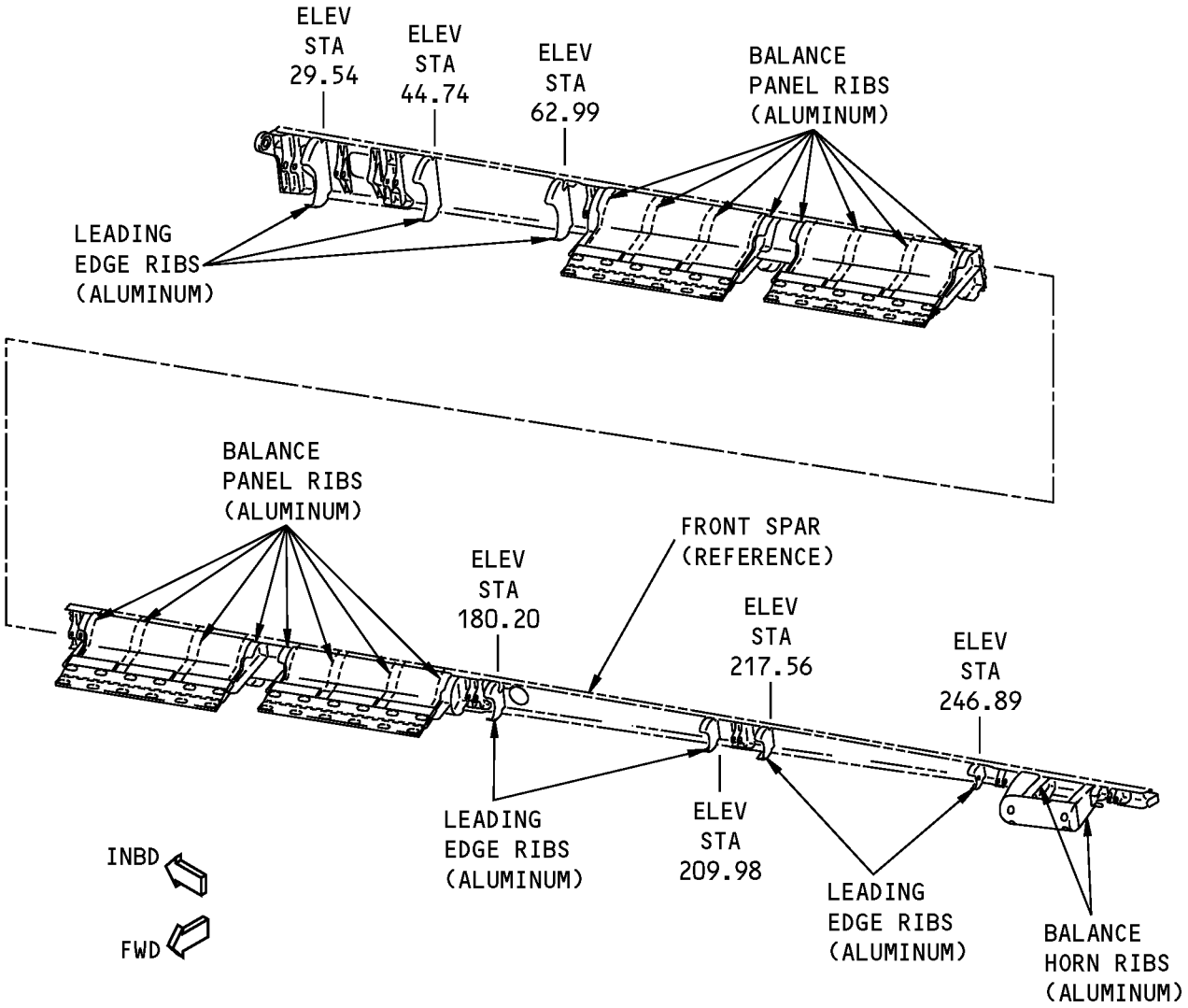
Elevator Structure Allowable Damage
Figure 104 (Sheet 1 of 9)



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

NOTE: REFER TO TABLE 101 FOR THE ALLOWABLE DAMAGE REFERENCES.

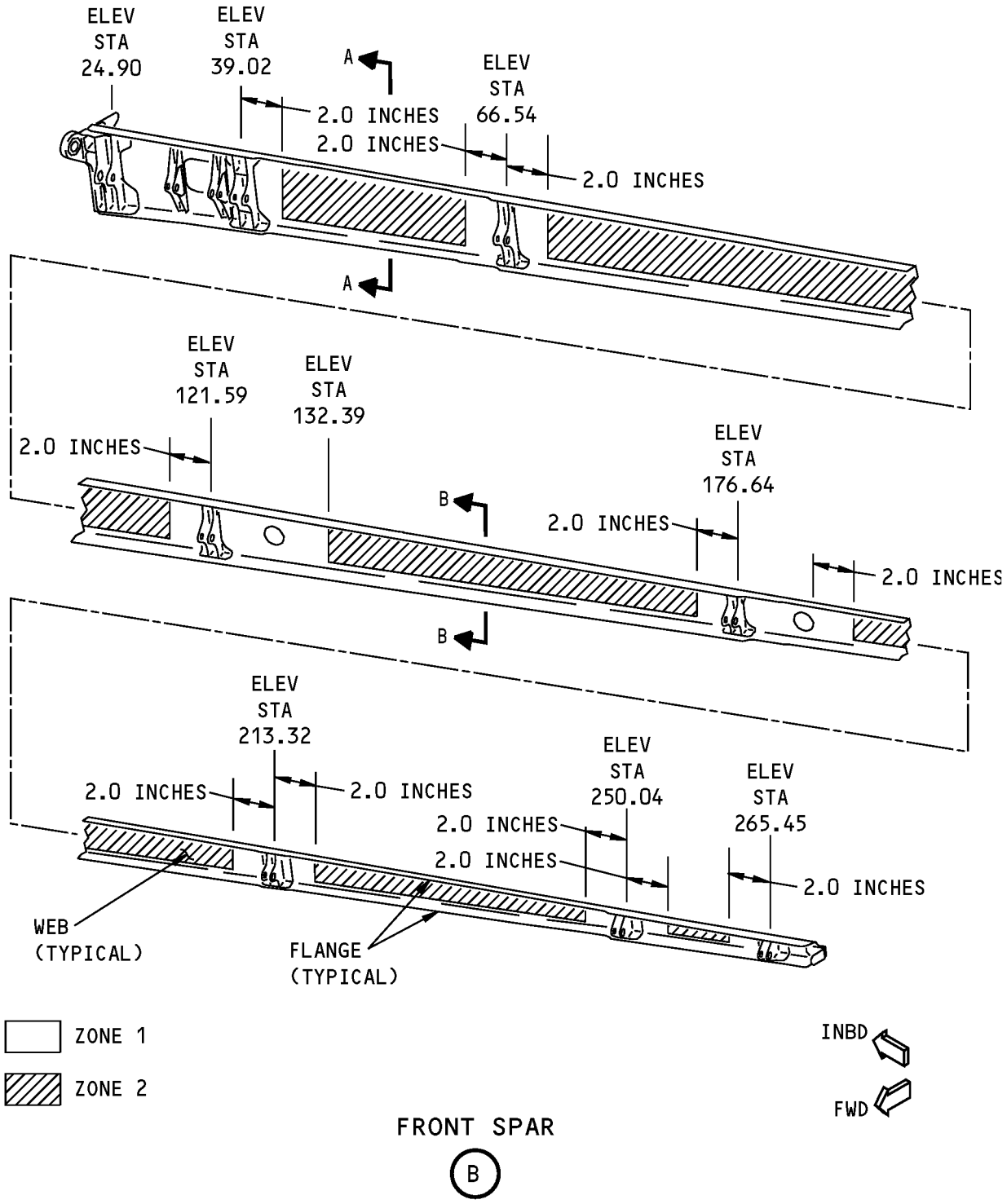
Elevator Structure Allowable Damage
Figure 104 (Sheet 2 of 9)



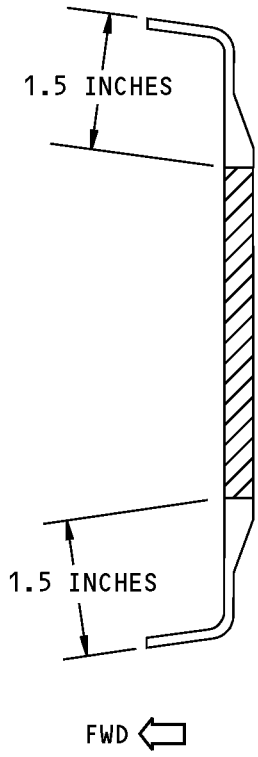
LEADING EDGE ASSEMBLY

A

Elevator Structure Allowable Damage
Figure 104 (Sheet 3 of 9)

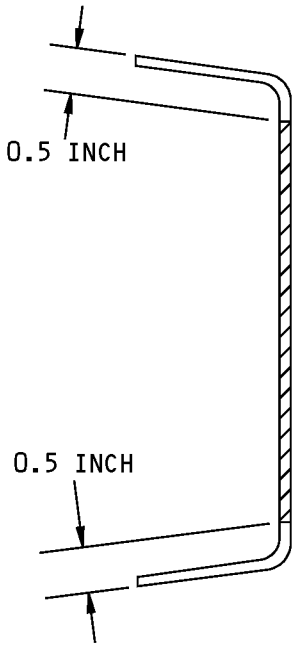


Elevator Structure Allowable Damage
Figure 104 (Sheet 4 of 9)



CROSS–SECTION OF THE FRONT SPAR WHERE HONEYCOMB CORE IS LOCATED IN THE WEB

A–A



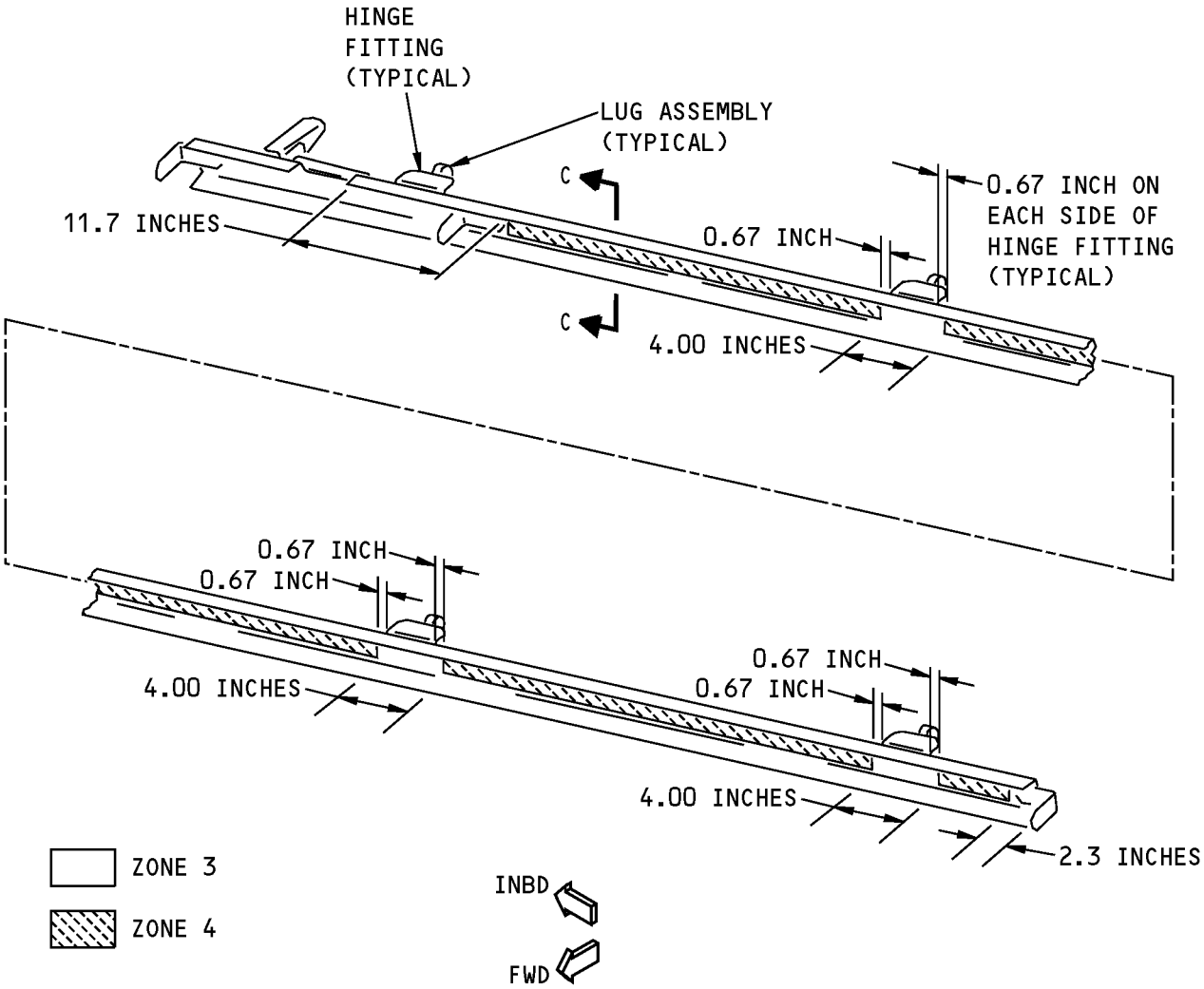
CROSS–SECTION OF THE FRONT SPAR WHERE THE WEB IS SOLID LAMINATE

B–B

ZONE 1

ZONE 2

Elevator Structure Allowable Damage
Figure 104 (Sheet 5 of 9)

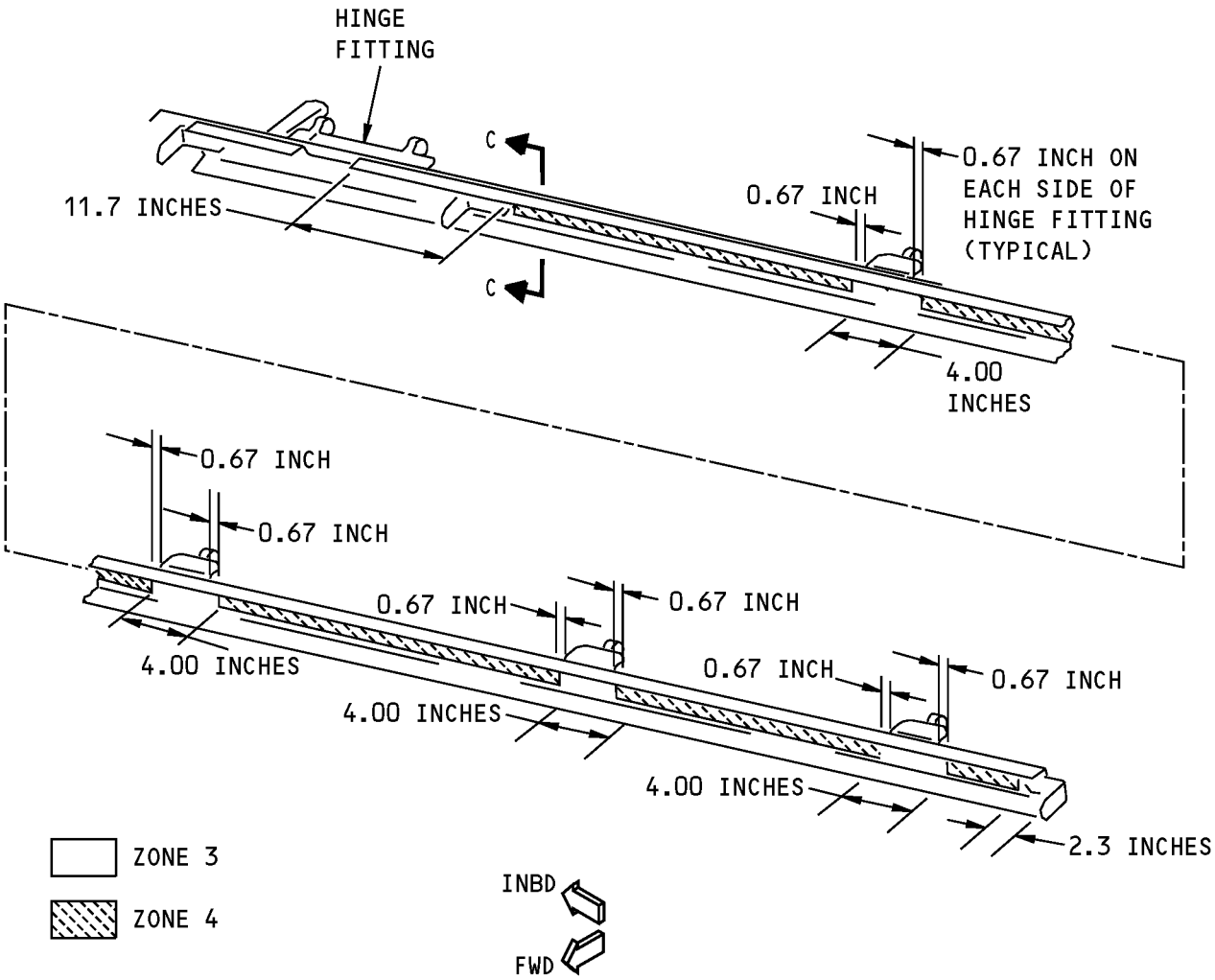


(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

REAR SPAR

C

Elevator Structure Allowable Damage
Figure 104 (Sheet 6 of 9)

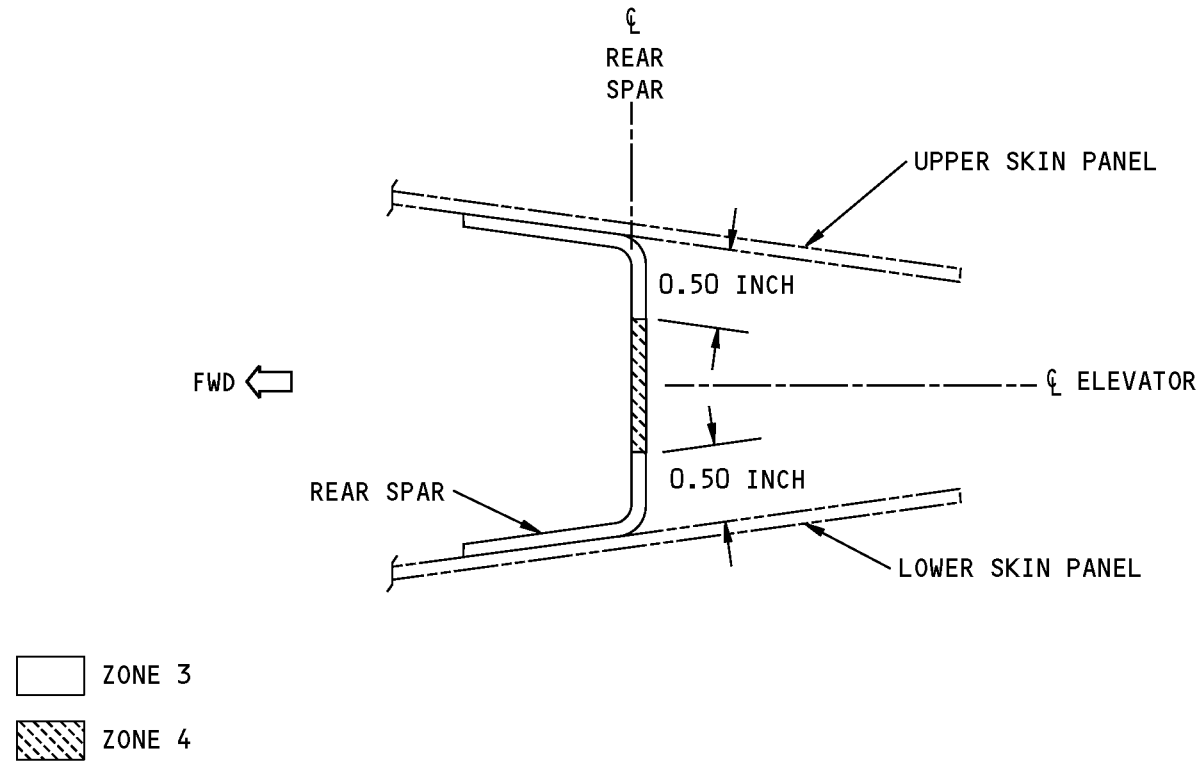


(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

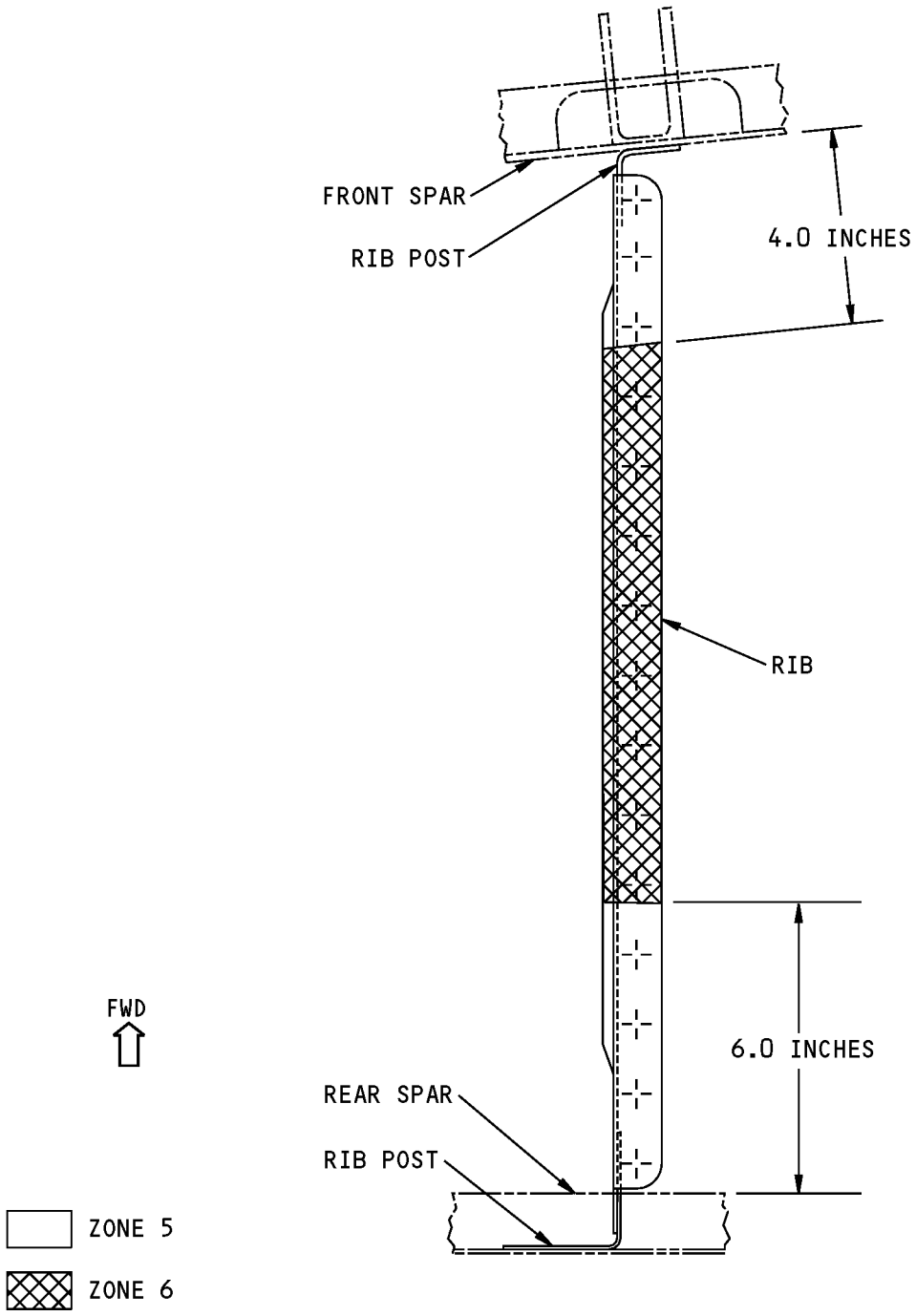
REAR SPAR

C

Elevator Structure Allowable Damage
Figure 104 (Sheet 7 of 9)



Elevator Structure Allowable Damage
Figure 104 (Sheet 8 of 9)



RIB

D

Elevator Structure Allowable Damage
Figure 104 (Sheet 9 of 9)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure
737 NDT Part 1, 51-05-01	Tap Test Inspection of Honeycomb Sandwich Structure

4. Allowable Damage Limits

A. Leading Edge Ribs, Balance Horn Ribs, Balance Panel Ribs - Aluminum

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details A, B, and F .

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details A, B, C, E, and F.

(b) Damage that does not go through the clad surface is permitted.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Detail D.

(4) Holes and Punctures are permitted if they are:

(a) A maximum diameter of 0.25 inch

(b) A minimum of 4D away from the edge of a hole or other damage. D is equal to the maximum dimension of the damage

(c) A minimum of 2D away from the edge of the part

(d) Filled with a 2117-T3 or 2117-T4 aluminum rivet.

1) Install the rivet without sealant.

B. Front Spar, Rear Spar, Ribs, and Closure Ribs - Solid Laminate Areas - All Zones

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.50 inch in length

(c) A maximum of 0.25 inch in width

(d) A minimum of 3.0 inches away from a hole

(e) A minimum of 1.5 inches away from the edge of the part

(f) A minimum of 6.0 inches away from other damage.

(3) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum diameter of 0.50 inch

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is fiber damage or the dent depth is more than one ply.

(c) A minimum of 3.0 inches away from a hole

(d) A minimum of 1.5 inch away from the edge of the part

(e) A minimum of 6.0 inches away from other damage.

(4) Holes and Punctures are permitted if they are:

(a) A maximum diameter of 0.25 inch

(b) A minimum of 6D away from the edge of a hole or other damage. D is equal to the maximum dimension of the damage

(c) A minimum of 2D away from the edge of the part.

(5) Delaminations are permitted as shown in Allowable Damage Limits for the Front Spar, Rear Spar, Ribs, and Closure Ribs - Solid Laminate Areas - Zones 2, 4, and 6, Figure 106/ALLOWABLE DAMAGE 1, if they are:

(a) A maximum diameter of 0.50 inch

(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(c) A minimum of 6D away from the edge of a hole or other damage. D is equal to the maximum dimension of the damage

(d) A minimum of 2D away from the edge of the part.

(6) Edge damage is permitted if it is:

(a) A maximum of one ply in depth

(b) A maximum of 0.25 inch in width

(c) A minimum of 0.50 inch away from the edge of a fastener hole.

C. Front Spar, Ribs, and Inboard Closure Rib - Honeycomb Core Areas - All Zones

(1) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum length of 0.5 inch

(c) A maximum width of 0.25 inch

(d) A minimum distance away from the edge of a hole, part edge, or other damage of 3.0 inches.

(3) Dents are permitted if they are:

(a) A maximum diameter of 0.5 inch

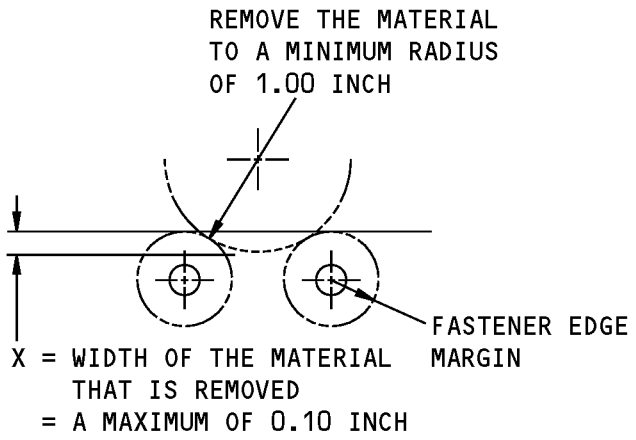
(b) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if there is fiber damage or the dent depth is more than one ply.

(c) A minimum distance away from the edge of a hole, part edge, or other damage of 6D. Refer to Allowable Damage Limits for the Front Spar, Ribs, and Inboard Closure Rib - Honeycomb Core Areas - Zones 1, 3, and 5, Figure 107/ALLOWABLE DAMAGE 1 for the permitted damage and the value of D.

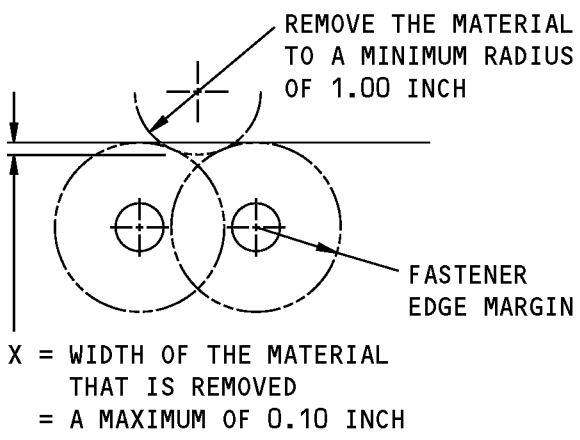
(4) Holes and Punctures are not permitted.

(5) Delaminations are not permitted.



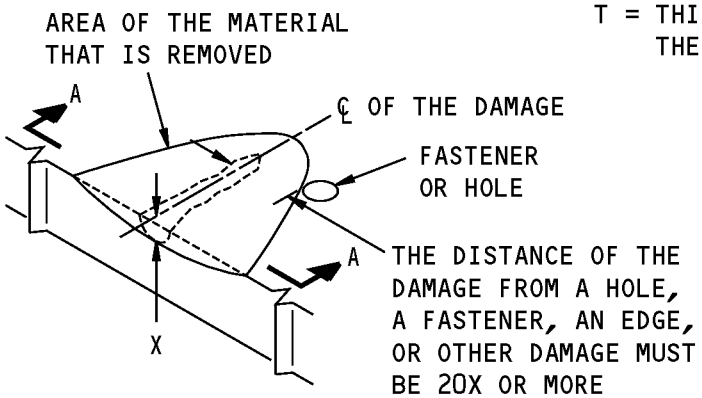
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

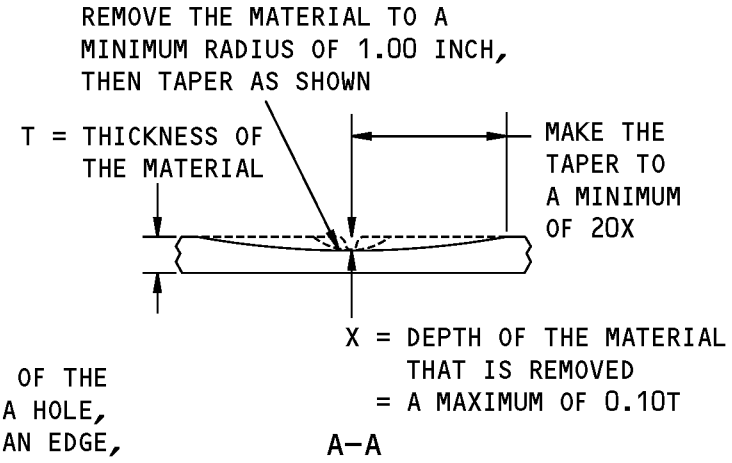
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

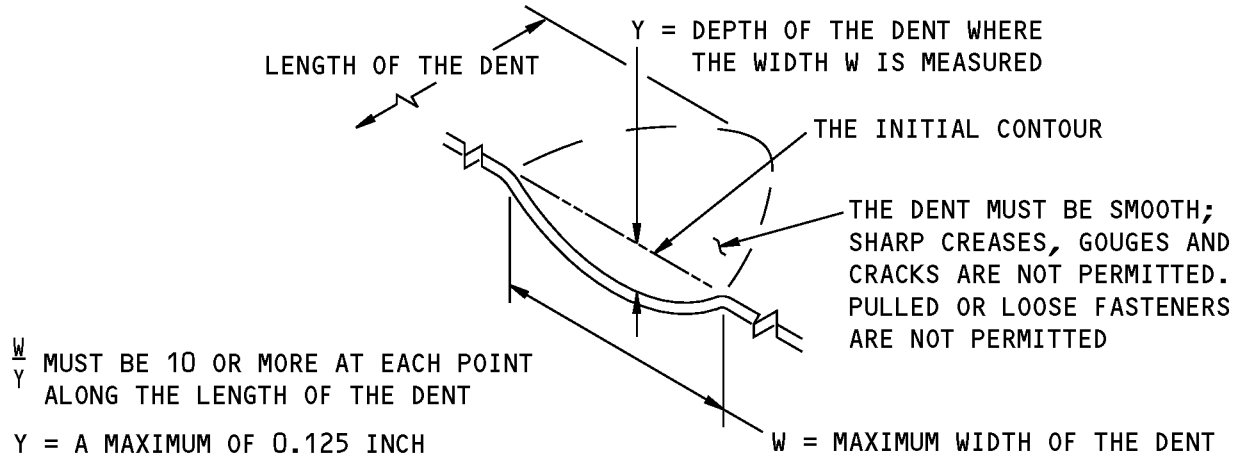




REMOVAL OF DAMAGED MATERIAL ON A SURFACE

C

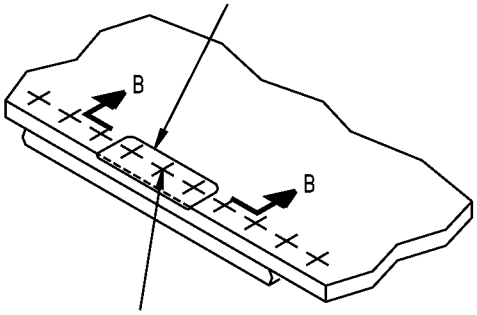
Allowable Damage Limits
Figure 105 (Sheet 1 of 3)



DENT THAT IS PERMITTED

D

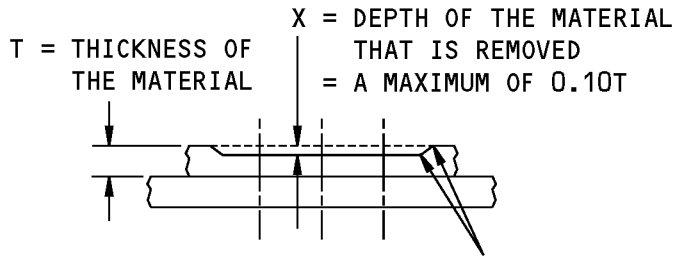
THE REMOVAL OF MATERIAL AROUND THREE FASTENERS IN ALL GROUPS OF TEN IS PERMITTED TO A MAXIMUM DEPTH OF X



REMOVE THE FASTENERS BEFORE THE DAMAGE IS REMOVED. INSTALL THE FASTENERS AFTER THE DAMAGE IS REMOVED

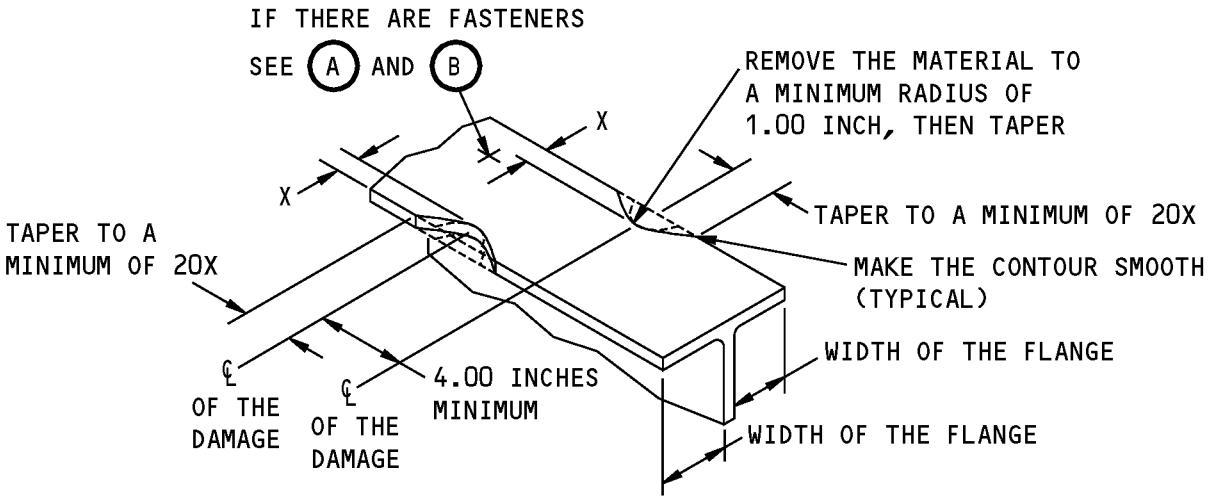
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E



B–B

Allowable Damage Limits
Figure 105 (Sheet 2 of 3)

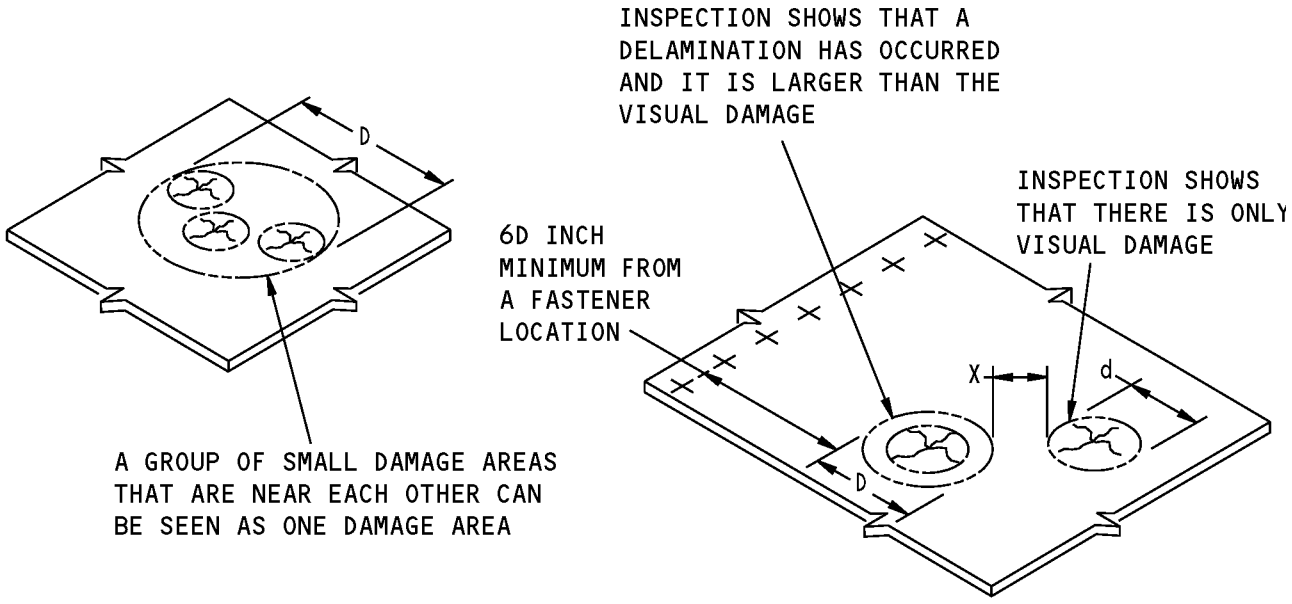


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

F

Allowable Damage Limits
Figure 105 (Sheet 3 of 3)



NOTE: TO FIND DELAMINATION, YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES. REFER TO NDT PART 1, 51-01-02.

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

D IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND CAN BE A MAXIMUM OF 0.50 INCH.

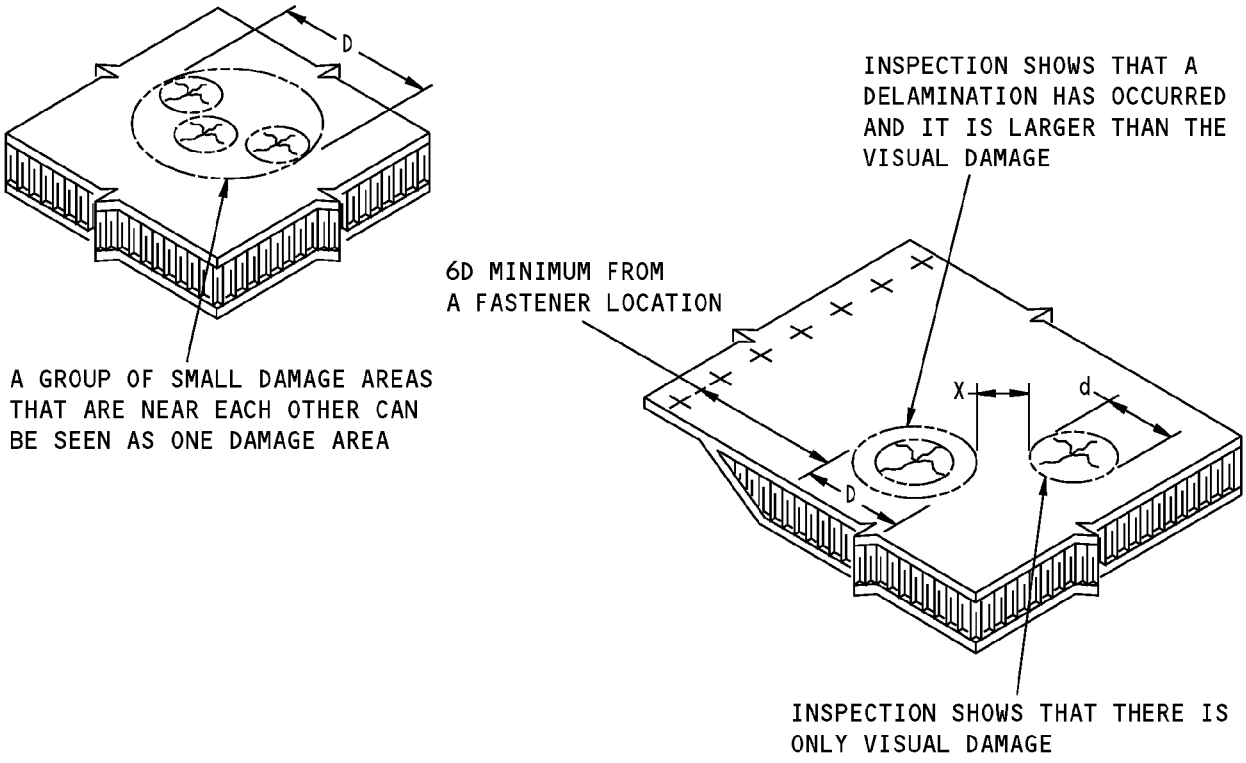
d IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

X IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS.

THE MINIMUM X THAT IS PERMITTED IS 6D.

DAMAGE THAT IS PERMITTED TO COMPOSITE PANELS

Allowable Damage Limits for the Front Spar, Rear Spar, Ribs, and Closure Ribs - Solid Laminate Areas - Zones 2, 4, and 6
Figure 106



NOTE: TO FIND DELAMINATION, YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES. REFER TO NDT PART 1, 51-01-02.

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

D IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND CAN BE A MAXIMUM OF 0.5 INCH.

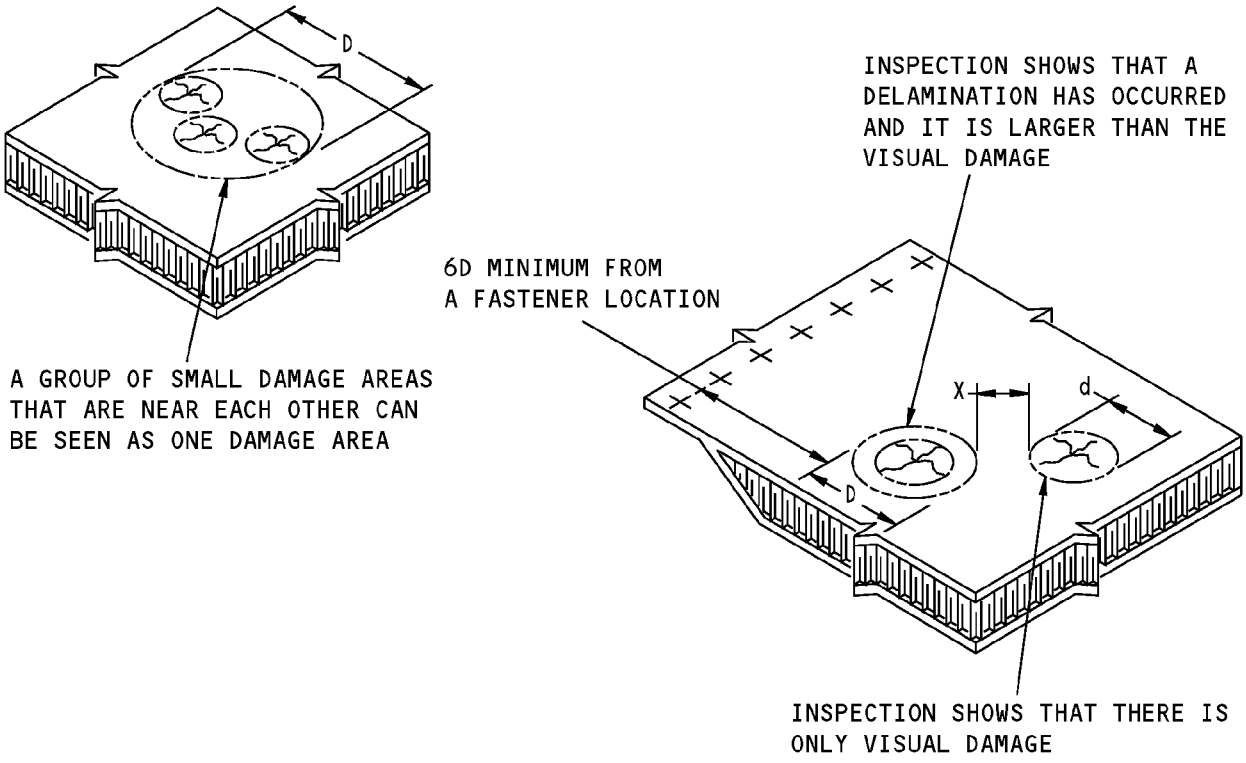
d IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

X IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS.

THE MINIMUM X THAT IS PERMITTED IS 6D.

DAMAGE THAT IS PERMITTED TO COMPOSITE PANELS

Allowable Damage Limits for the Front Spar, Ribs, and Inboard Closure Rib - Honeycomb Core Areas - Zones 1, 3, and 5
Figure 107



NOTE: TO FIND DELAMINATION, YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES. REFER TO NDT PART 1, 51-01-02.

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

D IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND CAN BE A MAXIMUM OF 0.50 INCHES.

d IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

X IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS.

THE MINIMUM X THAT IS PERMITTED IS 6D.

DAMAGE THAT IS PERMITTED TO COMPOSITE PANELS

Allowable Damage Limits for the Front Spar, Ribs, and Inboard Closure Rib - Honeycomb Core Areas - Zones 2, 4, and 6
Figure 108

ALLOWABLE DAMAGE 2 - ELEVATOR TAB SPAR

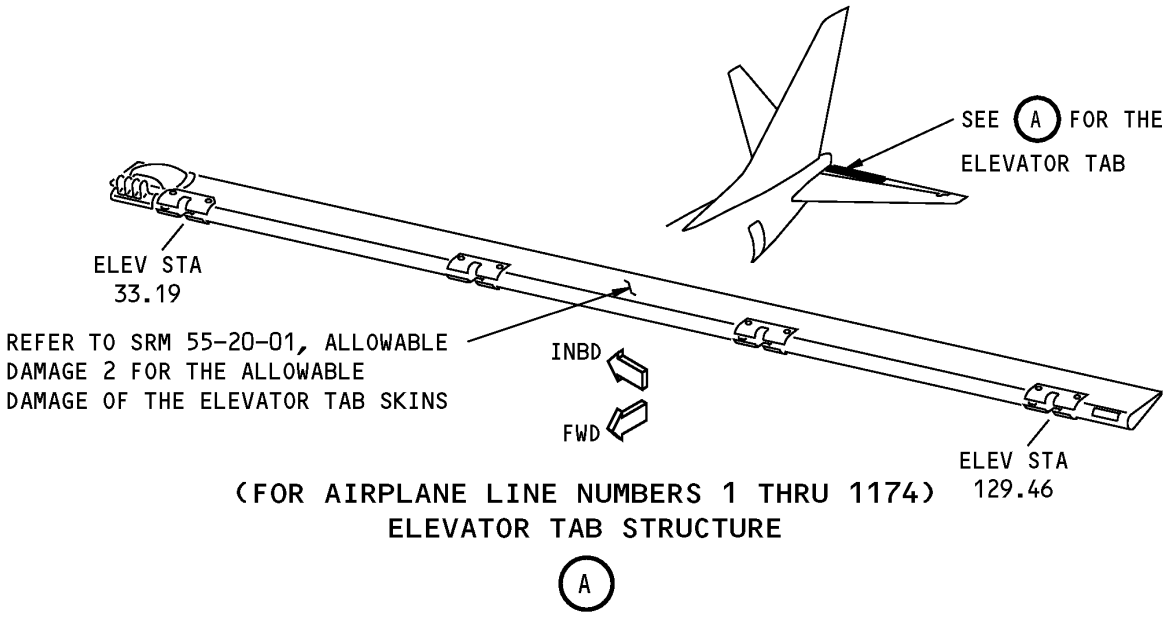
1. Applicability

A. This subject is applicable for damage to the elevator tab spar shown in Elevator Tab Spar Allowable Damage, Figure 101/ALLOWABLE DAMAGE 2.

NOTE: This Allowable Damage Subject ie applicable to airplane line nunbers 1 thtough 1174 that have not been modified as given in Service Bulletins 737-55-1080 and 737-55-1082. Refer to ALLOWABLE DAMAGE 3 for the airplanes with line nunbers equal to or greater than 1175 and for all the other airplanes that have been modified as given in Service Bulletins 737-55-1080 and 737-55-1082.

2. General

A. Damage is not permitted. Refer to 55-20-02, REPAIR 2, for repairs to the elevator tab spar.



Elevator Tab Spar Allowable Damage
Figure 101

3. References

Reference	Title
55-20-02, REPAIR 2	Elevator Tab Spar

4. Allowable Damage Limits

A. Damage is not permitted. Refer to 55-20-02, REPAIR 2, for repairs to the elevator tab spar.

ALLOWABLE DAMAGE 3 - ELEVATOR TAB SPAR FOR AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082

1. Applicability

A. This subject gives the allowable damage limits for the elevator tab spar shown in Elevator Tab Spar Allowable Damage, Figure 101/ALLOWABLE DAMAGE 3.

NOTE: THIS ALLOWABLE DAMAGE IS APPLICABLE TO AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-02, ALLOWABLE DAMAGE 2 FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

2. General

A. Do an inspection of the damaged composite area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Nondestructive Inspection (NDI) procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Damage Definitions, Figure 102/ALLOWABLE DAMAGE 3, Details A, B, and C for the definitions of the length, width, and depth of damage.

B. Remove all the contamination and water from the structure.

(1) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(2) Refer to 51-70-04 for the removal procedures.

C. Seal all permitted damage areas that are not more than one ply deep. Refer to the allowable damage limits. Seal the damage with one of the two methods that follows:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure the tape is in satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given 51-70-08.

(b) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

1) Apply one layer of BMS 10-60, Type II enamel to the exterior surfaces of the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

D. Seal all permitted damaged areas that are more than one ply deep. Refer to the allowable damage limits. Seal the damage as follows:

(1) Use a vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

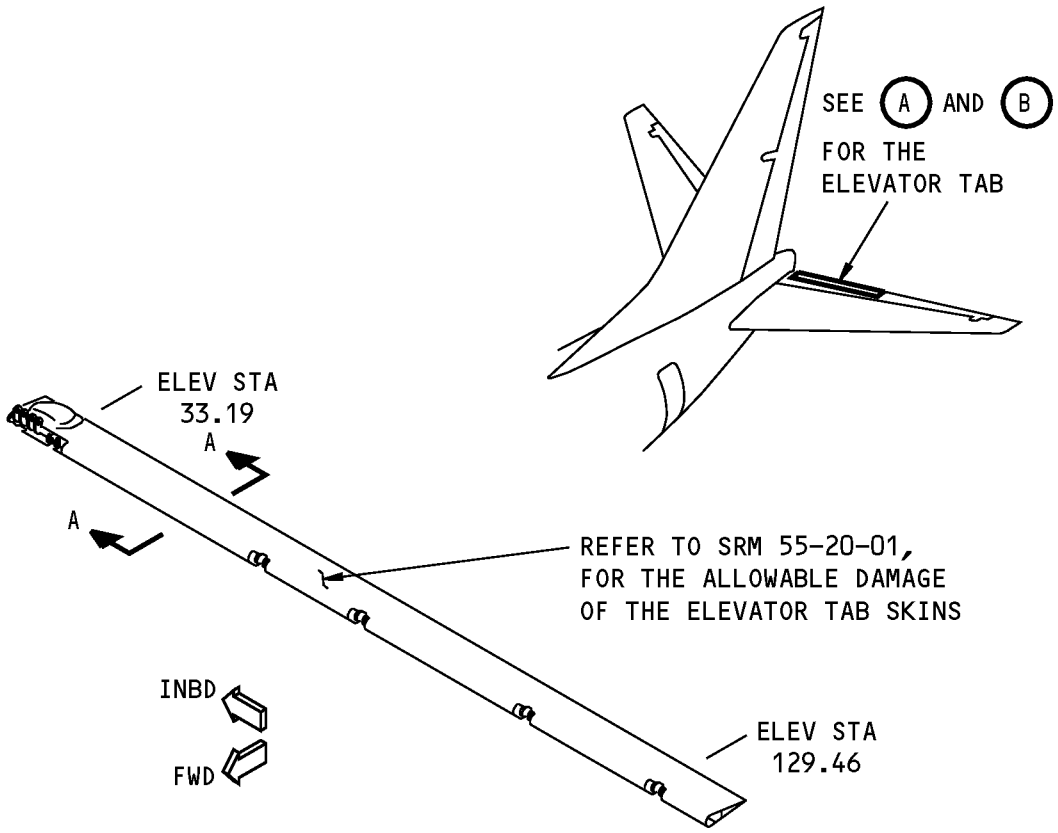
(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

(4) Repair the damage before 250 flight cycles has occurred.

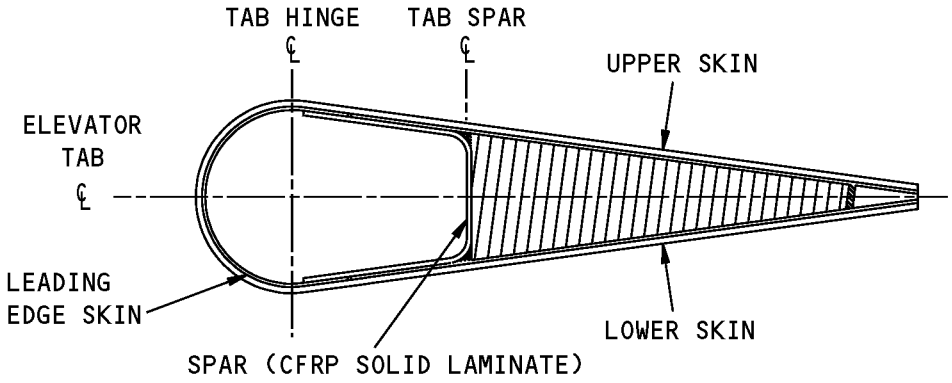
E. The definition of the words "other damage" as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause carbon fiber damage and are sealed.

F. Make sure the elevator tab is balanced. Refer to 51-60-06 for the balance procedures.



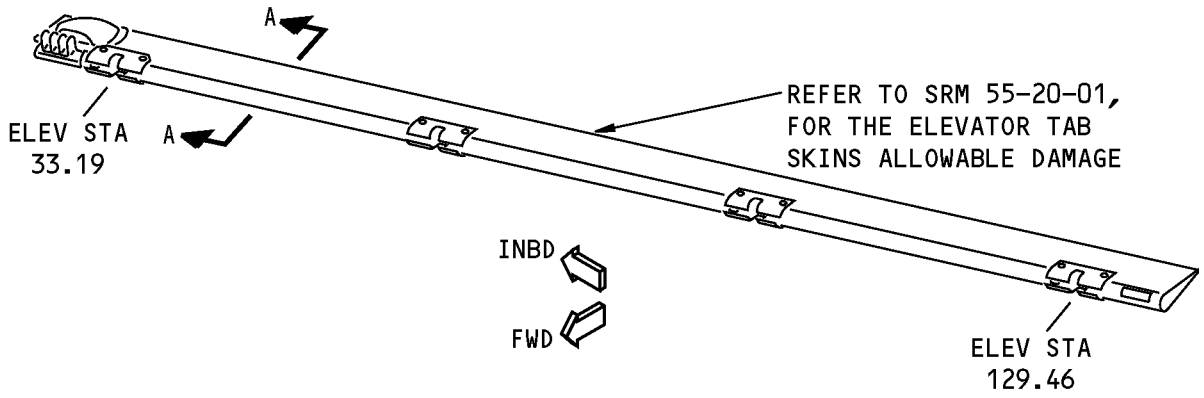
ELEVATOR TAB STRUCTURE

A



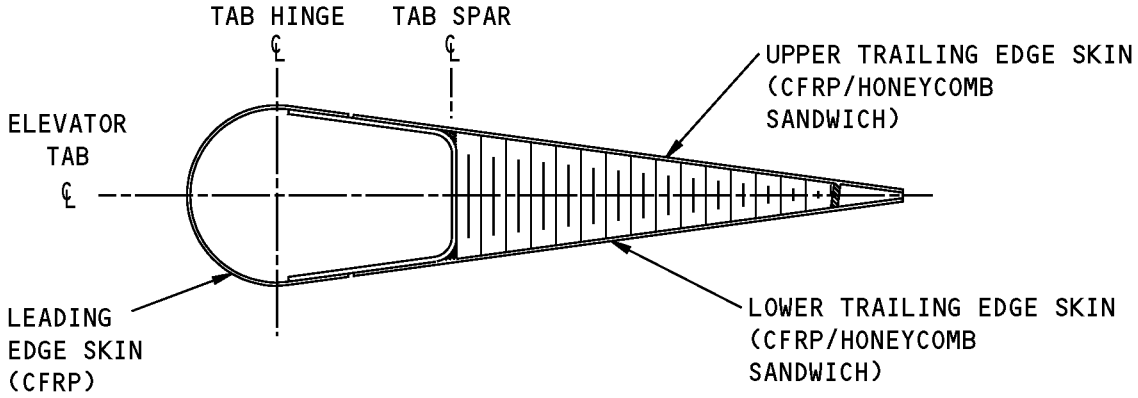
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)
A-A

Elevator Tab Spar Allowable Damage
Figure 101 (Sheet 1 of 2)



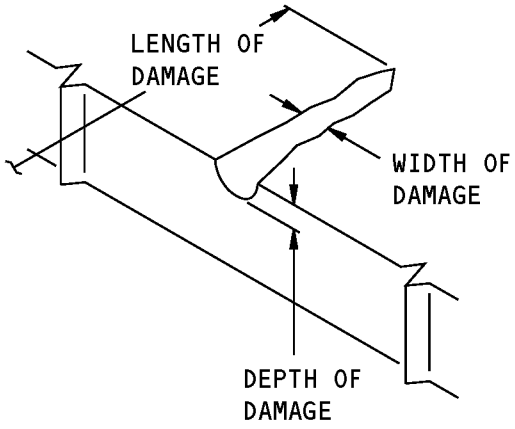
ELEVATOR TAB STRUCTURE

B



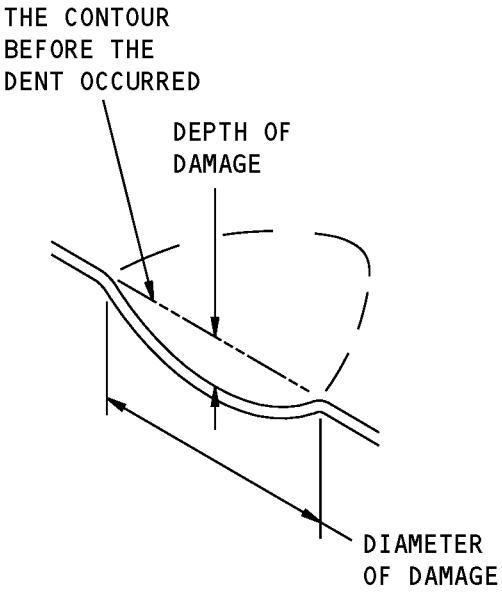
(FOR AIRPLANE LINE NUMBERS 1 THRU 1174
WITH COMPLETION OF SERVICE BULLETINS 737-55-1080
AND 737-55-1082)
A-A

Elevator Tab Spar Allowable Damage
Figure 101 (Sheet 2 of 2)



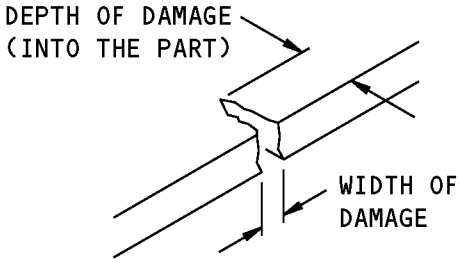
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 102

3. References

Reference	Title
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-06	ELEVATOR TAB BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
55-20-02	ELEVATOR STRUCTURE
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure

4. Allowable Damage Limits

A. Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

B. Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(1) A maximum of one ply in depth.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(2) A maximum of 0.50 inch in length

(3) A minimum of 1.00 inch away from a hole

(4) A minimum of 1.0 inch away from the edge of a part

(5) A minimum of 3.0 inches away from other damage

(6) A minimum of 1.0 inch away from a hinge or actuator location.

C. Dents are permitted if they are:

(1) A maximum diameter of 0.50 inch

(2) A minimum of 1.0 inch away from the edge of a hole.

(3) A minimum of 1.0 inch away from the edge of the part.

(4) A minimum of 3.0 inches away from the edge of other damage.

D. Holes and Punctures are permitted if they are:

(1) A maximum diameter of 0.30 inch

(2) A minimum of 3.0 inches away from other damage.

(3) A minimum of 1.0 inch away from the edge of the part

(4) A minimum of 1.0 inch away from a hinge or actuator location.

E. Delaminations are permitted if they are:

(1) A maximum of 0.50 inch in diameter

(2) A maximum of 1 damage area for each 144 square inches of skin area

(3) A minimum of 1.0 inch away from a hinge or actuator location or part edge.

(4) A minimum of 3.0 inches away from the edge of other damage.

F. Edge damage is permitted if it is:

(1) A maximum of 2.0 inches in length

(2) A maximum of 1 ply in depth

(3) A maximum of 0.25 inch in width

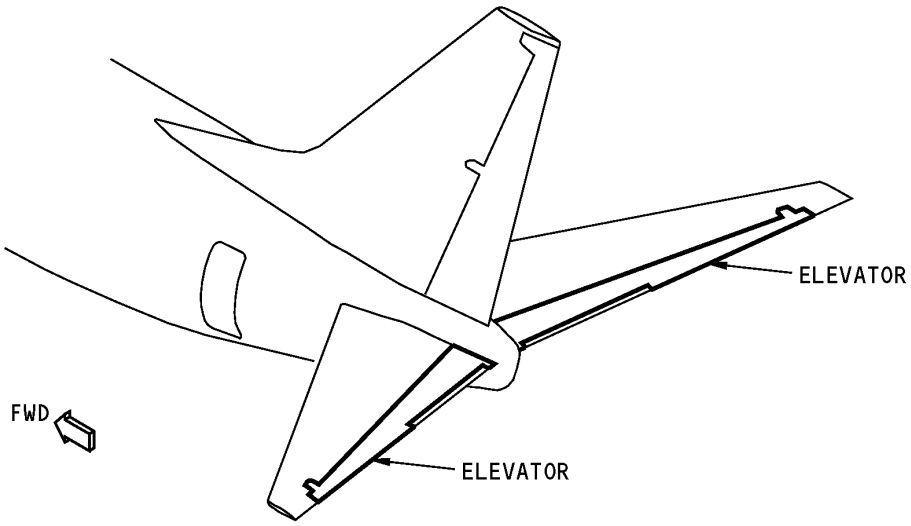
(4) A minimum of 3.0 inches away from other damage.

(5) Sealed as given in Paragraph 2.C./ALLOWABLE DAMAGE 3

REPAIR 1 - ELEVATOR STRUCTURE

1. Applicability

A. Repair 1 is applicable to the composite parts of the elevator structure shown in Elevator Location, Figure 201/REPAIR 1.



Elevator Location
Figure 201

2. General

A. Repair 1 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the elevator, as necessary. Refer to AMM 27-31-11/401.

C. Remove the skin panels, as necessary, to get access to the spars and ribs.

D. Remove the fittings or leading edge ribs from the spars, as necessary, to get access to the spars. Refer to SOPM 20-10-08.

E. Refer to Definitions of the Facesheets, Figure 202/REPAIR 1 for the definitions of the facesheets of a honeycomb core area.

F. Do an inspection of the damaged composite area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 and NDT, Part 1, 51-01-03 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT. Refer to NDT, Part 1, 51-05-01 for the inspection procedures.

(2) Refer to Damage Definitions, Figure 203/REPAIR 1, Details A, B, and C, f for the definitions of the length, width, and depth of the damage.

G. Do the repair as given in Paragraph 4./REPAIR 1

H. Install the fittings or leading edge ribs on the spars if they were removed.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

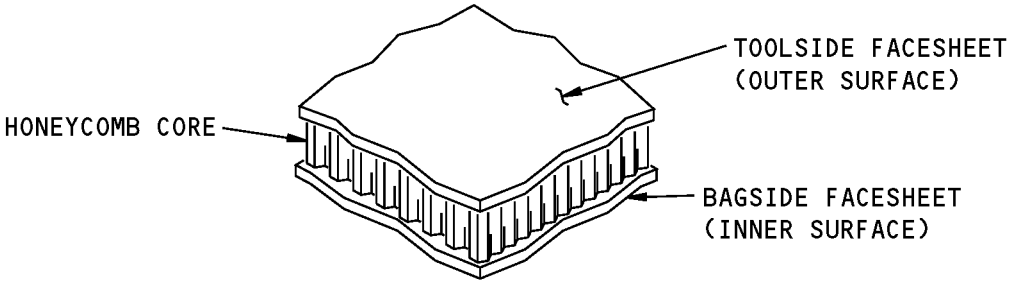
(2) Apply BMS 5-95 sealant to all parts that connect the fittings. Refer to 51-20-05.

I. Refer to Elevator Structure Repairs, Figure 204/REPAIR 1 for the locations of the repair zones.

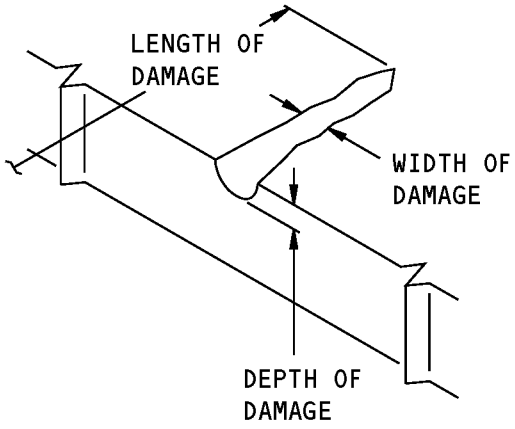
J. Install the skin panels, as applicable. Refer to 51-40-02 for the fastener installation procedures.

K. Make sure the elevator is balanced after all repairs are complete. Refer to 51-60-04.

L. Install the elevator, as applicable. Refer to AMM 27-31-11/401.

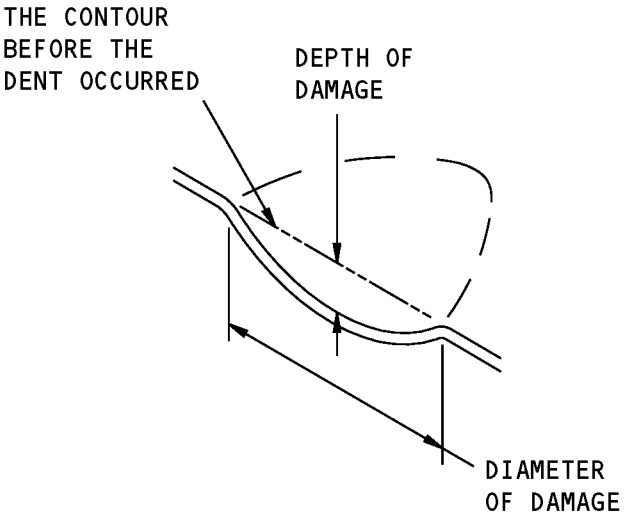


Definitions of the Facesheets
Figure 202



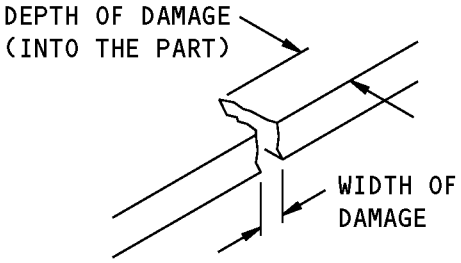
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

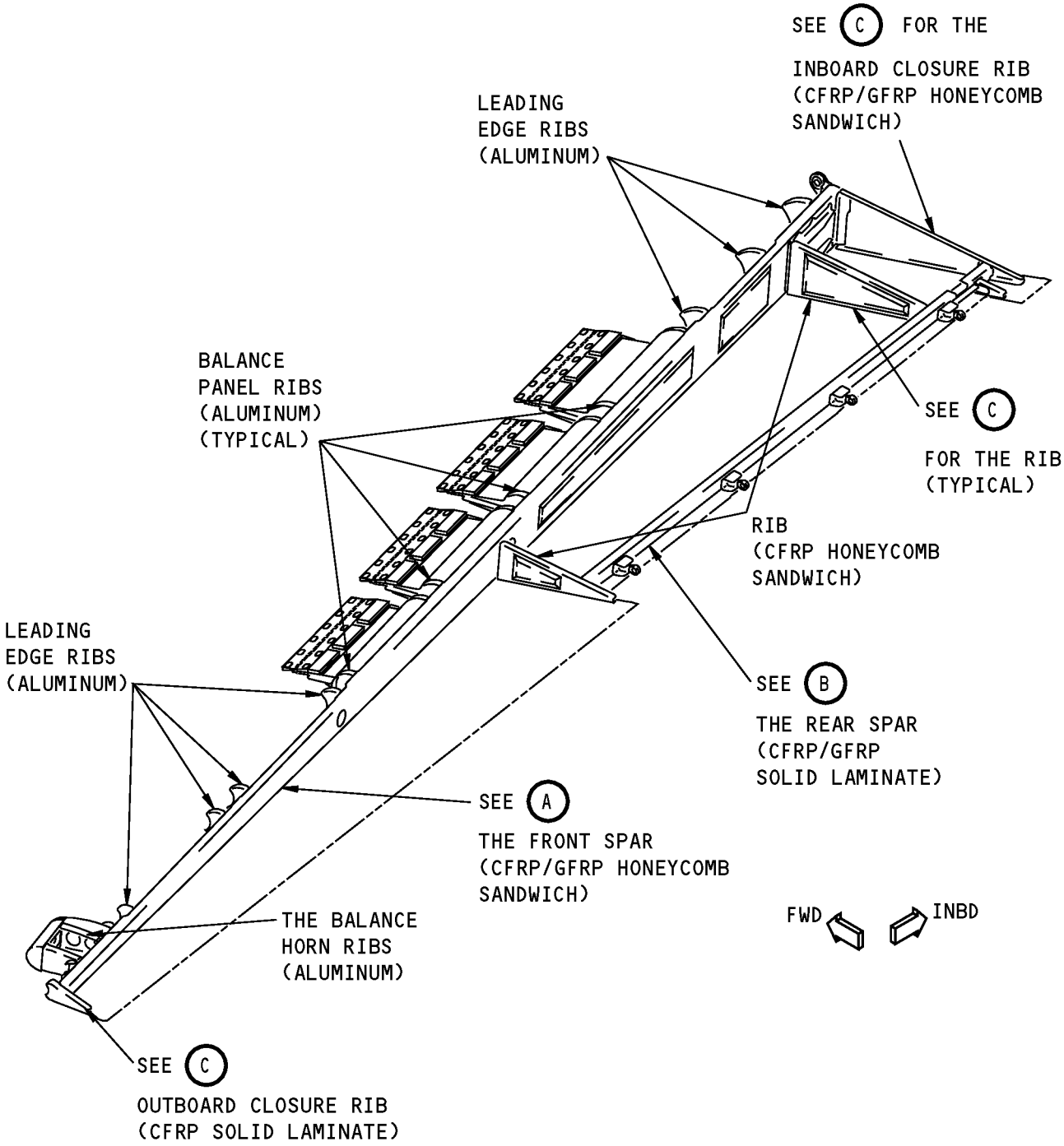
B



DEFINITIONS FOR EDGE DAMAGE

C

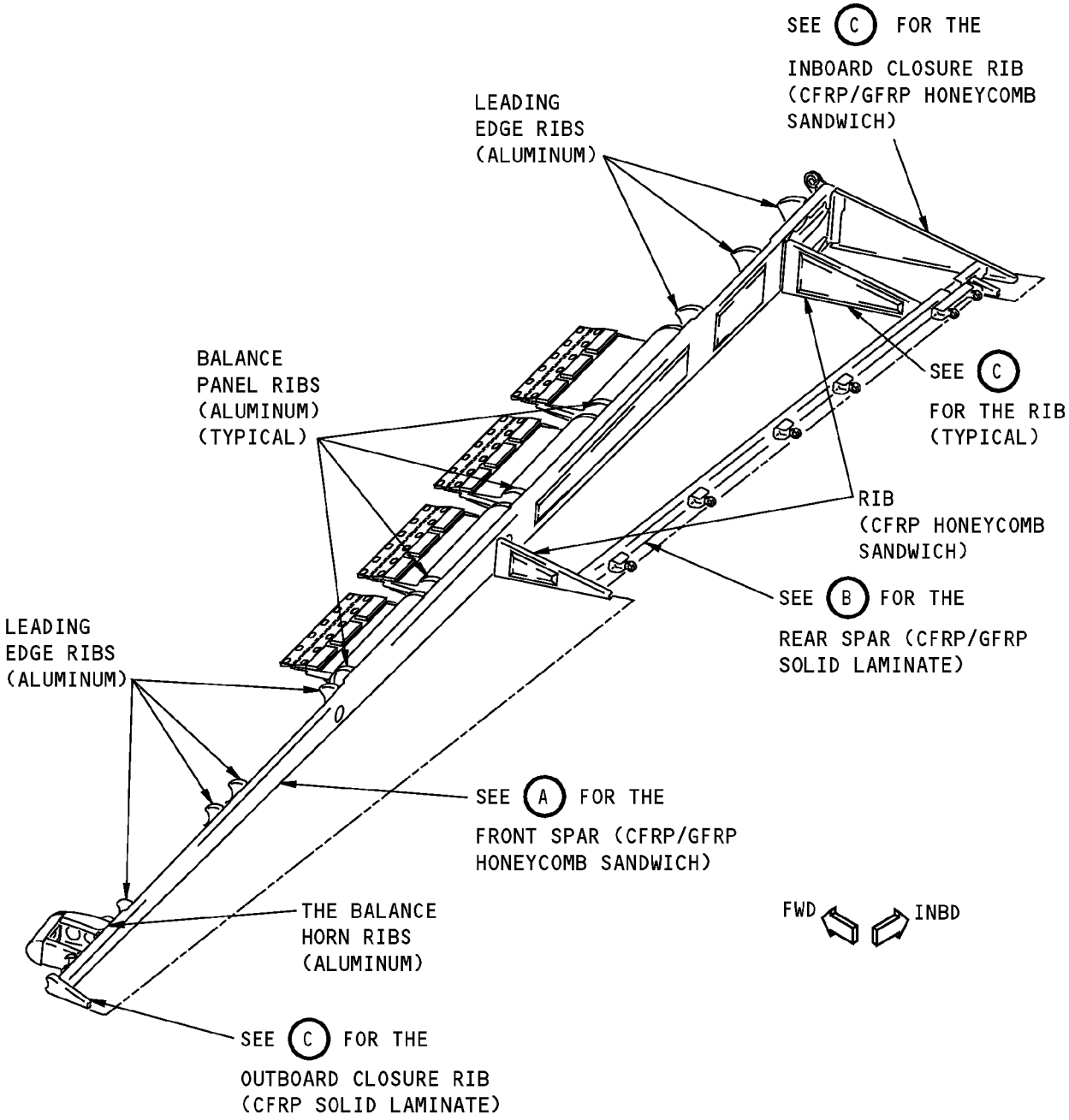
Damage Definitions
Figure 203



(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

NOTE: REFER TO TABLE 201 FOR THE REPAIR REFERENCES.

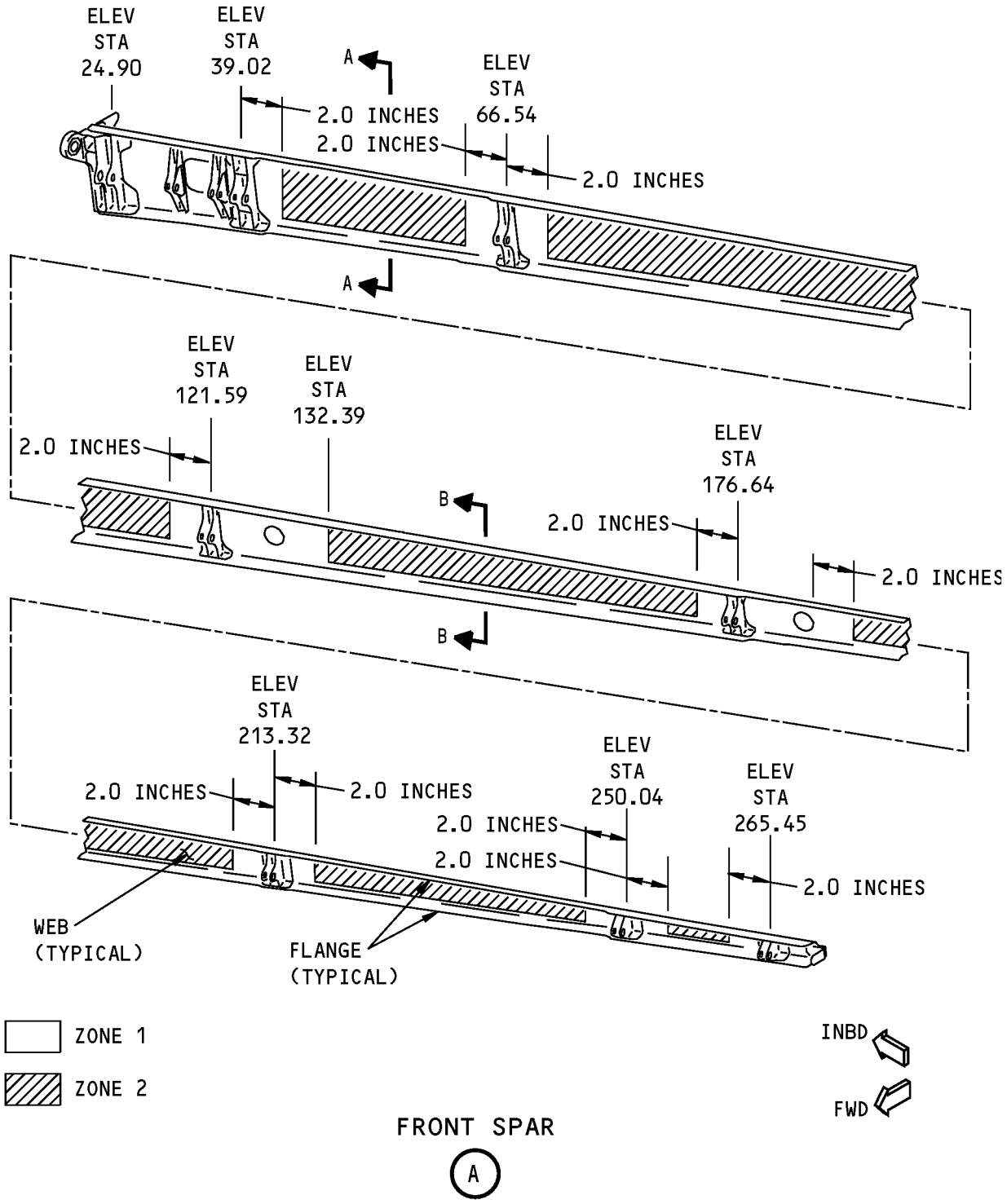
Elevator Structure Repairs
Figure 204 (Sheet 1 of 8)



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

NOTE: REFER TO TABLE 201 FOR THE REPAIR REFERENCES.

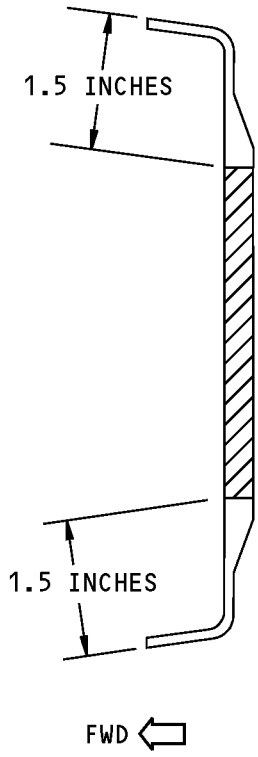
Elevator Structure Repairs
Figure 204 (Sheet 2 of 8)



FRONT SPAR

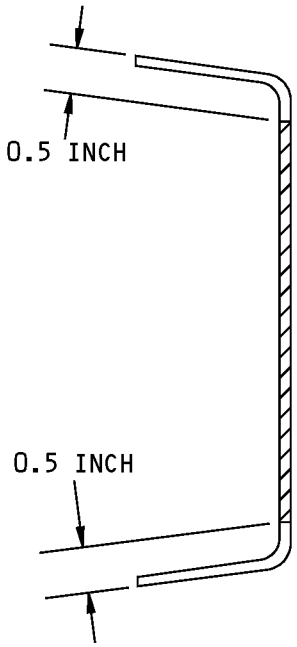
A

Elevator Structure Repairs
Figure 204 (Sheet 3 of 8)



CROSS–SECTION OF THE FRONT SPAR WHERE HONEYCOMB CORE IS LOCATED IN THE WEB

A–A



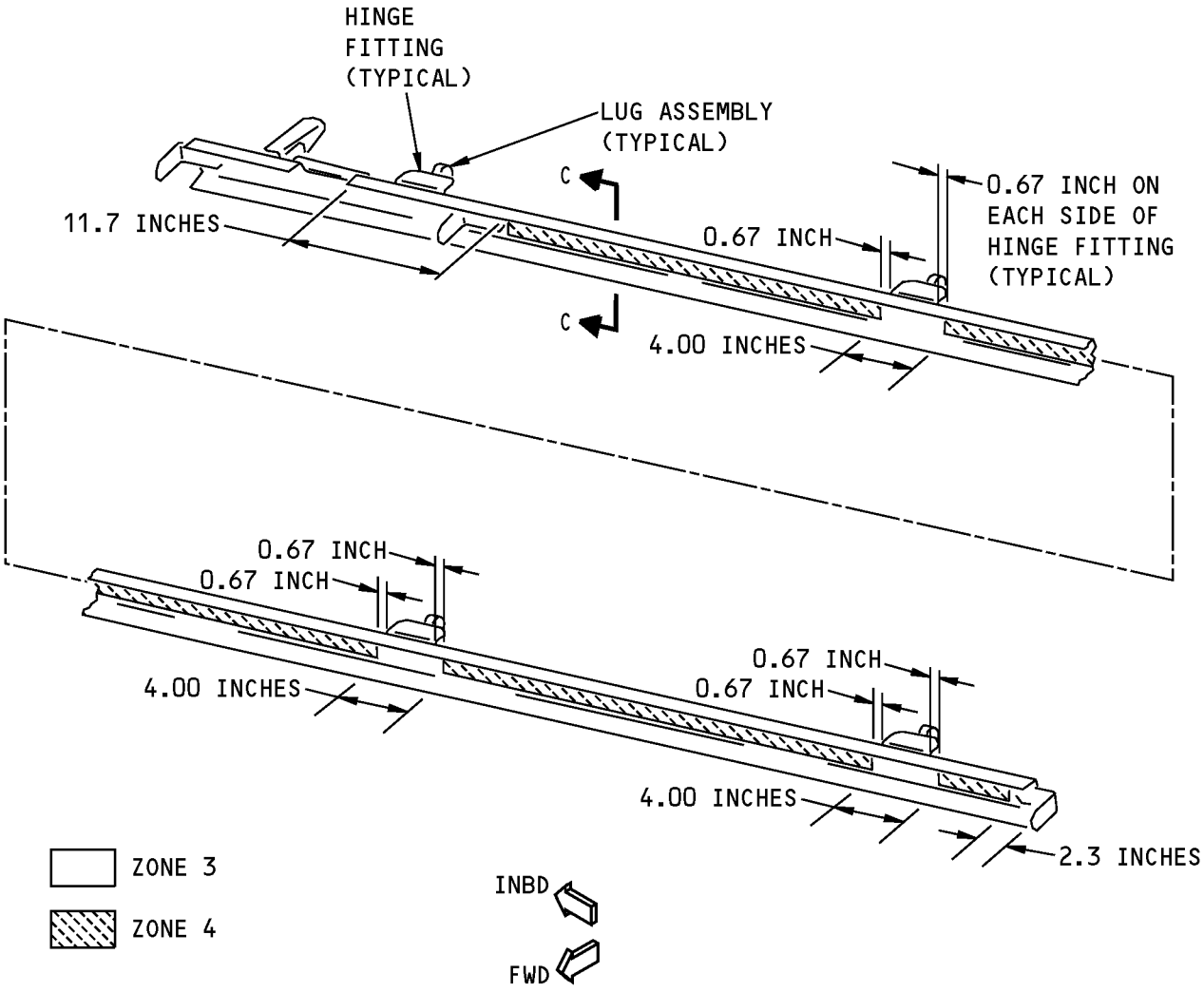
CROSS–SECTION OF THE FRONT SPAR WHERE THE WEB IS SOLID LAMINATE

B–B

ZONE 1

ZONE 2

Elevator Structure Repairs
Figure 204 (Sheet 4 of 8)

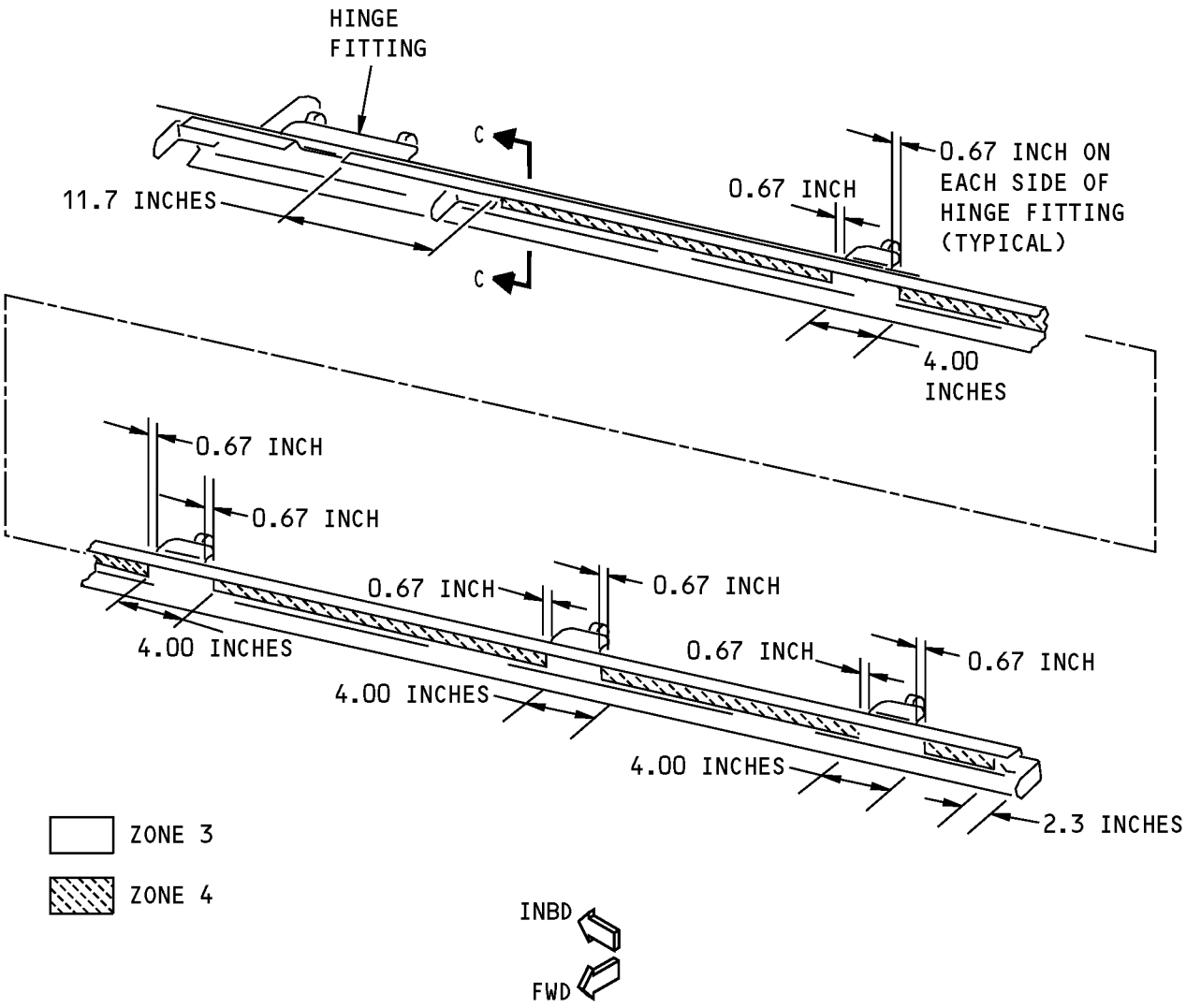


(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

REAR SPAR

B

Elevator Structure Repairs
Figure 204 (Sheet 5 of 8)

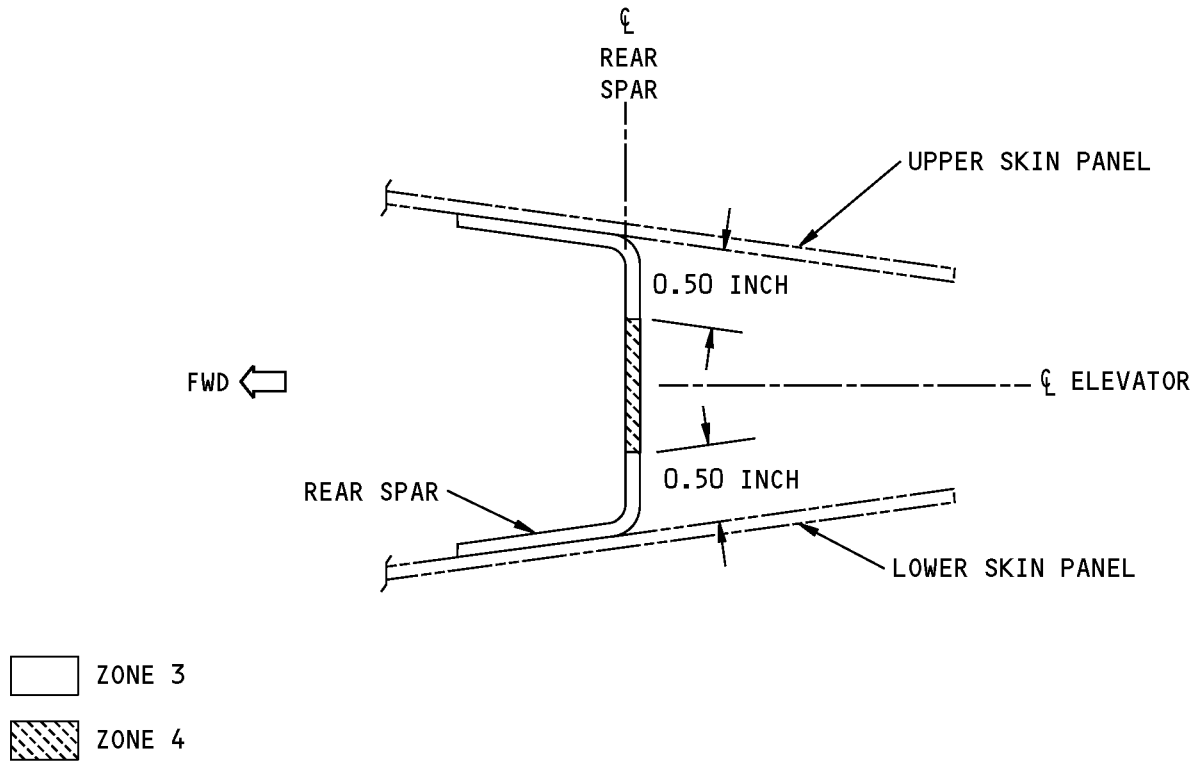


(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

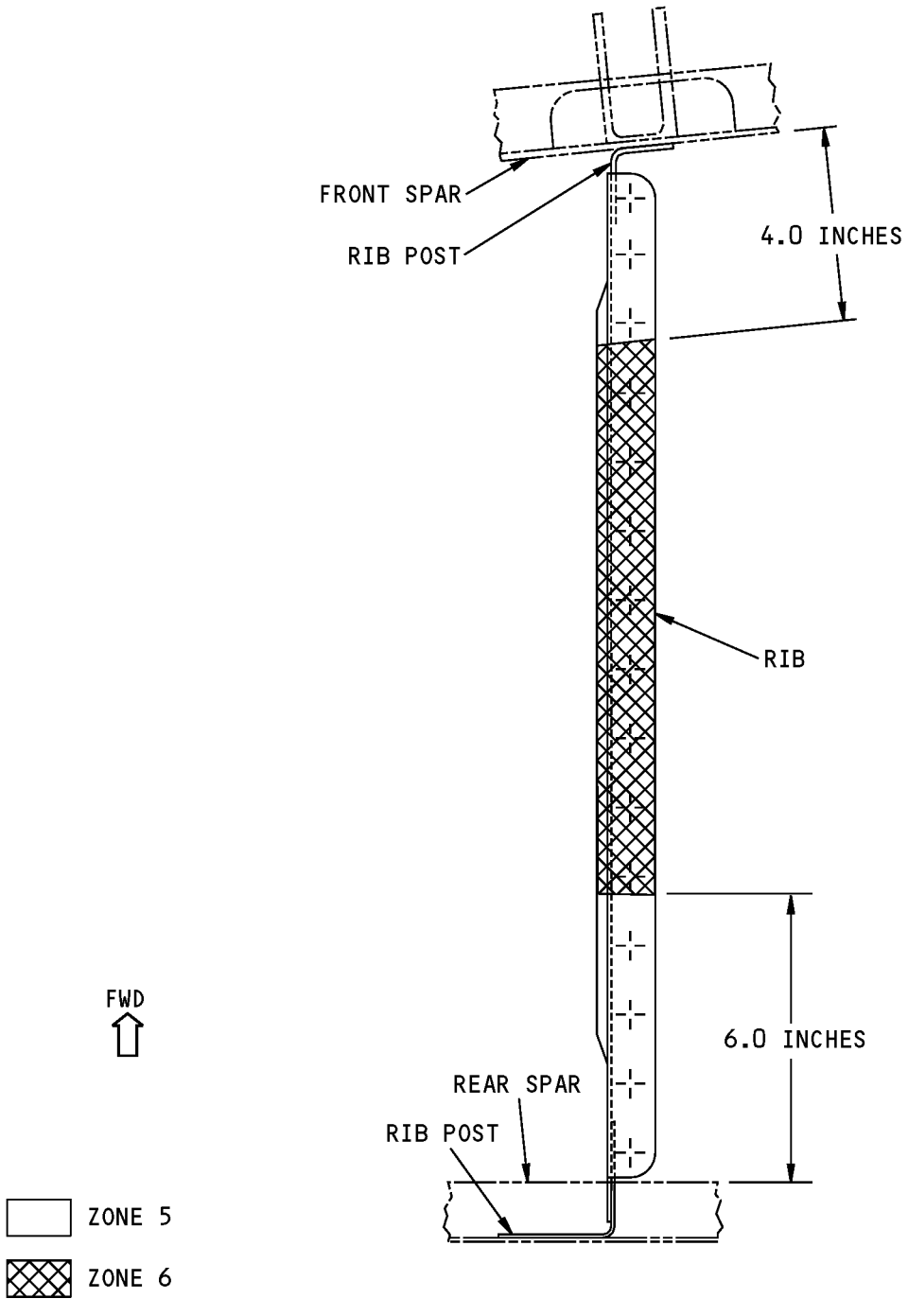
REAR SPAR

B

Elevator Structure Repairs
Figure 204 (Sheet 6 of 8)



Elevator Structure Repairs
Figure 204 (Sheet 7 of 8)



Elevator Structure Repairs
Figure 204 (Sheet 8 of 8)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04, REPAIR P/B REPAIR	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
55-20-02, ALLOWABLE DAMAGE 1	Elevator Structure
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
AMM 27-31-11/401	Elevator - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure
737 NDT Part 1, 51-05-01	Tap Test Inspection of Honeycomb Sandwich Structure

4. Repair Instructions

A. Do as follows when you make a repair:

(1) When you remove the damage, do not cut or make an abrasion into the radius of the structure.

(2) If the repair plies make an overlap of a hole or cutout, do the steps that follow:

(a) Cure the repair.

(b) Drill or cut the plies to the initial diameter of the hole or cutout.

(3) If you need clearance with adjacent structure, install a tapered shim on each side of the repair.

(4) It is permitted to put the repair plies around the full width of the structure.

(a) Do not make an overlap of the edges of the structure.

B. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

C. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged. Include a filler ply as applicable.

Table 201:

TABLE REFERENCES FOR THE REPAIR ZONES		
TYPE OF STRUCTURE	**ZONE LOCATION**	**TABLE**
LEADING EDGE RIBS, BALANCE HORN RIBS, BALANCE PANEL RIBS, (ALUMINUM)	——————— ——————— ———————	THERE ARE NO REPAIRS FOR THESE PARTS IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME
SOLID LAMINATE AREAS OF THE FRONT SPAR, REAR SPAR, RIBS, AND CLOSURE RIBS	ZONE 1 ZONE 3 ZONE 5	202
SOLID LAMINATE AREAS OF THE FRONT SPAR, REAR SPAR, RIBS, AND CLOSURE RIBS	ZONE 2 ZONE 4 ZONE 6	203
HONEYCOMB CORE AREAS OF THE FRONT SPAR, RIBS, AND INBOARD CLOSURE RIB	ZONE 1 ZONE 3 ZONE 5	204
HONEYCOMB CORE AREAS OF THE FRONT SPAR, RIBS, AND INBOARD CLOSURE RIB	ZONE 2 ZONE 4 ZONE 6	205

Table 202:

REPAIR DATA FOR THE SOLID LAMINATE AREA OF ALL ZONES ON THE 350°F (177°C) CURE - ELEVATOR STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	This repair is not permitted in these zones	Damage that is a maximum of: - 3.00 inches across largest dimension of damage - 10 percent of the smallest dimension across the part at the damage location 3.0 inches minimum clearance from: - other repairs - fastener holes - other holes - part edges	Damage that is a maximum of: - 3.00 inches across largest dimension of damage - 10 percent of the smallest dimension across the part at the damage location 3.0 inches minimum clearance from: - other repairs - fastener holes - other holes - part edges	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	Not permitted	SRM 51-70-05 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.C

Table 203:

REPAIR DATA FOR THE HONEYCOMB CORE AREA OF ALL ZONES ON THE 350°F (177°C) CURE - ELEVATOR STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Contact Boeing for repair instructions	Damage that is a maximum of: - 3.0 inches in diameter - 30 percent of the smallest dimension across the part at the damage location 3.0 inches minimum clearance from: - other repairs - fastener holes - other holes - part edges	Damage that is a maximum of: - 3.0 inches in diameter - 30 percent of the smallest dimension across the part at the damage location 3.0 inches minimum clearance from: - other repairs - fastener holes - other holes - part edges	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	Not Permitted	SRM 51-70-04 and Paragraph 4.B	SRM 51-70-05 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.C

REPAIR 2 - ELEVATOR TAB SPAR

1. Applicability

A. Repair 2 is applicable to the elevator tab spar shown in Elevator Tab Spar Repairs, Figure 201/REPAIR 2.

NOTE: THIS REPAIR IS APPLICABLE TO AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-02, REPAIR 3 FOR AIRPLANE LINE NUMBERS EQUAL TO OR GREATER THAN LINE NUMBER 1175 AND FOR ALL LINE NUMBERS WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

2. General

A. Repairs done as given in Repair 2 are an Alternate Method of Compliance (AMOC) to the Federal Aviation Administration (FAA) Airworthiness Directive (AD) 2001-08-09, Paragraph (d).

B. Repair 2 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

C. Remove the elevator tab, as necessary. Refer to AMM 27-31-31/401.

D. Remove the skin panels, as necessary, to get access to the spar.

E. Remove the fittings, as necessary, to get access to the spar. Refer to SOPM 20-10-08.

F. Do an inspection of the damaged composite area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

(1) Refer to Damage Definitions, Figure 202/REPAIR 2, Details A, B, and C the definitions of the length, width, and depth of the damage.

CAUTION: DO NOT EXCEED ONE REPAIR LOCATION. REPAIRS ARE NOT PERMITTED INBOARD OF ELEVATOR STA 45.0. FOR ANY REPAIRS INBOARD OF ELEVATOR STATION 45.0, CONTACT BOEING. IF YOU DO NOT OBEY, THEN DAMAGE TO STRUCTURE COULD OCCUR.

G. Do the repair as given in Paragraph 4./REPAIR 2 and Table 201/REPAIR 2.

H. Install the fittings on the spar, if they were removed.

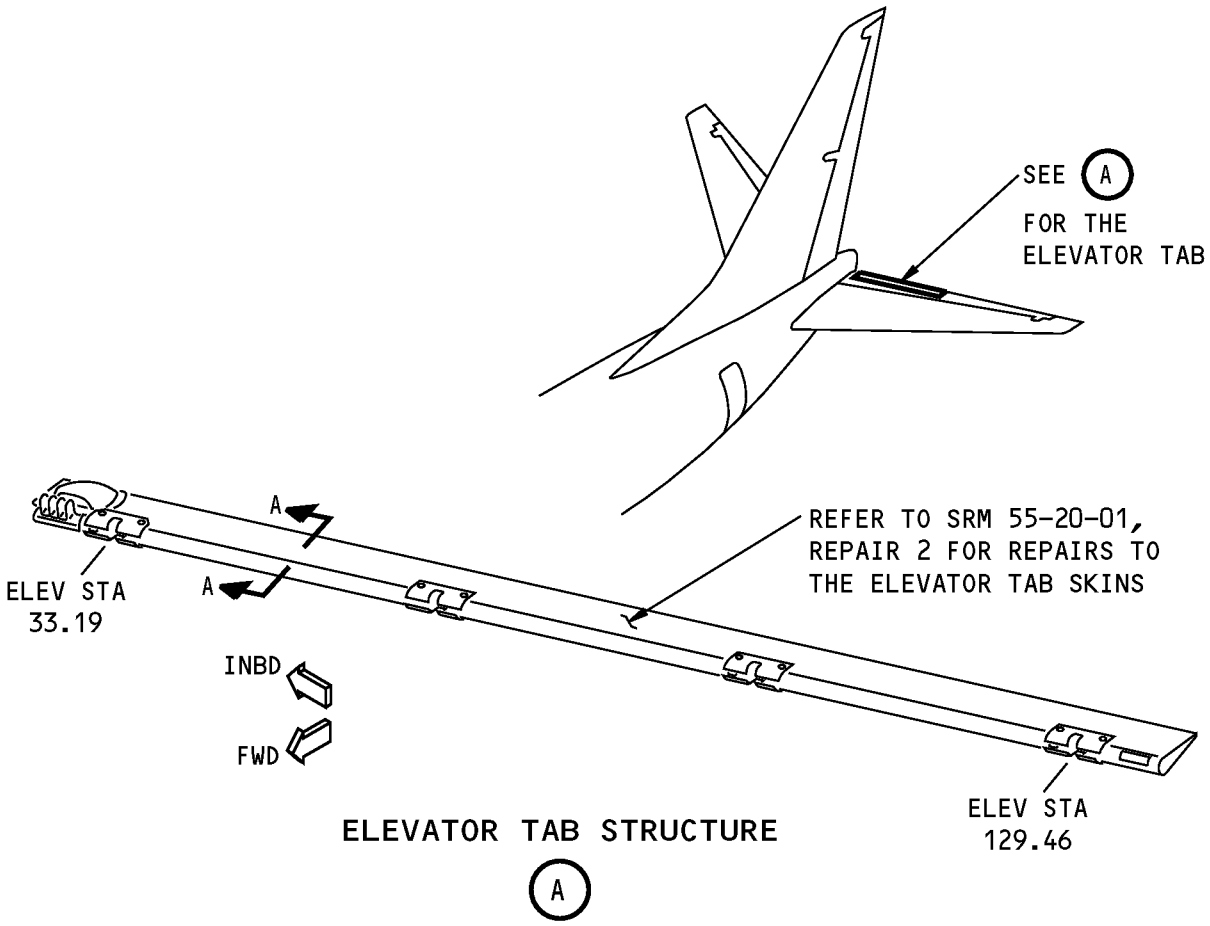
(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Apply BMS 5-95 sealant to all parts that connect the fittings. Refer to 51-20-05.

I. Install the skin panels, if they were removed.

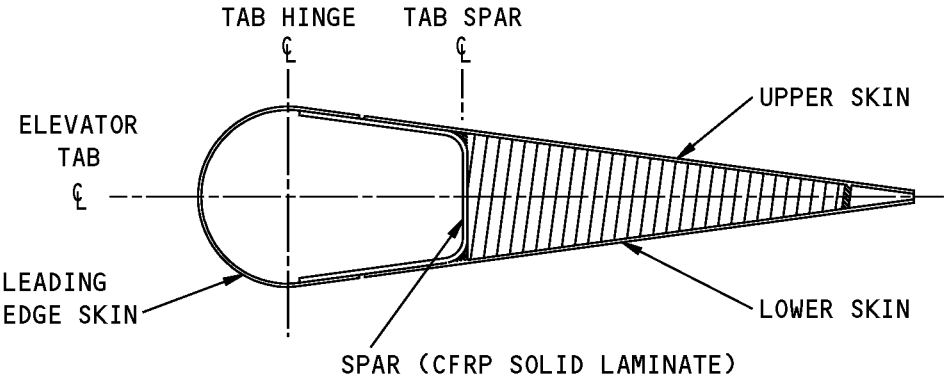
J. Make sure the elevator tab is balanced after all repairs are complete. Refer to 51-60-06.

K. Install the elevator tab, as applicable. Refer to AMM 27-31-31/401.



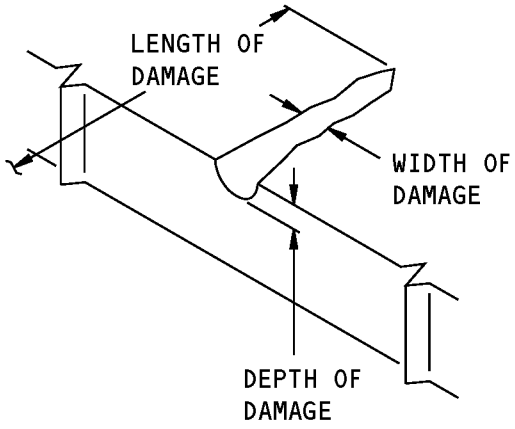
ELEVATOR TAB STRUCTURE

A



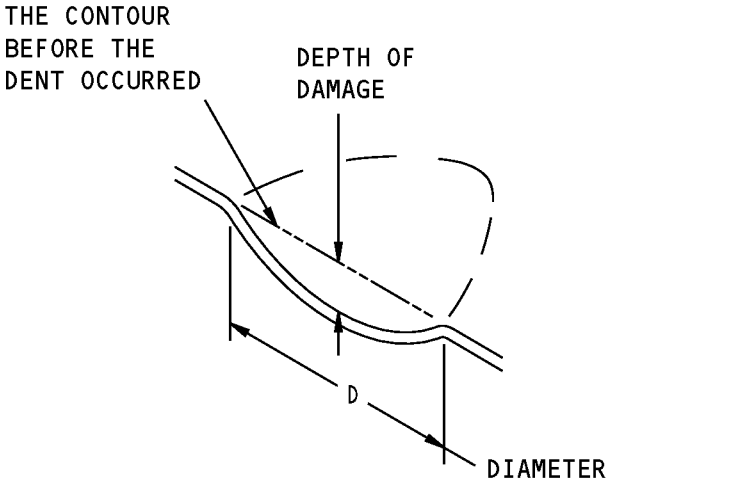
(FOR AIRPLANE LINE NUMBERS 1 THRU 1174)
A-A

Elevator Tab Spar Repairs
Figure 201



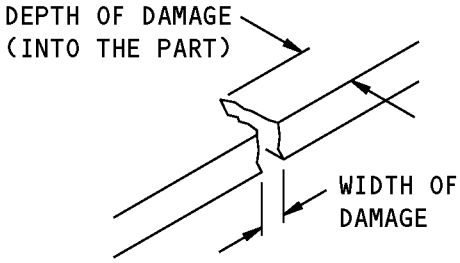
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-60-06	ELEVATOR TAB BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05	REPAIR PROCEDURES FOR PREIMPREGNATED MATERIALS
55-20-02	ELEVATOR STRUCTURE
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
AMM 27-31-31/401	Elevator Tab - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure

4. Repair Instructions

A. Do as follows when you make a repair:

(1) It is permitted to put the repair plies around the full width of the structure.

(2) Make the size of the repair plies with overlap as given in 51-70-04 and 51-70-05 and with a tolerance of +/- 0.10 inch.

B. Refer to Table 201/REPAIR 2 for the repair data that is applicable to damage to the solid laminate areas for the elevator tab spar.

C. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2d (d = fastener diameter) away from a fastener hole.

(3) Do an inspection of Category B repairs after each 800 flight hour interval or more frequently. Refer to 737 NDT Part 1, 51-01-01 for inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

D. Use the instructions that follow to do a Category A repair with preimpregnated layup materials at 350°F (177°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

E. Repairs with preimpregnated layup materials at 250°F (121°C) cure are not permitted.

Table 201:

REPAIR DATA FOR THE TAB SPAR MADE OF SOLID LAMINATE ON THE 350°F (177°C) CURE, ELEVATOR TAB SPAR				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)** *[1]*[2]	**200°F (93°C)** *[1]*[2]	**250°F (121°C)**	**350°F (177°C)** *[1]*[2]
REPAIR SIZE AND LIMITS	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Damage that is a maximum of: - 0.50 inch across the largest dimension of the damage Damage must be a minimum of 2.5 X (D) away from a fastener hole or part edge.	Damage is not permitted.	Damage that is a maximum of: - 1.0 inch across the largest dimension of the damage
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.C	——	SRM 51-70-05 and Paragraph 4.D

*[1] Only one repair is permitted for each elevator tab spar.

*[2] For damage that is more than the limits given in this table, ask The Boeing Company for repair data.

REPAIR 3 - ELEVATOR TAB SPAR FOR AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082

1. Applicability

A. Repair 3 is applicable to the elevator tab spar shown in Elevator Tab Spar Repairs, Figure 201/REPAIR 3.

NOTE: THIS REPAIR IS APPLICABLE TO AIRPLANE LINE NUMBERS 1175 AND ON AND LINE NUMBERS 1 THROUGH 1174 WITH COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082. REFER TO 55-20-02, REPAIR 2 FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174 PRIOR TO COMPLETION OF SERVICE BULLETINS 737-55-1080 AND 737-55-1082.

2. General

A. Repair 3 gives instructions for Category A repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the elevator tab, as necessary. Refer to AMM 27-31-31/401.

C. Remove the skin panels, as necessary, to get access to the spar.

D. Remove the fittings, as necessary, to get access to the spar. Refer to SOPM 20-10-08.

E. Do an inspection of the damaged composite area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

(1) Refer to Damage Definitions, Figure 202/REPAIR 3, Details A, B, and C, f or t he definitions of the length, width, and depth of the damage.

F. Do the repair as given in Paragraph 4./REPAIR 3 and Table 201/REPAIR 3.

G. Install the fittings on the spar, if they were removed.

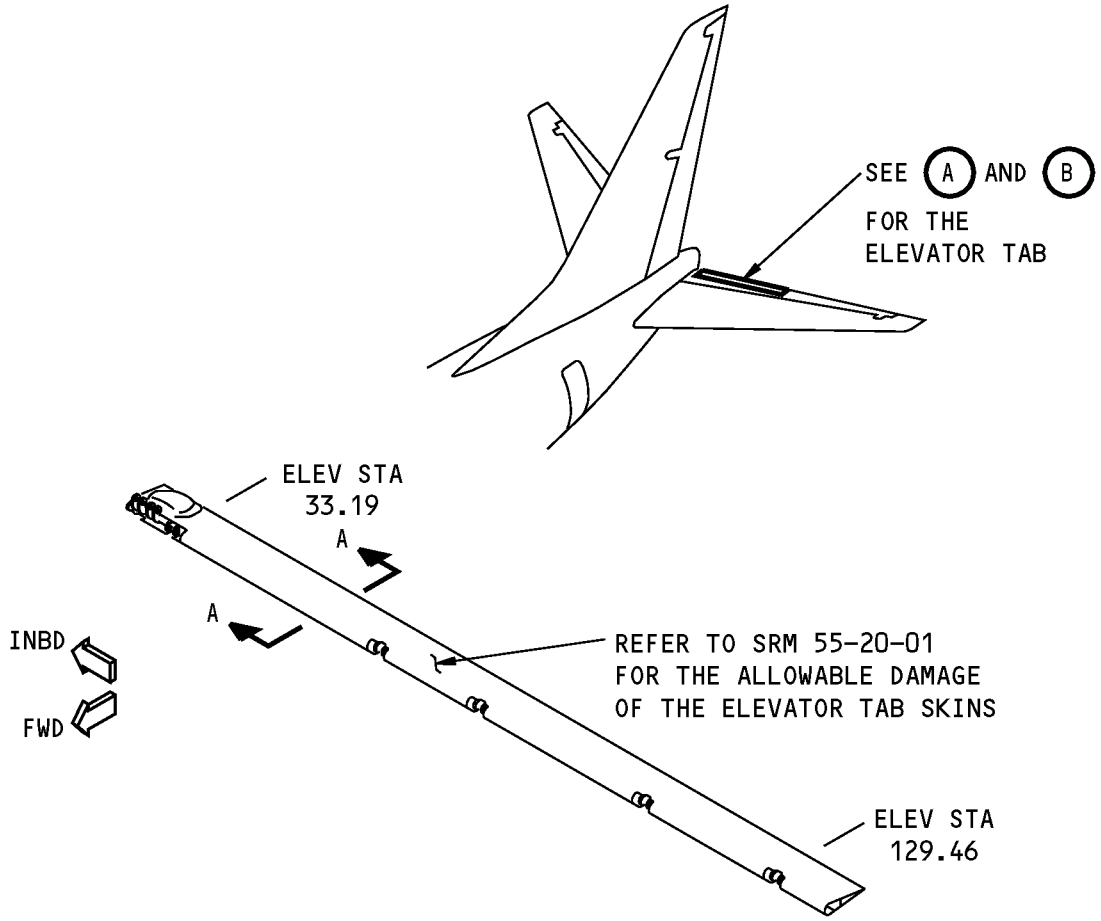
(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Apply BMS 5-95 sealant to all parts that connect the fittings. Refer to 51-20-05.

H. Install the skin panels, if they were removed.

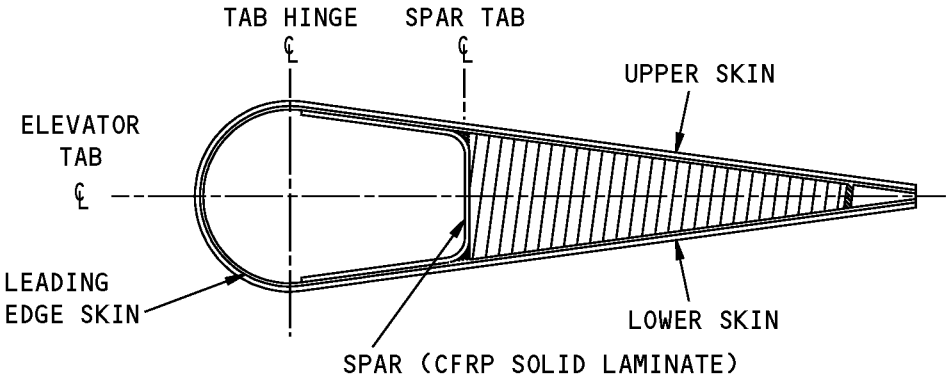
I. Make sure the elevator tab is balanced after all repairs are complete. Refer to 51-60-06.

J. Install the elevator tab, as applicable. Refer to AMM 27-31-31/401.



ELEVATOR TAB STRUCTURE

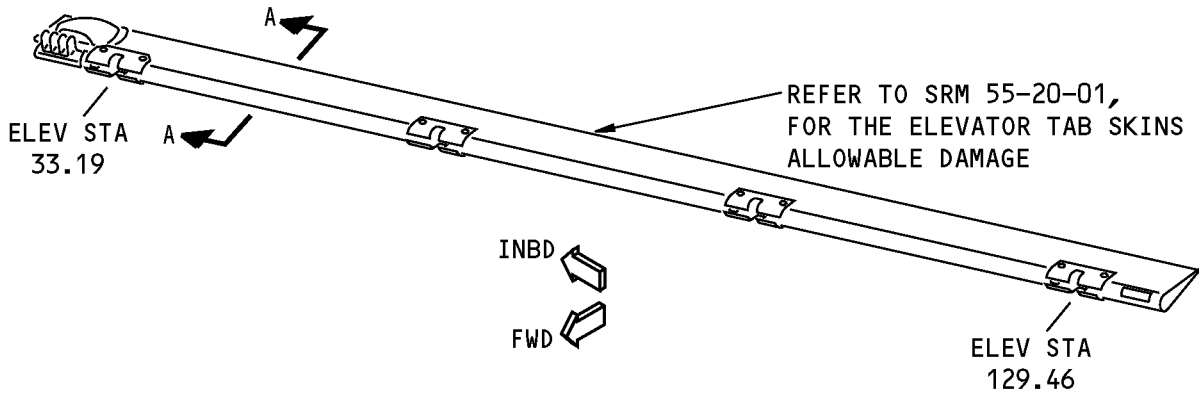
A



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

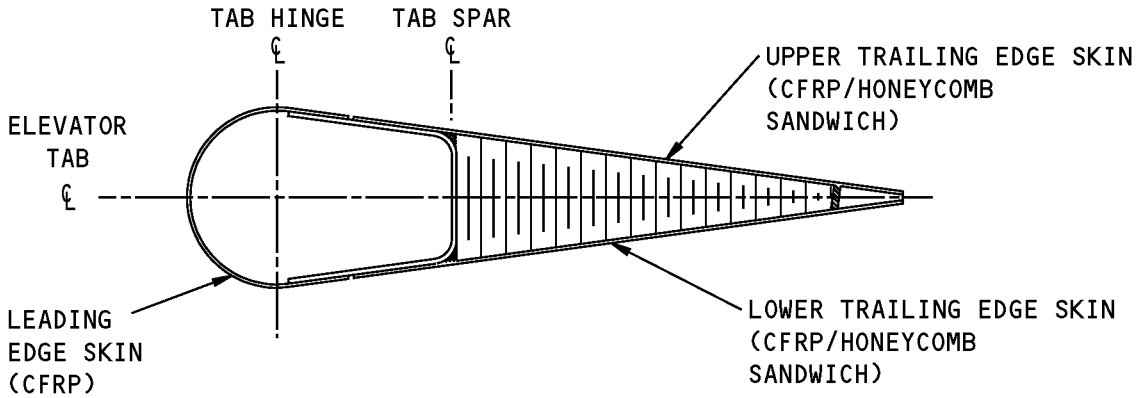
A-A

Elevator Tab Spar Repairs
Figure 201 (Sheet 1 of 2)



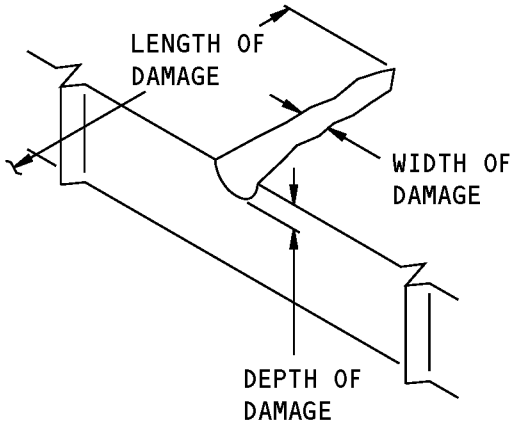
ELEVATOR TAB STRUCTURE

B



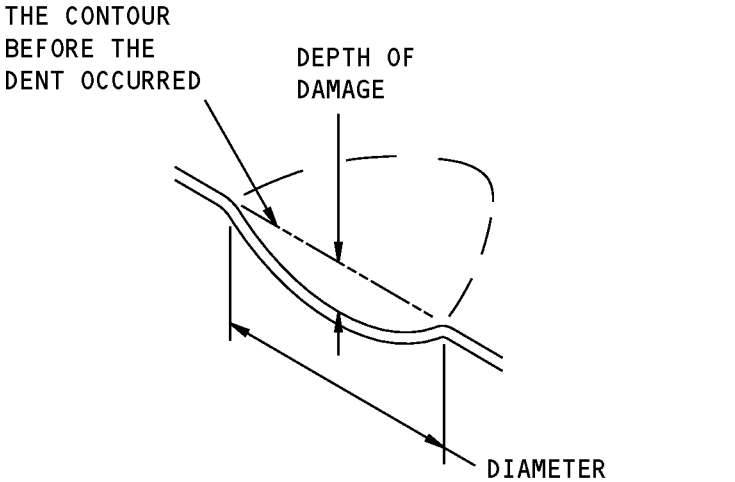
(FOR AIRPLANE LINE NUMBERS 1 THRU 1174
WITH COMPLETION OF SERVICE BULLETINS 737-55-1080
AND 737-55-1082)
A-A

Elevator Tab Spar Repairs
Figure 201 (Sheet 2 of 2)



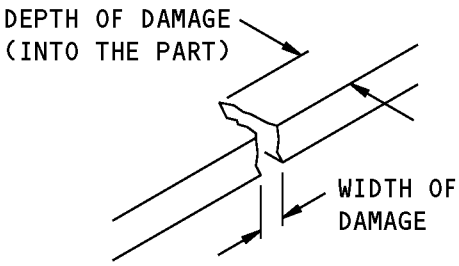
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-60-06	ELEVATOR TAB BALANCE PROCEDURE
51-70-04, REPAIR GENERAL	Repair Procedures for Wet Layup Materials
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
55-20-02	ELEVATOR STRUCTURE
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
AMM 27-31-31/401	Elevator Tab - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure

4. Repair Instructions

A. Do as follows when you make a repair:

(1) When you remove the damage, do not cut or make an abrasion into the radius of the structure.

(2) If the repair plies make an overlap of a hole or cutout, do the steps that follow:

(a) Cure the repair.

(b) Drill or cut the plies to the initial diameter of the hole or cutout.

(3) If you need clearance with adjacent structure, install a tapered shim on each side of the repair.

(4) It is permitted to put the repair plies around the full width of the structure.

(a) Do not make an overlap of the edges of the structure.

B. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

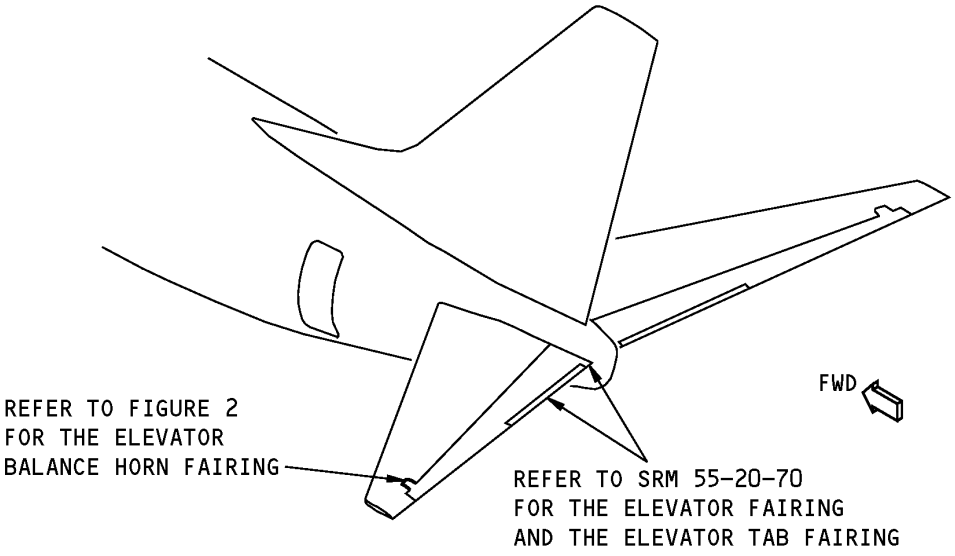
NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2D (D = fastener diameter) away from a fastener hole.

C. For repairs made with preimpregnated materials, use the same number of repair plies as the number of initial plies that were damaged.

Table 201:

REPAIR DATA FOR THE TAB SPAR MADE OF SOLID LAMINATE ON THE 350°F (177°C) CURE, ELEVATOR TAB STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	- Contact The Boeing Company for this temperature repair	Damage that is a maximum of: - 1.5 inches in diameter - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 3.0 inches minimum clearance from other repairs 1.0 inch minimum clearance from: - part edges - fastener holes	Damage that is a maximum of: - 1.5 inches in diameter - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 3.0 inches minimum clearance from other repairs 1.0 inch minimum clearance from: - part edges - fastener holes	Damage that is a maximum of: - 1.5 inches in diameter - 50 percent of the smallest dimension across the part at the damage location One repair for each 144 square inches 3.0 inches minimum clearance from other repairs 1.0 inch minimum clearance from: - part edges - fastener holes
REPAIR PROCEDURES	————	SRM 51-70-04 and Paragraph 4.B	SRM 51-70-05 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.C

IDENTIFICATION 1 - ELEVATOR BALANCE HORN FAIRING

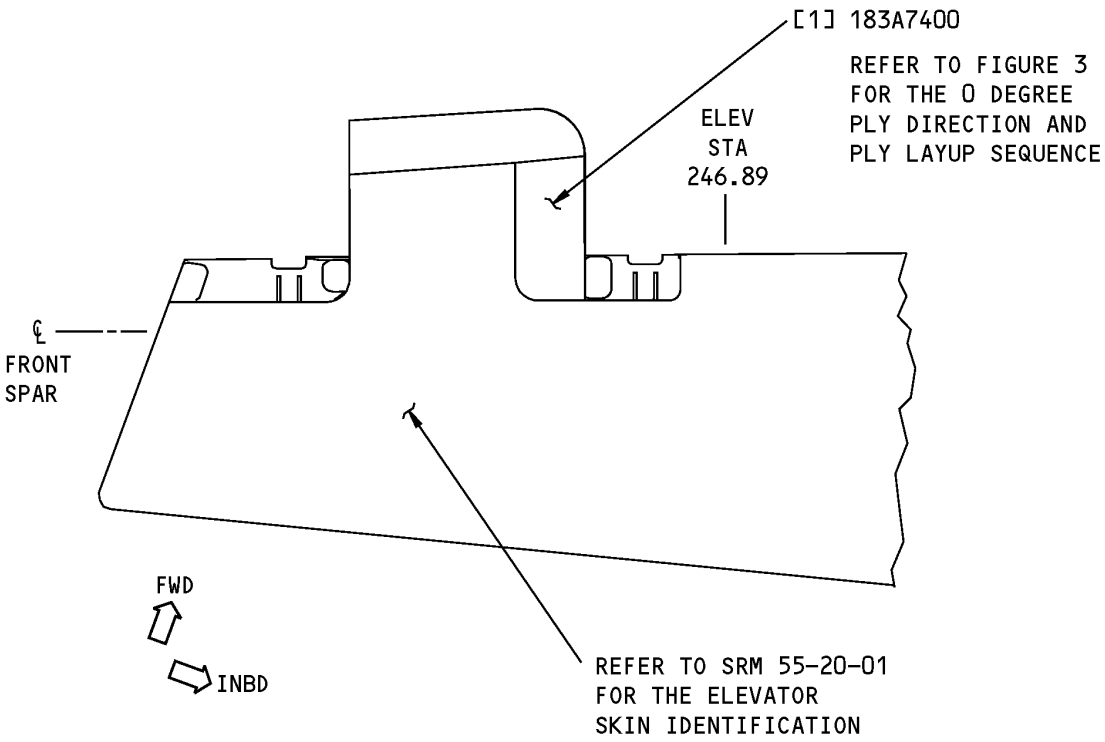


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Elevator Balance Horn Fairing Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A0101	Elevator Assembly - Functional Product Collector
183A6000	Elevator Leading Edge Installation
183A7000	Elevator Balance Horn Assembly
183A7400	Elevator Balance Horn Fairing



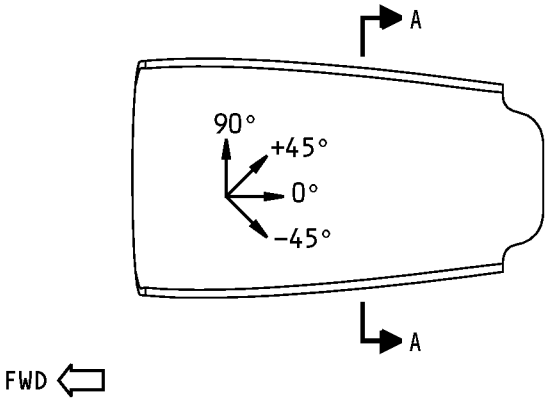
THE LEFT ELEVATOR BALANCE HORN FAIRING IS SHOWN,
THE RIGHT ELEVATOR BALANCE HORN FAIRING IS OPPOSITE

Elevator Balance Horn Fairing Identification
Figure 2

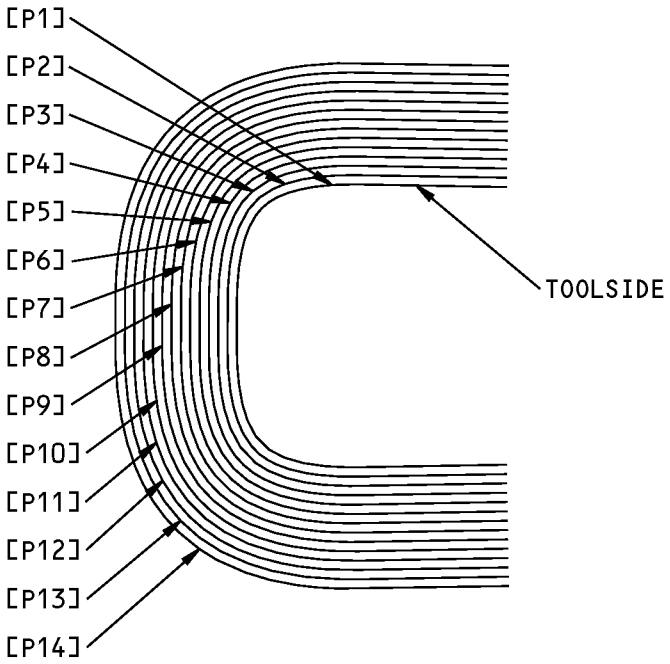
Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Fairing		Refer to Figure 3	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



ELEVATOR BALANCE HORN FAIRING



A–A

NOTE: REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES.

Ply Direction and Ply Layup Sequence for the Elevator Balance Horn Fairing
Figure 3

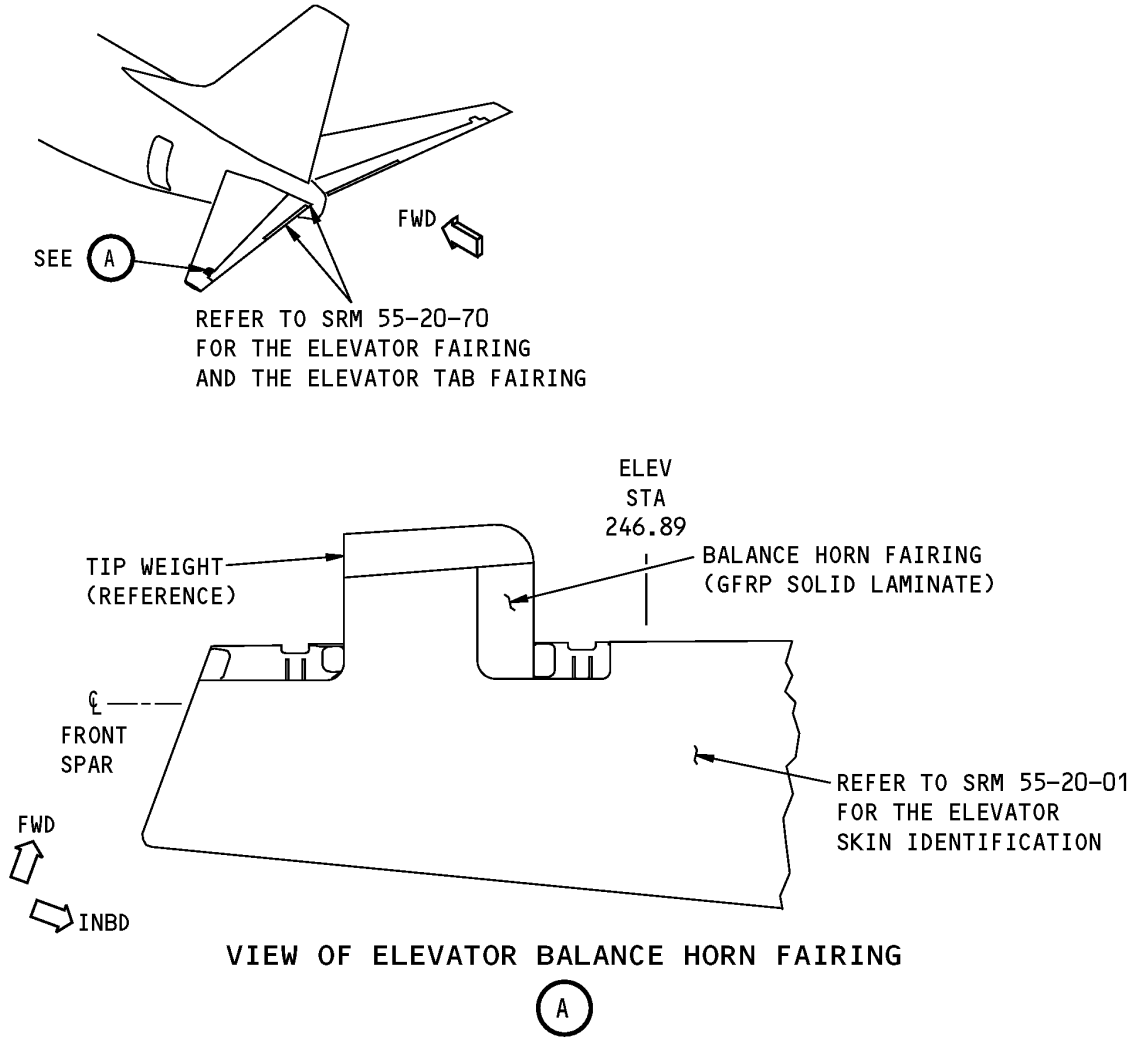
Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1, P14	0 or 90 degrees	Glass Fiber Reinforced Plastic (GFRP) as given in BMS 8-79, Class 3, Grade B, Style 120
P2, P13	+ or - 45 degrees	GFRP as given in BMS 8-79, Class 3, Grade B, Style 120
P3, P5, P7, P8, P10, P12	0 or 90 degrees	GFRP as given in BMS 8-79, Class 3, Grade B, Style 1581
P4, P6, P9, P11	+ or - 45 degrees	GFRP as given in BMS 8-79, Class 3, Grade B, Style 1581

ALLOWABLE DAMAGE 1 - ELEVATOR BALANCE HORN FAIRING

1. Applicability

A. Allowable Damage 1 is applicable to damage on the elevator balance horn fairing skin as shown in Elevator Balance Horn Fairing Location, Figure 101/ALLOWABLE DAMAGE 1.



Elevator Balance Horn Fairing Location
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Damage Definitions, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

B. Remove all the contamination and water from the fairing.

(1) Refer to 51-30-05 for possible sources of the tools and equipment you can use to remove the damage.

(2) Refer to 51-70-04 for the cleanup procedures.

C. Seal all the permitted damage areas that are not more than one ply in depth. Refer to the allowable damage limits in Paragraph 4./ALLOWABLE DAMAGE 1 Use one of the two methods that follow:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location of the damage.

(c) If the tape is on the external surface of the fairing, then make sure that it is in satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60, Type II enamel to the external surfaces of the fairing that area sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

D. Seal all of the damage areas that are more than one ply in depth. Refer to the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 1

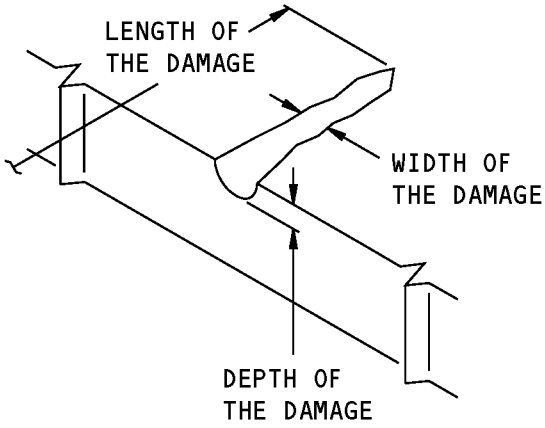
(1) Use a vacuum and heat to remove moisture from the solid laminate. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location of the damage.

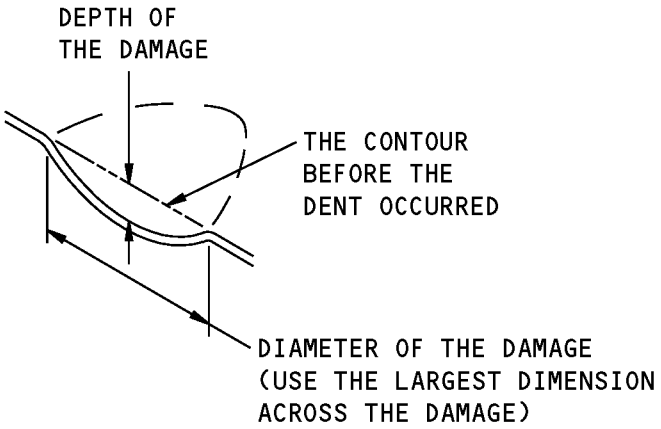
(4) Repair the damage at or before 250 flight cycless from the time the seal was made.

E. The definition of the words "other damage", as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause damage to the glass fibers and are sealed.



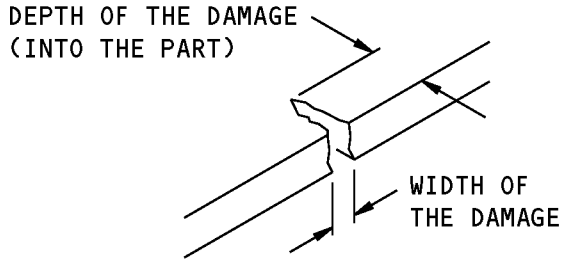
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Damage Definitions
Figure 102

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-04, GENERAL	Elevator Balance Procedure For Airplane Line Numbers 1 Through 1174 Prior To Completion of Service Bulletins 737-55-1080, 737-55-1081, and 737-55-1082
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

B. Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(1) The depth is a maximum of one ply.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(2) The length is a maximum of 5.0 inches (127.0 mm)

(3) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage.

C. Dents that do not cause damage to the glass fibers are permitted if:

(1) The depth is a maximum of 0.05 inch (1.27 mm)

NOTE: Use the limits for holes and punctures if the damage is more than 0.05 inch (1.27 mm) in depth.

(2) The diameter is a maximum of 2.0 inches (50.80 mm)

(3) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

D. Holes and Punctures are permitted if:

(1) The diameter is a maximum of 2.0 inch (50.80 mm)

(2) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

E. Delaminations are permitted if:

(1) The diameter is a maximum of 2.0 inch (50.8 mm)

(2) The damage is a minimum of 2D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

(3) Edge damage is permitted if:

(a) The depth is a maximum of 0.10 inch (2.54 mm)

(b) The width is a maximum of 0.50 inch (12.70 mm)

(4) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage.

REPAIR 1 - ELEVATOR BALANCE HORN FAIRING

1. Applicability

A. Repair 1 is applicable to the elevator balance horn fairing made of Glass Fiber Reinforced Plastic (GFRP) as shown in Elevator Balance Horn Fairing Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.

2. General

A. Repair 1 gives the instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the elevator balance horn fairing.

(2) Refer to 51-40-02 for information on fastener removal.

C. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for the inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

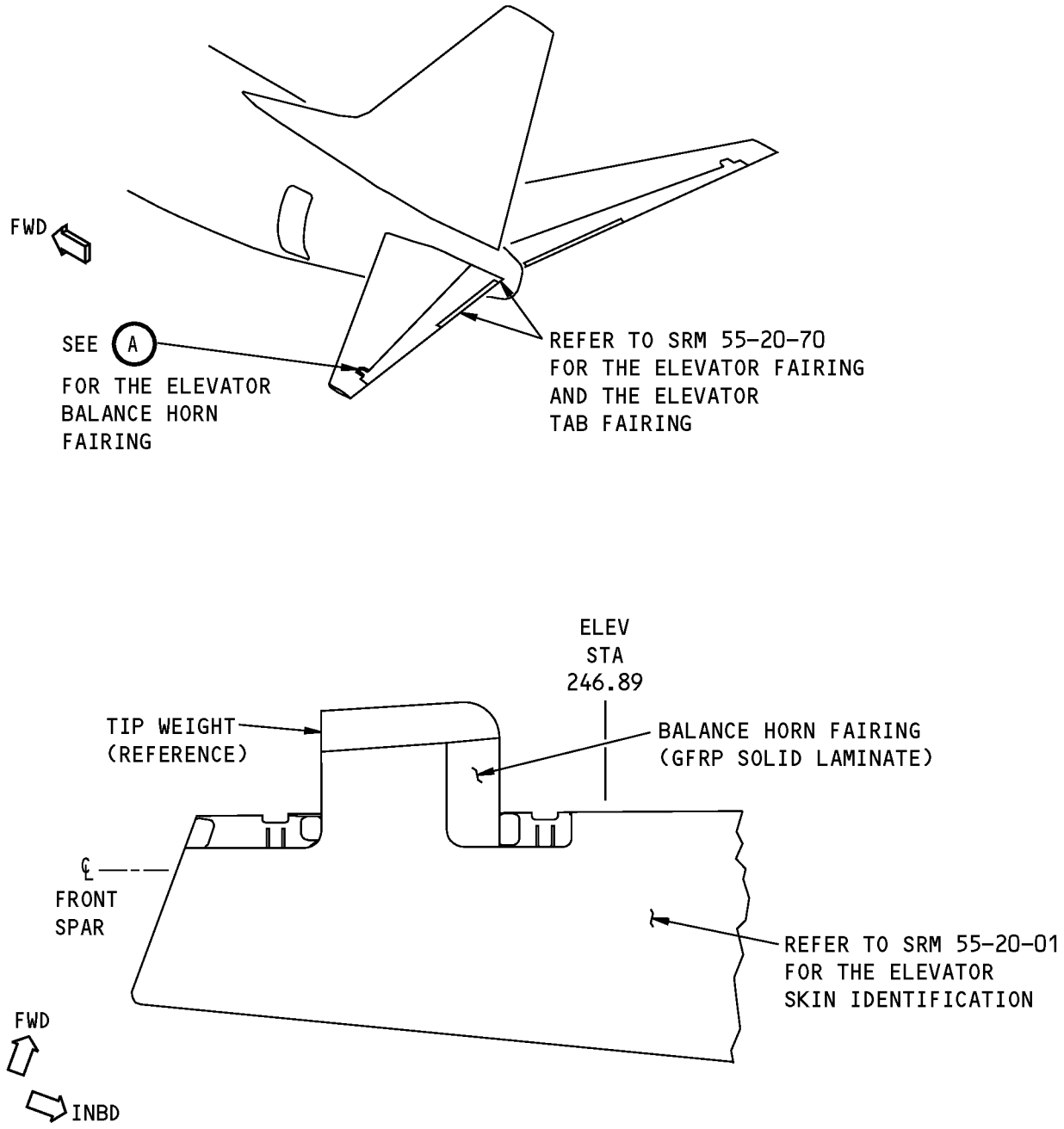
D. Refer to Damage Definitions, Figure 202/REPAIR 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

E. Do the repair as given in Paragraph 4./REPAIR 1

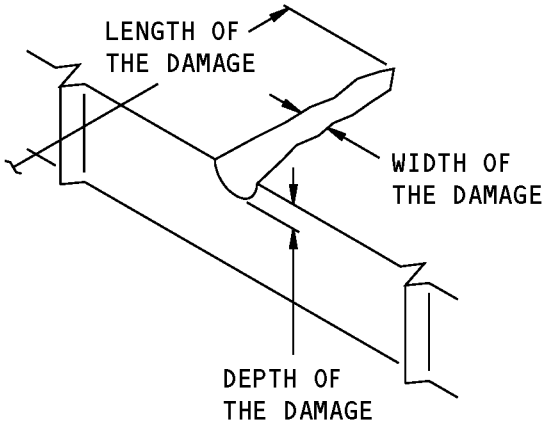
F. Put the balance horn fairing back to the initial condition, as applicable.

(1) Install the fairing if it was removed. Refer to 51-40-02 for the data about fastener installation.

G. Do a check of the elevator balance. Refer to 51-60-04

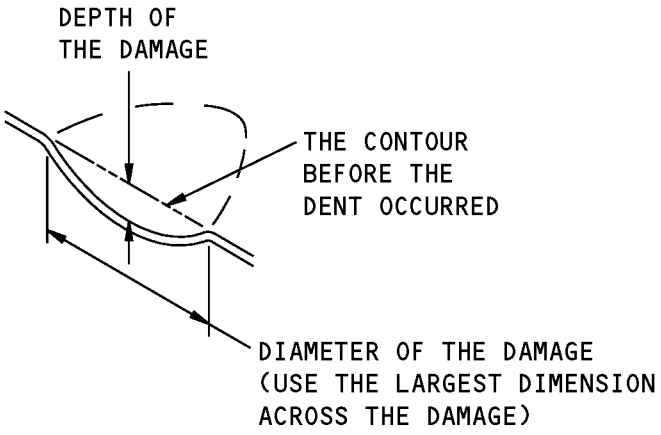


Elevator Balance Horn Fairing Location
Figure 201



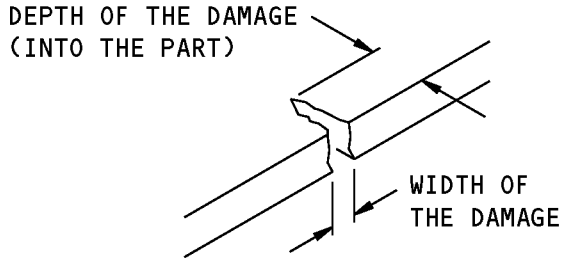
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Damage Definitions
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-60-04	ELEVATOR BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06, REPAIR GENERAL	Room Temperature Cure Repairs With Wet Layup Materials For Glass Fabric Reinforced Plastic Solid Laminates and Honeycomb Core Panels
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. If a dent is 2 inches (50.80 mm) in diameter or less, and has no fiber damage or delamination, then fill the dent with potting compound and apply a fiberglass patch as given in Repair 14 of 51-70-04.

B. If Paragraph 4.A./REPAIR 1 is not applicable, then refer to Table 201/REPAIR 1 for the repair data that is applicable to damage to the elevator balance horn fairing.

C. For repairs made with wet layup materials, do the staps that follow, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2D (D = fastener diameter) away from a fastener hole.

(3) Examine Category B repairs after each interval of 800 flight hours or more frequently. Refer to 737 NDT Part 1, 51-01-01 for the inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

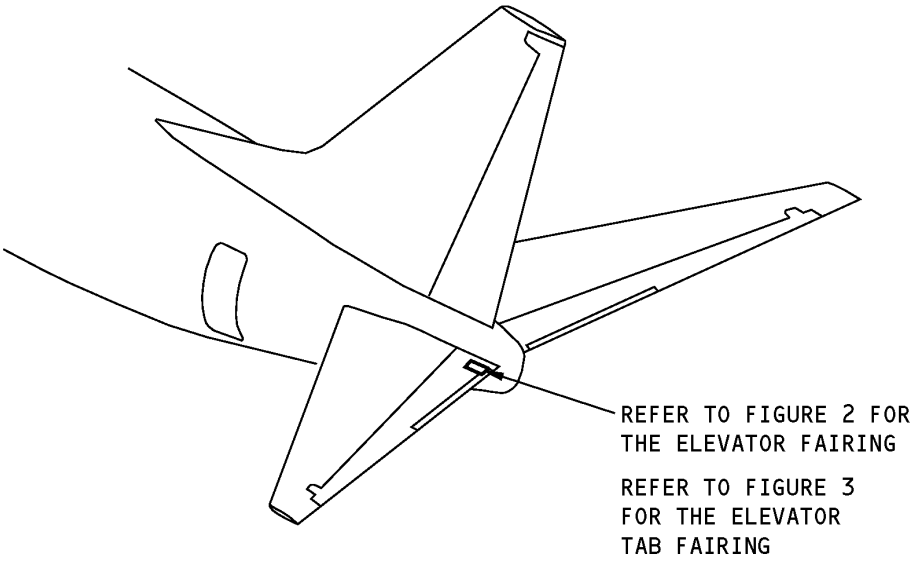
NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

D. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged.

Table 201:

REPAIR DATA FOR THE ELEVATOR BALANCE HORN FAIRING - 250°F (121°C) CURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE AND LIMITS	Contact Boeing for repair instructions	Damage that is a maximum of: -5.0 in. (127 mm) in diameter - 2.0 inches (50.80 mm) minimum clearance from: - other repairs - fastener holes - panel edges	Damage that is a maximum of: - 5 in. (127 mm) in diameter -2.0 inches (50.80 mm) minimum clearance from: - other repairs - fastener holes - panel edges	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	Not permitted	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D

IDENTIFICATION 1 - ELEVATOR FAIRING AND ELEVATOR TAB FAIRING SKIN

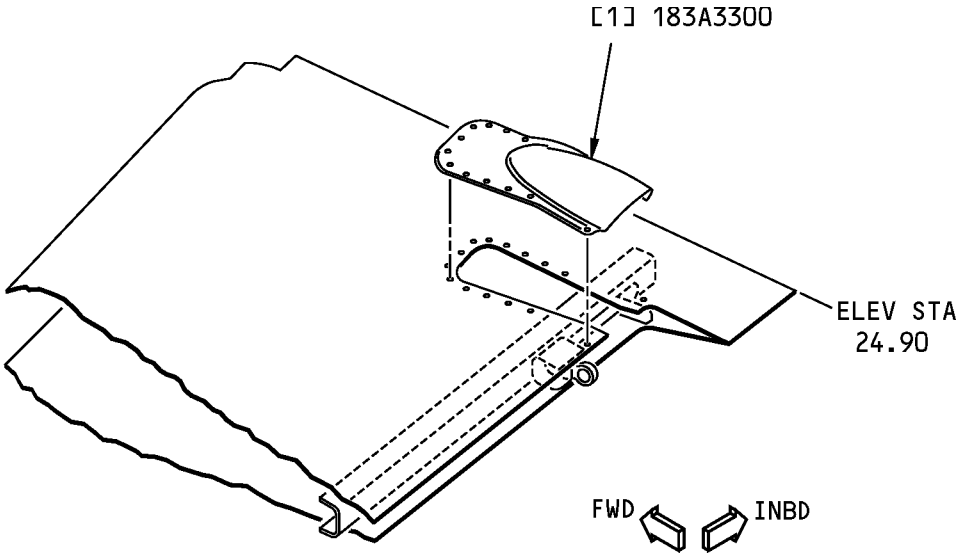


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Elevator Fairing Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A0001	Final Assembly - Product Collector
183A0001	Elevator Integration Functional Product Collector
183A0002	Elevator Integration Functional Product Collector
183A0101	Elevator Assembly Functional Product Collector
183A3000	Upper Skin Panel Installation - Elevator
183A3300	Fairing - Tab Control Rod, Elevator
183A8000	Tab Installation - Elevator
183A8100	Tab Assembly - Elevator
183A8500	Mast Arm Fairing - Tab, Elevator



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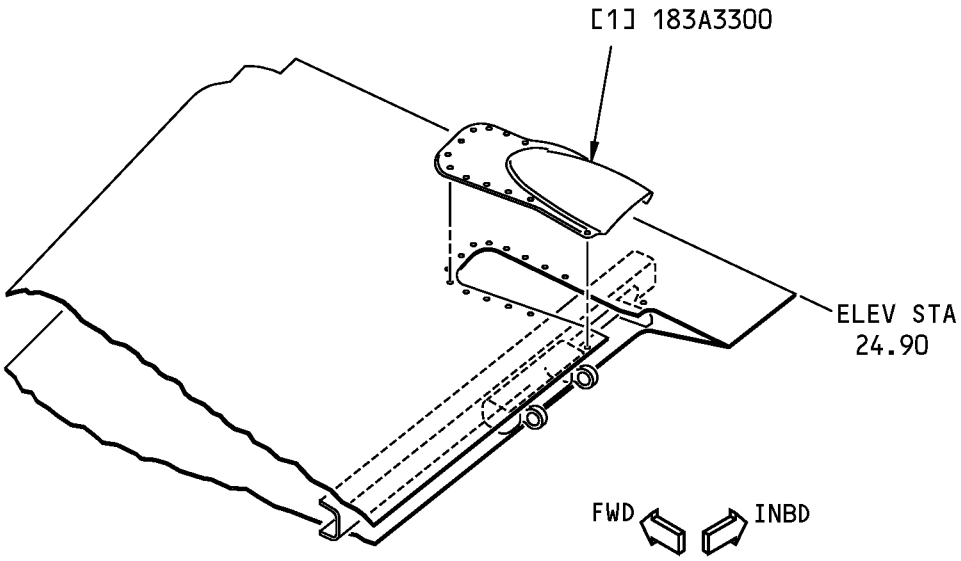
(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

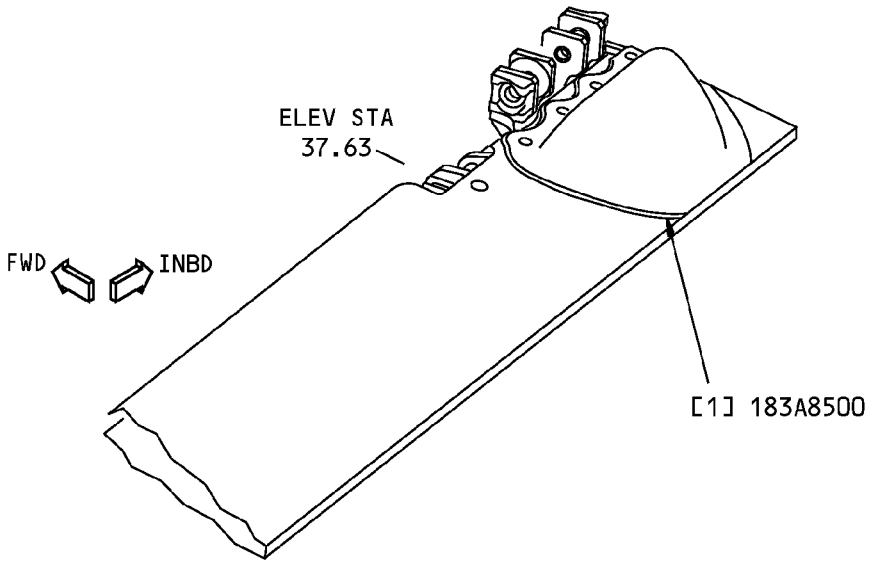
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Fairing Skin Identification
Figure 2

Table 2:

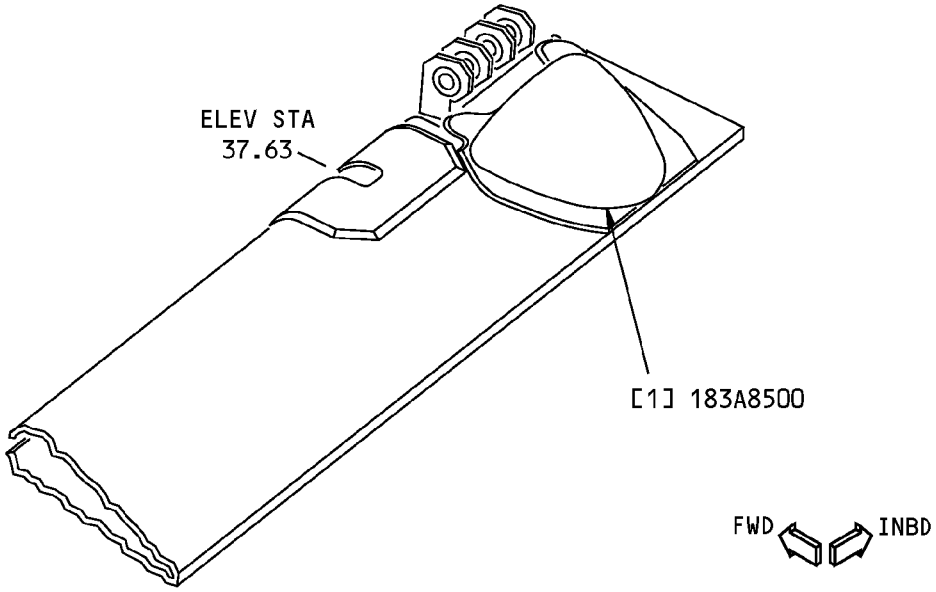
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Fairing - Tab Control Rod		Epoxy sheet molding compound as given in BMS 8-327, Type I-Lytex 9063	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)



NOTE: REFER TO TABLE 3 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

Elevator Tab Fairing Skin Identification
Figure 3

Table 3:

LIST OF MATERIALS FOR FIGURE 3				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Fairing - Mast Arm		Epoxy sheet molding compound as given in BMS 8-327, Type I-Lytex 9063	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

ALLOWABLE DAMAGE 1 - ELEVATOR FAIRING SKIN AND ELEVATOR TAB FAIRING SKIN

1. Applicability

A. This subject gives the allowable damage limits for the elevator tab control rod fairing and the elevator tab mast arm fairing as shown in Elevator Fairing Skin Allowable Damage, Figure 101/ALLOWABLE DAMAGE 1. Refer to Elevator Fairing Skin Allowable Damage, Figure 102/ALLOWABLE DAMAGE 1 for the elevator tab control rod fairing details. Refer to Elevator Tab Fairing Skin Allowable Damage, Figure 103/ALLOWABLE DAMAGE 1 for the elevator tab mast arm fairing details.

2. General

A. Do an inspection of the damaged area to find the length, width and depth of the damage. Boeing recommends that you do an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection procedures that are satisfactory to the operator can be used.

B. Refer to Definitions of the Damage Size, Figure 104/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

C. Remove contamination and water from the structure surface.

(1) Refer to 51-30-05 for possible sources of the tools and equipment you can use to remove the damage.

(2) Refer to 51-70-04 for the damage removal procedures.

D. Seal all permitted damage areas. Refer to the allowable damage limits. Seal the damage with one of the two methods that follow:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

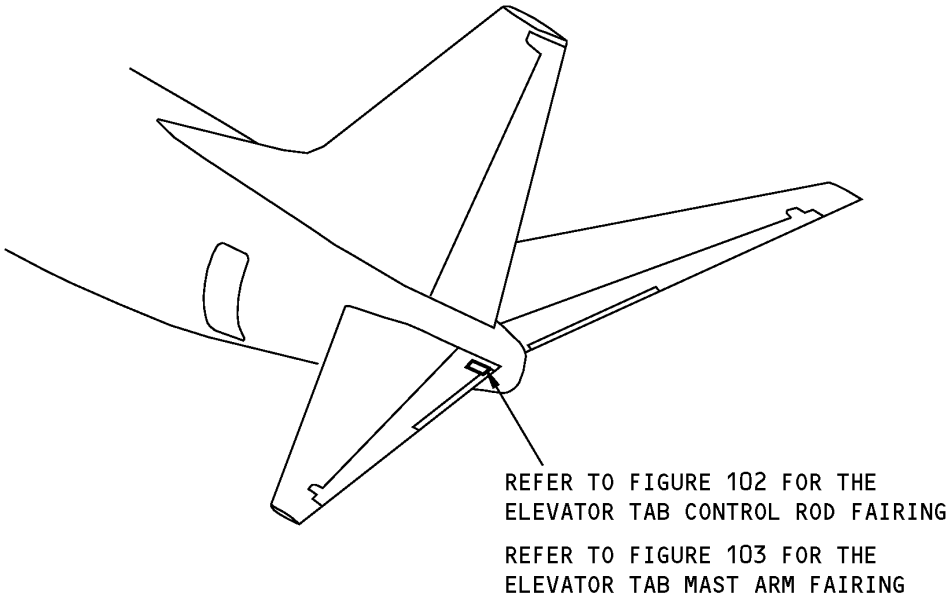
(c) Monitor and re-apply the tape as necessary at normal maintenance intervals.

(2) Make a permanent seal.

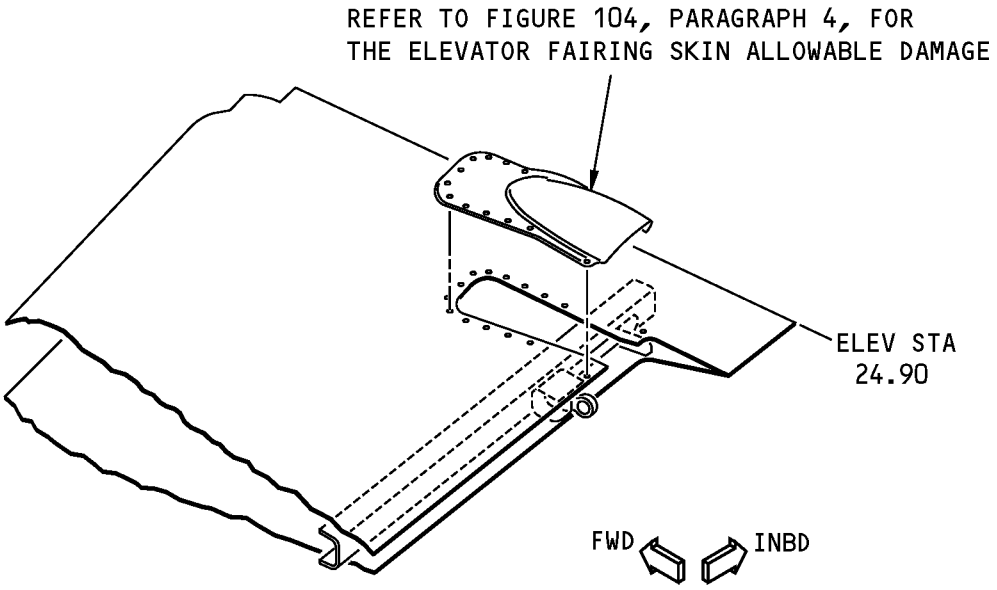
(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given 51-70-08.

(b) Apply one layer of BMS 10-79, Type 3 primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

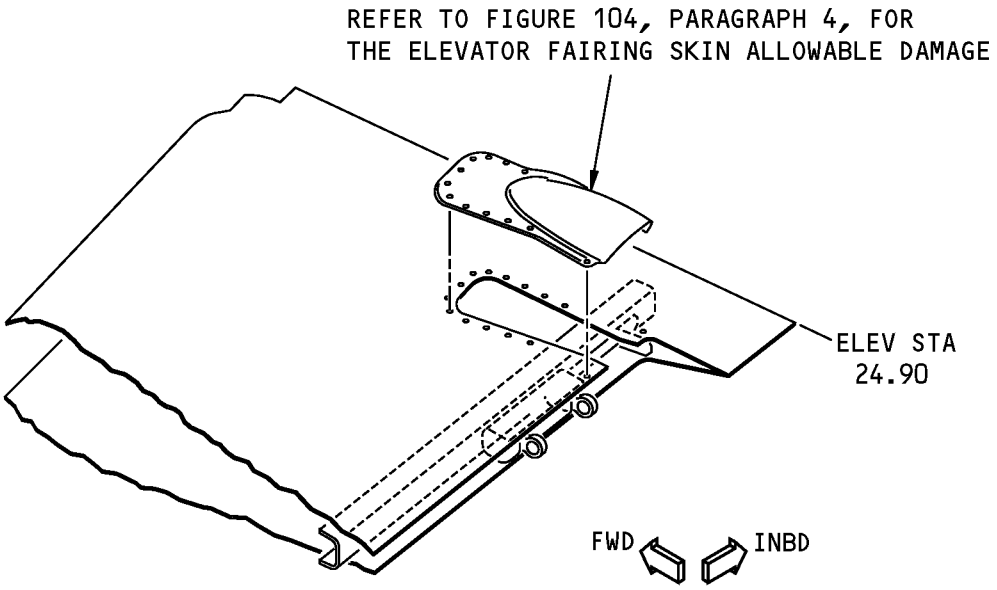


Elevator Fairing Skin Allowable Damage
Figure 101



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

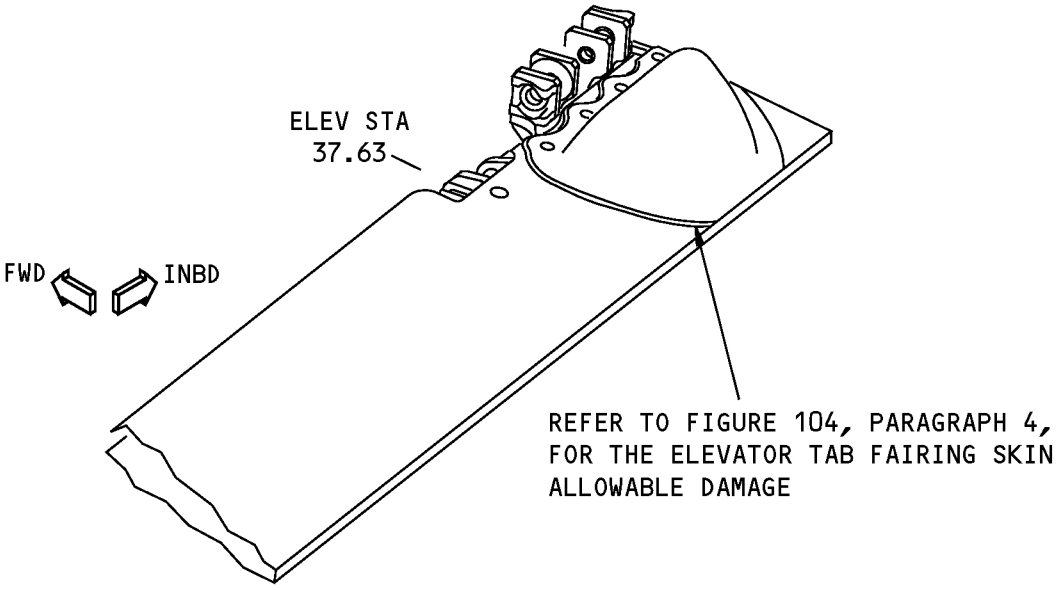
(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Fairing Skin Allowable Damage
Figure 102



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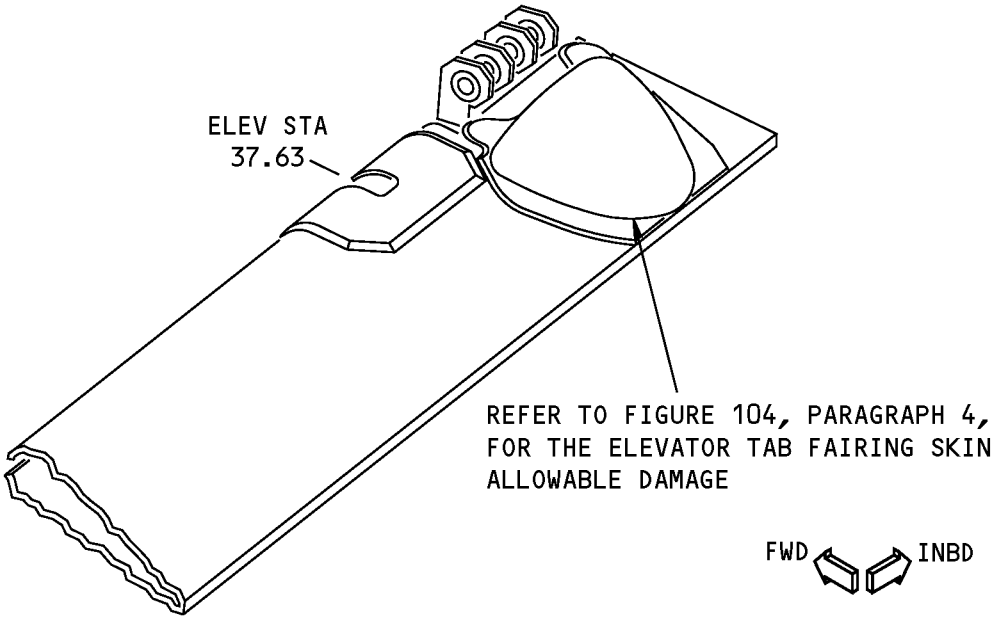
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)



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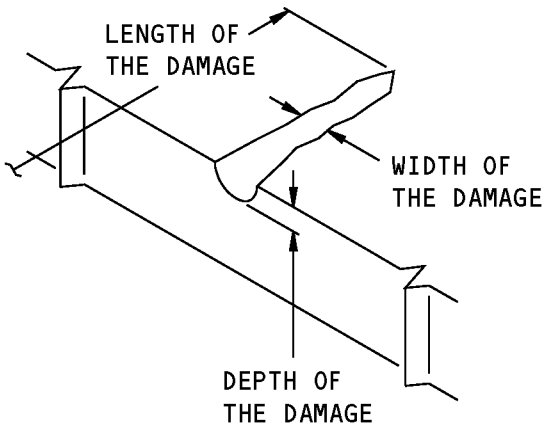
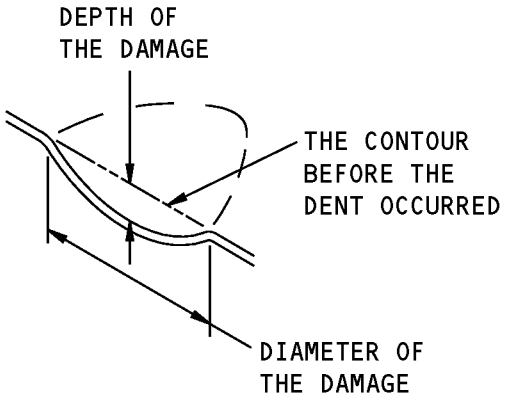
(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

Elevator Tab Fairing Skin Allowable Damage
Figure 103



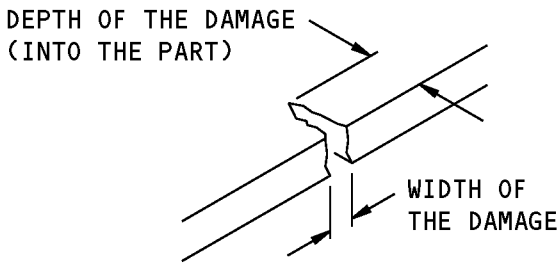
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 104

3. References

Reference	Title
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Nicks, Gouges, and Scratches are permitted if they are:

(1) A maximum of 0.01 inch in depth.

(2) A maximum of 3.00 inches in length for the elevator fairing skin.

(3) A maximum of 2.50 inches in length for the elevator tab fairing skin.

(4) A minimum of 1.00 inches (edge to edge) from other damage, a hole or part edge.

B. Dents are permitted if they are:

(1) A maximum of 0.50 inch diameter.

(2) A maximum of 0.025 inch in depth.

NOTE: Use the limits for holes and punctures if the dent damage is more than 0.025 inch in depth.

(3) A minimum (edge to edge) of 4D (D = dimension of the damage) from other damage, a hole or part edge.

C. Holes and Punctures are permitted if they are:

(1) A maximum diameter of 0.50 inch.

(2) A minimum (edge to edge) of 4D (D = dimension of the damage) from other damage, from a hole or part edge.

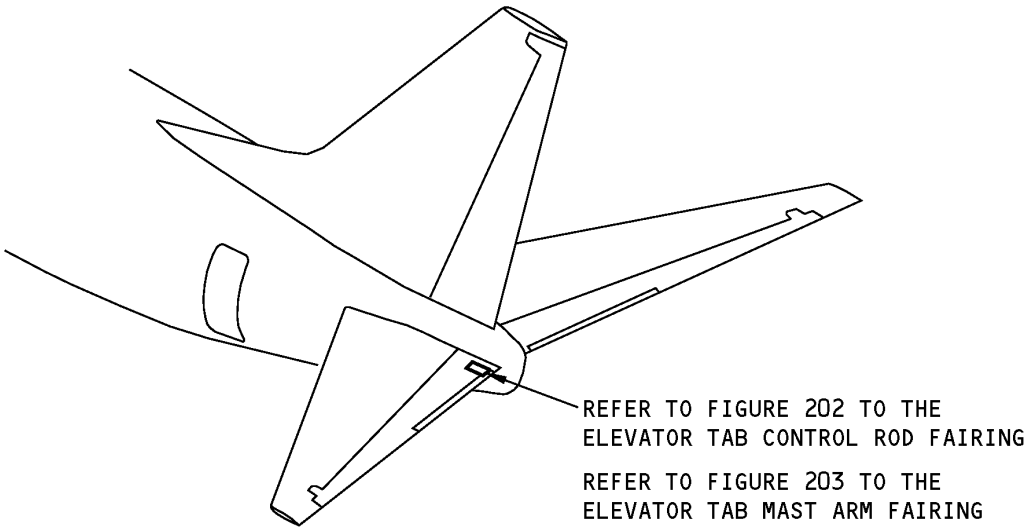
D. Edge damage is permitted if it is:

(1) A maximum of 0.10 inch depth.

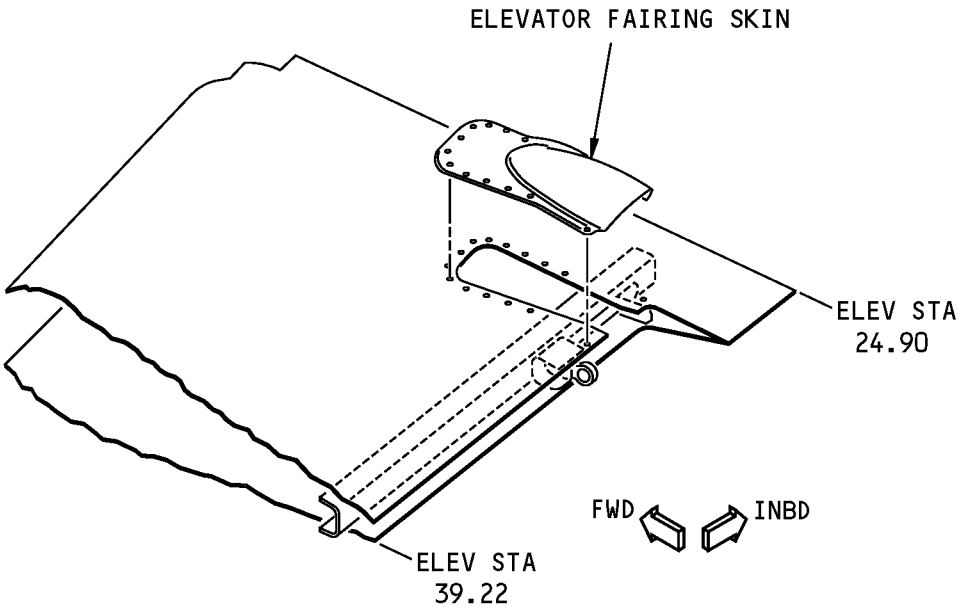
(2) A maximum of 0.25 inch width.

(3) A minimum of 1.00 inch (edge to edge) away from other damage, a fastener hole or part edge.

REPAIR 1 - ELEVATOR FAIRING AND ELEVATOR TAB FAIRING SKIN

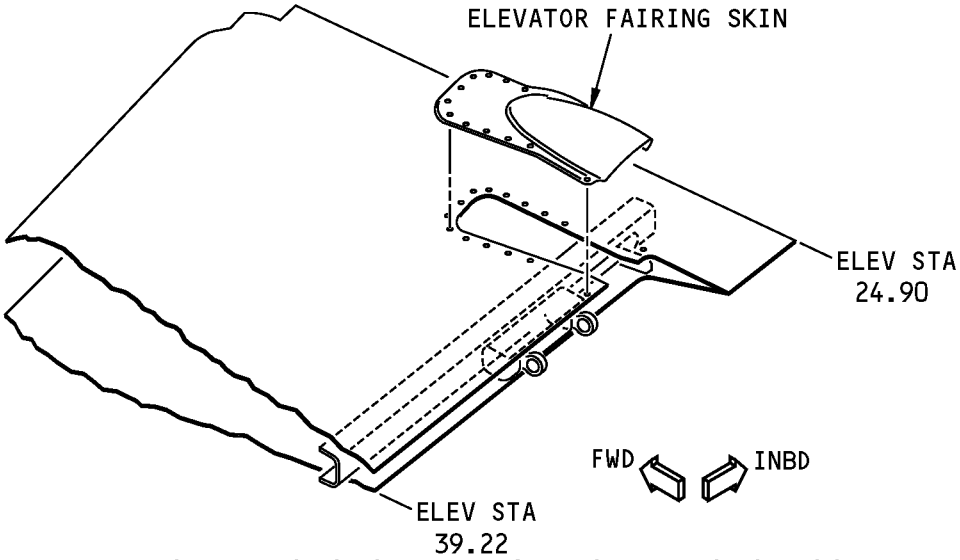


Elevator Fairing Skin Repair
Figure 201



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

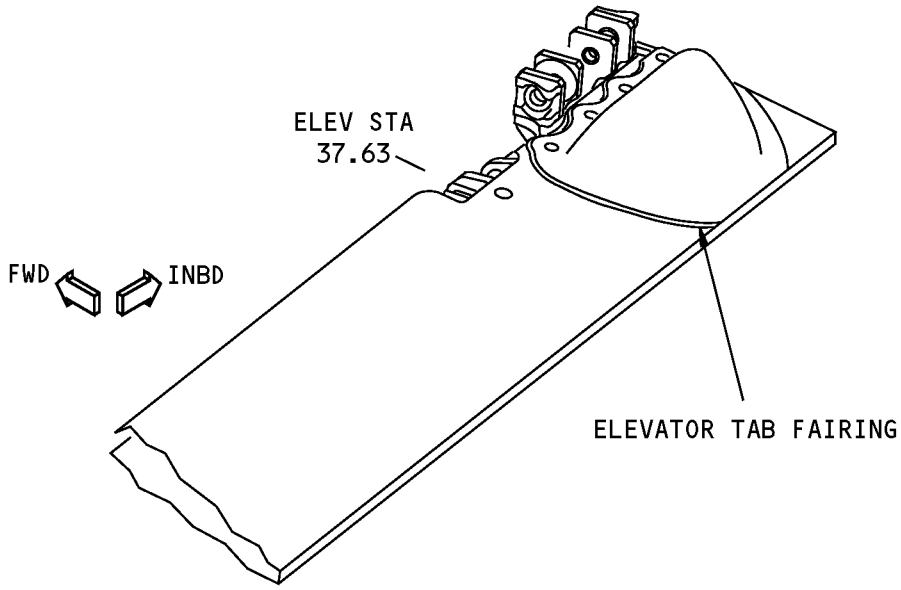


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

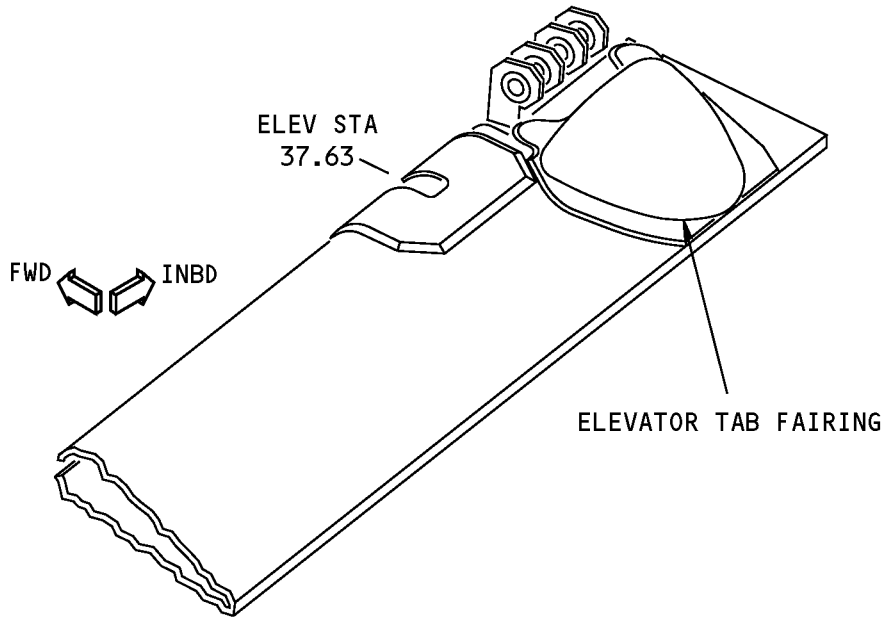
NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

Elevator Fairing Skin Repair
Figure 202



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)



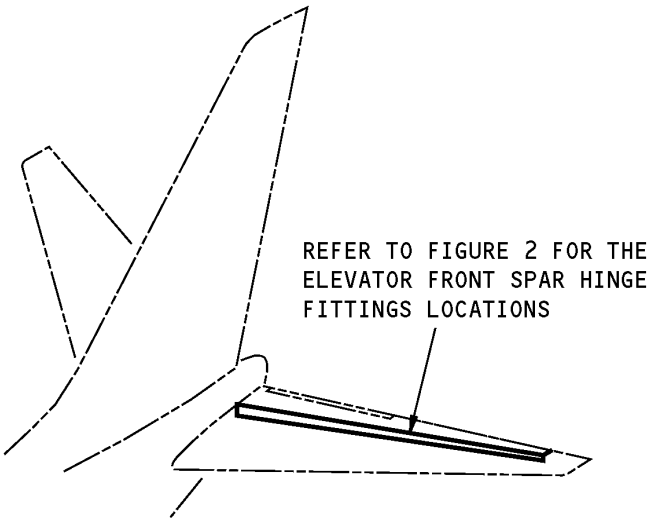
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

Elevator Tab Fairing Skin Repair
Figure 203

IDENTIFICATION 1 - ELEVATOR FRONT SPAR HINGE FITTINGS



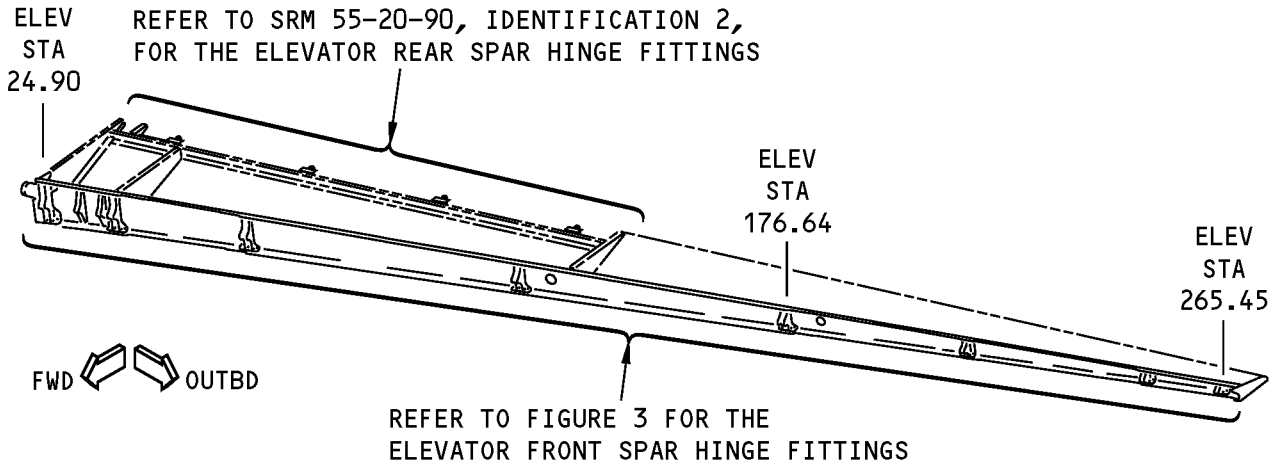
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Elevator Front Spar Hinge Fittings
Figure 1

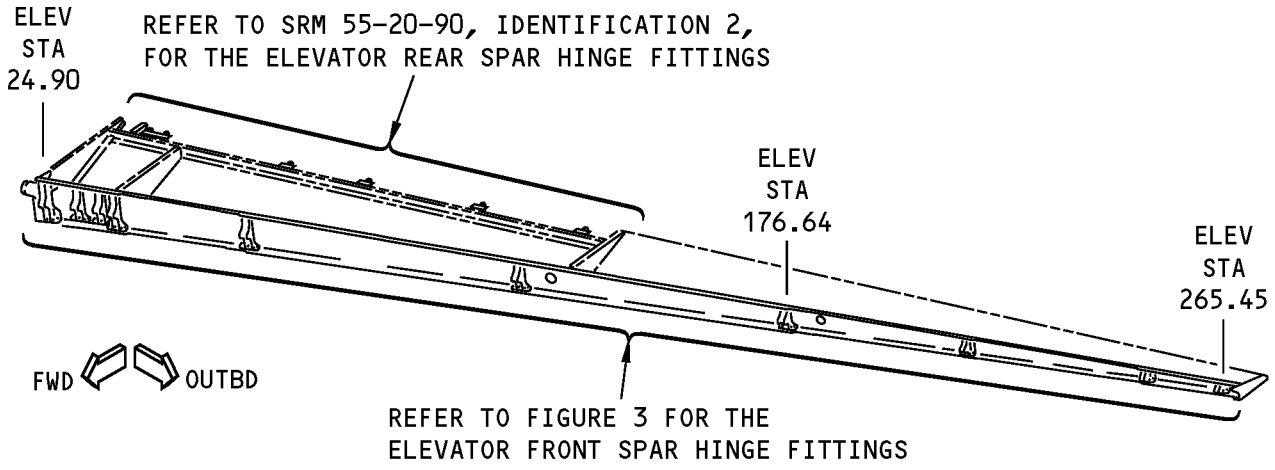
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A1000	Elevator Front Spar Assembly
183A1310	Elevator Hinge Fitting Assembly
183A1320	Elevator Hinge Fitting Assembly
183A1330	Elevator Hinge Fitting Assembly
183A1340	Elevator Hinge Fitting Assembly
183A1350	Elevator Hinge Fitting Assembly
183A1360	Elevator Hinge Fitting Assembly
183A1370	Elevator Hinge Fitting Assembly



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

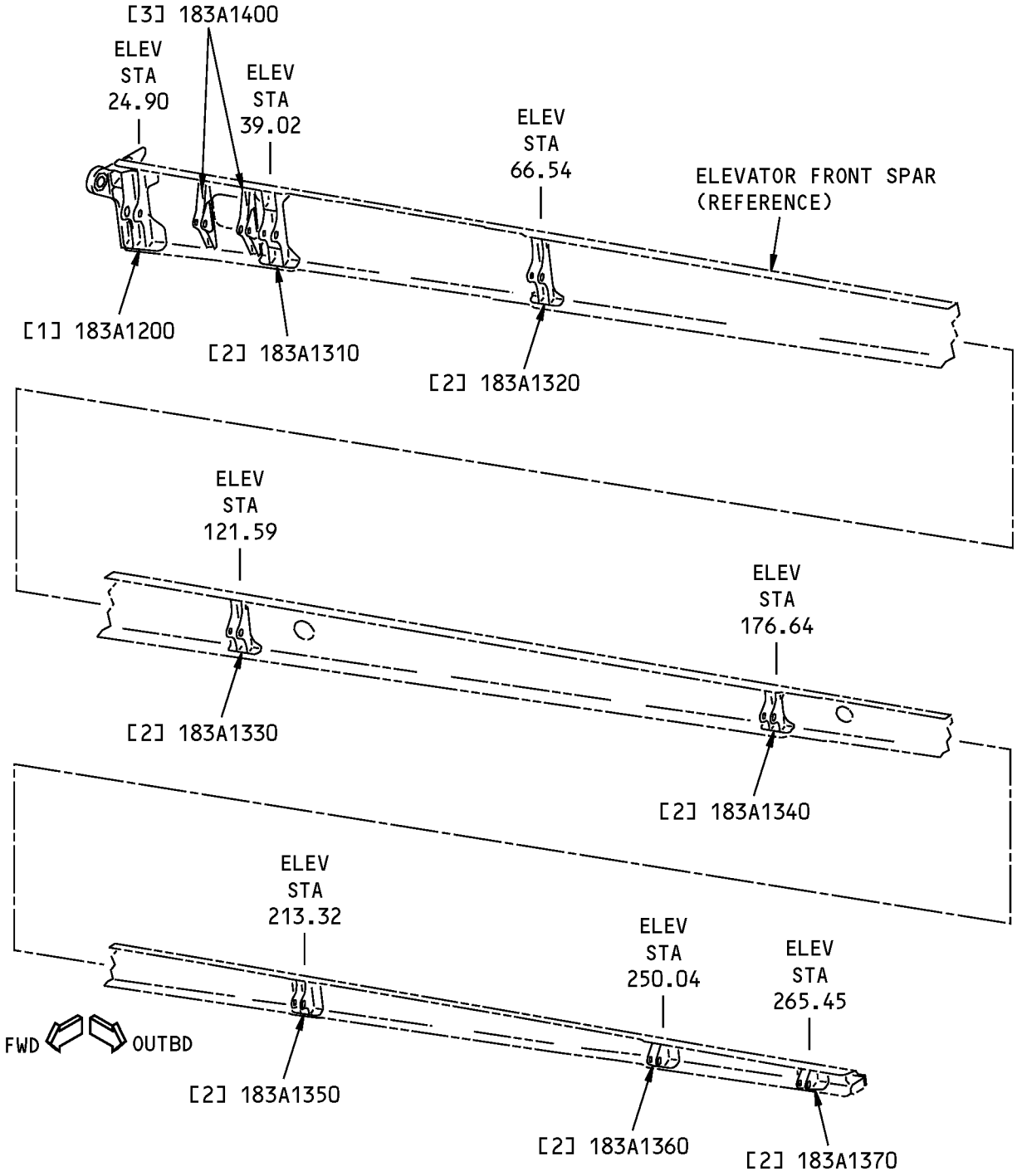
(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

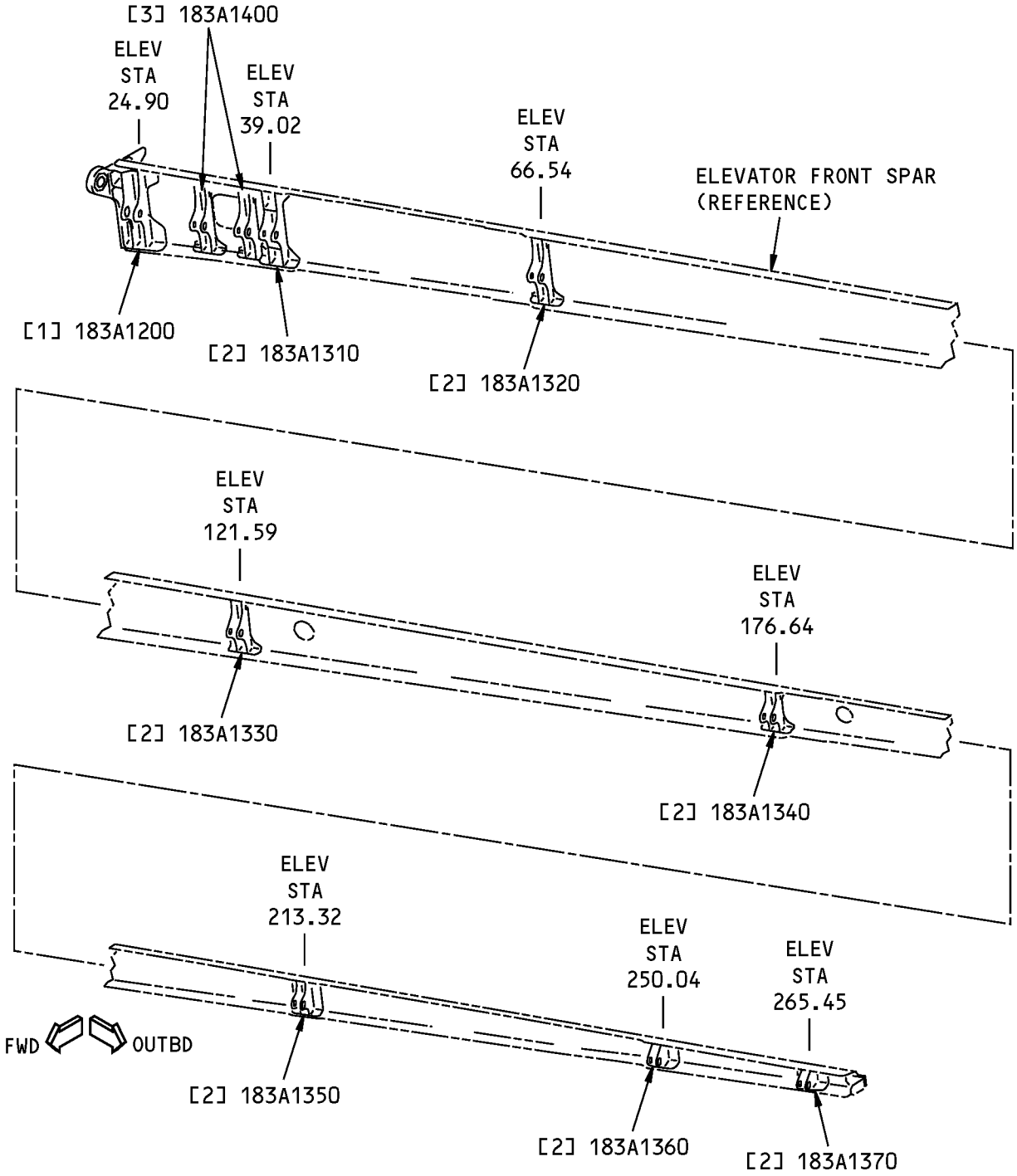
Elevator Front Spar Hinge Fittings Location
Figure 2



(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Elevator Front Spar Hinge Fittings Identification
Figure 3 (Sheet 1 of 2)



(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

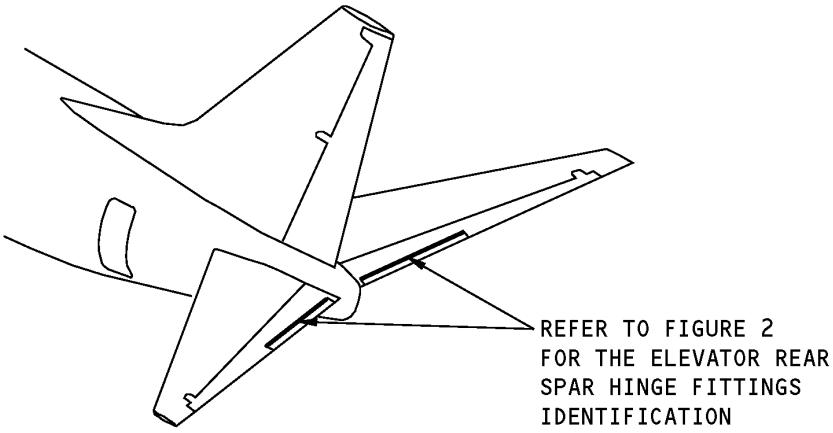
Elevator Front Spar Hinge Fittings Identification
Figure 3 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Mast Arm Fitting Assembly			
	Mast Arm Fitting		7050-T7451 plate as given in BMS 7-323	
	Failsafe Strap		7075-T7351 plate	
[2]	Elevator Hinge Fitting Assembly		7050-T7451 plate as given in BMS 7-323	
[3]	Tab Control Bracket Assembly			
	Bracket		7075-T7351 plate	
	Bracket Doubler	0.09 (2.29)	7075-T6 sheet	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - ELEVATOR REAR SPAR HINGE FITTINGS



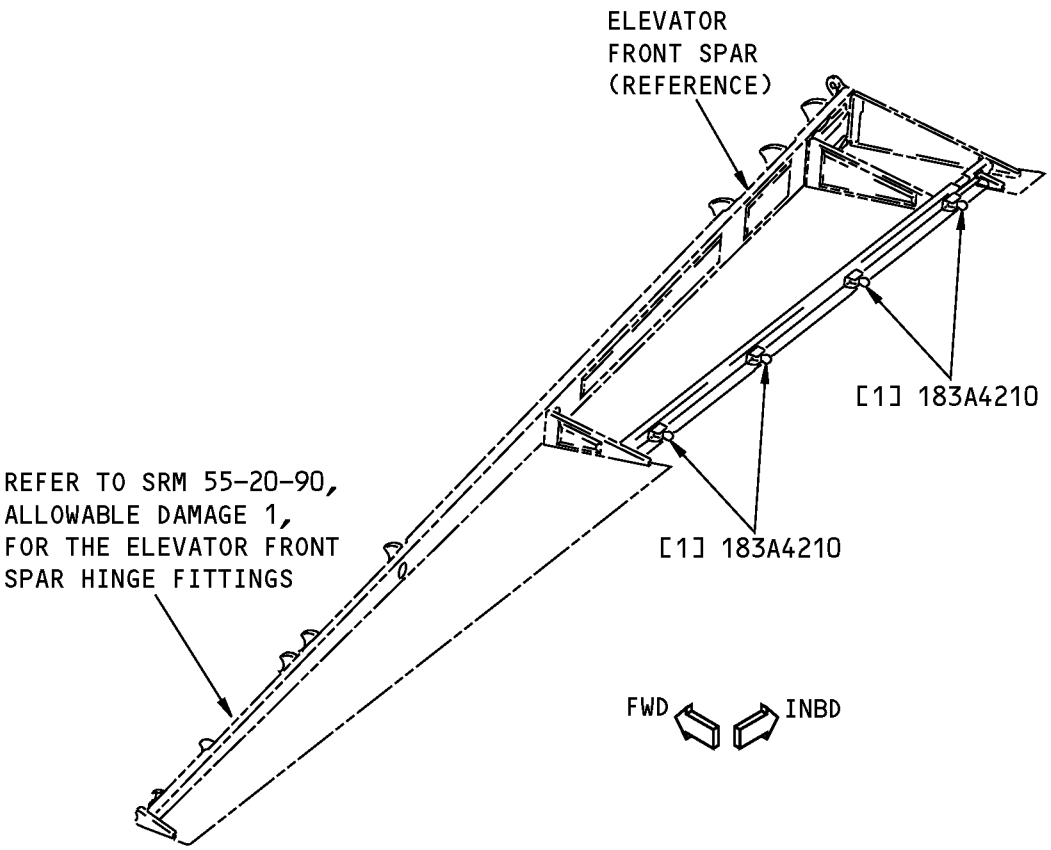
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Elevator Rear Spar Hinge Fittings Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A4000	Elevator Rear Spar Assembly
183A4210	Elevator Rear Spar Hinge Fitting

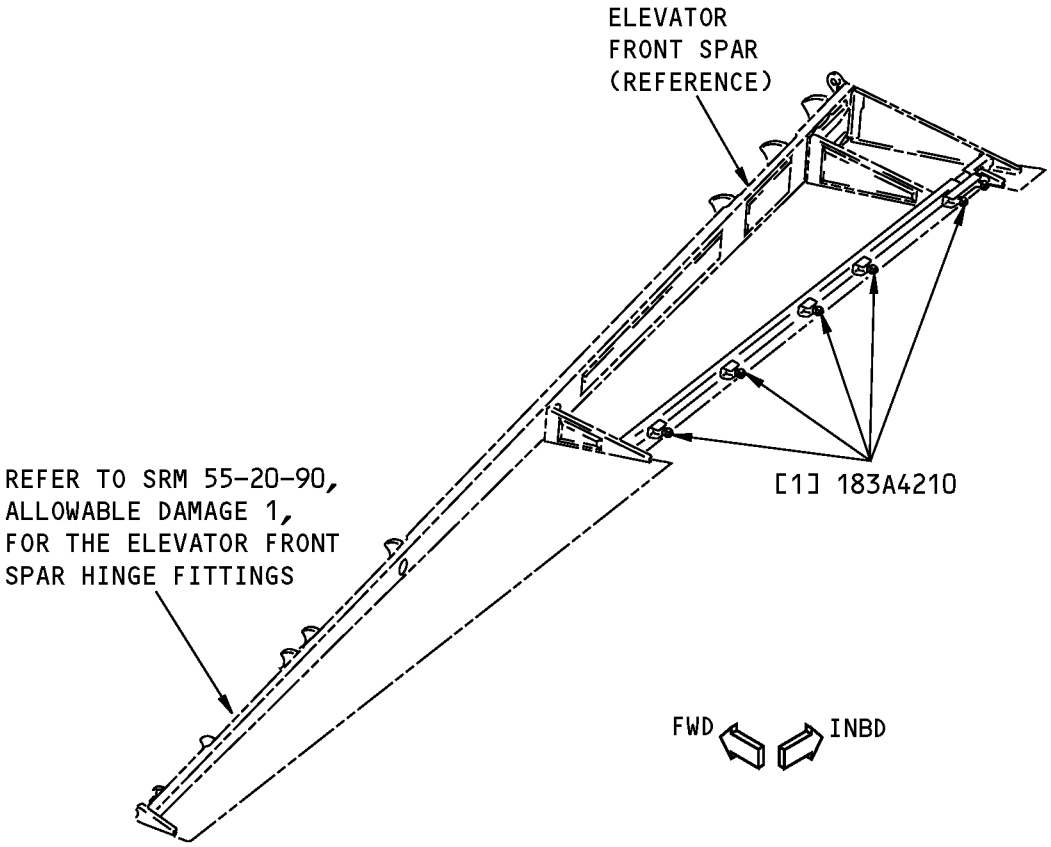


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

A

Elevator Rear Spar Hinge Fitting Locations
Figure 2 (Sheet 1 of 2)



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

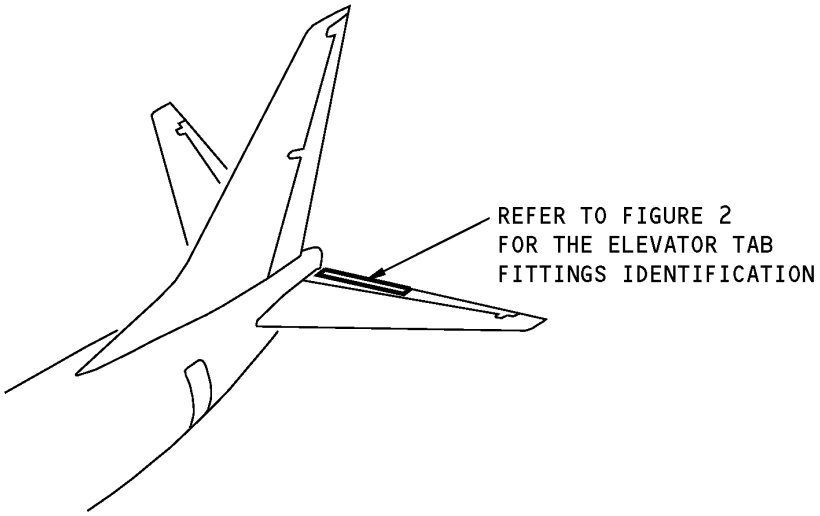
B

Elevator Rear Spar Hinge Fitting Locations
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2			
ITEM	**DESCRIPTION**	**MATERIAL**	**EFFECTIVITY**
[1]	Hinge Fitting	7075-T7351 plate as given in QQ-A-250/12	For airplane line numbers 1 though 1174
		7050-T7451 plate as given in BMS 7-323, Type III	For airplane line numbers 1175 and on

IDENTIFICATION 3 - ELEVATOR TAB FITTINGS



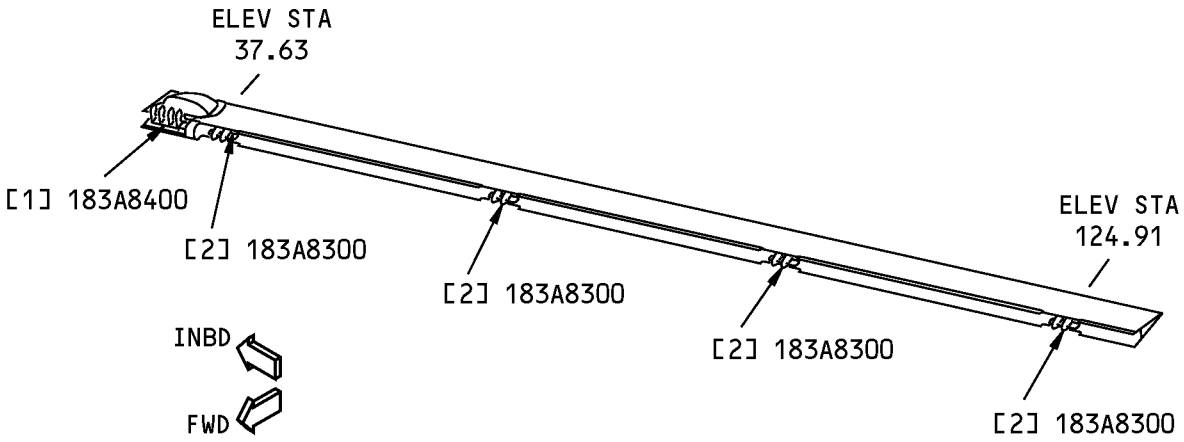
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Elevator Tab Fittings Location
Figure 1

Table 1:

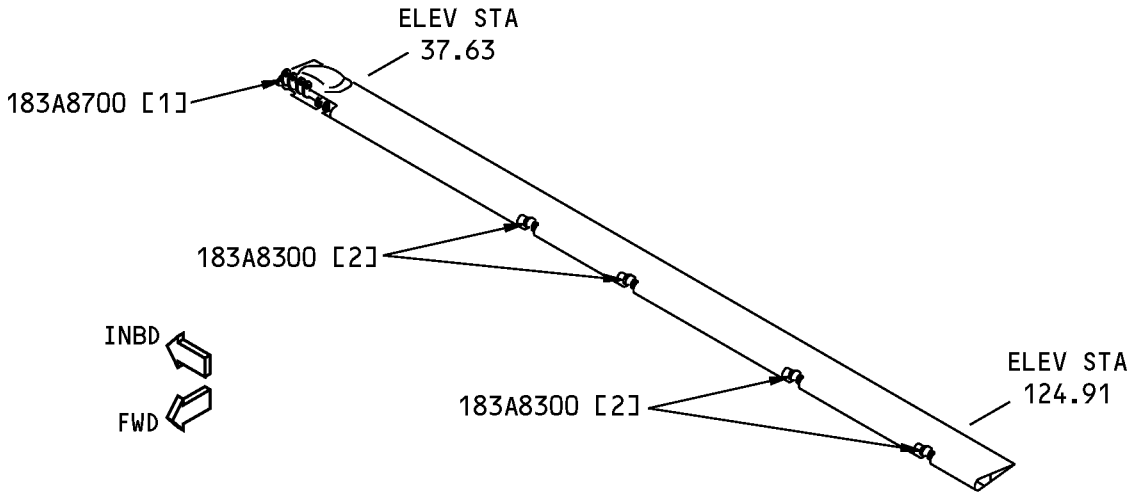
REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
183A8000	Elevator Tab Installation
183A8100	Elevator Tab Assembly



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Tab Fittings Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T**	**MATERIAL**	**EFFECTIVITY**
[1]	Hinge/Mast Arm		7050-T7451 plate as given in BMS 7-323, Type III	
[2]	Hinge Fitting		7075-T7351 plate as given in QQ-A-250/12	For cum lines 1 through 1174
			7050-T7451 plate as given in BMS 7-323, Type III	For cum lines 1175 and on

ALLOWABLE DAMAGE 1 - ELEVATOR FRONT SPAR HINGE FITTINGS

1. Applicability

A. This subject gives the allowable damage limits for the elevator front spar hinge fittings shown in Elevator Front Spar Hinge Fittings Location, Figure 101/ALLOWABLE DAMAGE 1.

2. General

A. Refer to Paragraph 4./ALLOWABLE DAMAGE 1 for the allowable damage limits.

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the investigation and removal of damage.

(2) Refer to 51-30-03 for possible sources of non-metallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) Put a surface finish of 125 microinches Ra or better on the reworked areas.

C. After you remove the damage, do the steps that follow:

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

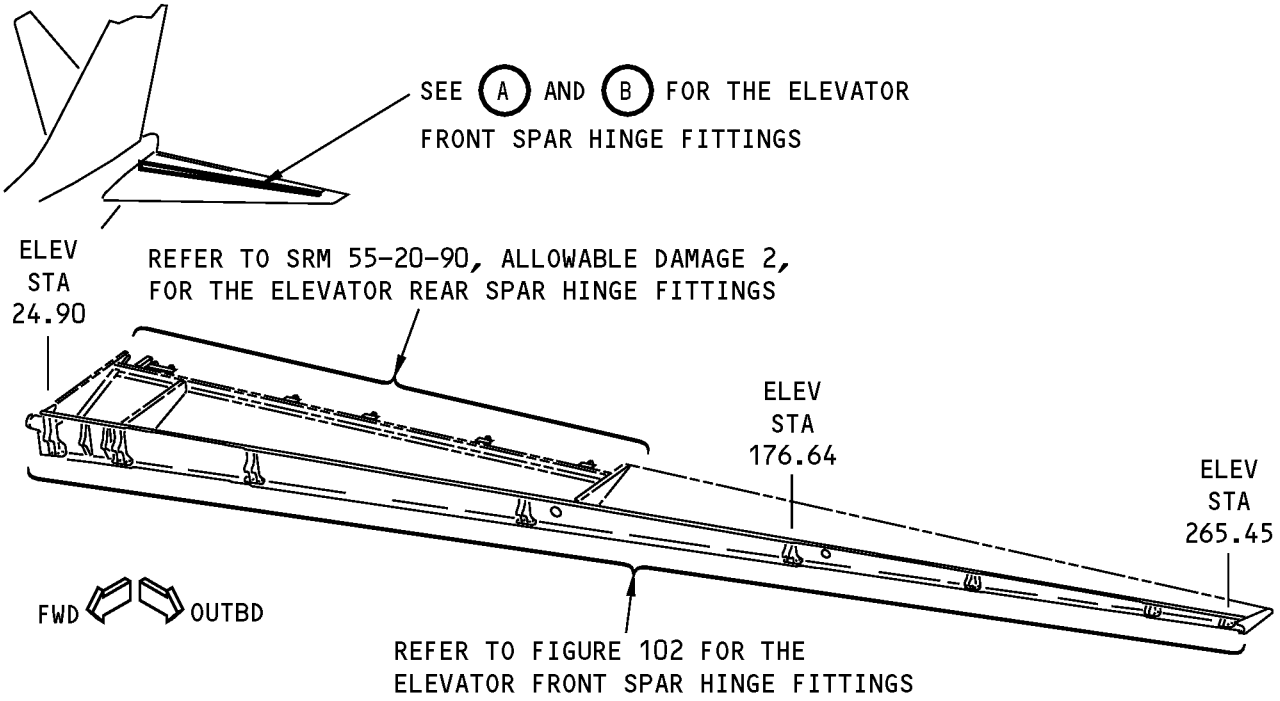
(1) Flap peen or shot peen the reworked areas of the parts, but not the inner surfaces of the lug bores.

(a) Refer to 51-20-06 for the shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for the flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the reworked areas. Refer to 51-20-01.

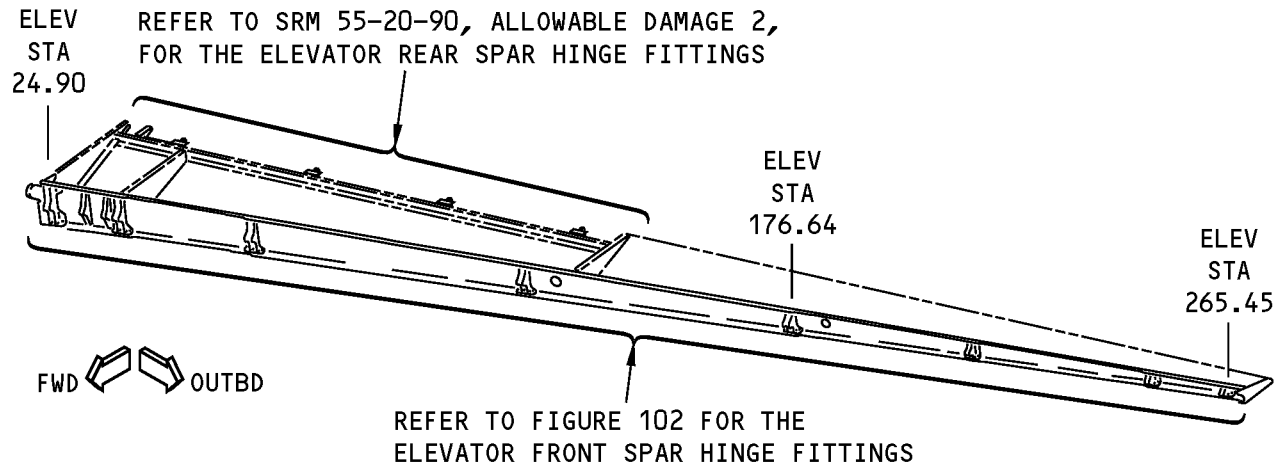
(3) Apply a layer of BMS 10-79, Type III primer to the reworked areas. Refer to SOPM 20-44-04.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

A

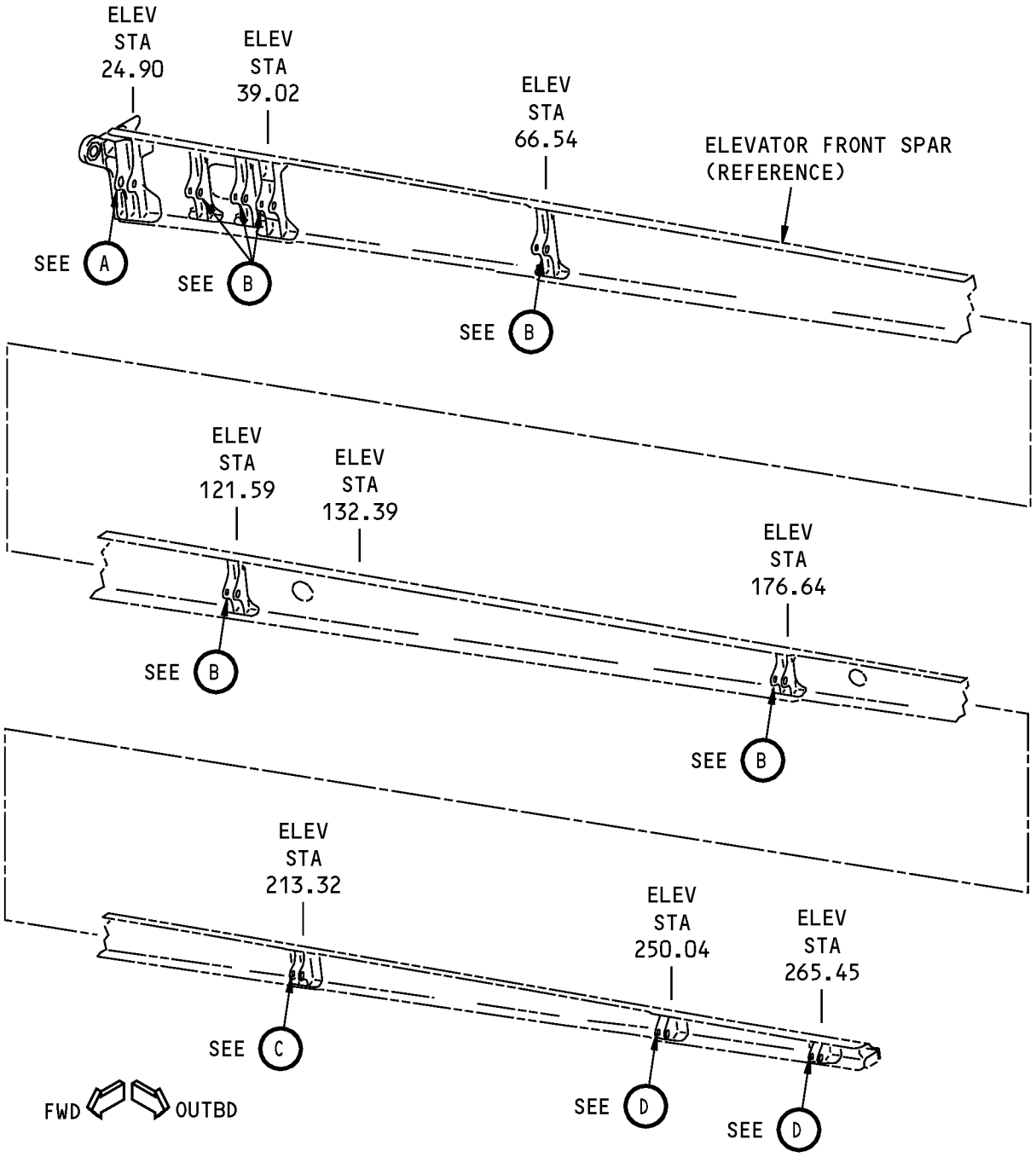


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

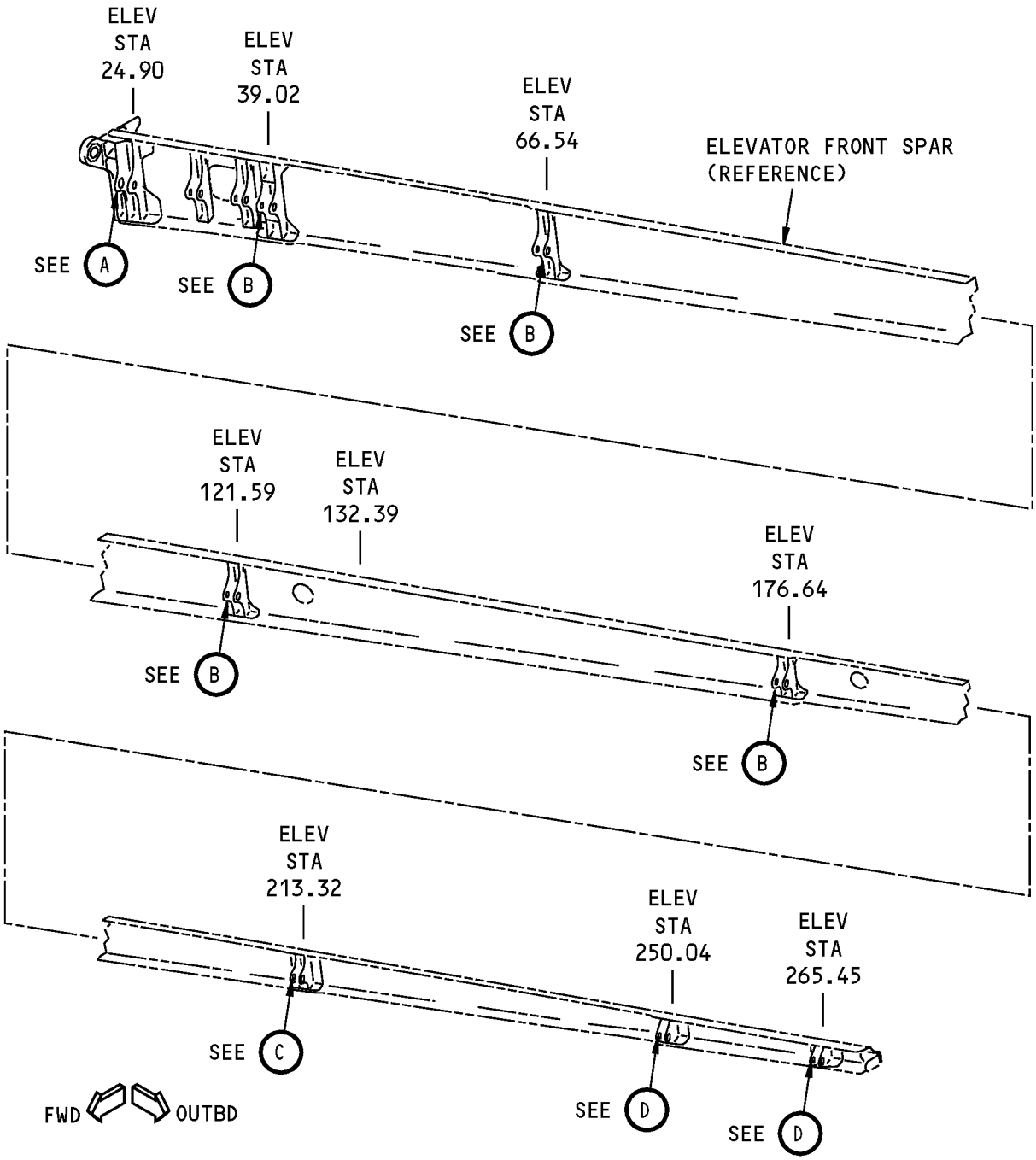
B

Elevator Front Spar Hinge Fittings Location
Figure 101



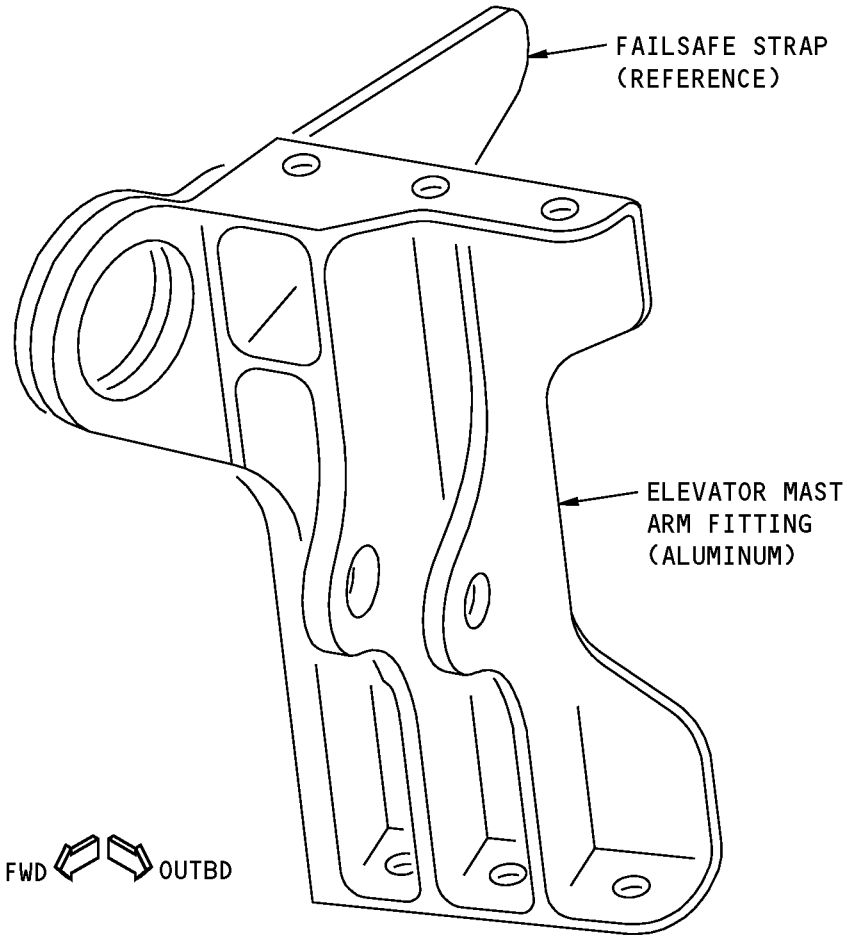
(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Front Spar Hinge Fittings
Figure 102 (Sheet 1 of 5)

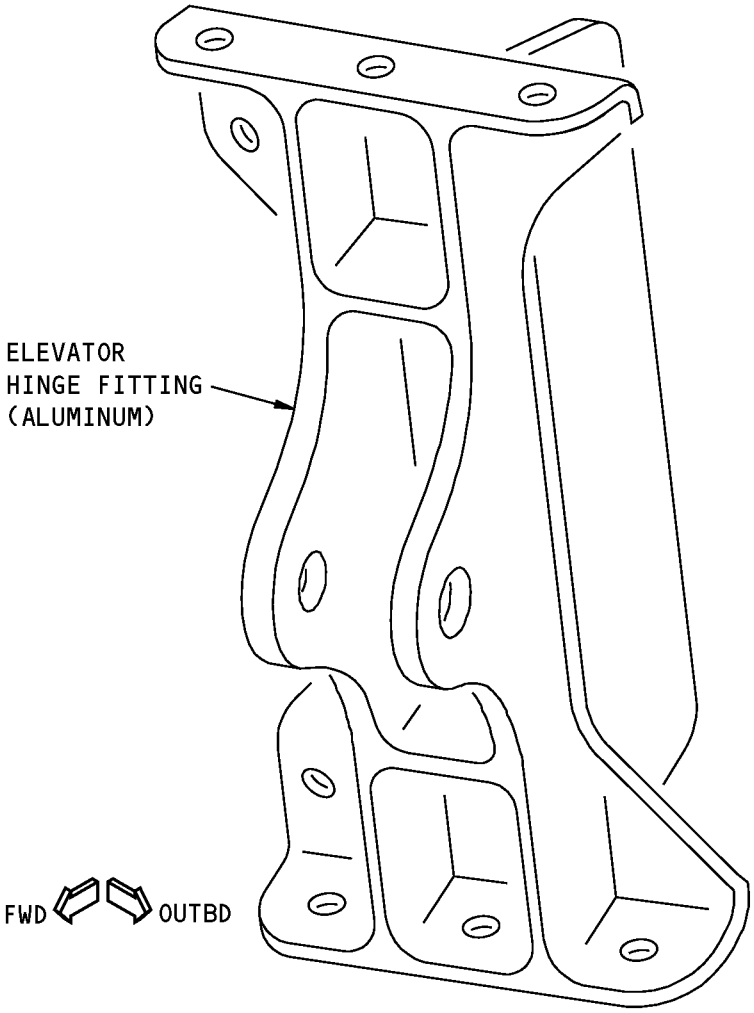


(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

Elevator Front Spar Hinge Fittings
Figure 102 (Sheet 2 of 5)

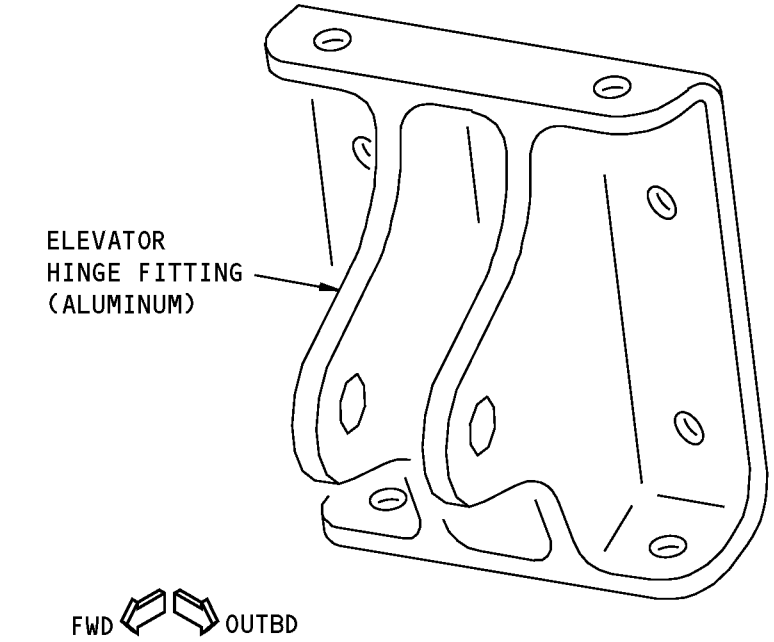


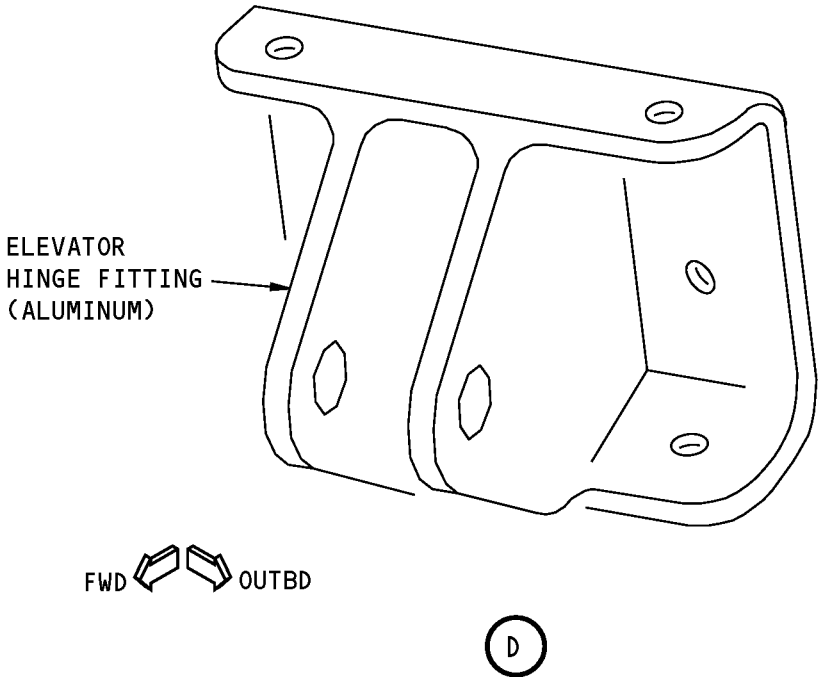
Elevator Front Spar Hinge Fittings
Figure 102 (Sheet 3 of 5)



B

Elevator Front Spar Hinge Fittings
Figure 102 (Sheet 4 of 5)





Elevator Front Spar Hinge Fittings
Figure 102 (Sheet 5 of 5)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Mast Arm Fitting and Elevator Hinge Fittings (Except at ELEV STA 39.02 and ELEV STA 66.54)

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Elevator Hinge Fittings (ELEV STA 39.02 and ELEV STA 66.54)

(1) Cracks:

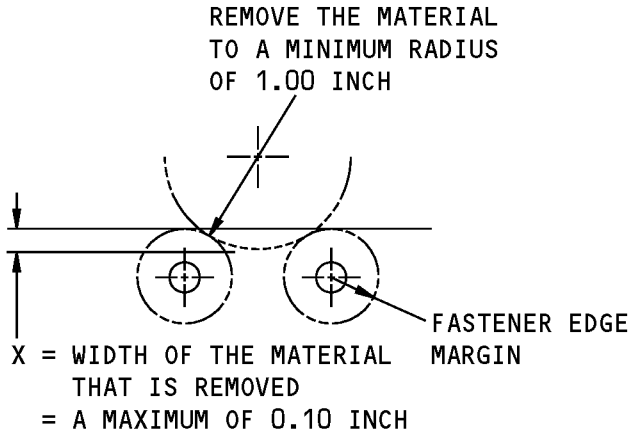
(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 1, Details A, B, and E.

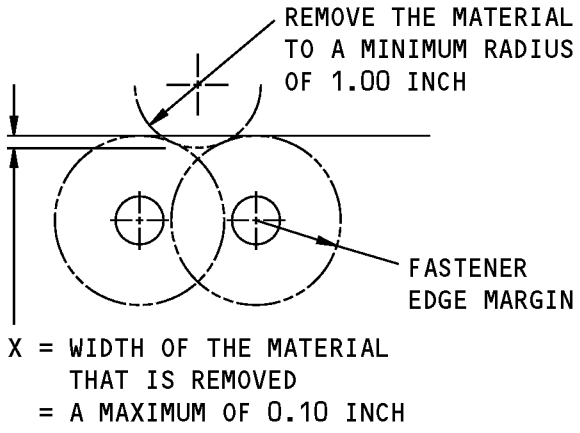
(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.



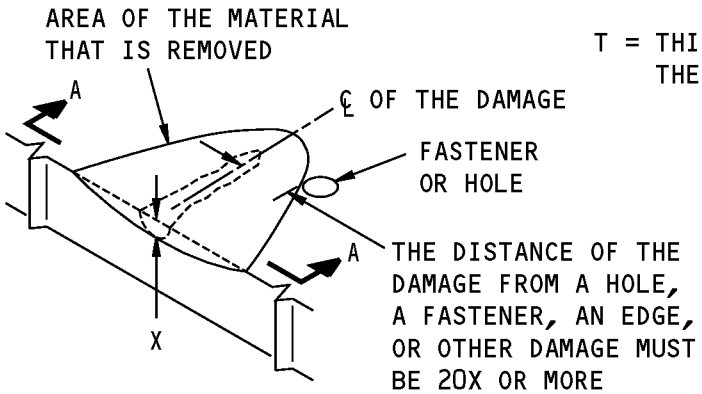
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

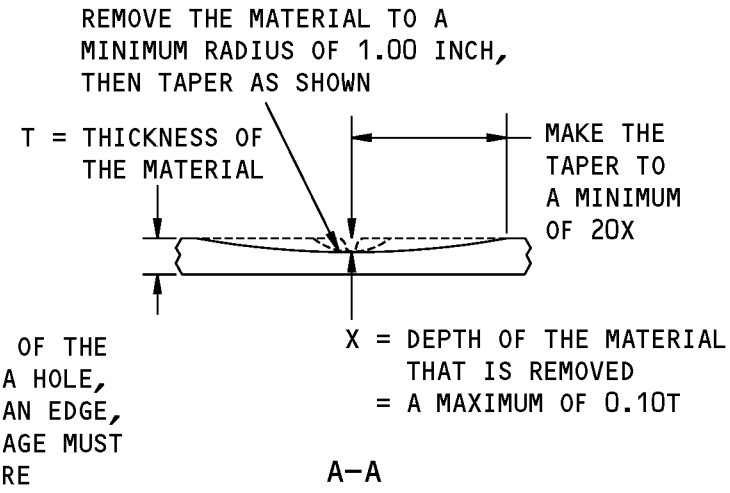
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

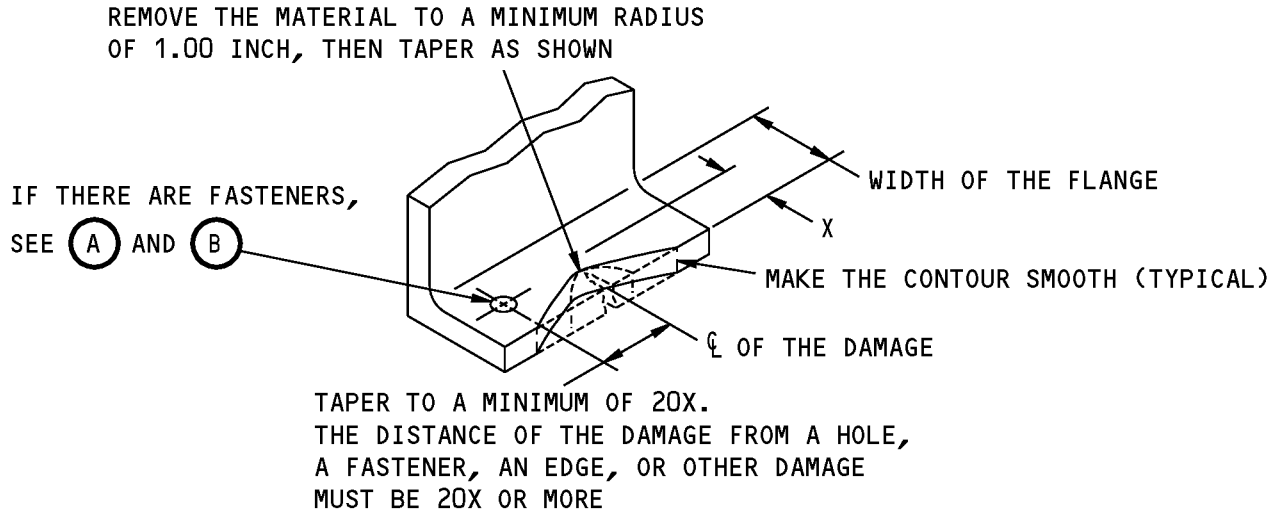




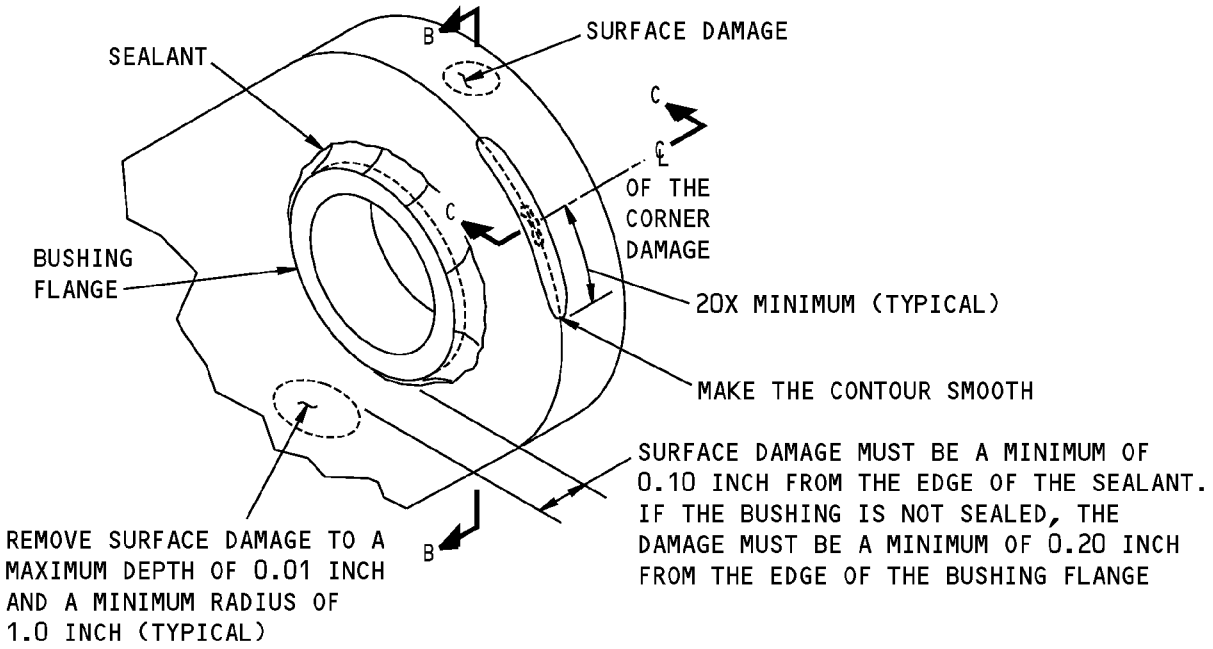
REMOVAL OF DAMAGED MATERIAL ON A SURFACE

C

Allowable Damage Limits
Figure 103 (Sheet 1 of 3)



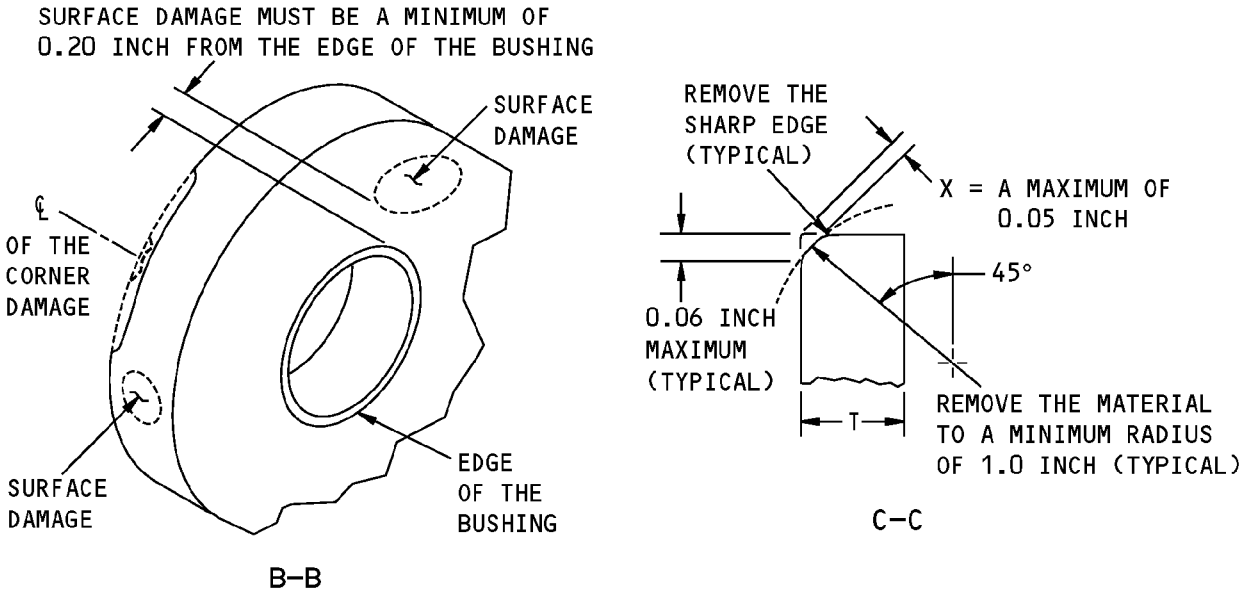
Allowable Damage Limits
Figure 103 (Sheet 2 of 3)



NOTE: DAMAGED SEALANT IS NOT PERMITTED. IF THE SEALANT IS DAMAGED, LOOK FOR MIGRATION OR ROTATION OF THE BUSHING. IF THERE IS NO MIGRATION, ROTATION, OR CORROSION, REMOVE THE DAMAGED SEALANT AND APPLY A NEW FILLET SEAL.

REMOVAL OF SURFACE AND EDGE DAMAGE FROM A LUG THAT HAS A BUSHING

(E)



Allowable Damage Limits
Figure 103 (Sheet 3 of 3)

ALLOWABLE DAMAGE 2 - ELEVATOR REAR SPAR HINGE FITTINGS

1. Applicability

A. This subject gives the allowable damage limits for the elevator rear spar hinge fittings shown in Figure 101.

2. General

A. Refer to Paragraph 4./ALLOWABLE DAMAGE 2 for the allowable damage limits.

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the investigation and removal of damage.

(2) Refer to 51-30-03 for possible sources of non-metallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) Put a surface finish of 125 microinches Ra or better on the reworked areas.

C. After you remove the damage, do the steps that follow:

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

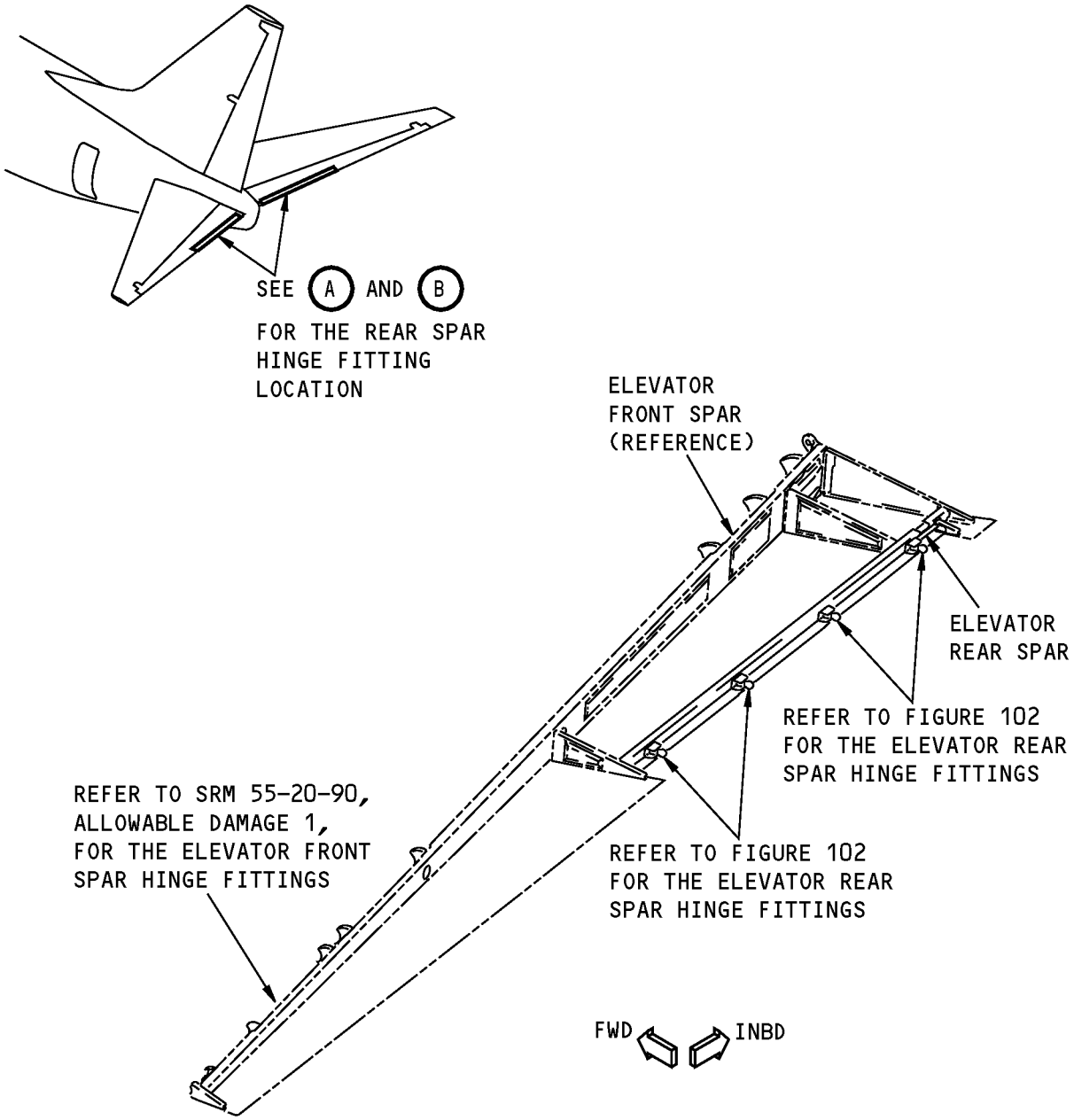
(1) Flap peen or shot peen the reworked areas of the parts, but not the inner surfaces of the lug bores.

(a) Refer to 51-20-06 for the shot peen intensity and shot number.

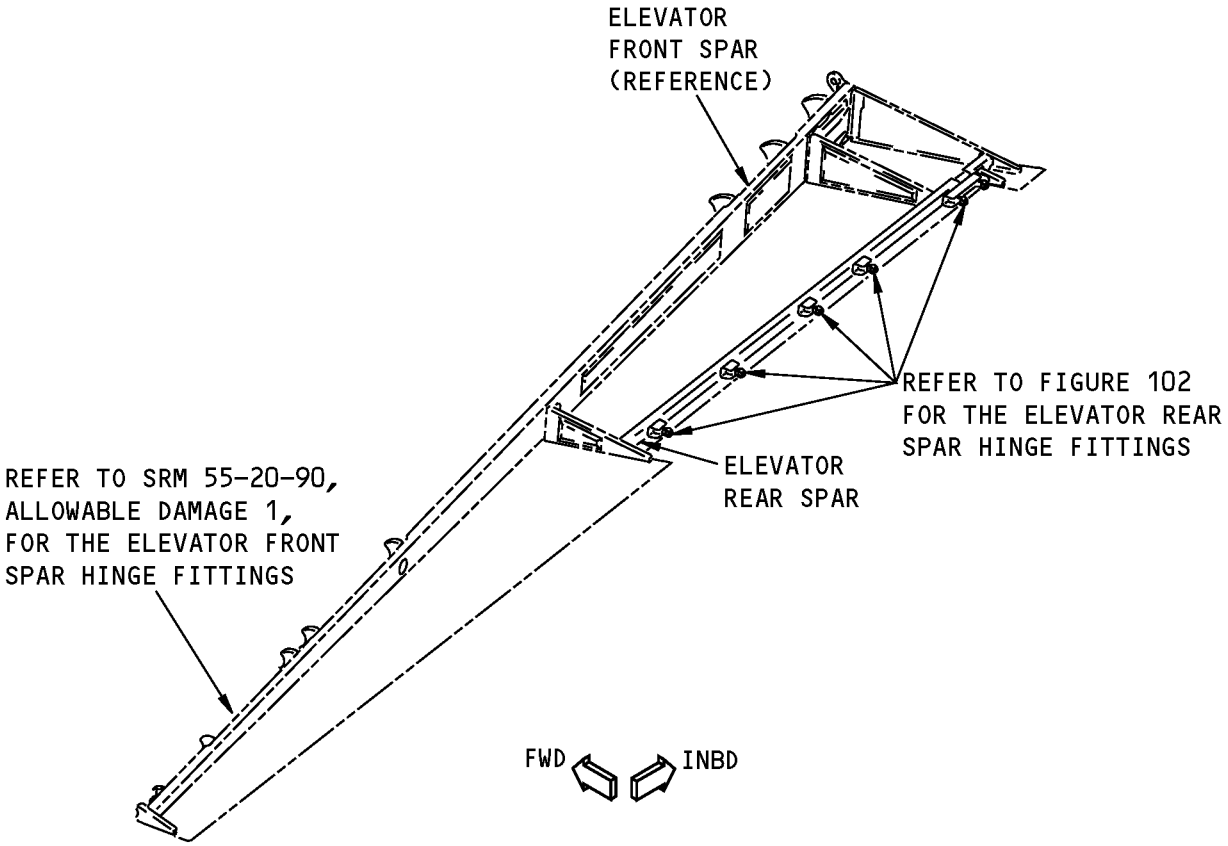
(b) Refer to SOPM 20-10-03 for the flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the reworked areas. Refer to 51-20-01.

(3) Apply a layer of BMS 10-79, Type III primer to the reworked areas. Refer to SOPM 20-44-04.



Elevator Rear Spar Hinge Fitting Locations
Figure 101 (Sheet 1 of 2)

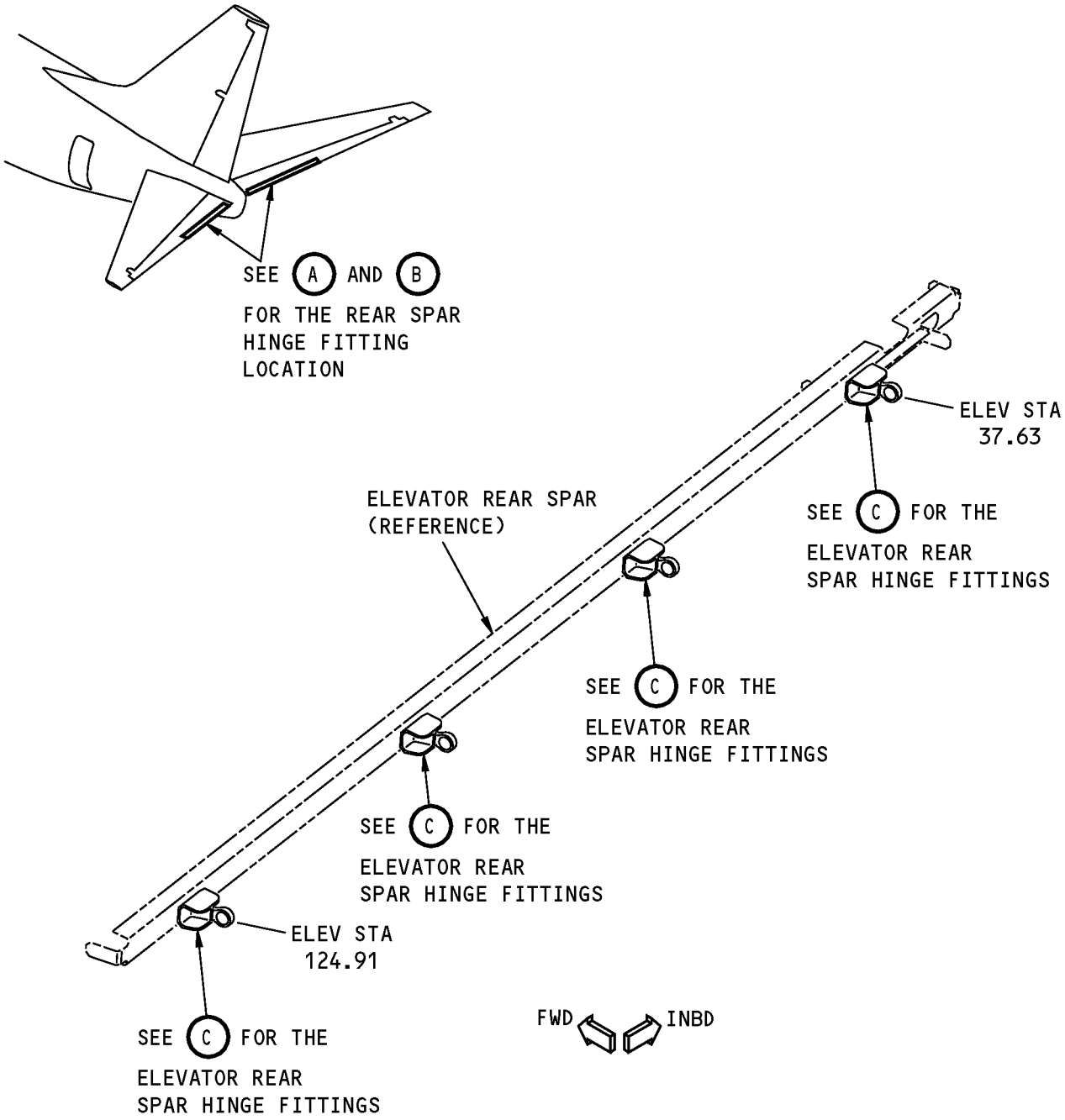


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

B

Elevator Rear Spar Hinge Fitting Locations
Figure 101 (Sheet 2 of 2)

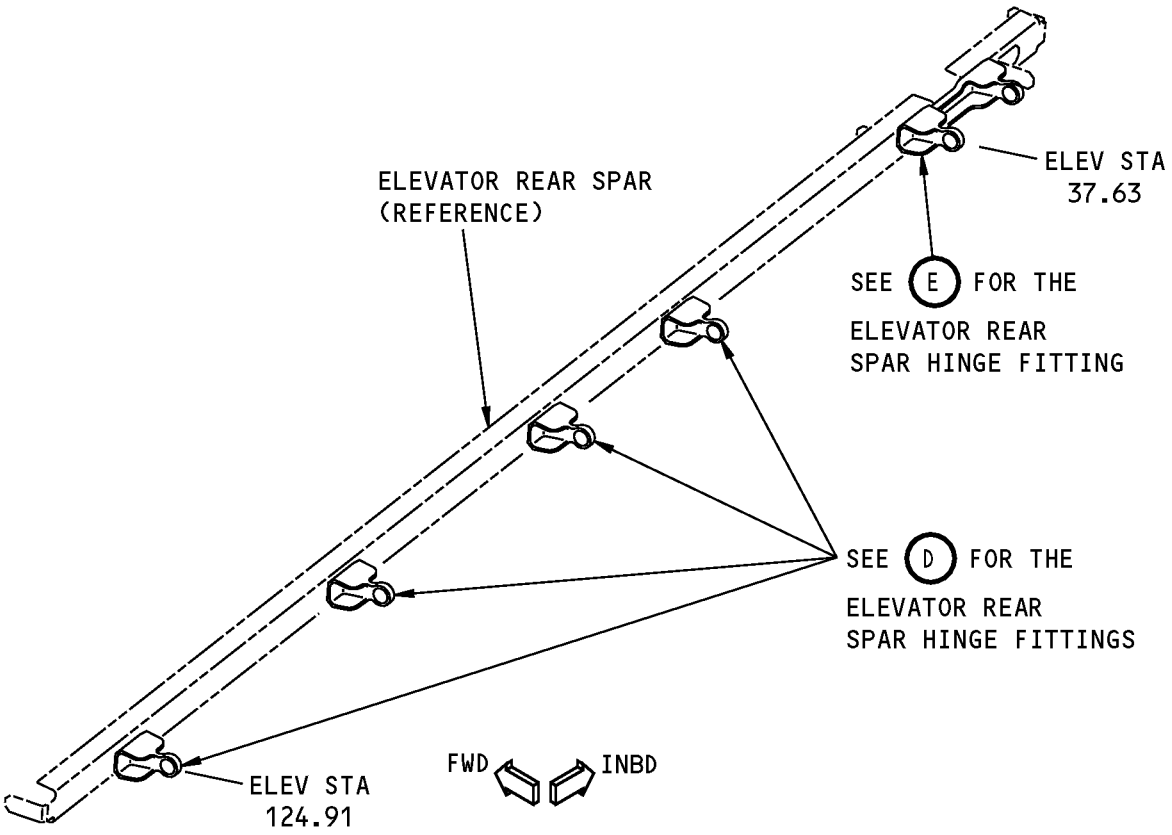


ELEVATOR REAR SPAR HINGE FITTINGS

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

A

Elevator Rear Spar Hinge Fittings
Figure 102 (Sheet 1 of 3)

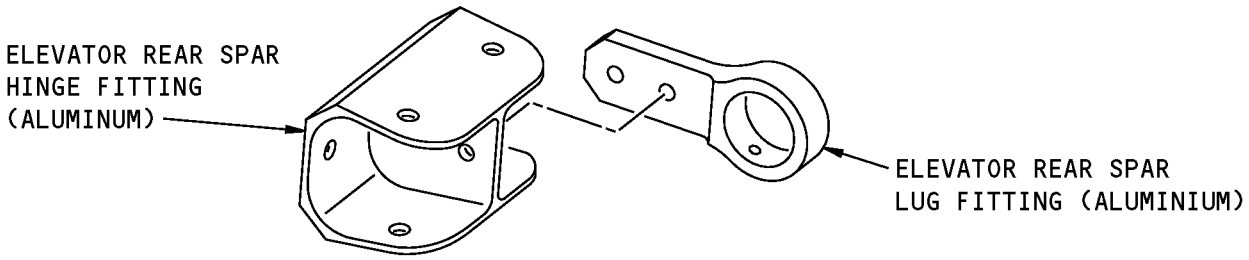


ELEVATOR REAR SPAR HINGE FITTINGS

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

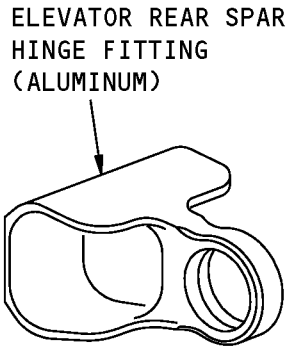
(B)

Elevator Rear Spar Hinge Fittings
Figure 102 (Sheet 2 of 3)



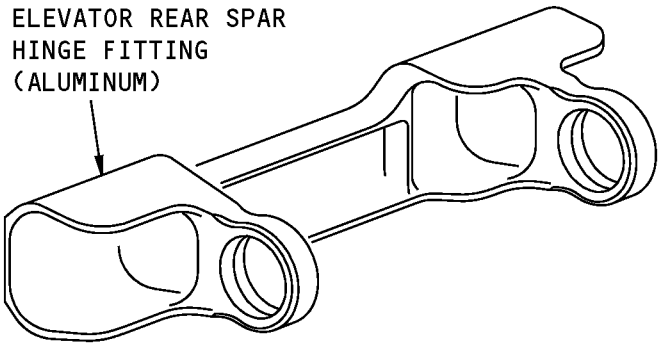
ELEVATOR REAR SPAR HINGE FITTINGS

C



ELEVATOR REAR SPAR HINGE FITTING

D



ELEVATOR REAR SPAR HINGE FITTING

E

Elevator Rear Spar Hinge Fittings
Figure 102 (Sheet 3 of 3)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Hinge Fittings (Except at ELEV STA 37.63)

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

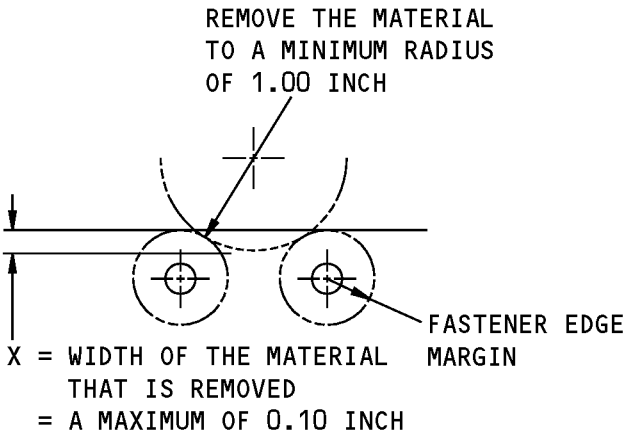
(a) Remove the damage as shown in Allowable Damage Limits, Figure 103/ALLOWABLE DAMAGE 2, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

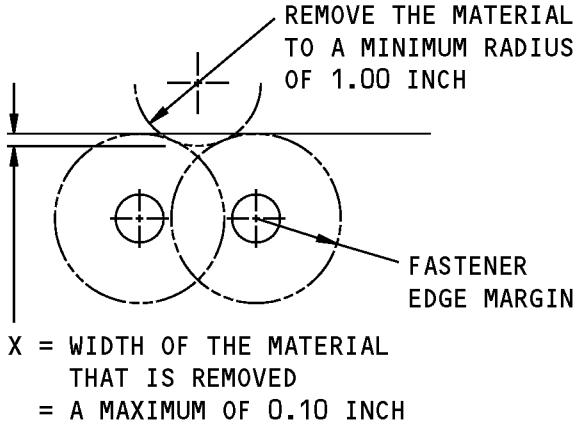
B. Hinge Fitting at ELEV STA 37.63

(1) Damage is not permitted.



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

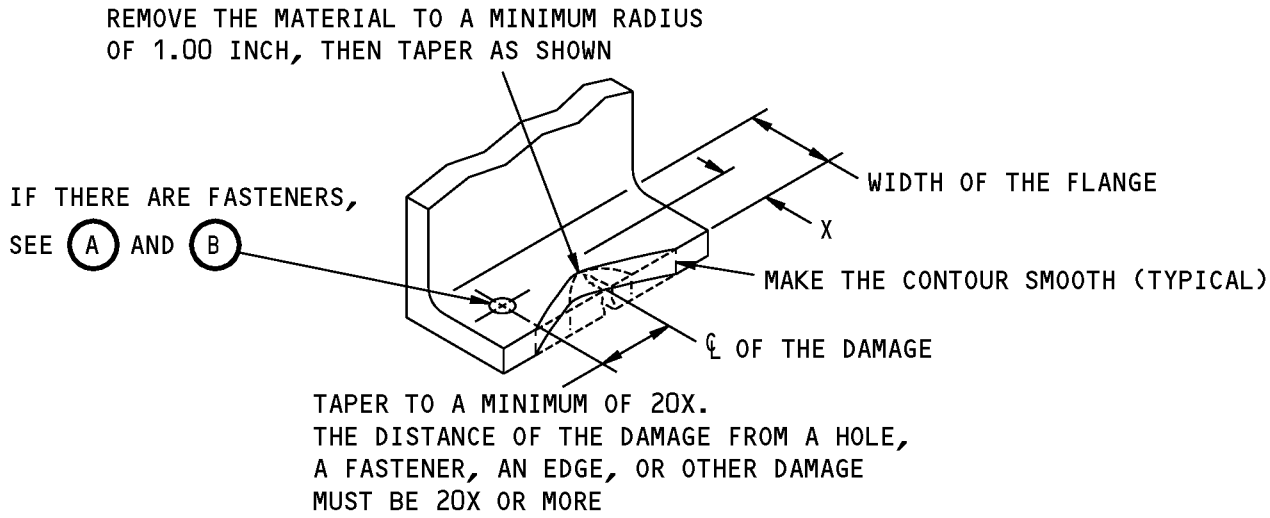
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

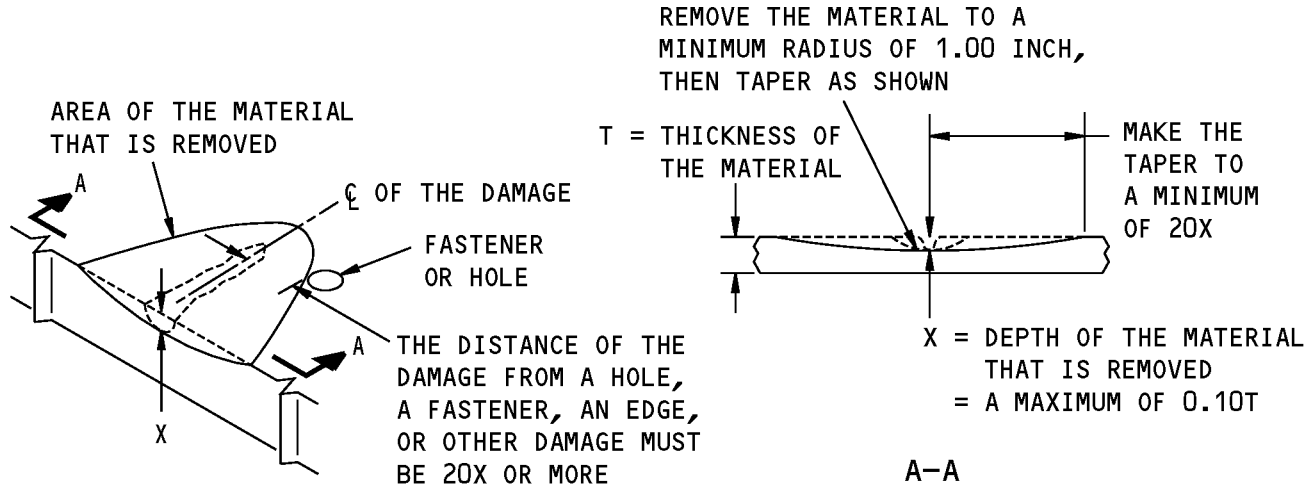
B

Allowable Damage Limits
Figure 103 (Sheet 1 of 3)



REMOVAL OF DAMAGED MATERIAL AT AN EDGE

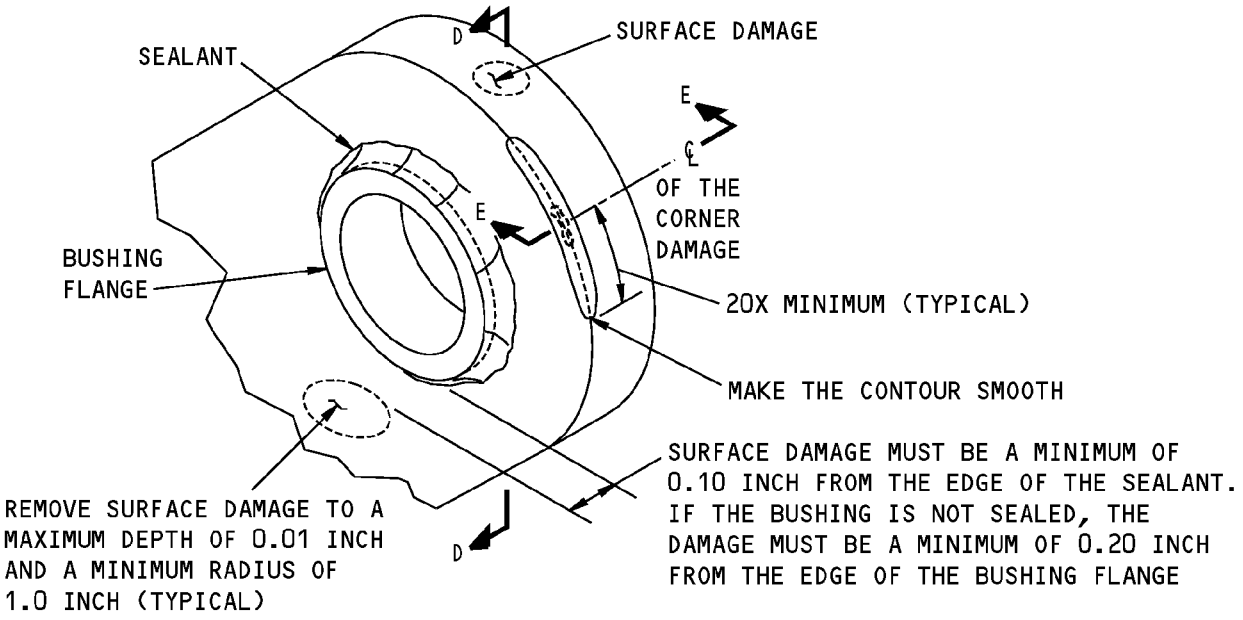
C



REMOVAL OF DAMAGED MATERIAL
ON A SURFACE

D

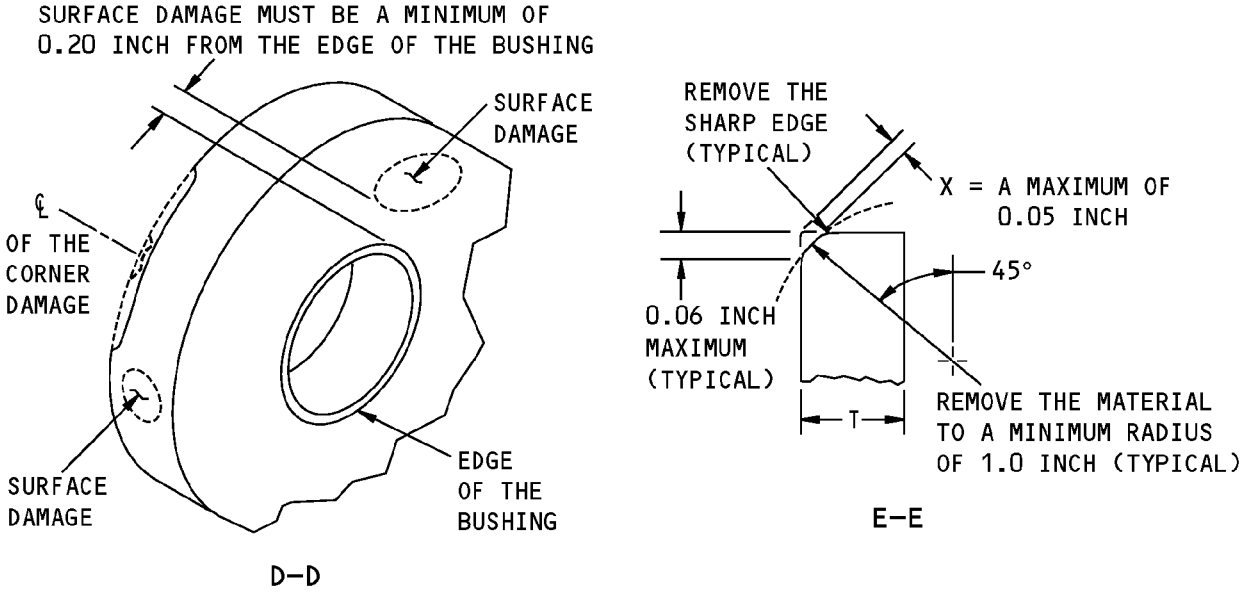
Allowable Damage Limits
Figure 103 (Sheet 2 of 3)



NOTE: DAMAGED SEALANT IS NOT PERMITTED. IF THE SEALANT IS DAMAGED, LOOK FOR MIGRATION OR ROTATION OF THE BUSHING. IF THERE IS NO MIGRATION, ROTATION, OR CORROSION, REMOVE THE DAMAGED SEALANT AND APPLY A NEW FILLET SEAL.

REMOVAL OF SURFACE AND EDGE DAMAGE FROM A LUG THAT HAS A BUSHING

(E)

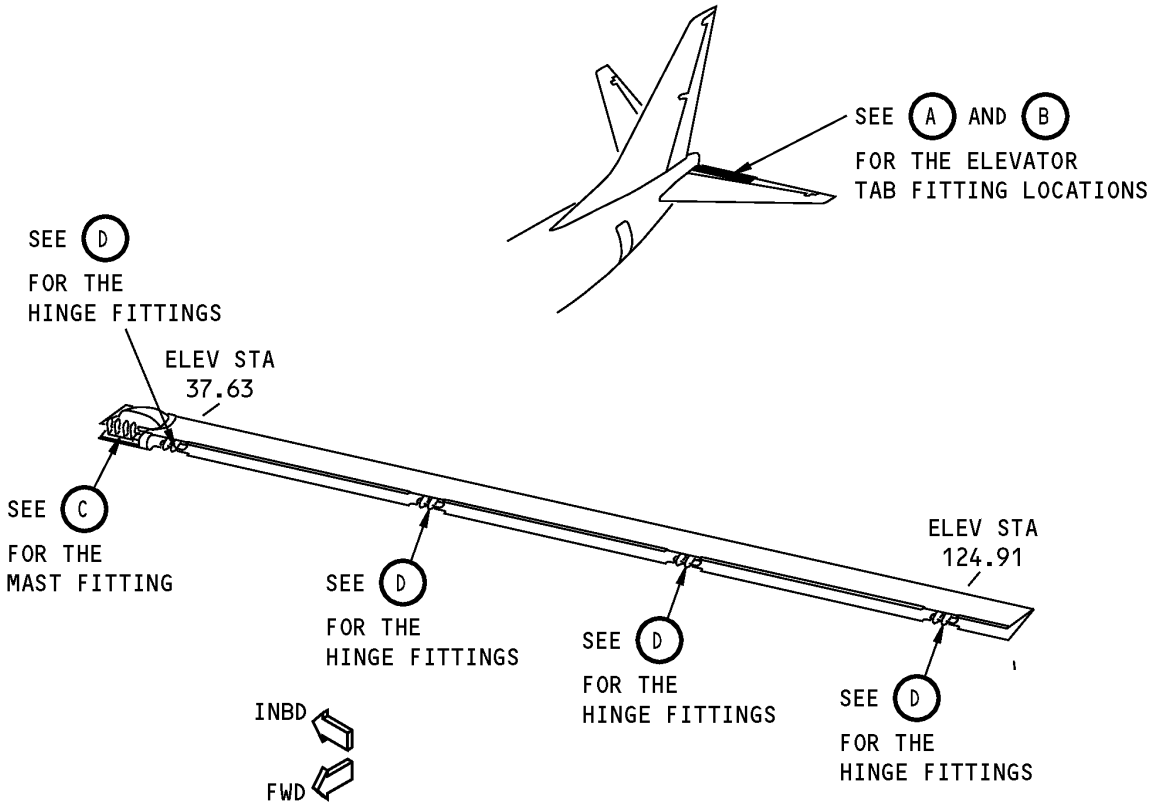


Allowable Damage Limits
Figure 103 (Sheet 3 of 3)

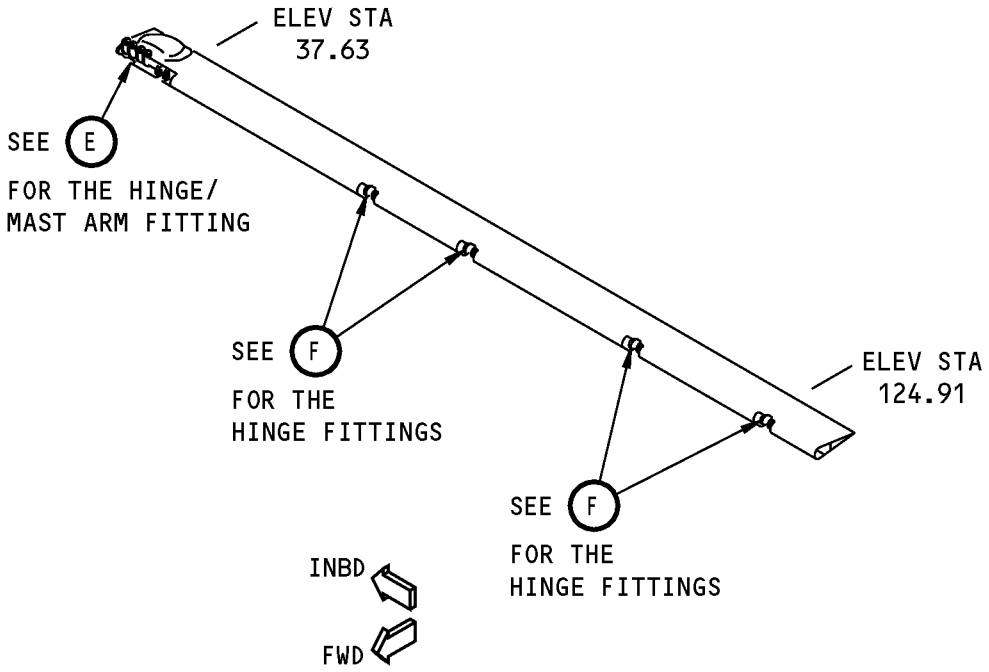
ALLOWABLE DAMAGE 3 - ELEVATOR TAB FITTINGS

1. Applicability

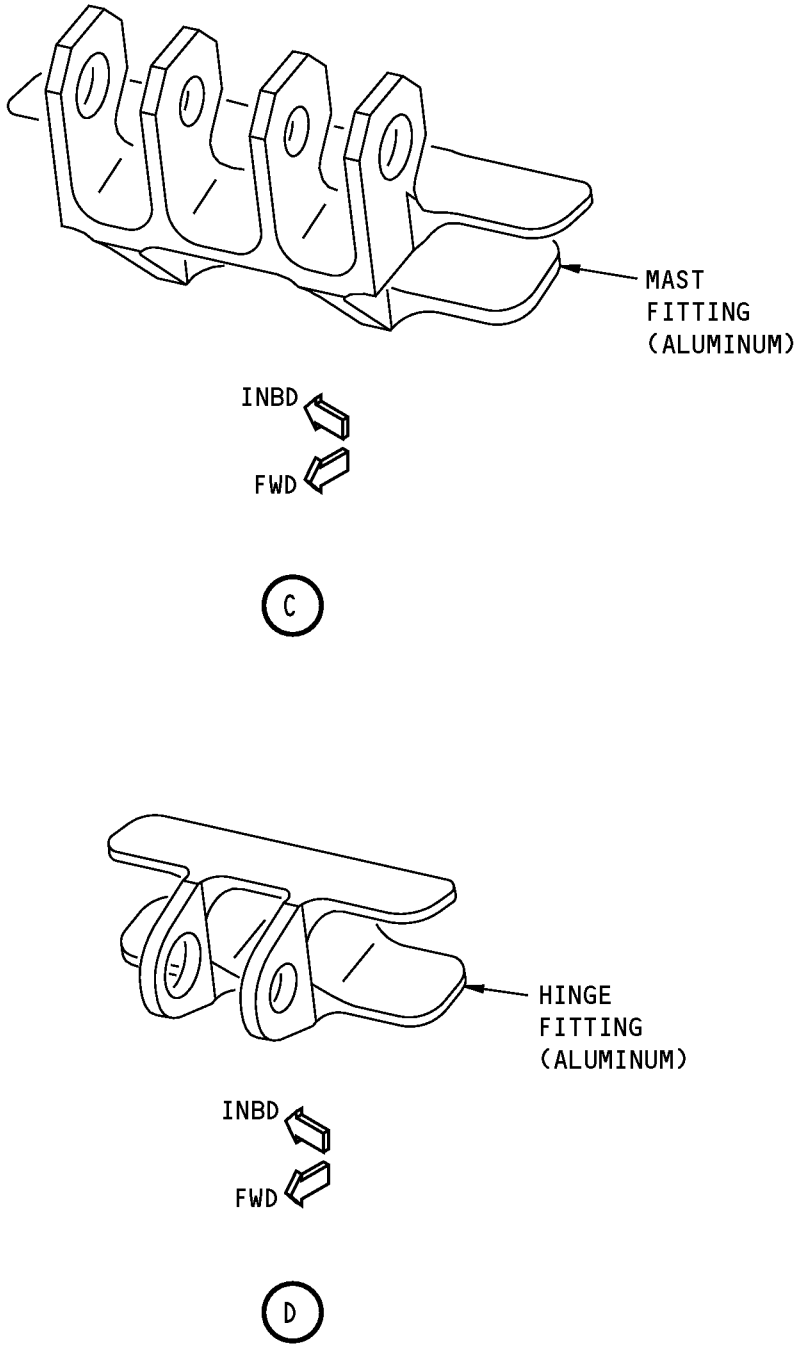
A. This subject gives the allowable damage limits for the elevator tab fittings shown in Elevator Tab Fitting Location, Figure 101/ALLOWABLE DAMAGE 3.



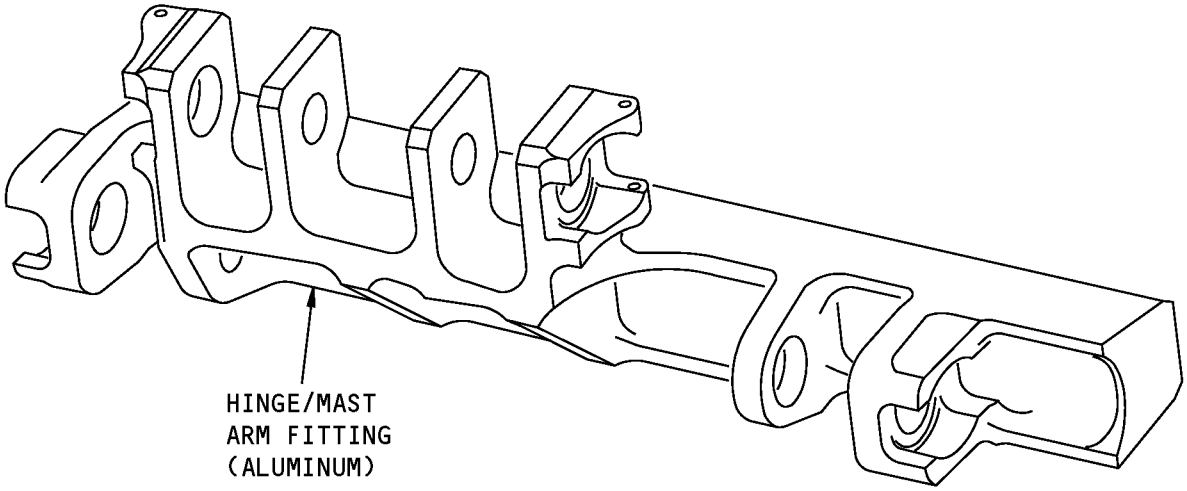
Elevator Tab Fitting Location
Figure 101 (Sheet 1 of 4)

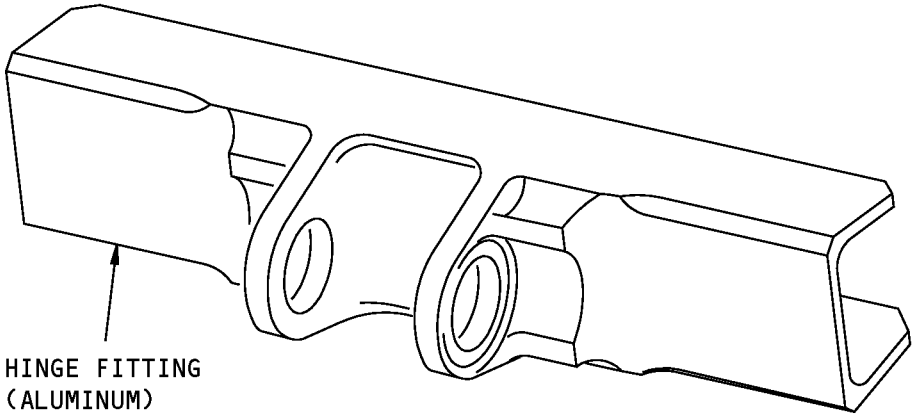


Elevator Tab Fitting Location
Figure 101 (Sheet 2 of 4)



Elevator Tab Fitting Location
Figure 101 (Sheet 3 of 4)





Elevator Tab Fitting Location
Figure 101 (Sheet 4 of 4)

2. General

A. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits.

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the investigation and removal of damage.

(2) Refer to 51-30-03 for possible sources of non-metallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) Put a surface finish of 125 microinches Ra or better on the reworked areas.

C. After you remove the damage, do the steps that follow:

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(1) Flap peen or shot peen the reworked areas of the parts, but not the inner surfaces of the lug bores.

(a) Refer to 51-20-06 for the shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for the flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the reworked areas. Refer to 51-20-01.

(3) Apply a layer of BMS 10-79, Type III primer to the reworked areas. Refer to SOPM 20-44-04.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Hinge Fittings

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 3, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

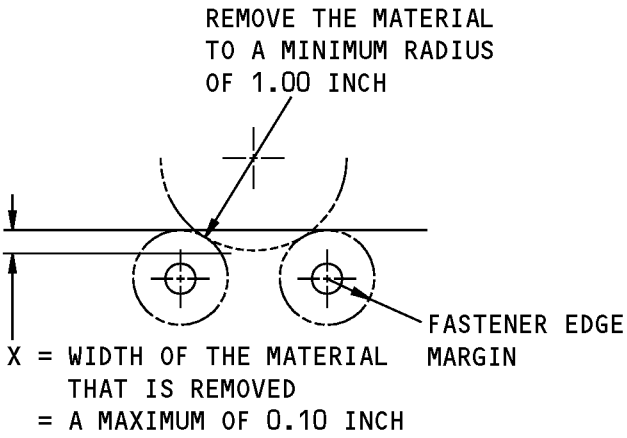
(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 3, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

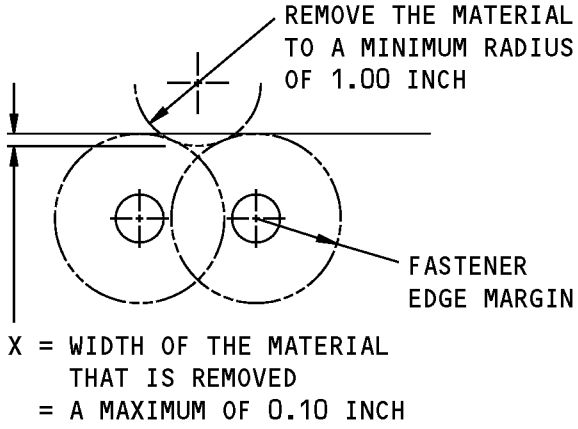
B. Mast Fitting

(1) Damage is not permitted.



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

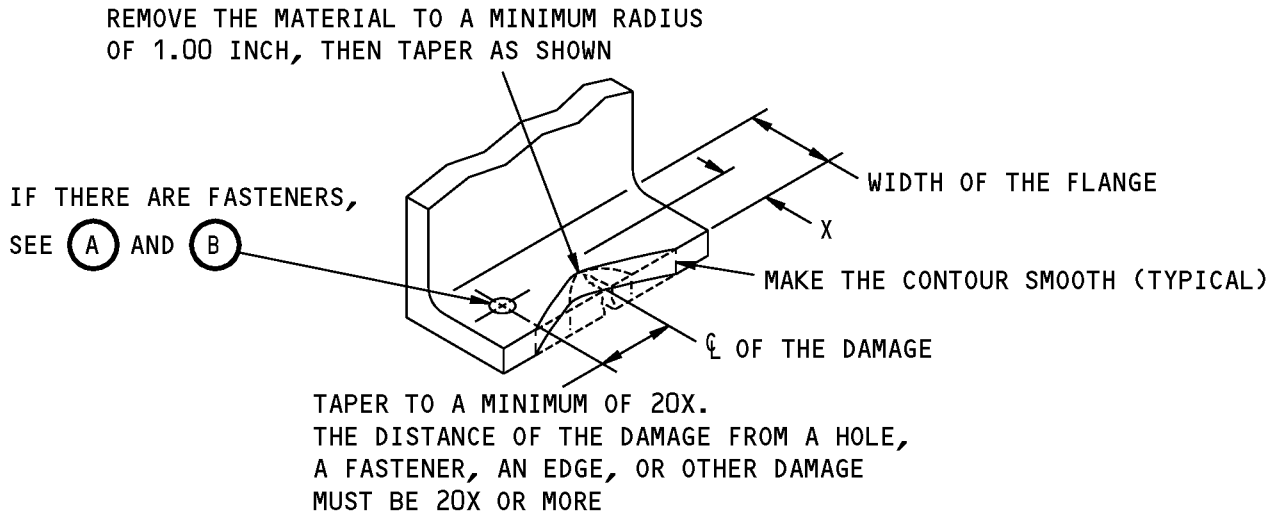
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

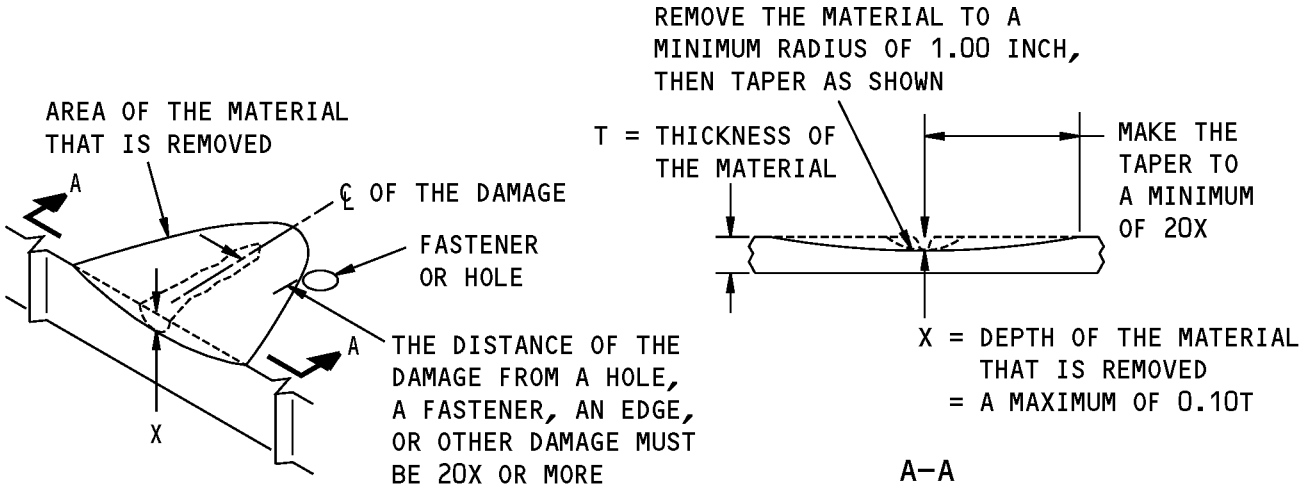
Allowable Damage Limits
Figure 102 (Sheet 1 of 3)



X = WIDTH OF THE MATERIAL REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

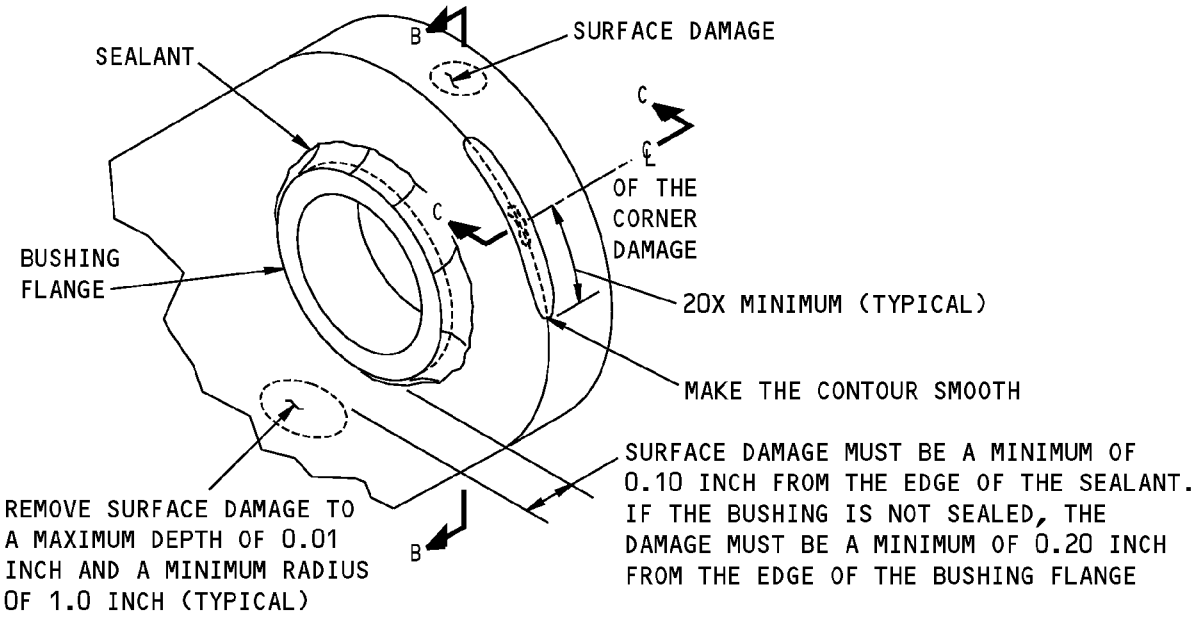
C



REMOVAL OF DAMAGED MATERIAL
ON A SURFACE

D

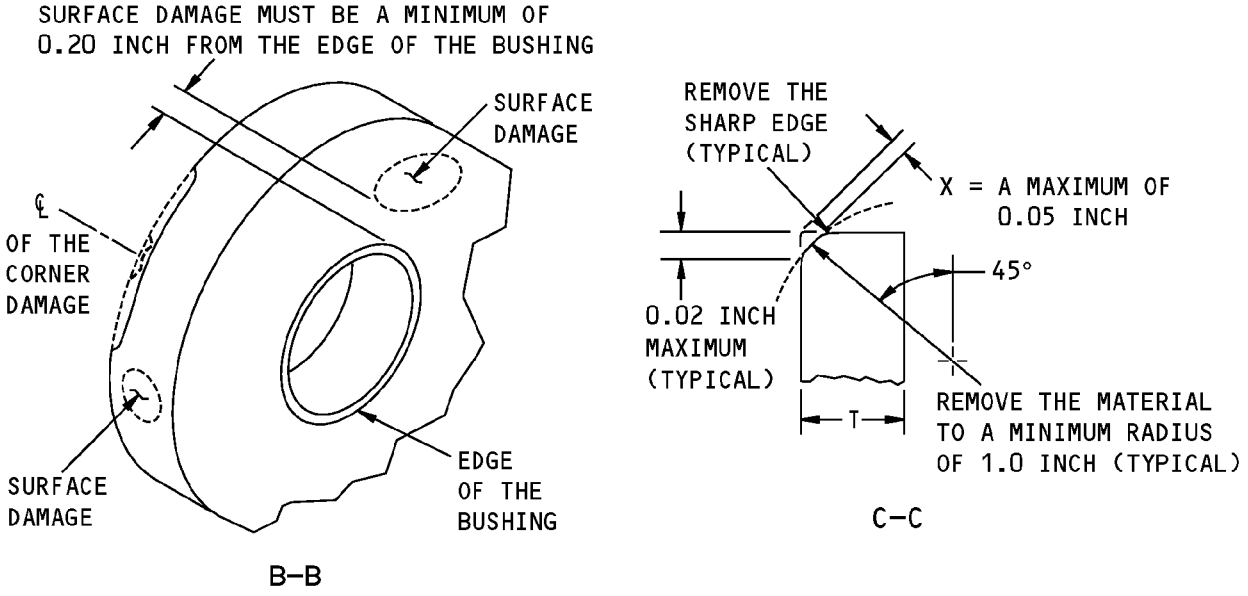
Allowable Damage Limits
Figure 102 (Sheet 2 of 3)



NOTE: DAMAGED SEALANT IS NOT PERMITTED. IF THE SEALANT IS DAMAGED, LOOK FOR MIGRATION OR ROTATION OF THE BUSHING. IF THERE IS NO MIGRATION, ROTATION, OR CORROSION, REMOVE THE DAMAGED SEALANT AND APPLY A NEW FILLET SEAL.

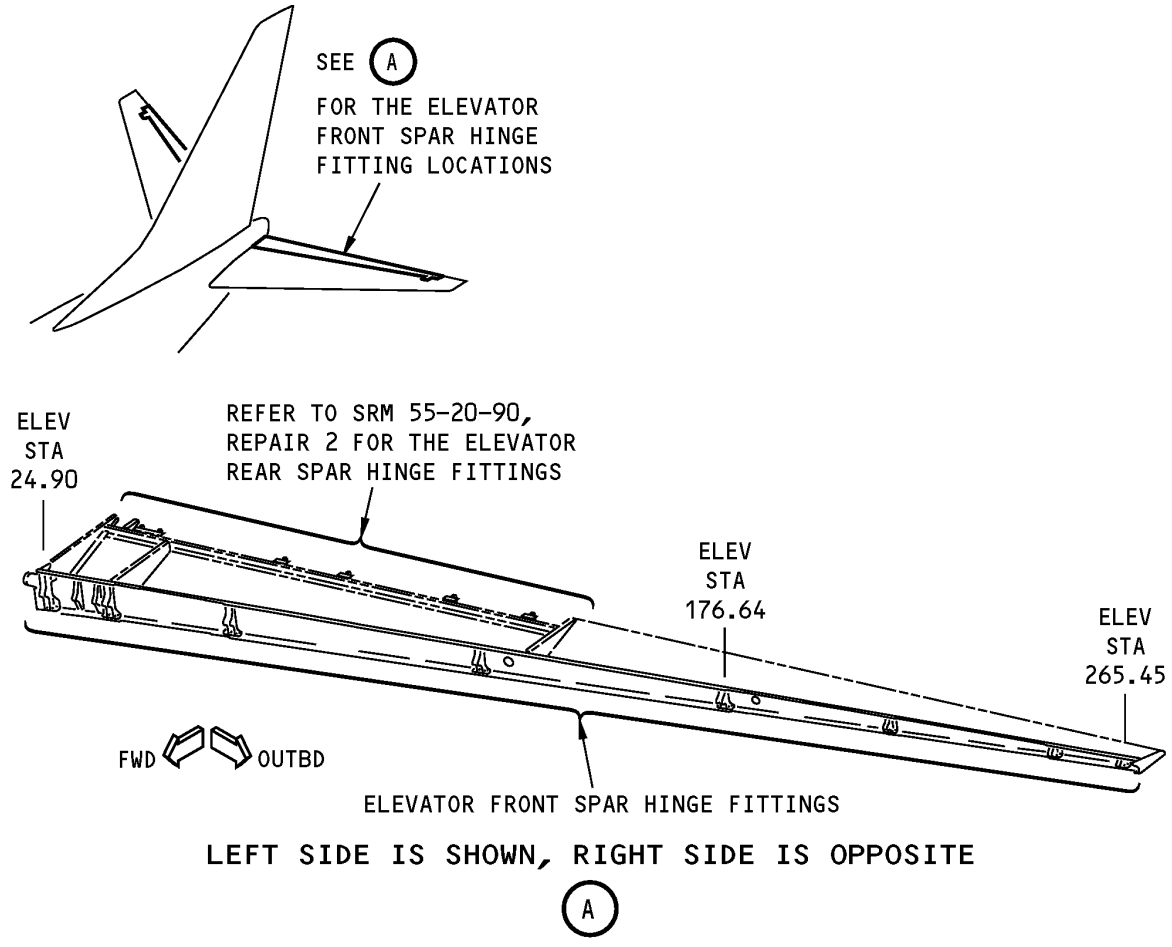
REMOVAL OF SURFACE AND EDGE DAMAGE FROM A LUG THAT HAS A BUSHING

(E)



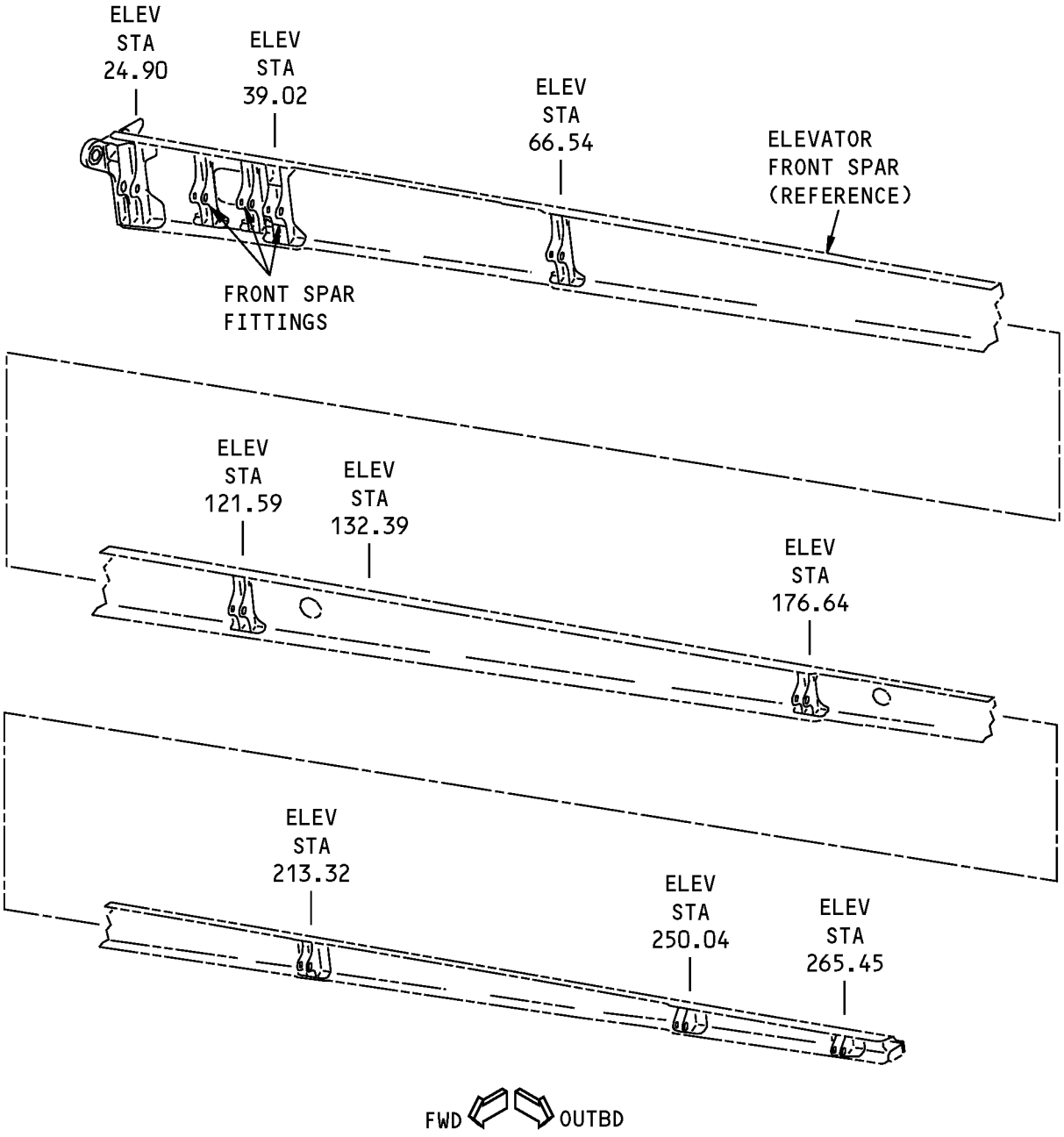
Allowable Damage Limits
Figure 102 (Sheet 3 of 3)

REPAIR 1 - ELEVATOR FRONT SPAR HINGE FITTINGS



NOTE: BOEING HAS NOT FOUND IT NECESSARY TO SUPPLY REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

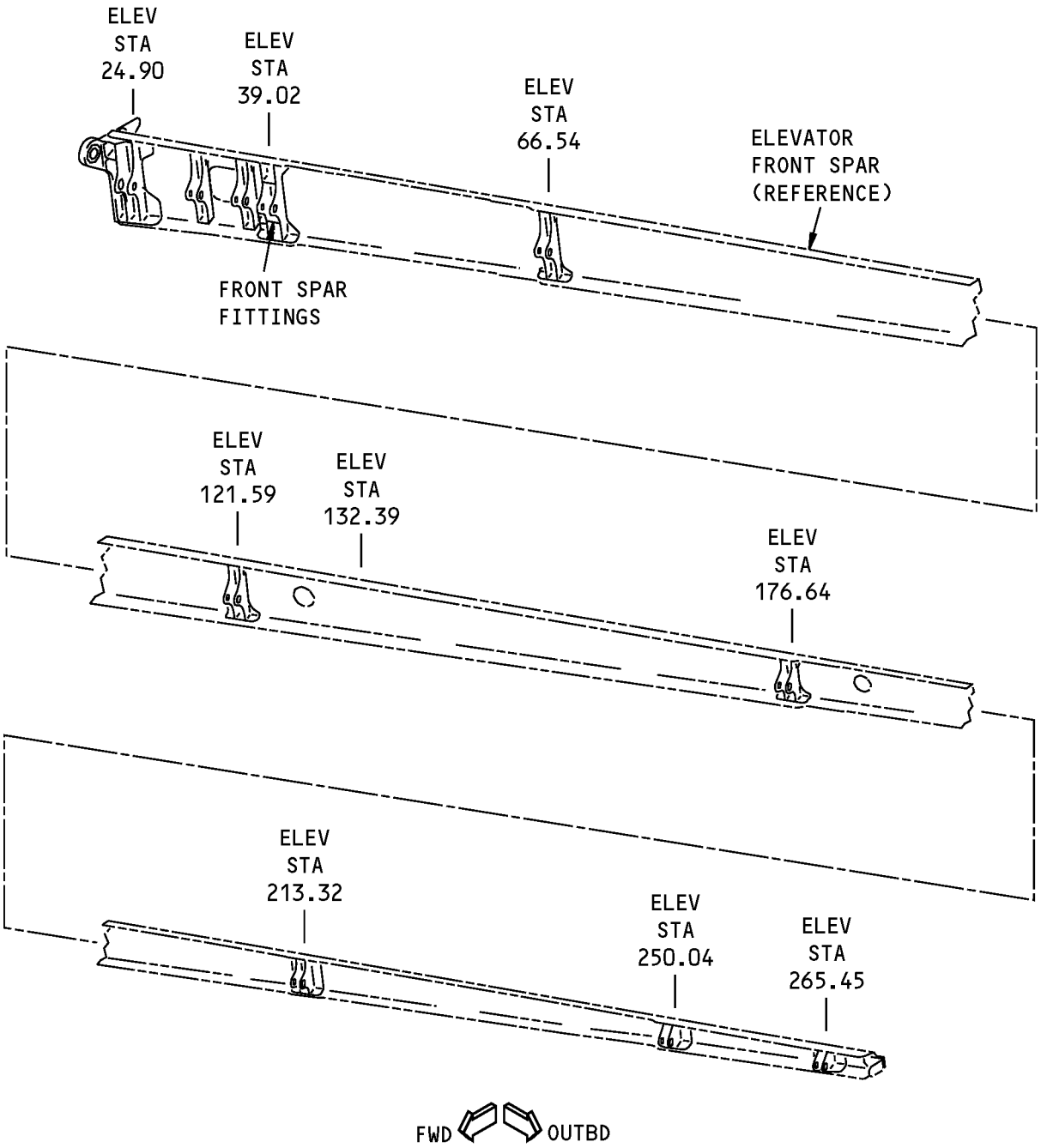
Elevator Front Spar Hinge Fitting Locations
Figure 201



NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Front Spar Hinge Fitting Repair
Figure 202 (Sheet 1 of 2)

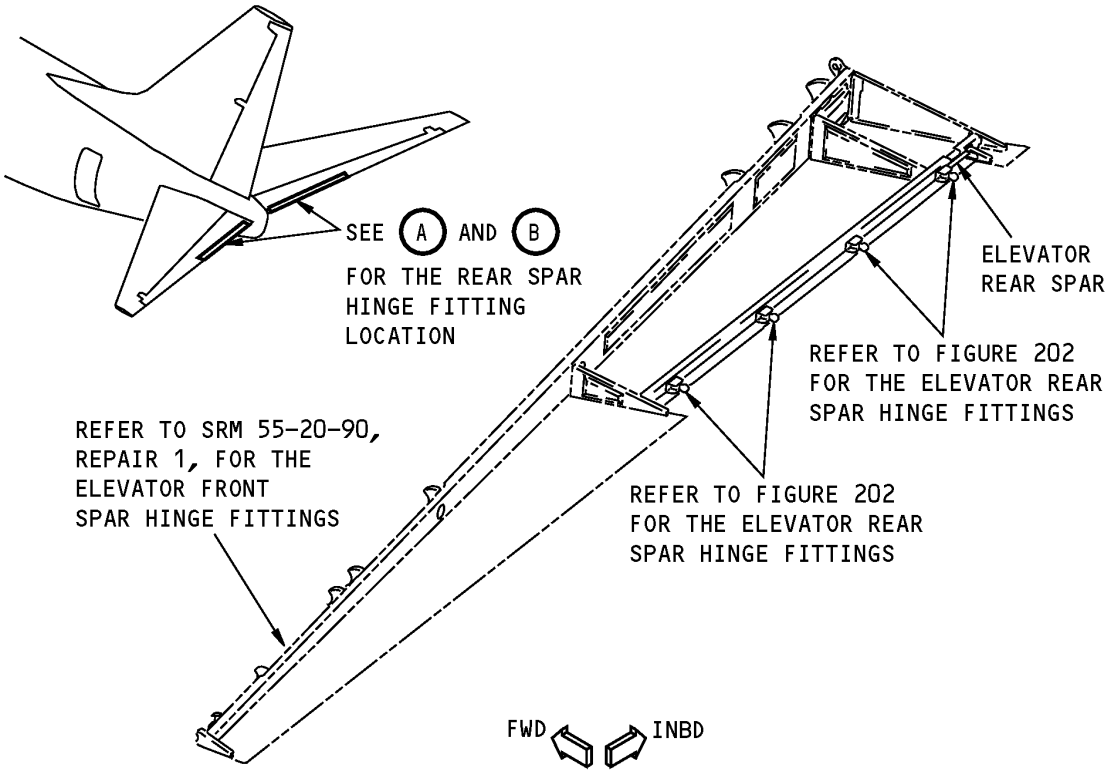


NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

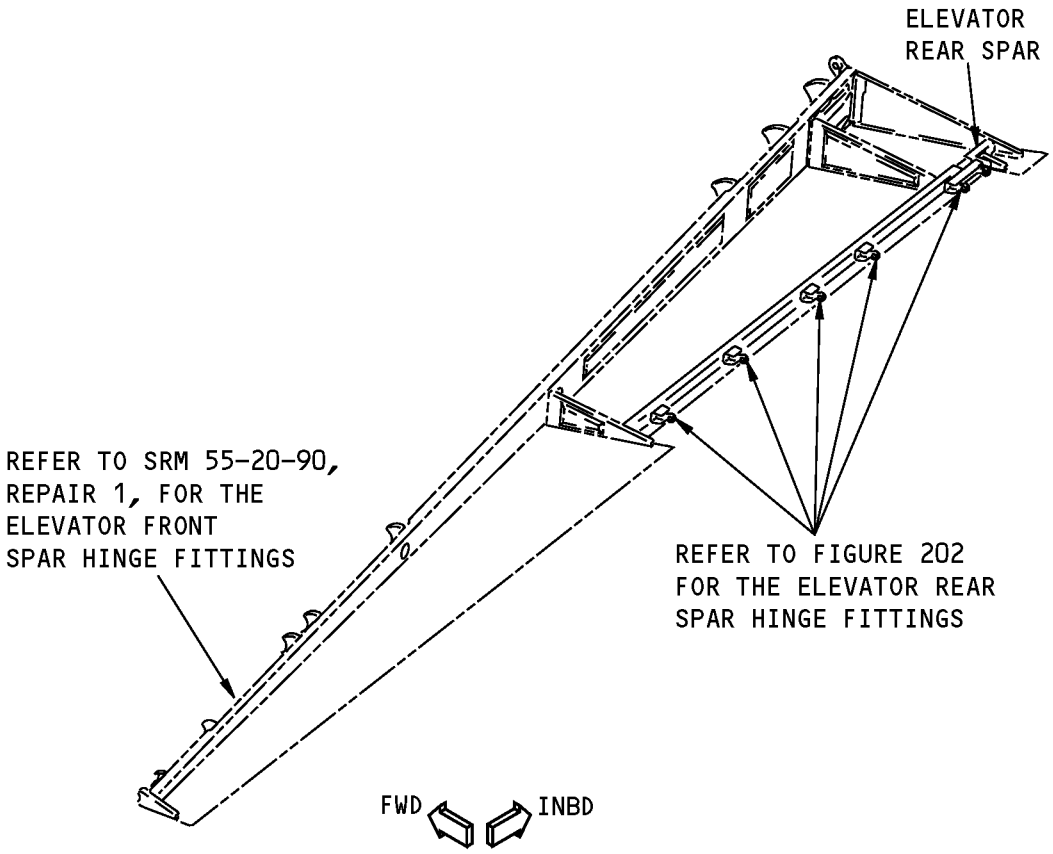
Elevator Front Spar Hinge Fitting Repair
Figure 202 (Sheet 2 of 2)

REPAIR 2 - ELEVATOR REAR SPAR HINGE FITTINGS



NOTE: BOEING HAS NOT FOUND IT NECESSARY TO SUPPLY REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

Elevator Rear Spar Hinge Fitting Locations
Figure 201 (Sheet 1 of 2)

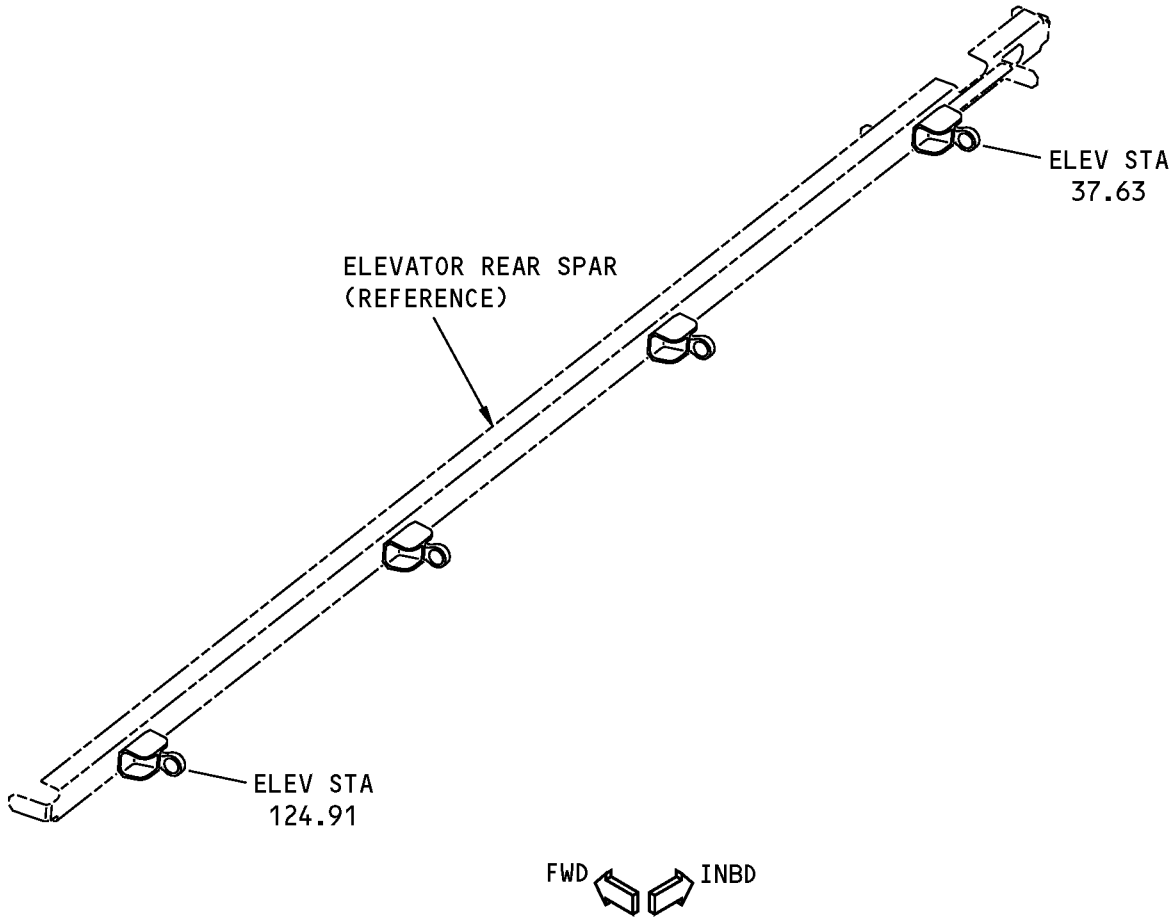


LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

B

Elevator Rear Spar Hinge Fitting Locations
Figure 201 (Sheet 2 of 2)

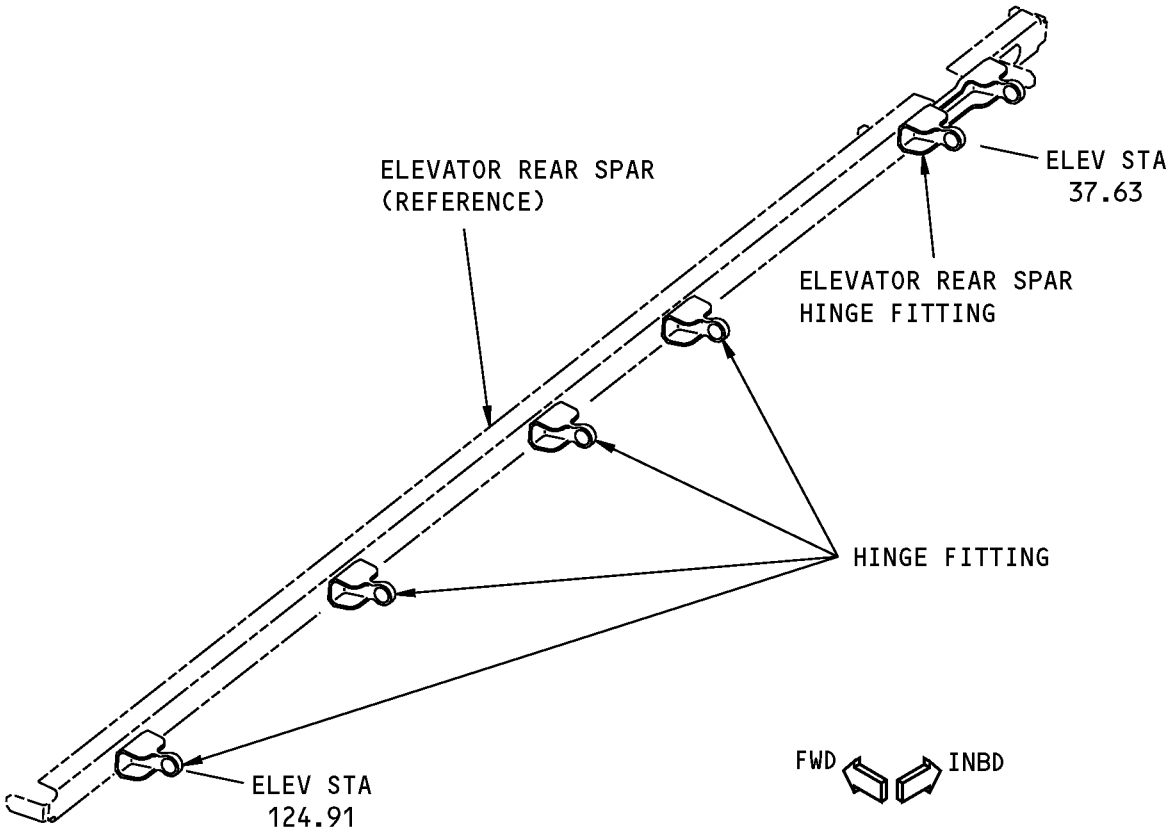


NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

ELEVATOR REAR SPAR HINGE FITTINGS

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

Elevator Rear Spar Hinge Fitting Repair
Figure 202 (Sheet 1 of 2)

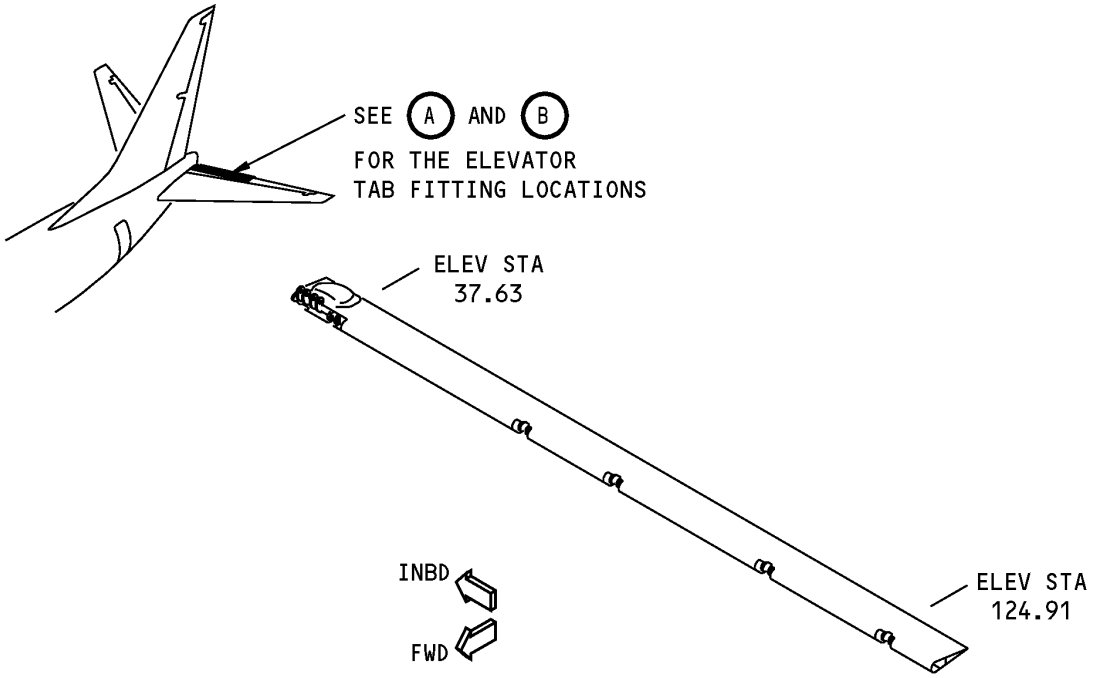


NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

Elevator Rear Spar Hinge Fitting Repair
Figure 202 (Sheet 2 of 2)

REPAIR 3 - ELEVATOR TAB FITTINGS



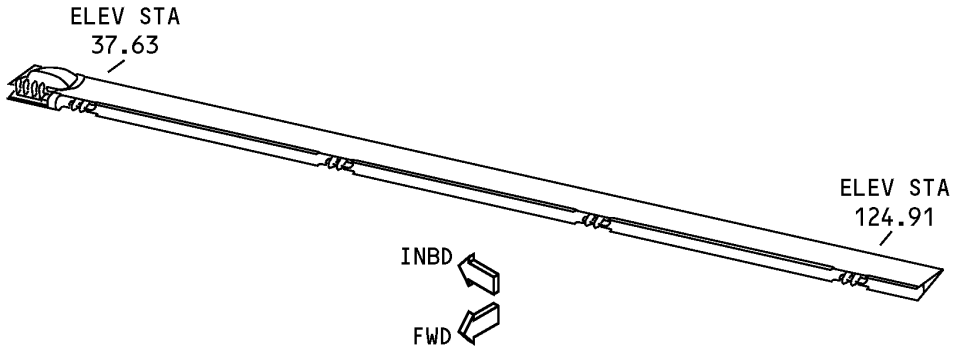
NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1175 AND ON)

A

Elevator Tab Fitting Repair
Figure 201 (Sheet 1 of 2)



NOTE: THERE ARE NO REPAIRS FOR THIS PART IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

(FOR AIRPLANE LINE NUMBERS 1 THROUGH 1174)

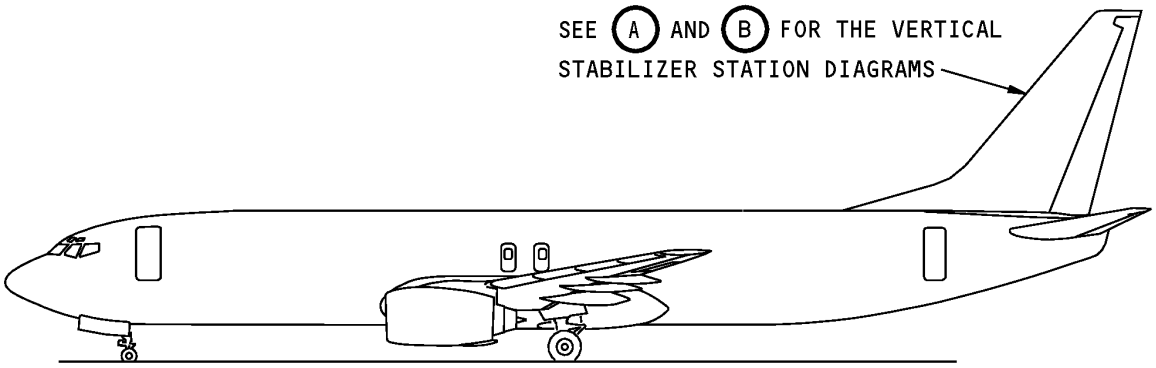
B

Elevator Tab Fitting Repair
Figure 201 (Sheet 2 of 2)

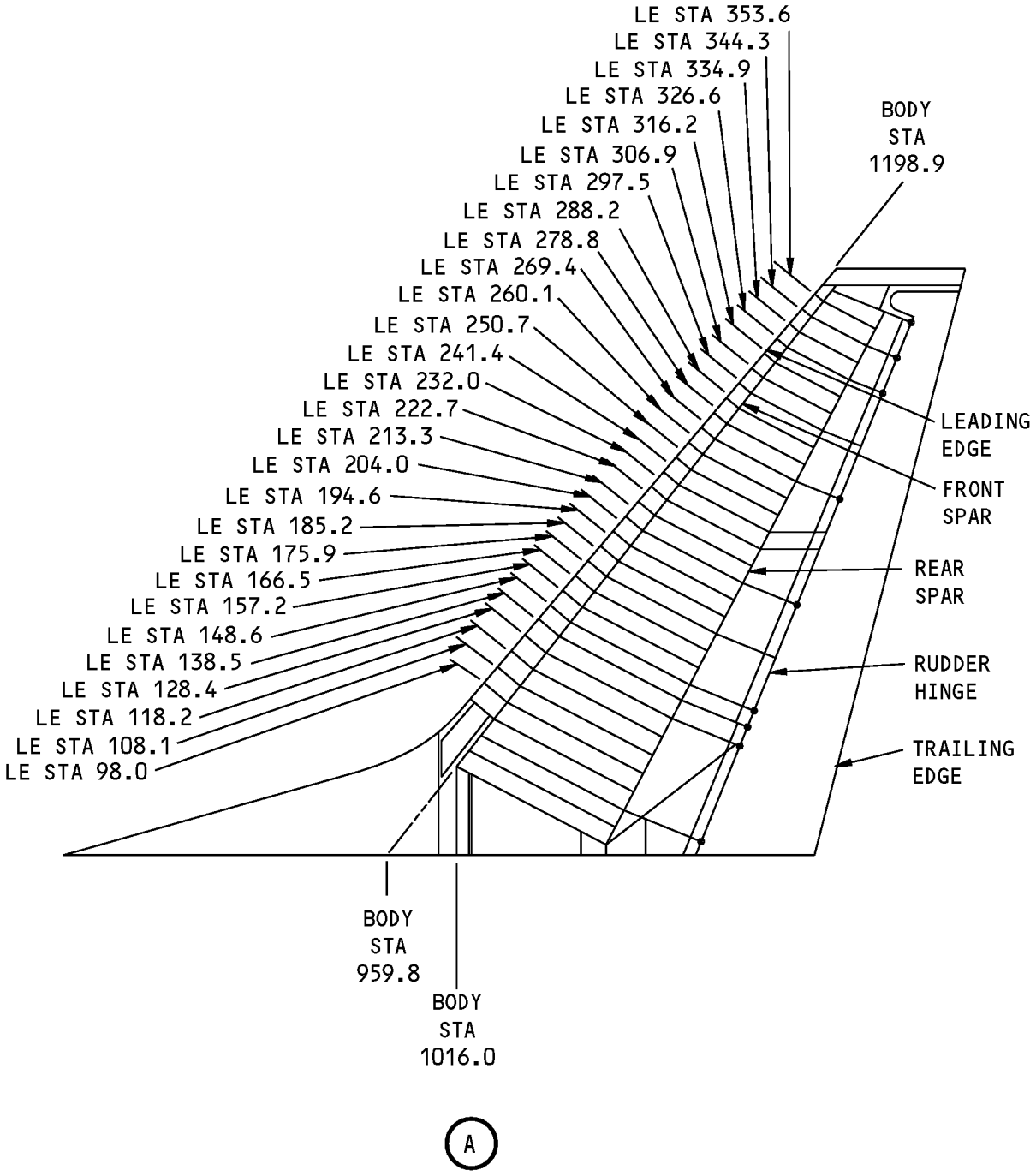
IDENTIFICATION GENERAL - VERTICAL STABILIZER AND RUDDER STATION DIAGRAM

1. General

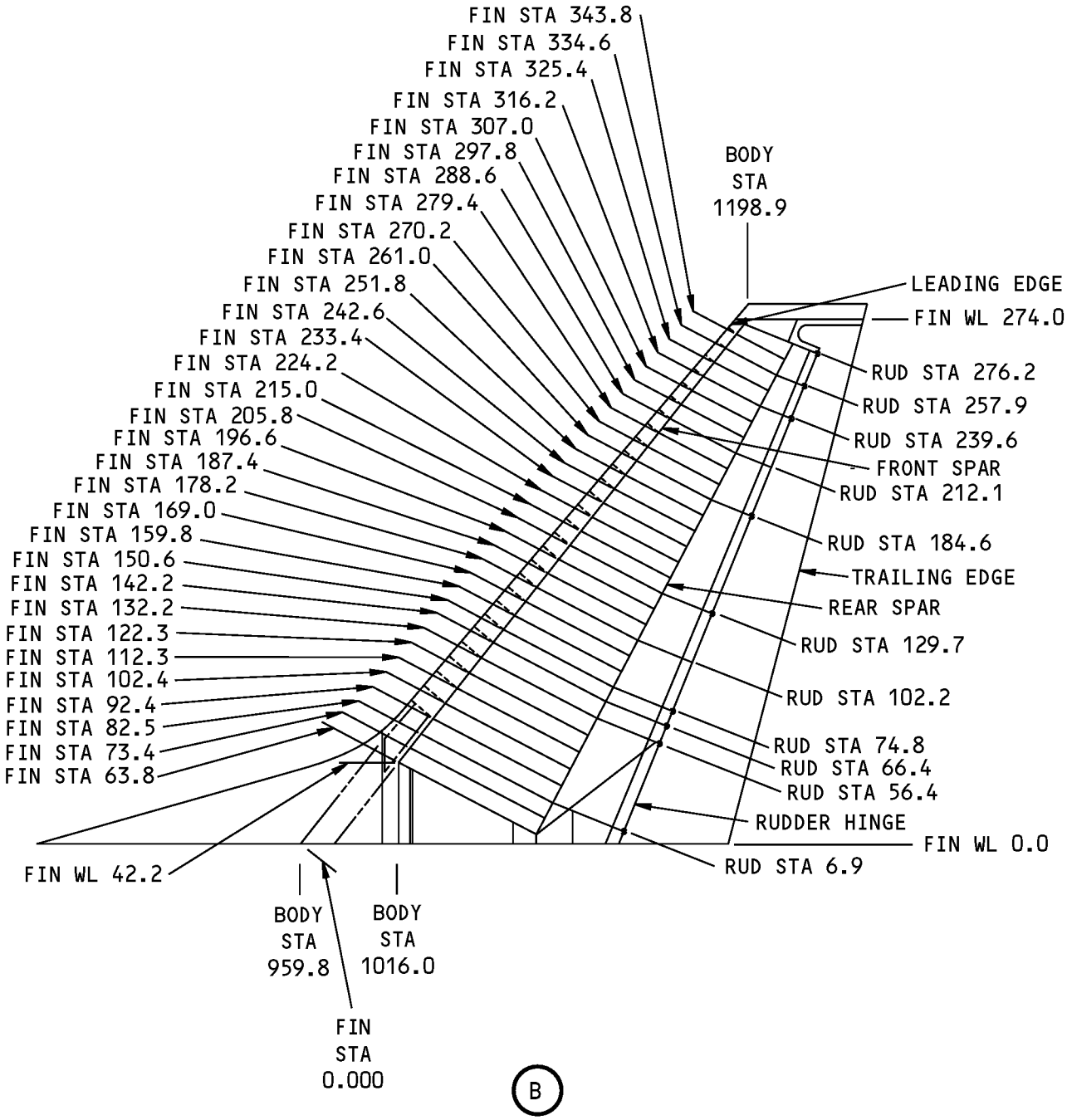
A. The vertical stabilizer and rudder station diagram gives the locations of the structural components on the vertical stabilizer and rudder (Refer to Vertical Stabilizer Station Diagram, Figure 1/IDENTIFICATION GENERAL).



Vertical Stabilizer Station Diagram
Figure 1 (Sheet 1 of 3)

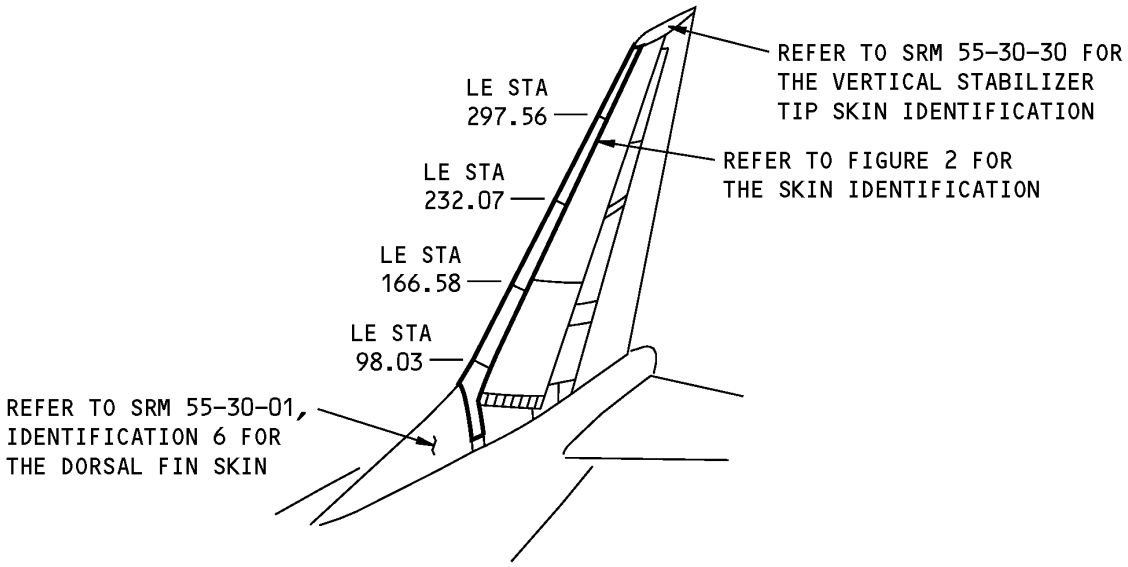


Vertical Stabilizer Station Diagram
Figure 1 (Sheet 2 of 3)



Vertical Stabilizer Station Diagram
Figure 1 (Sheet 3 of 3)

IDENTIFICATION 1 - VERTICAL STABILIZER LEADING EDGE SKIN



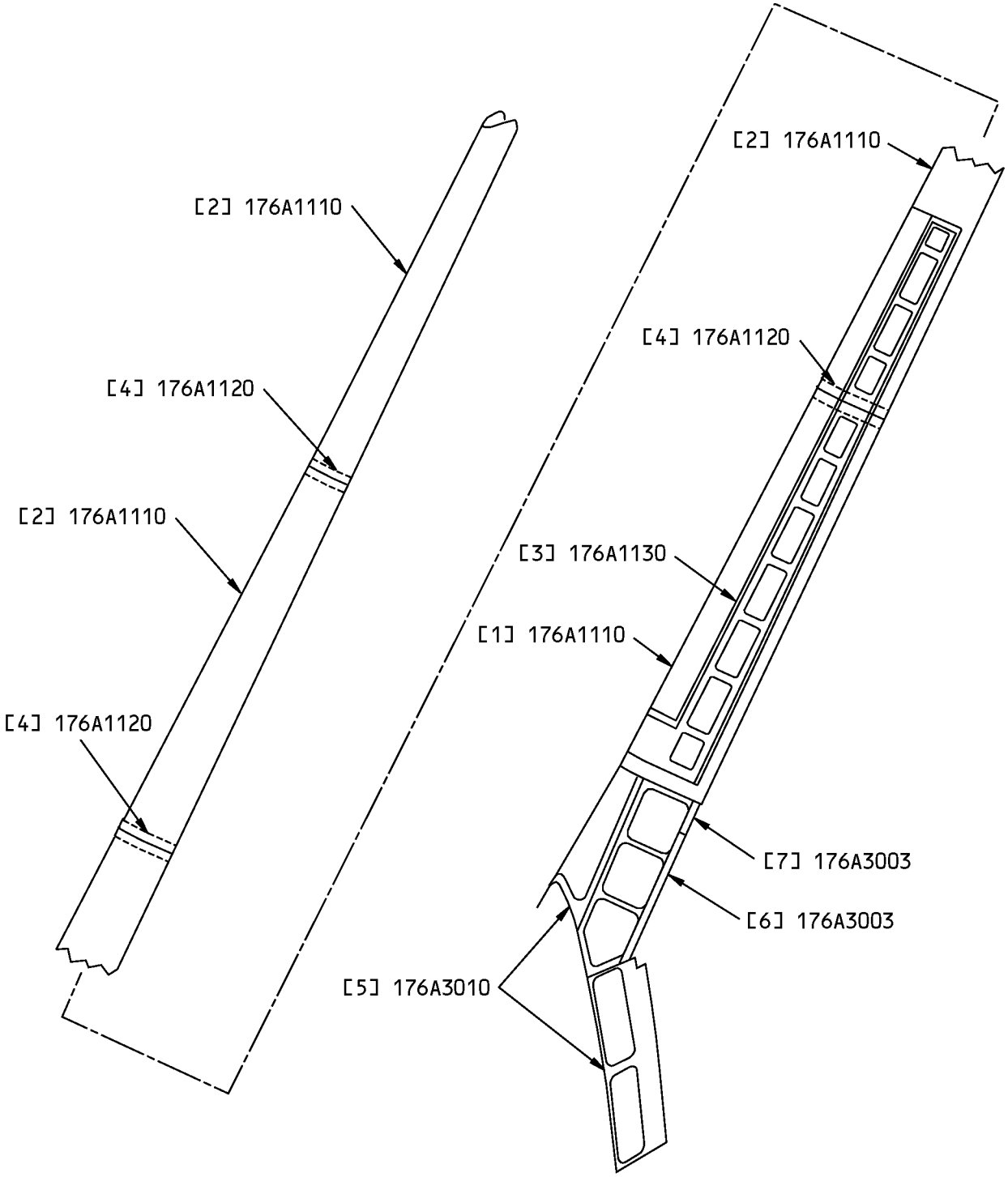
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Vertical Stabilizer Leading Edge Skin Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
176A0001	Leading Edge and Miscellaneous Functional Collector - Vertical Fin
176A1001	Removable Leading Edge Assembly/Installation - Vertical Fin
176A1100	Skin Assembly - Removable Leading Edge Vertical Fin
176A3001	Fixed Leading Edge Installation - Vertical Fin
176A3009	Skin Assembly - Fixed Leading Edge, Vertical Fin



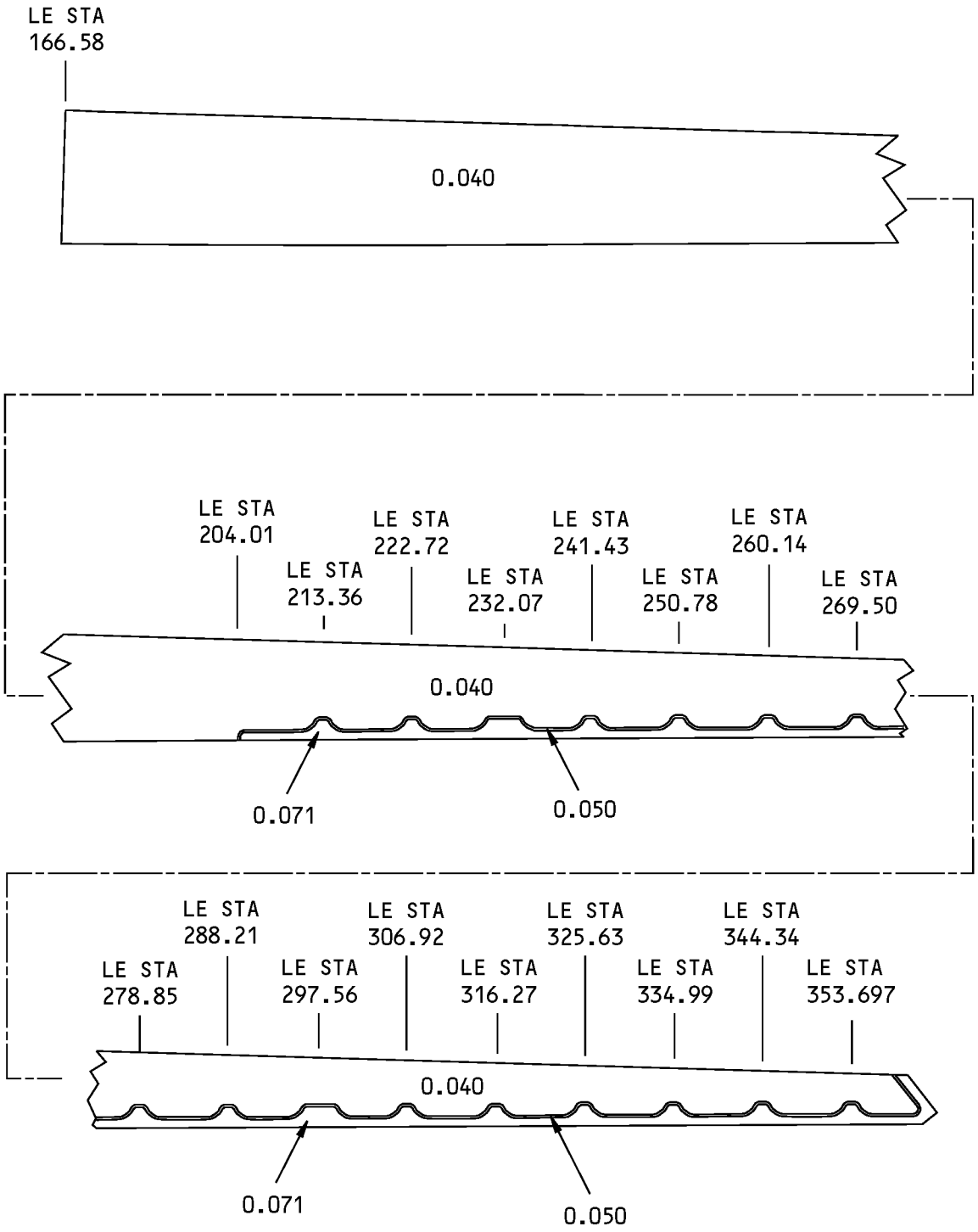
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Fin Leading Edge Panel Identification
Figure 2

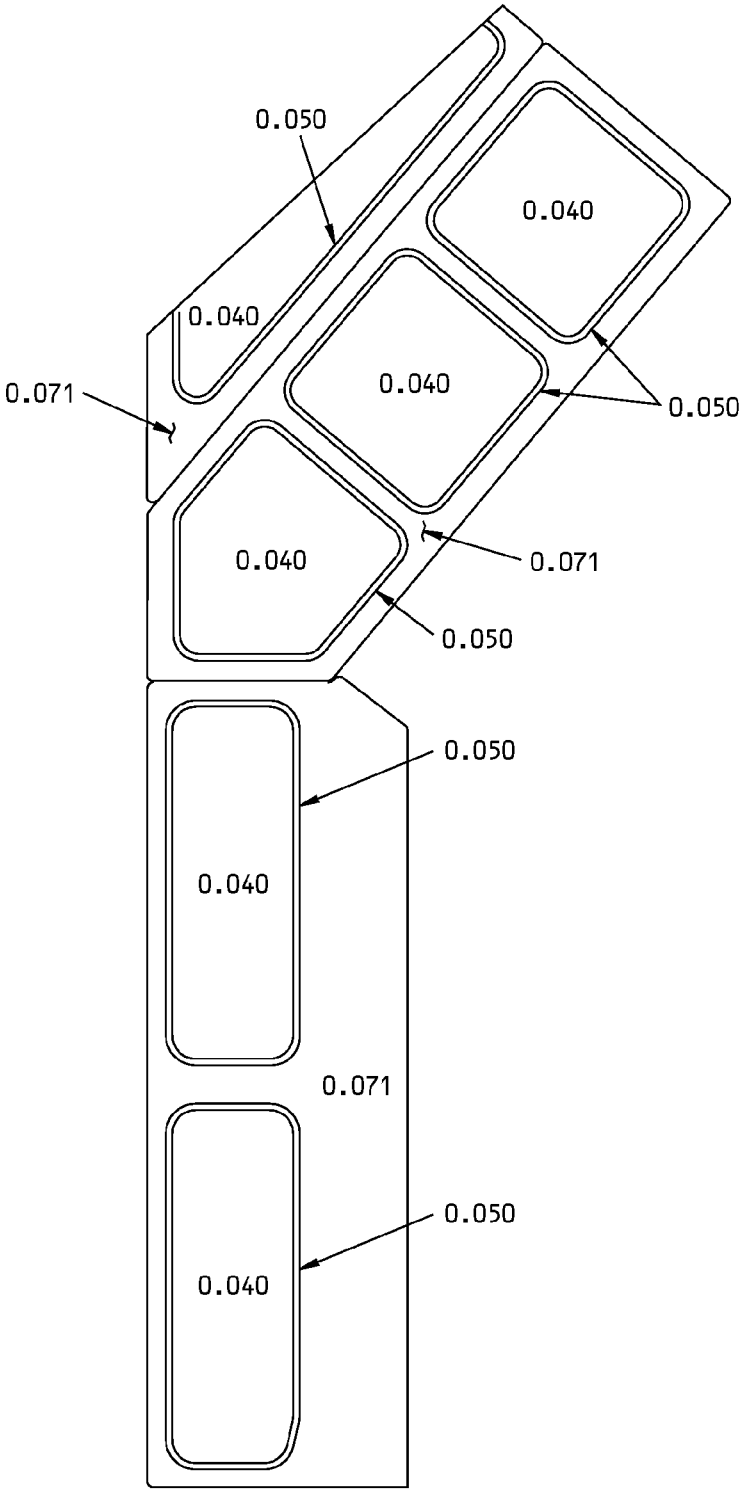
Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Skin	0.040 (1.02)	2024-T3 clad sheet as given in QQ-A-250/5	
[2]	Skin	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the chem-mill areas	
[3]	Fiberglass Strap		Glass Fabric Reinforced Plastic (GFRP) as given in BMS 8-79, Class III, Grade B, Style 1581	
[4]	Splice	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[5]	Skin	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 4 for the chem-mill areas	
[6]	Lower Strap	0.312 (7.92)	7050-T7451 machined plate as given in AMS 4050	
[7]	Upper Strap	0.500 (12.70)	7050-T7451 machined plate as given in AMS 4050	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

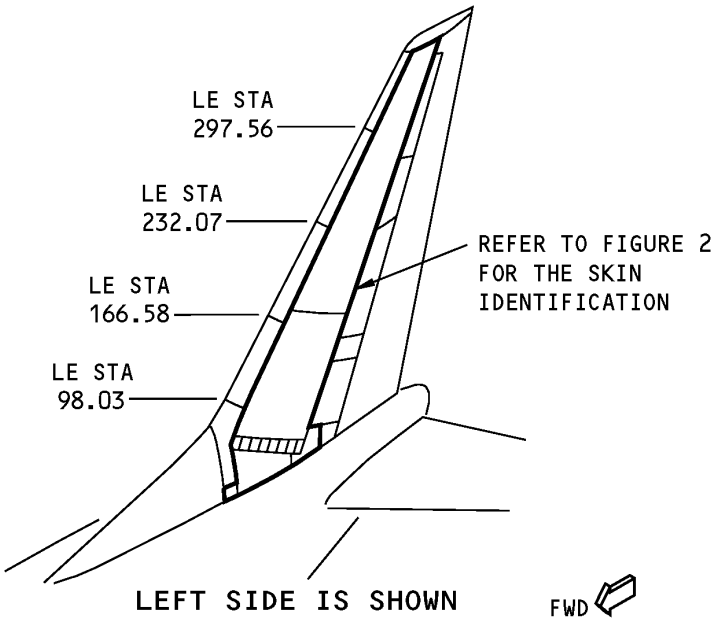


Chem-Milled Areas for Figure 2, Item [2]
Figure 3



Chem-Milled Areas for Figure 2, Item [5]
Figure 4

IDENTIFICATION 2 - VERTICAL STABILIZER LEFT INSPAR SKIN

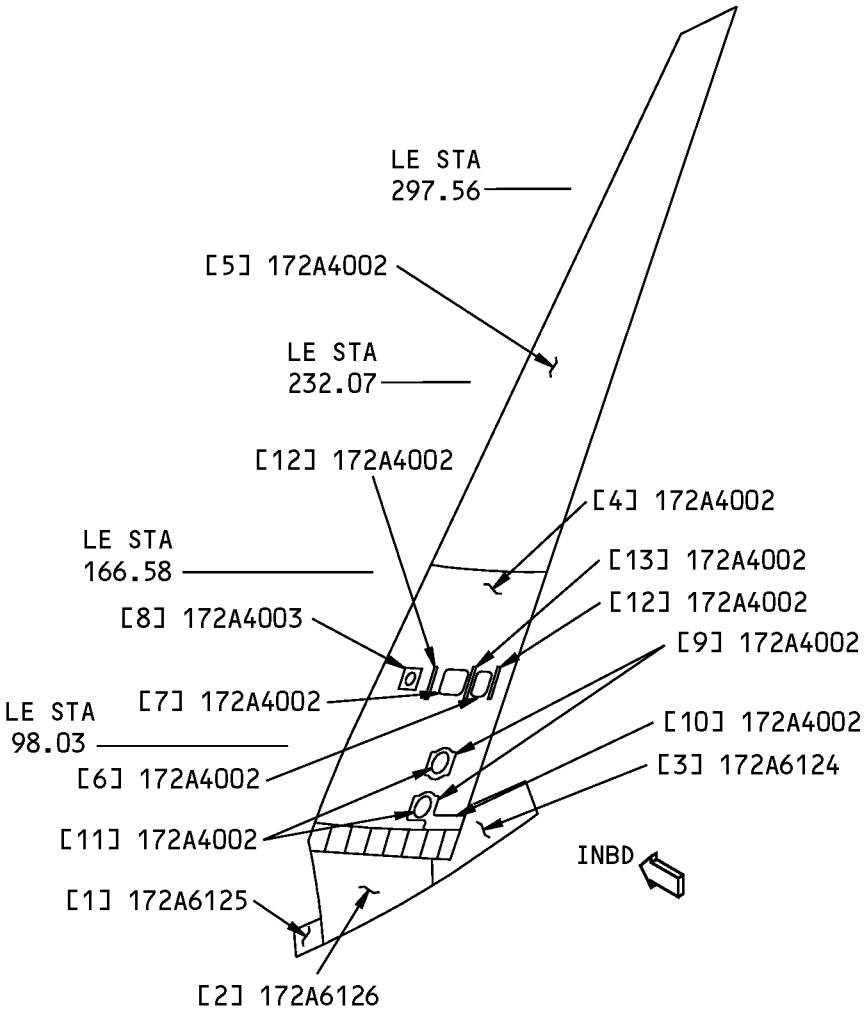


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Inspar Skin Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A0001	Torque Box Functional Collector - Vertical Fin
172A4001	Skin Installation - Inspar, Vertical Fin
172A6120	Panel Installation - Fin to Body, Vertical Fin
172A6121	Panel Assembly, Closeout - Vertical Fin
172A6122	Door Assembly, Access - Vertical Fin



LEFT SIDE IS SHOWN

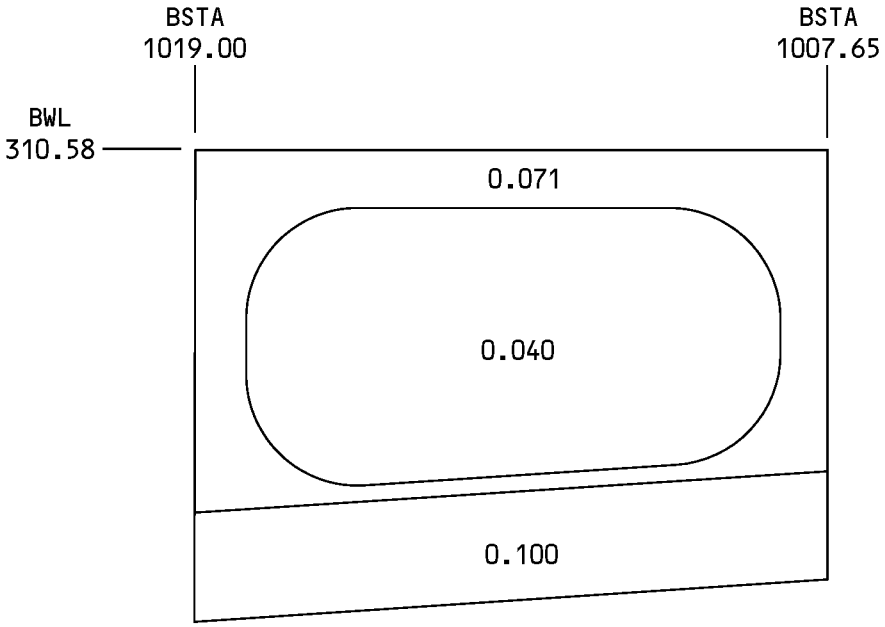
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Inspar Skin Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Access Door	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the chem-mill areas	
[2]	Inspar Closeout Panel - Bonded Assembly Skin Core		Glass Fabric Reinforced Plastic (GFRP) honeycomb sandwich Refer to Figure 4 for the 0 degree ply direction, material, and ply sequence Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 4 for the core ribbon direction	
[3]	Aft Closeout Panel	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 5 for the chem-mill areas	
[4]	Skin Panel - Lower Left Hand	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 6 for the chem-mill areas	
[5]	Skin Panel - Upper Left Hand	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 7 for the chem-mill areas	
[6]	Door	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 8 for the chem-mill areas	
[7]	Door	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 9 for the chem-mill areas	
[8]	Doubler	0.250 (6.35)	7075-T7351 plate as given in QQ-A-250/12	
[9]	Doubler	0.063 (1.60)	2024-T3 clad sheet as given in QQ-A-250/5	
[10]	Doubler	0.025 (0.64)	2024-T3 clad sheet as given in QQ-A-250/5	
[11]	Door	0.071 (1.80)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 10 for the chem-mill areas	
[12]	Strap	0.090 (2.29)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Boeing production drawings for the chem-mill thicknesses	
[13]	Strap	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Boeing production drawings for the chem-mill thicknesses	

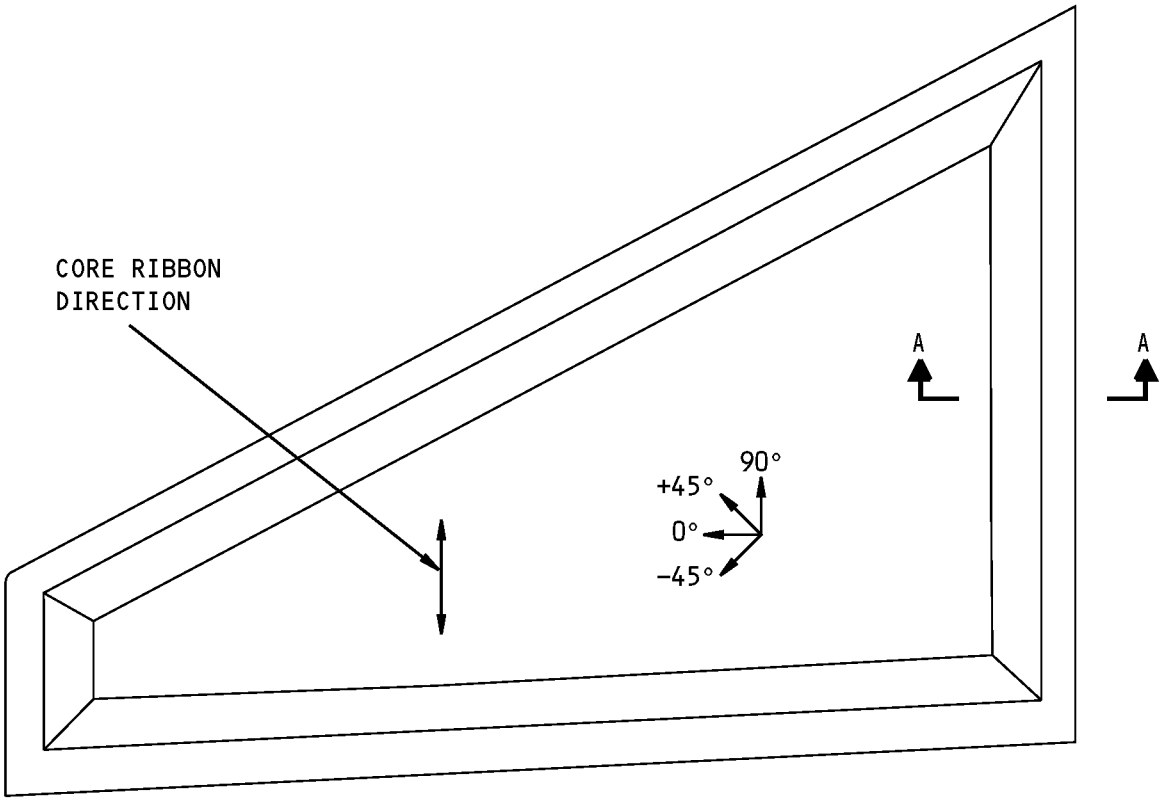
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



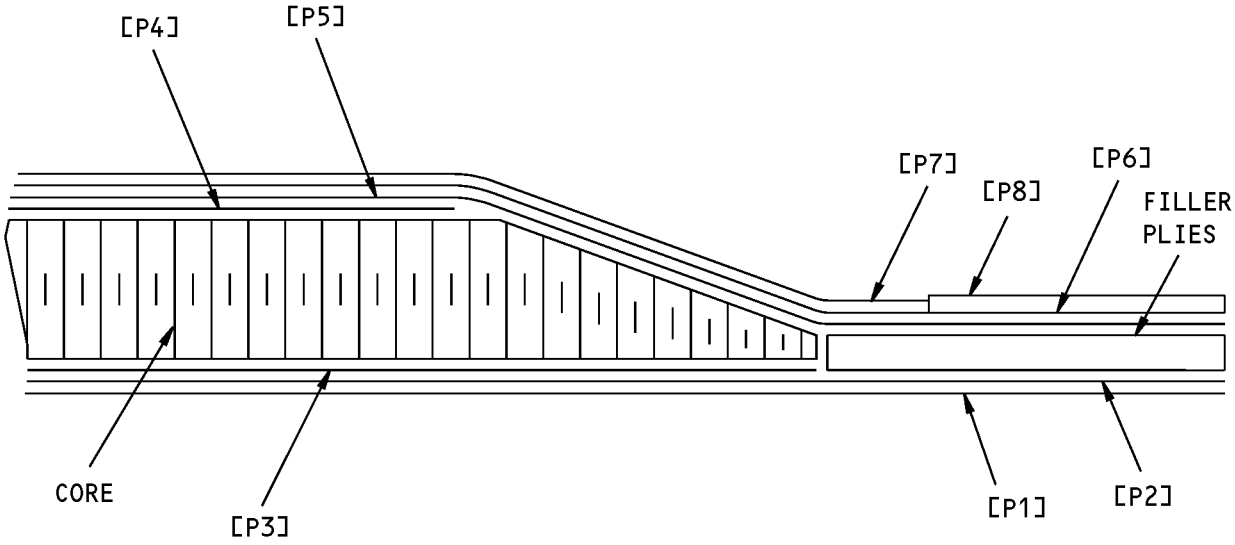
Chem-milled Areas for Figure 2, Item [1]
Figure 3

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P2, P5, P6	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4	90 degrees	Epoxy/Graphite tape as given in BMS 8-168, Type II, Class I, Grade 145
P7	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P8	———	Bondable teflon

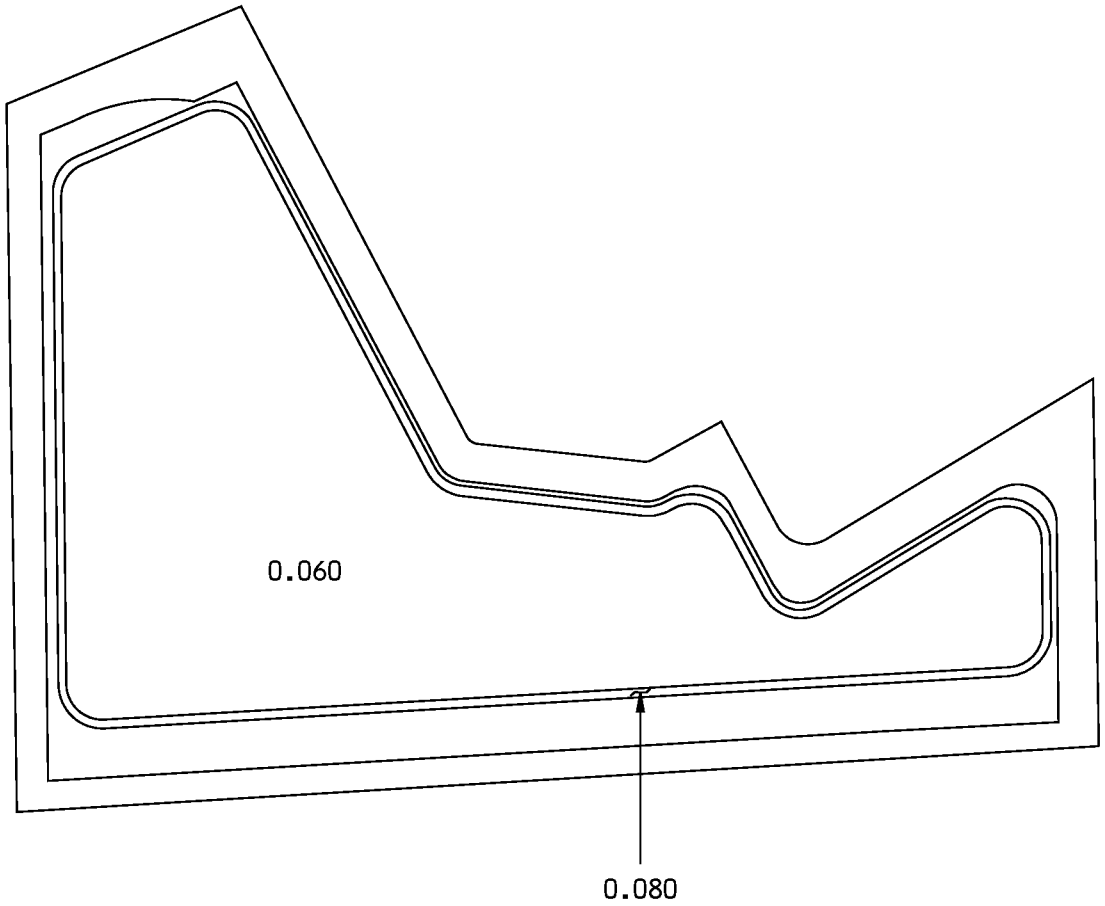


Ply Direction, Core Ribbon Direction, and Ply Sequence for the Inspar Closeout Panel, Figure 2, Item [2]
Figure 4 (Sheet 1 of 2)

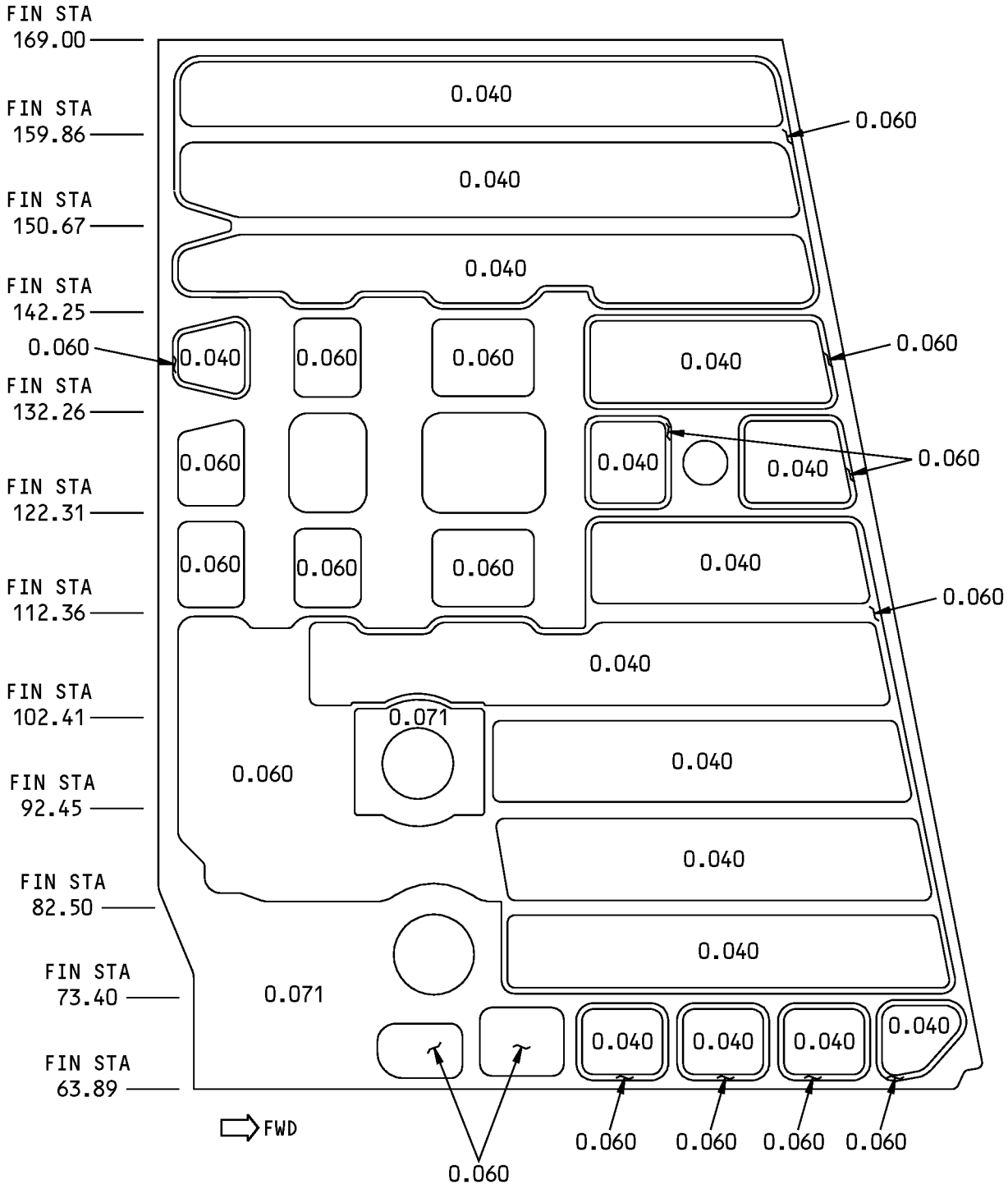


A–A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Inspar Closeout Panel, Figure 2, Item [2]
Figure 4 (Sheet 2 of 2)

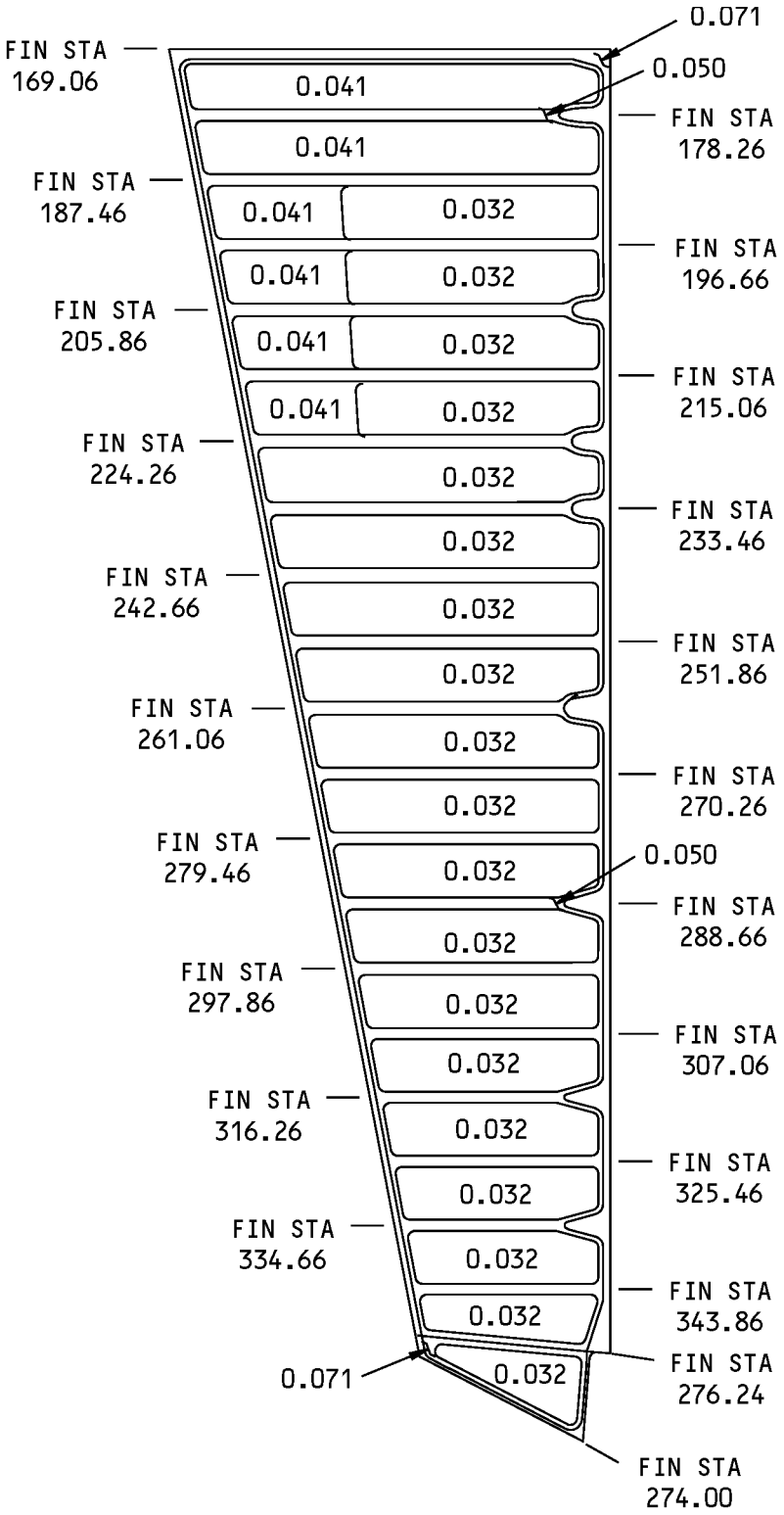


Chem-milled Areas for Figure 2, Item [3]
Figure 5

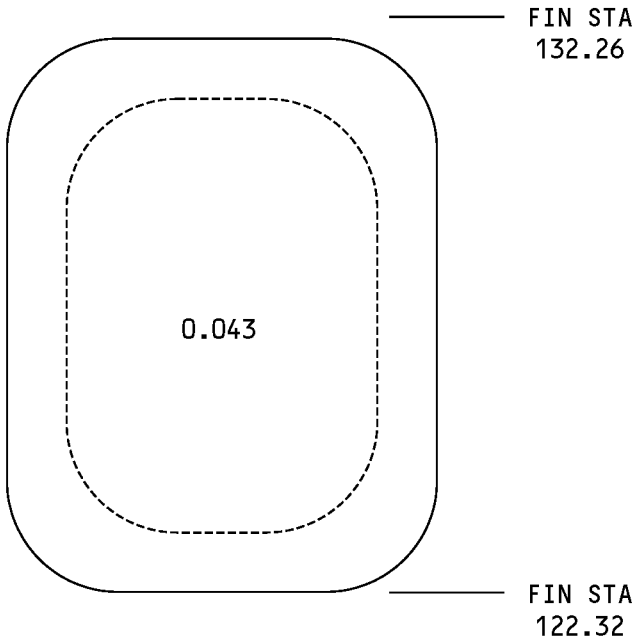


NOTE: ALL DIMENSIONS SHOWN ARE THICKNESSES IN INCHES.

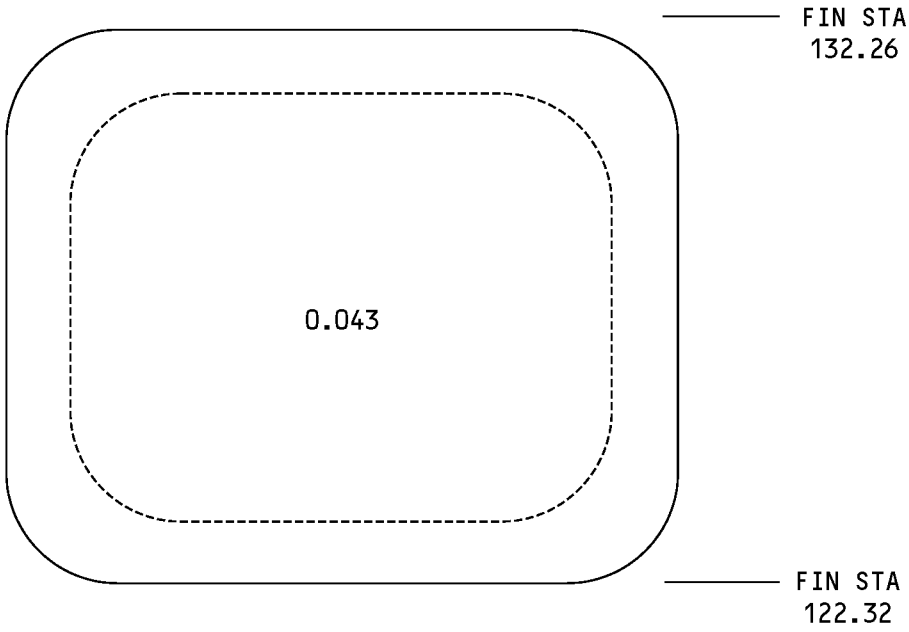
Chem-milled Areas for Figure 2, Item [4]
Figure 6



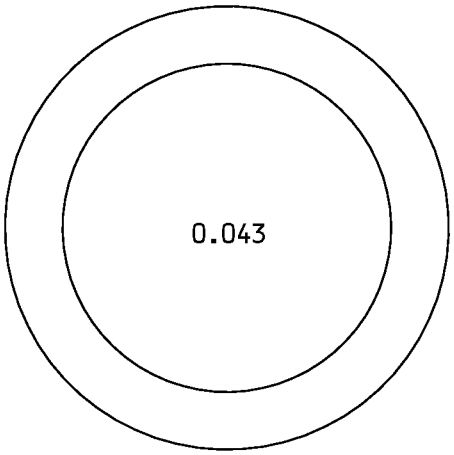
Chem-milled Areas of Figure 2, Item [5]
Figure 7



Chem-milled Areas of Figure 2, Item [6]
Figure 8

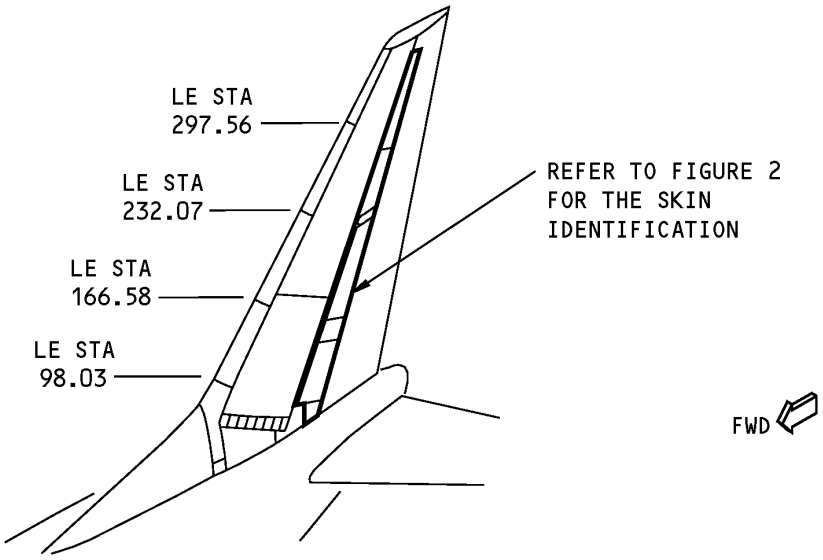


Chem-milled Areas of Figure 2, Item [7]
Figure 9



Chem-milled Areas of Figure 2, Item [11]
Figure 10

IDENTIFICATION 3 - VERTICAL STABILIZER LEFT TRAILING EDGE PANELS



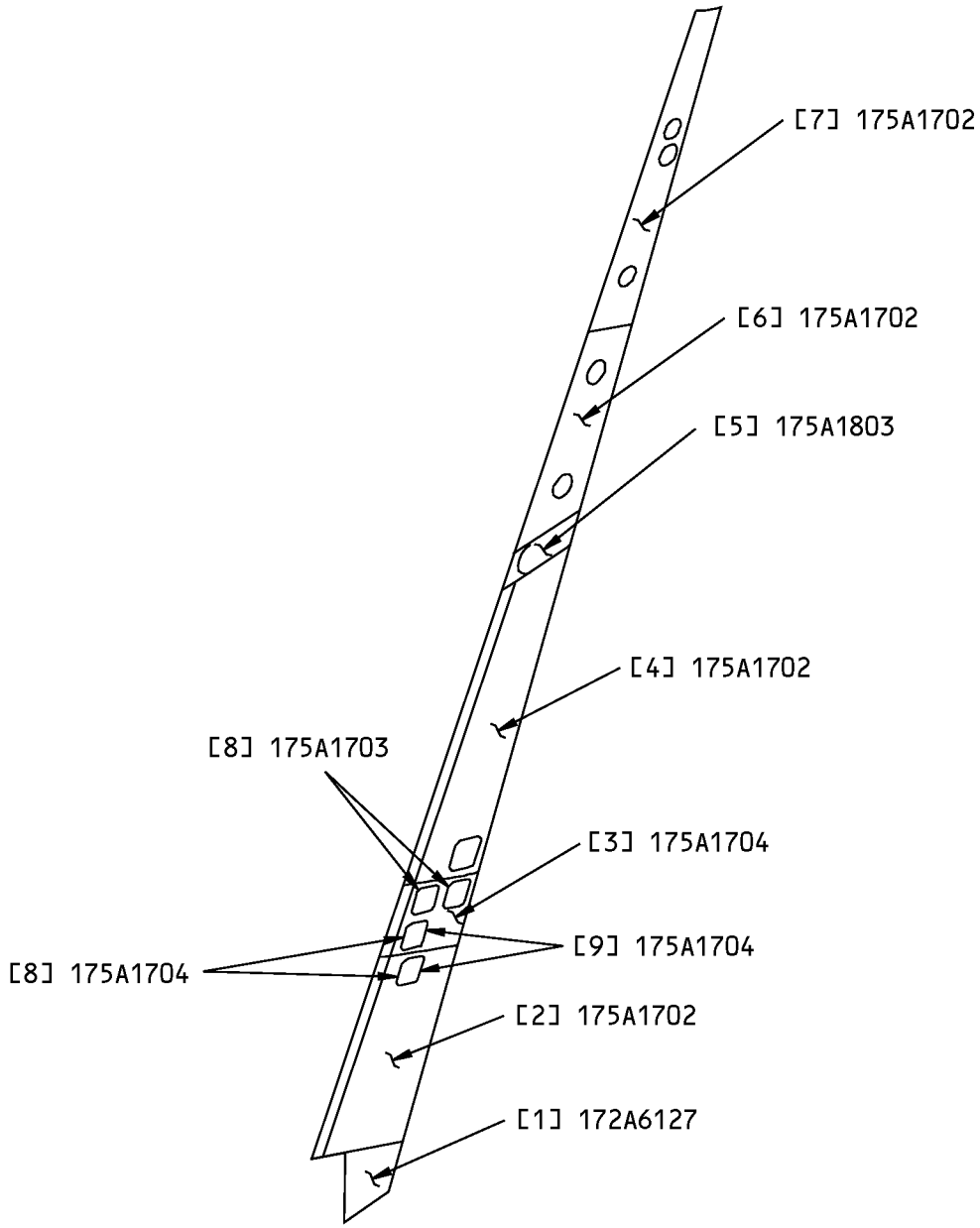
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

LEFT SIDE IS SHOWN

Vertical Stabilizer Trailing Edge and Closeout Panel Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A0001	Torque Box Functional Collector - Vertical Fin
172A6123	Panel Assembly - Trailing Edge Closeout, Vertical Fin
175A0001	Trailing Edge Functional Collector - Vertical Fin
175A1701	Panel Installation - Trailing Edge, Vertical Fin
175A1703	Door Assembly - Trailing Edge, Vertical Fin
175A1801	Seal Installation - Mass Balance Cavity, Fin WL 151.17, Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN

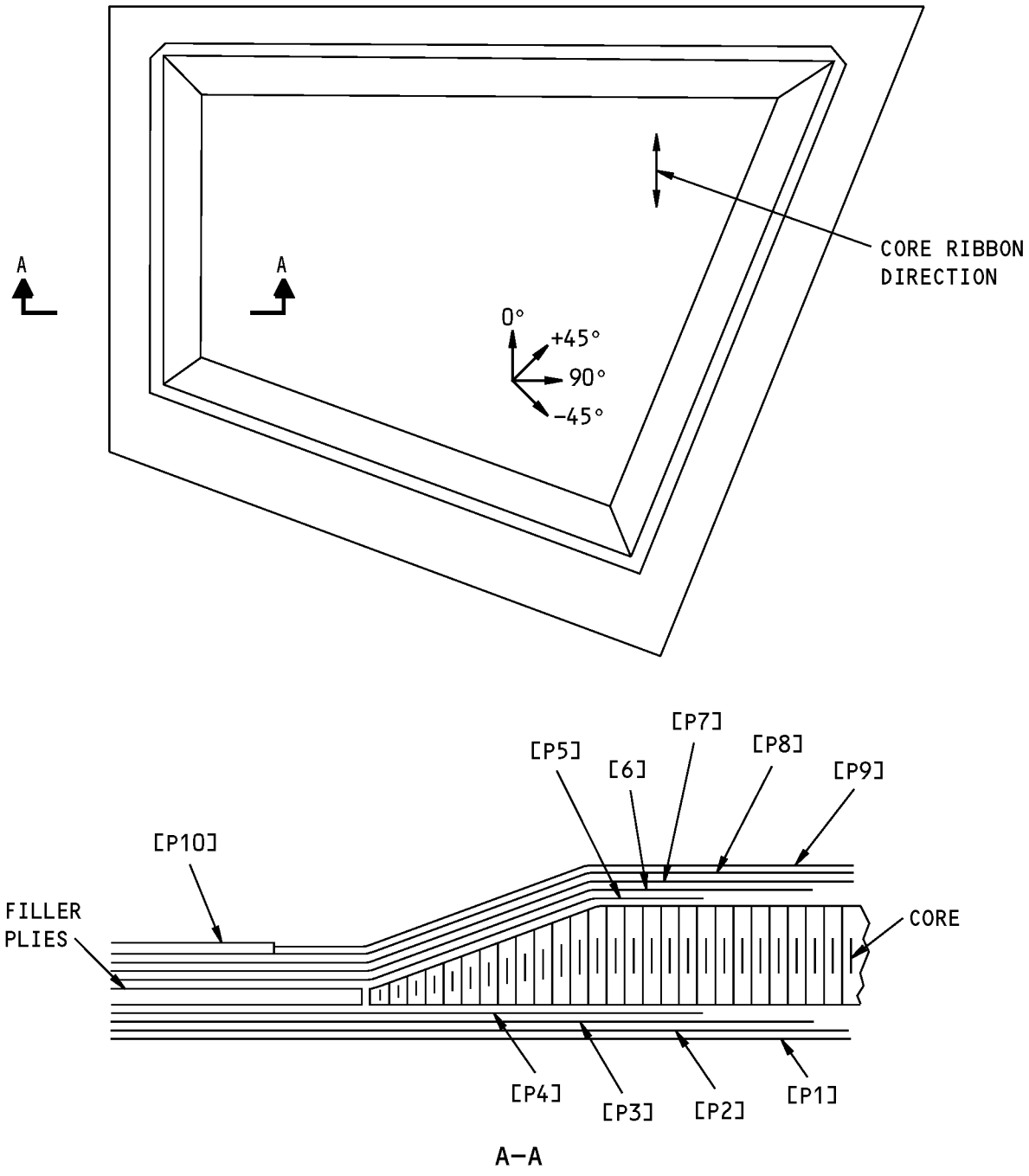
Vertical Stabilizer Trailing Edge and Closeout Panel Skin Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Closeout Panel Assembly -		Glass Fabric Reinforced Plastic (GFRP) honeycomb sandwich	
	Skin		Refer to Figure 3 for the 0 degree ply direction, material, and ply sequence	
	Core		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 3 for the core ribbon direction	
[2]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 4 for the 0 degree ply direction, material, and ply sequence	
	Core		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 4 for the core ribbon direction	
[3]	Trailing Edge Skin Panel	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 5 for the chem-mill areas	
[4]	Trailing Edge Panel Assembly - Bonded panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 6 for the 0 degree ply direction, material, and ply sequence	
	Core (3)		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 6 for the core ribbon direction	
	Door	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[5]	Mass Balance Cavity Panel - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 7 for the 0 degree ply direction, material, and ply sequence	
	Core		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 7 for the core ribbon direction	
[6]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 8 for the 0 degree ply direction, material, and ply sequence	
	Core (2)		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 8 for the core ribbon	
	Cover	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[7]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 9 for the 0 degree ply direction, material, and ply sequence	
	Core (3)		Nonmetallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 9 for the core ribbon	
	Cover	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	

LIST OF MATERIALS FOR FIGURE 2				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
[8]	Door	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5	
[9]	Doubler	0.050 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5	

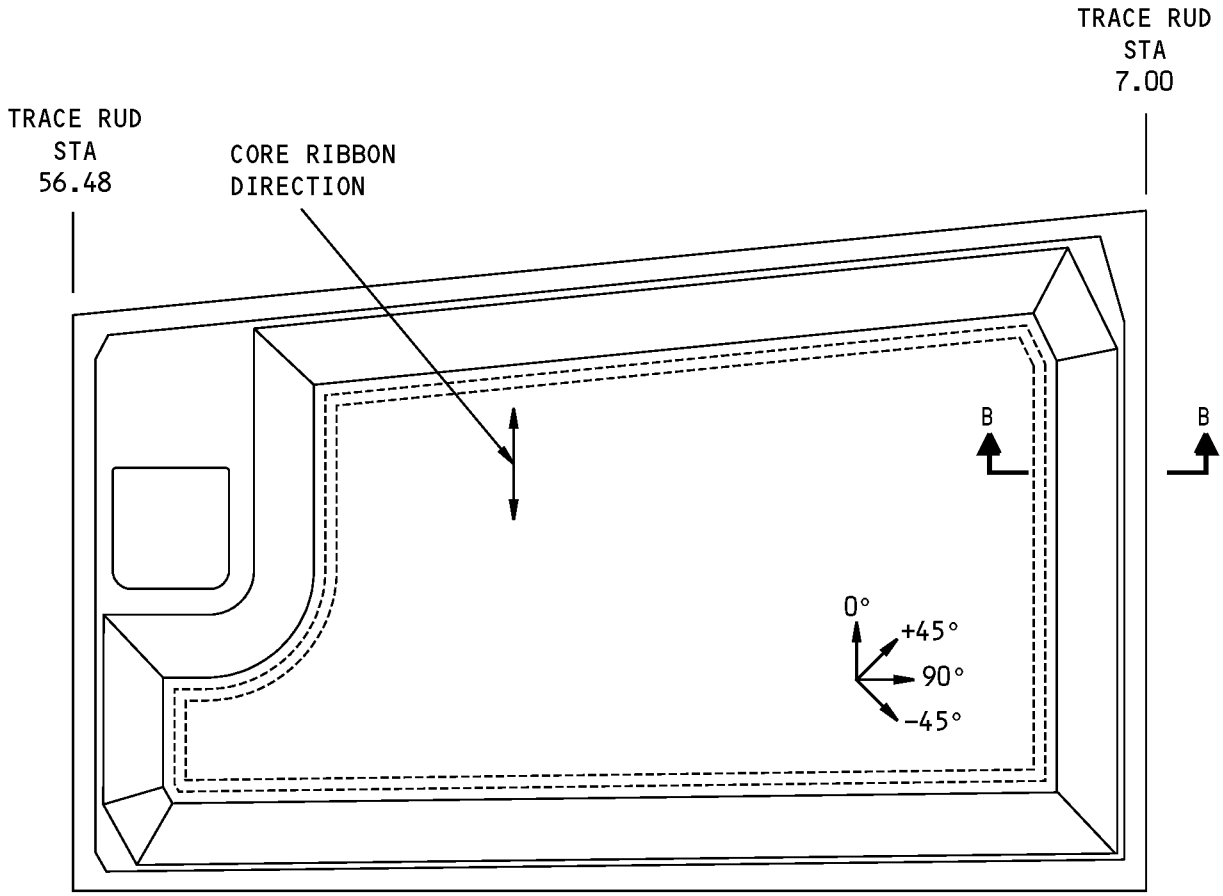
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

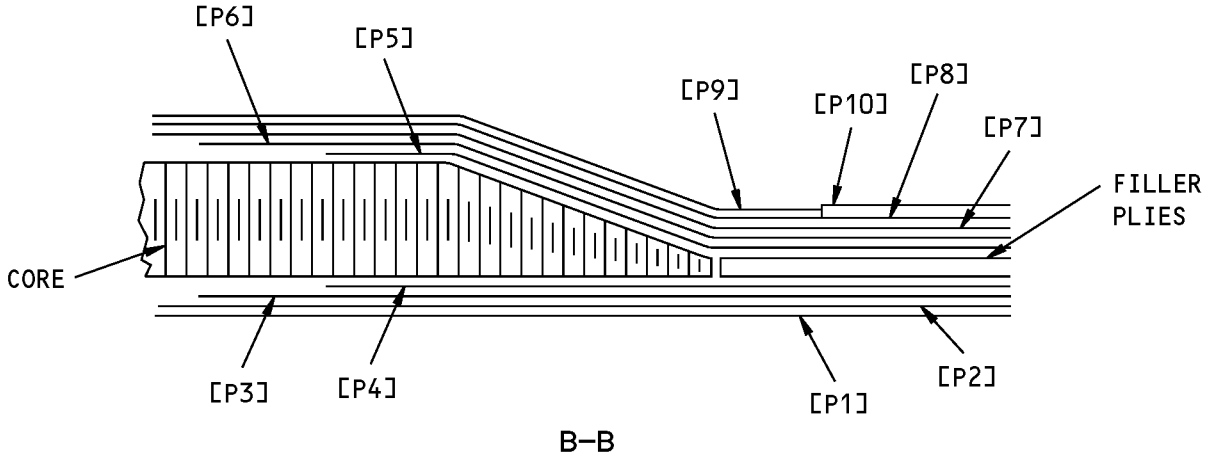


Ply Configuration for Figure 2, Item [1]
Figure 3

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79 Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P10	———	Bondable teflon

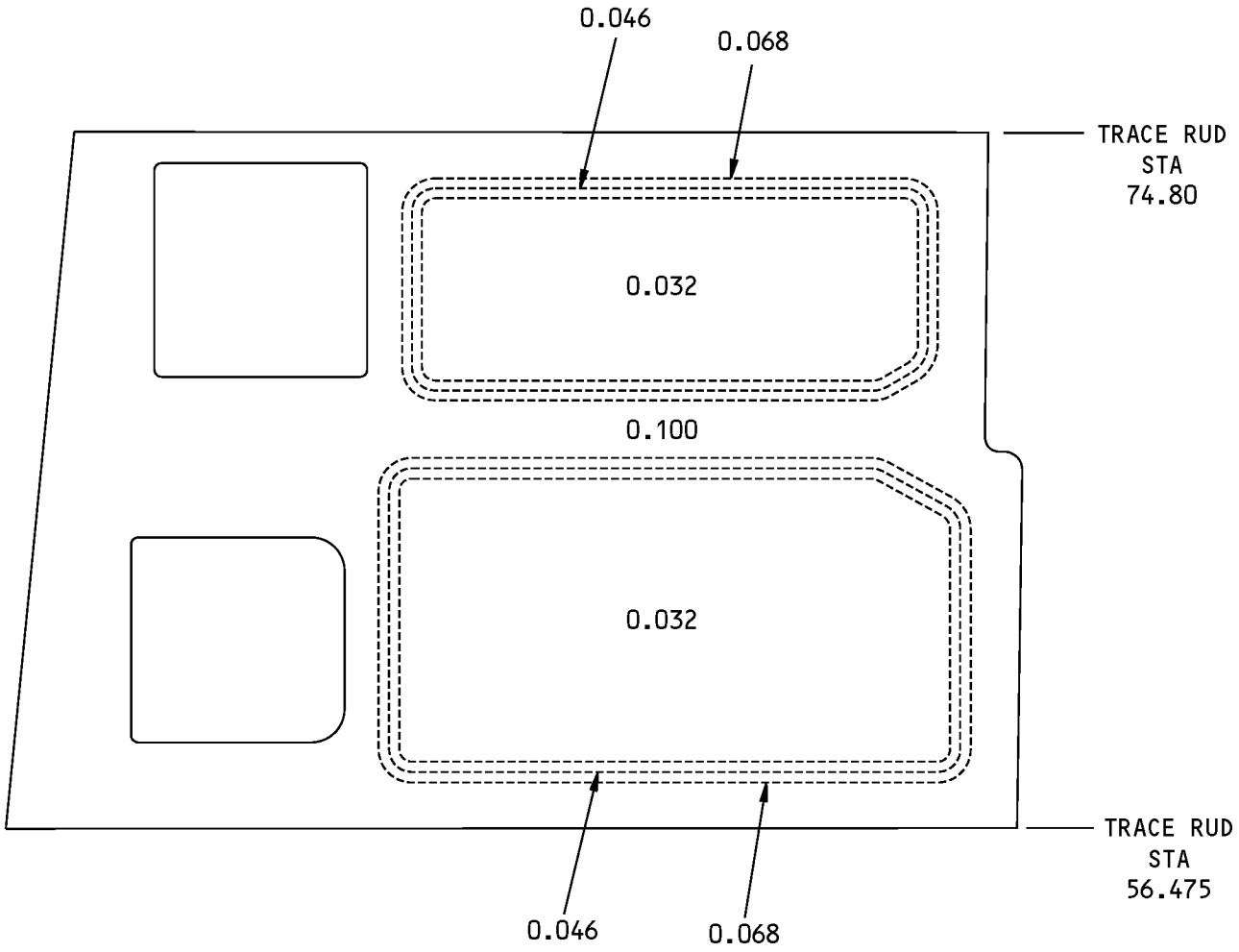




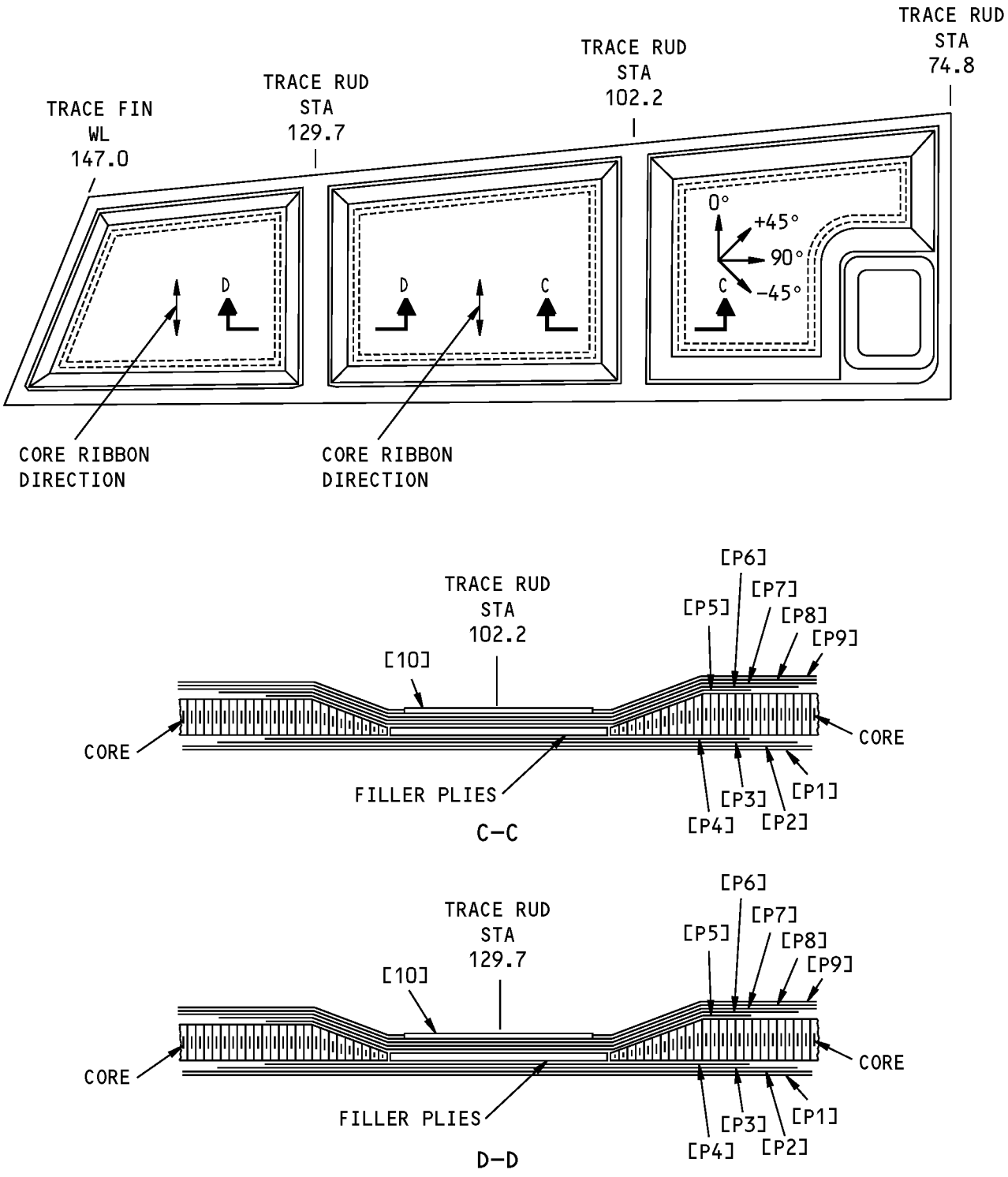
Ply Configuration for Figure 2, Item [2]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P10	———	Bondable teflon



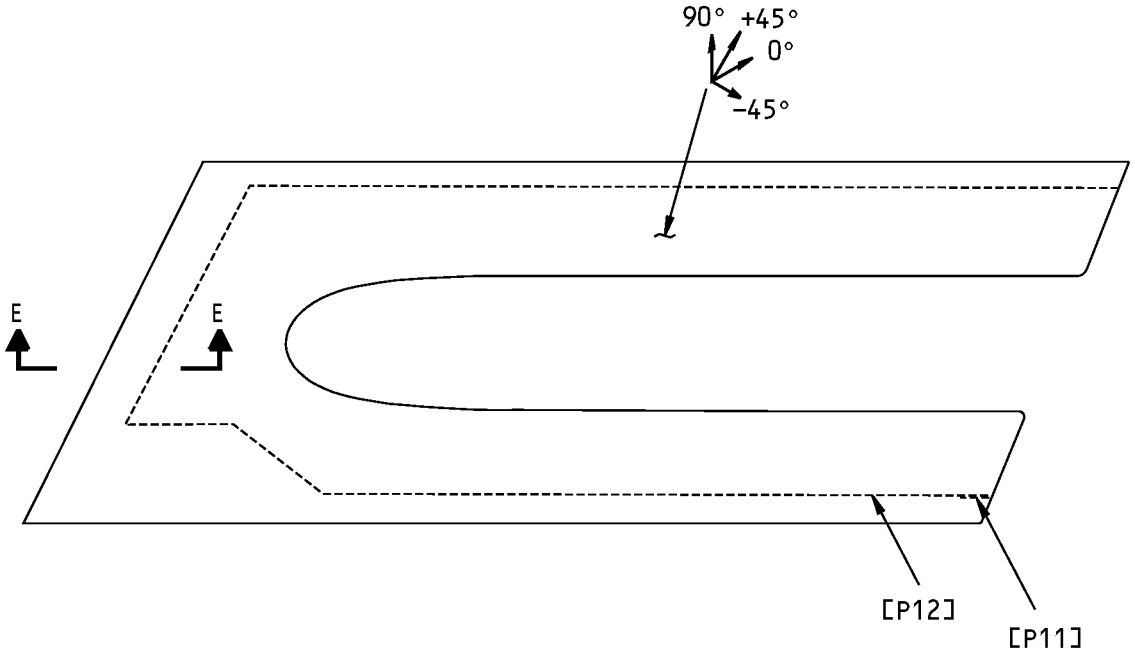
Chem-milled Areas for Figure 2, Item [3]
Figure 5

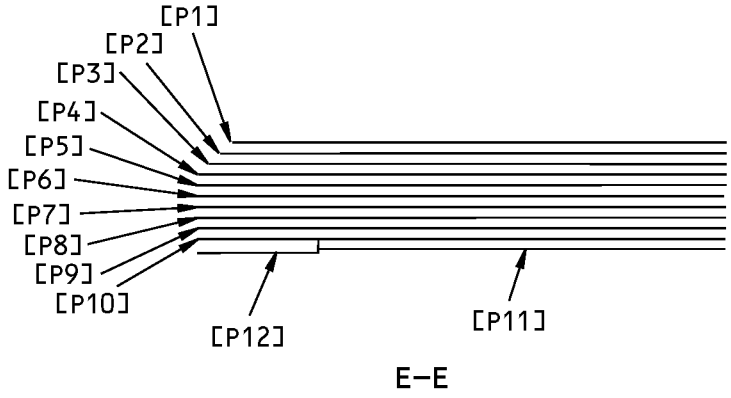


Ply Configuration of Figure 2, Item [4]
Figure 6

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P10	———	Bondable teflon

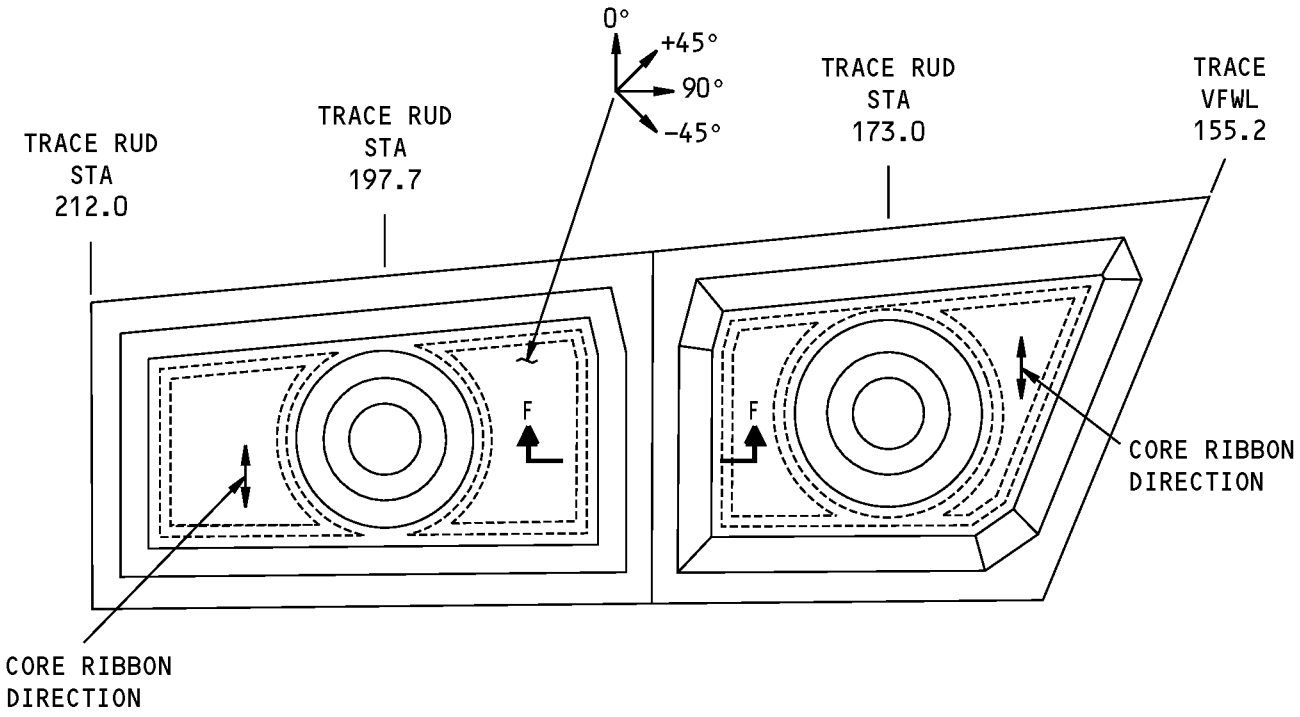


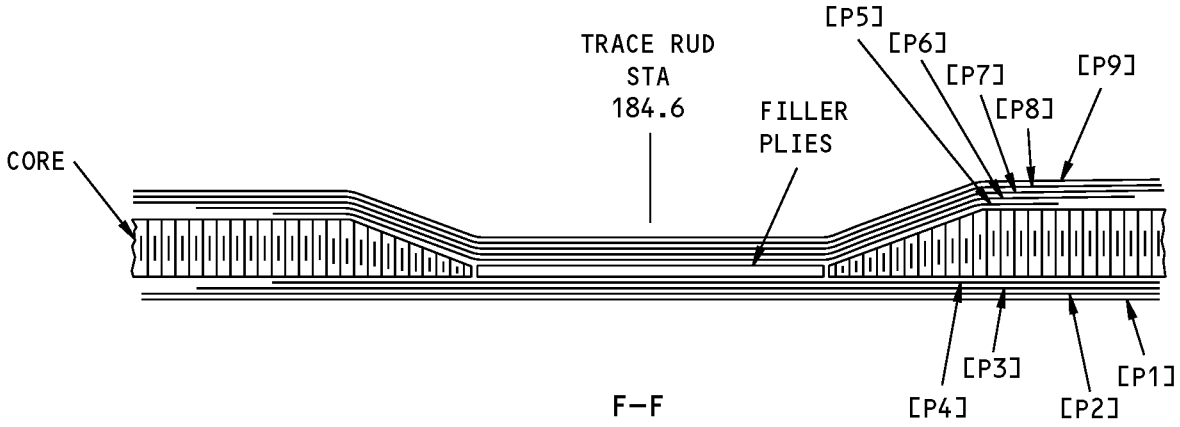


Ply Configuration for Figure 2, Item [5]
Figure 7

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 7		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P6, P8, P10	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P7, P9	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P11	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P11	———	0.001 inch thick white bondable tedlar film
P12	———	Bondable teflon

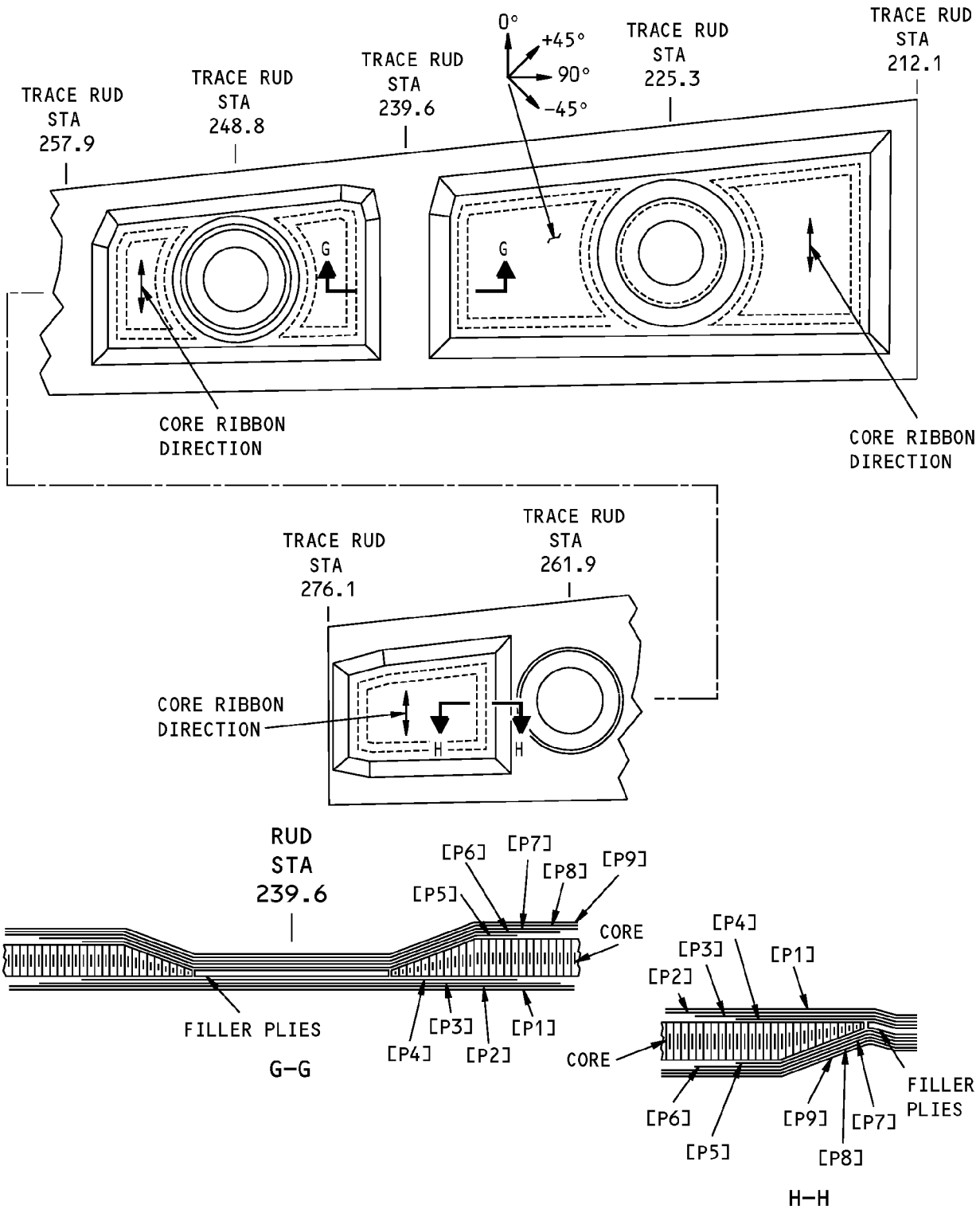




Ply Configuration for Figure 2, Item [6]
Figure 8

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 8		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	0.001 inch (0.025 mm) thick white bondable tedlar film

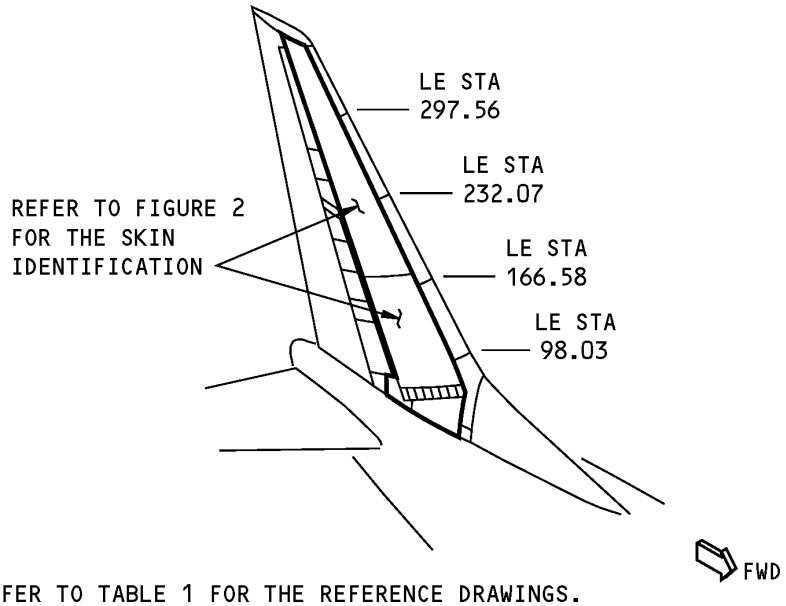


Ply Configuration for Figure 2, Item [7]
Figure 9

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 9		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	0.001 inch (0.025 mm) thick white bondable tedlar film

IDENTIFICATION 4 - VERTICAL STABILIZER RIGHT INSPAR SKIN



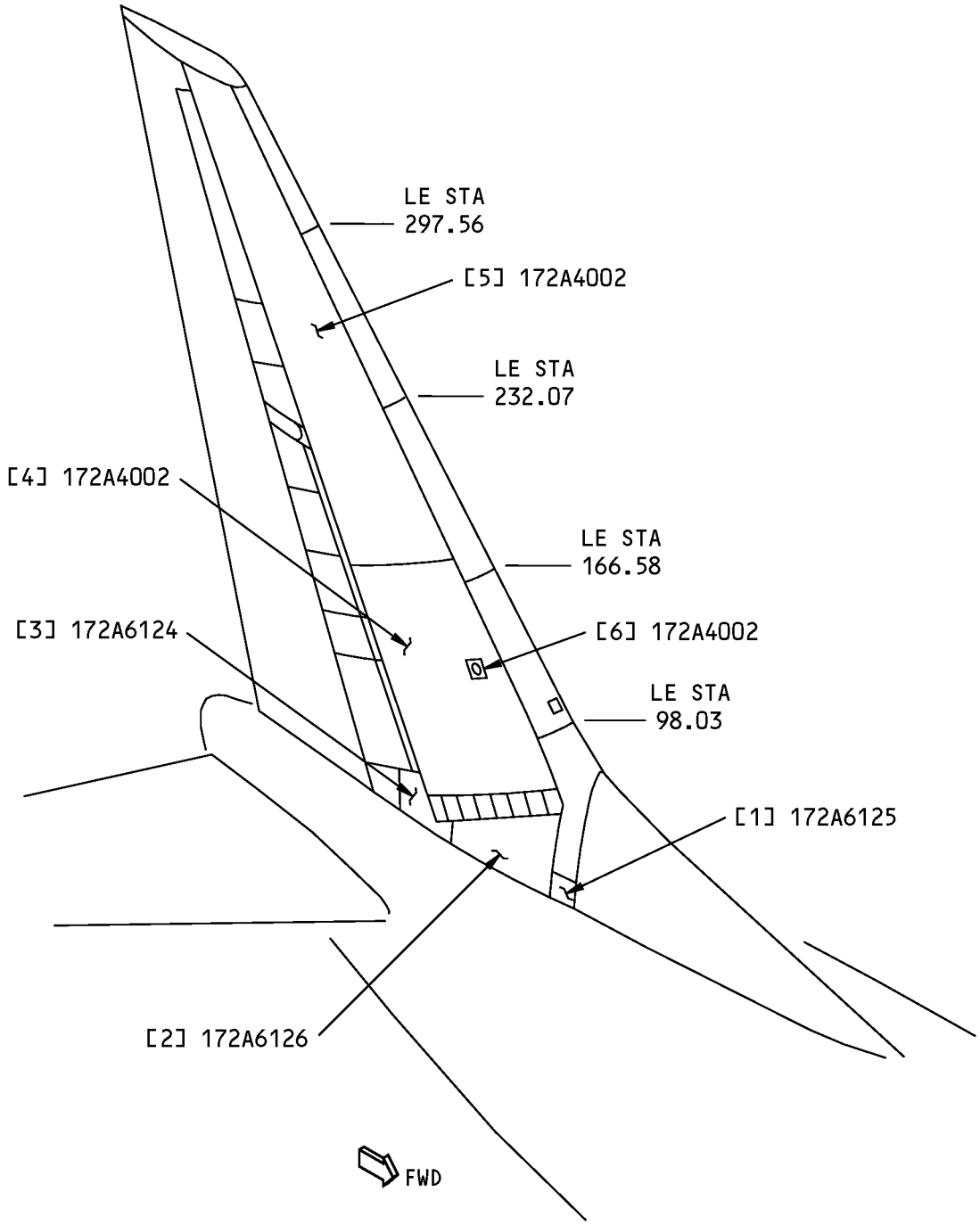
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

RIGHT SIDE IS SHOWN

Vertical Stabilizer Inspar Skin Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A0001	Torque Box Functional Collector - Vertical Fin
172A4001	Skin Installation - Inspar, Vertical Fin
172A6120	Panel Installation - Fin to Body, Vertical Fin
172A6121	Panel Assembly, Closeout - Vertical Fin
172A6122	Door Assembly, Access - Vertical Fin



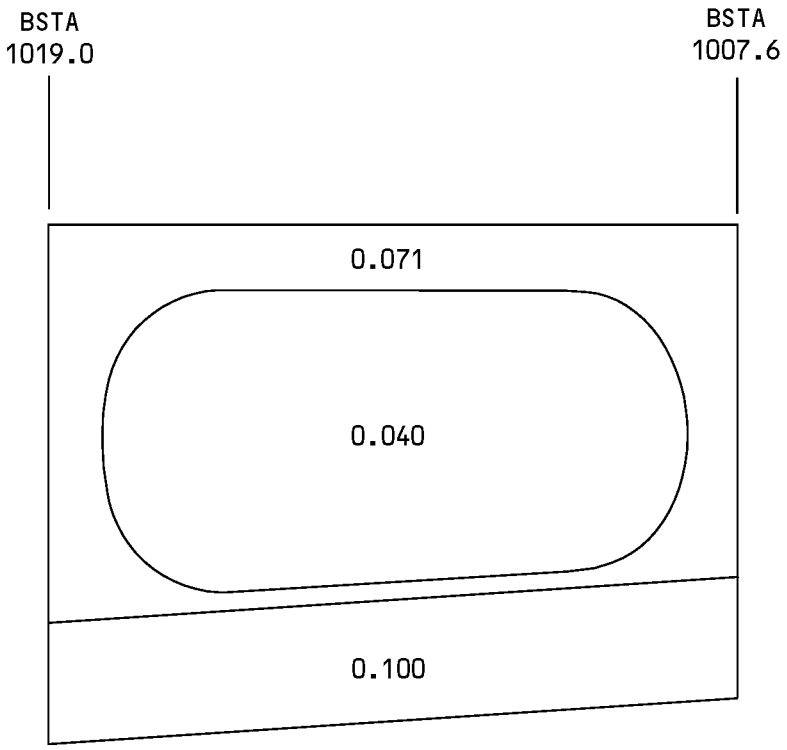
RIGHT SIDE IS SHOWN

Vertical Stabilizer Inspar Skin Identification
Figure 2

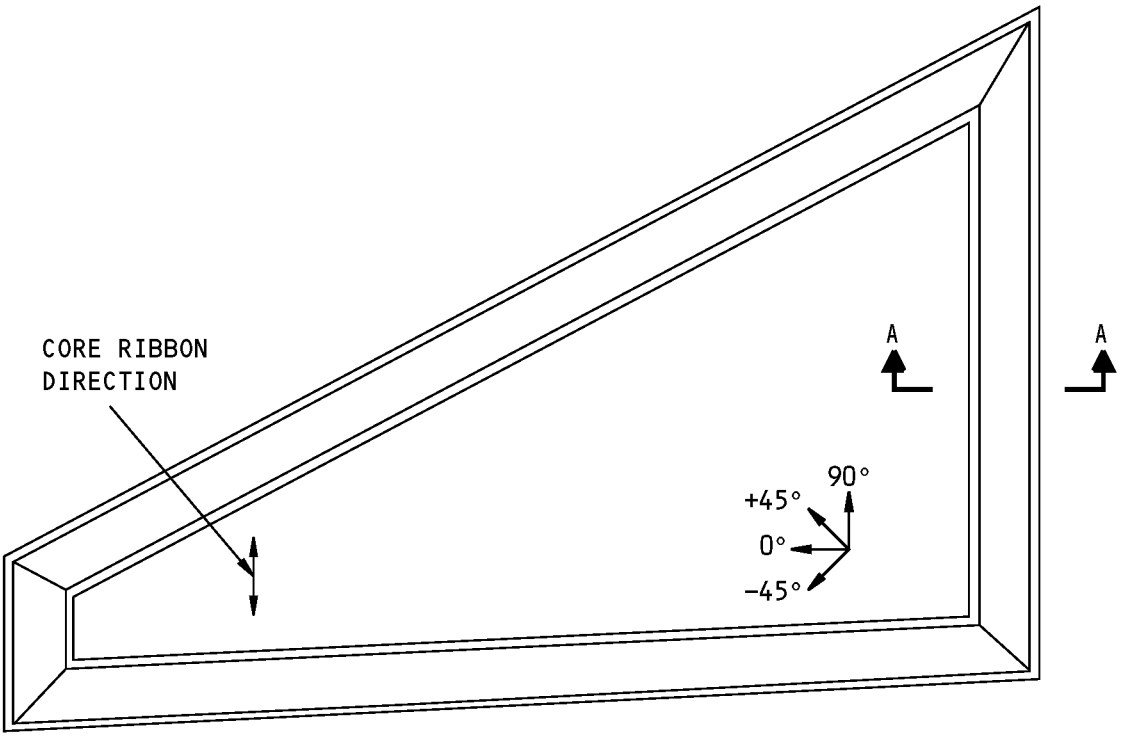
Table 2:

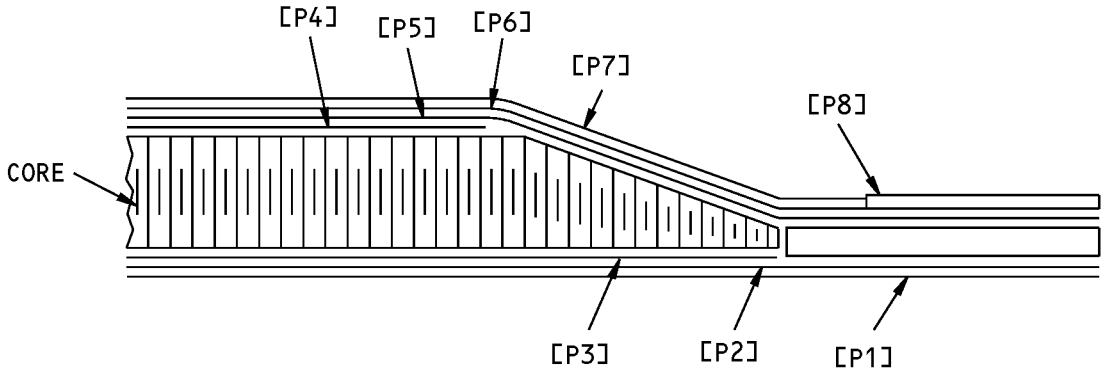
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Access Door	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 3 for the chem-mill areas	
[2]	Inspar Closeout Panel - Bonded Assembly		Glass Fiber Reinforced Plastic (GFRP) honeycomb sandwich	
	Skin		Refer to Figure 4 for the 0 degree ply direction, material, and ply sequence	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 3 for the core ribbon direction	
[3]	Aft Closeout Panel	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 5 for the chem-mill areas	
[4]	Skin Panel - Lower Left Hand	0.071 (1.80)	2024-T3 clad sheet as shown in QQ-A-250/5. Refer to Figure 6 for the chem-mill areas	
[5]	Skin Panel - Upper Left Hand	0.071 (1.80)	2024-T3 clad sheet as shown in QQ-A-250/5. Refer to Figure 7 for the chem-mill areas	
[6]	Doubler	0.025 (0.64)	2024-T3 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



Chem-milled Areas for Figure 2, Item [1]
Figure 3



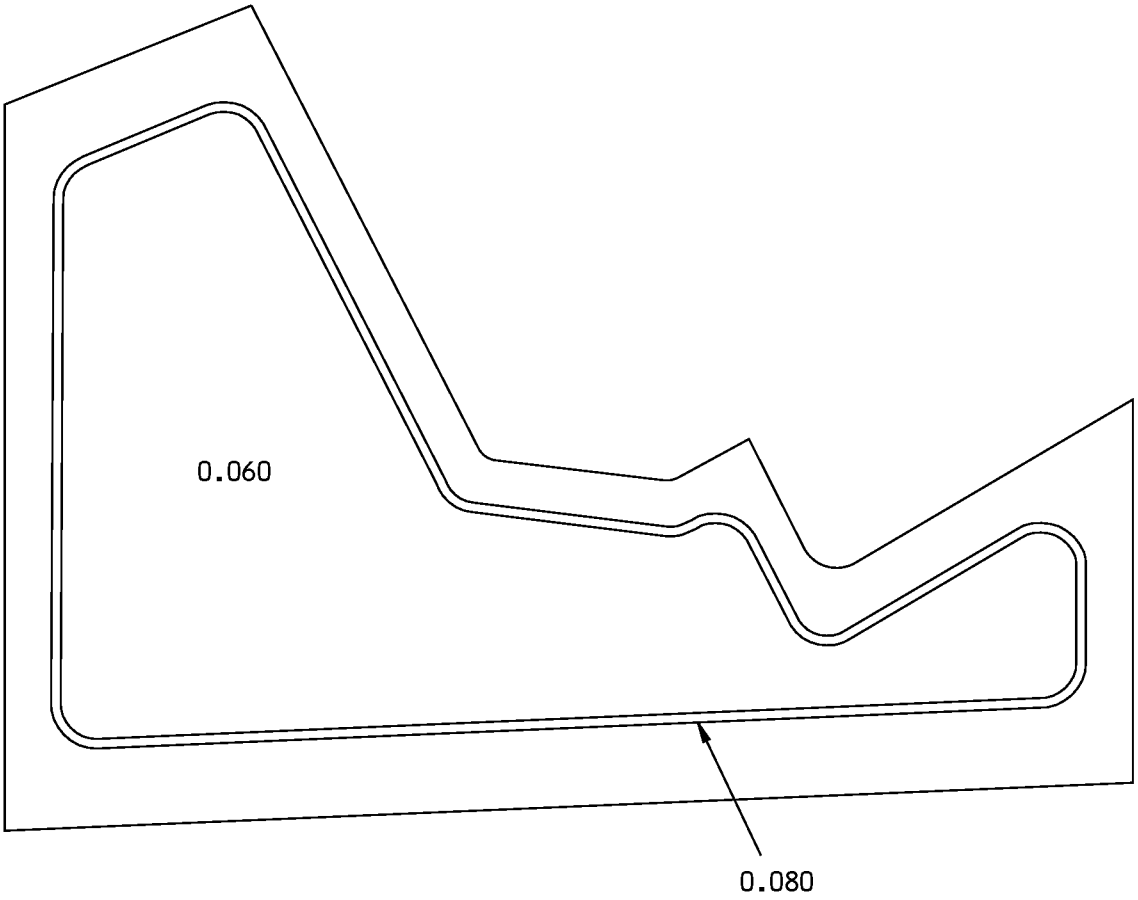


A–A

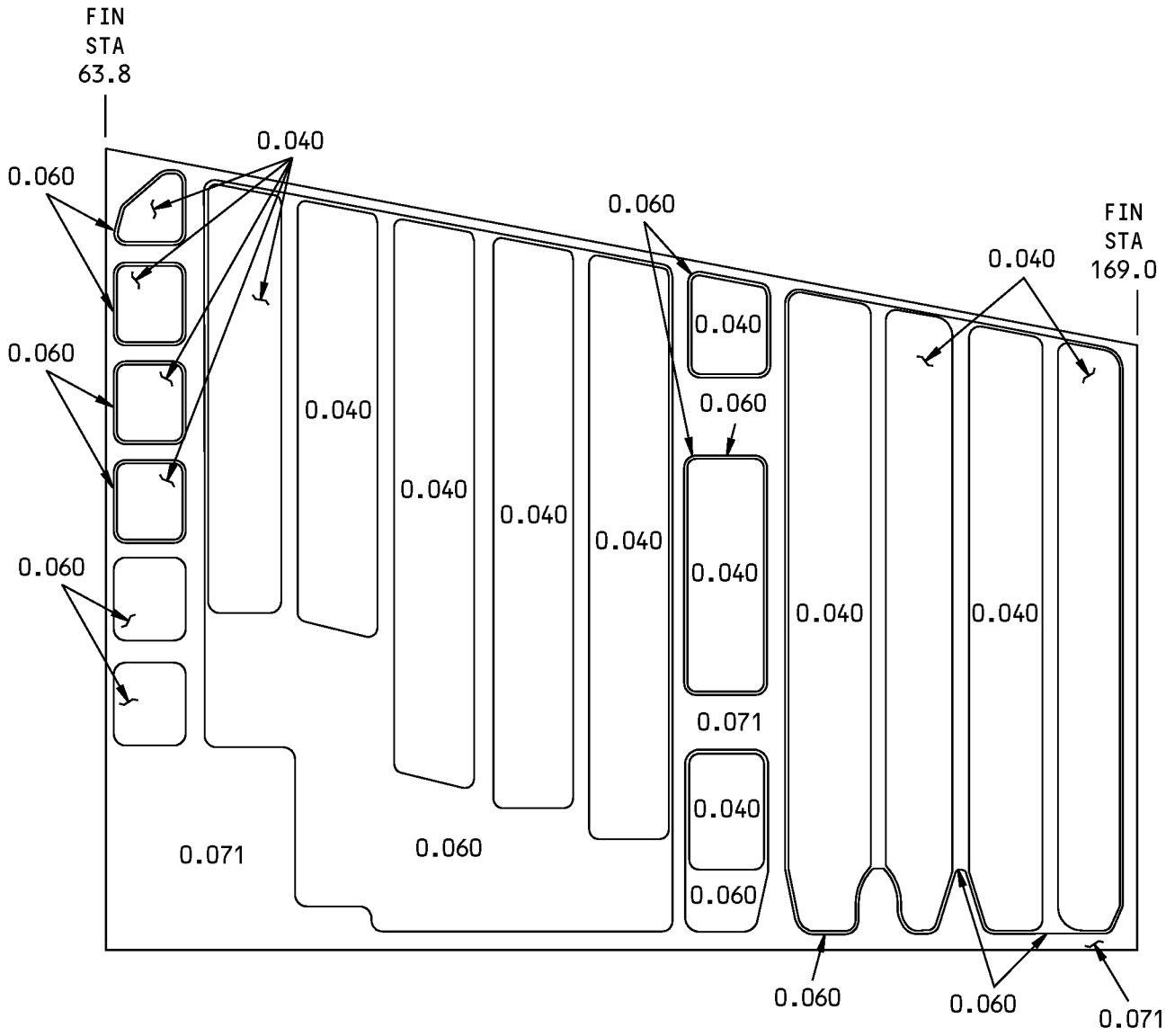
Ply Configuration for Figure 2, Item [2]
Figure 4

Table 3:

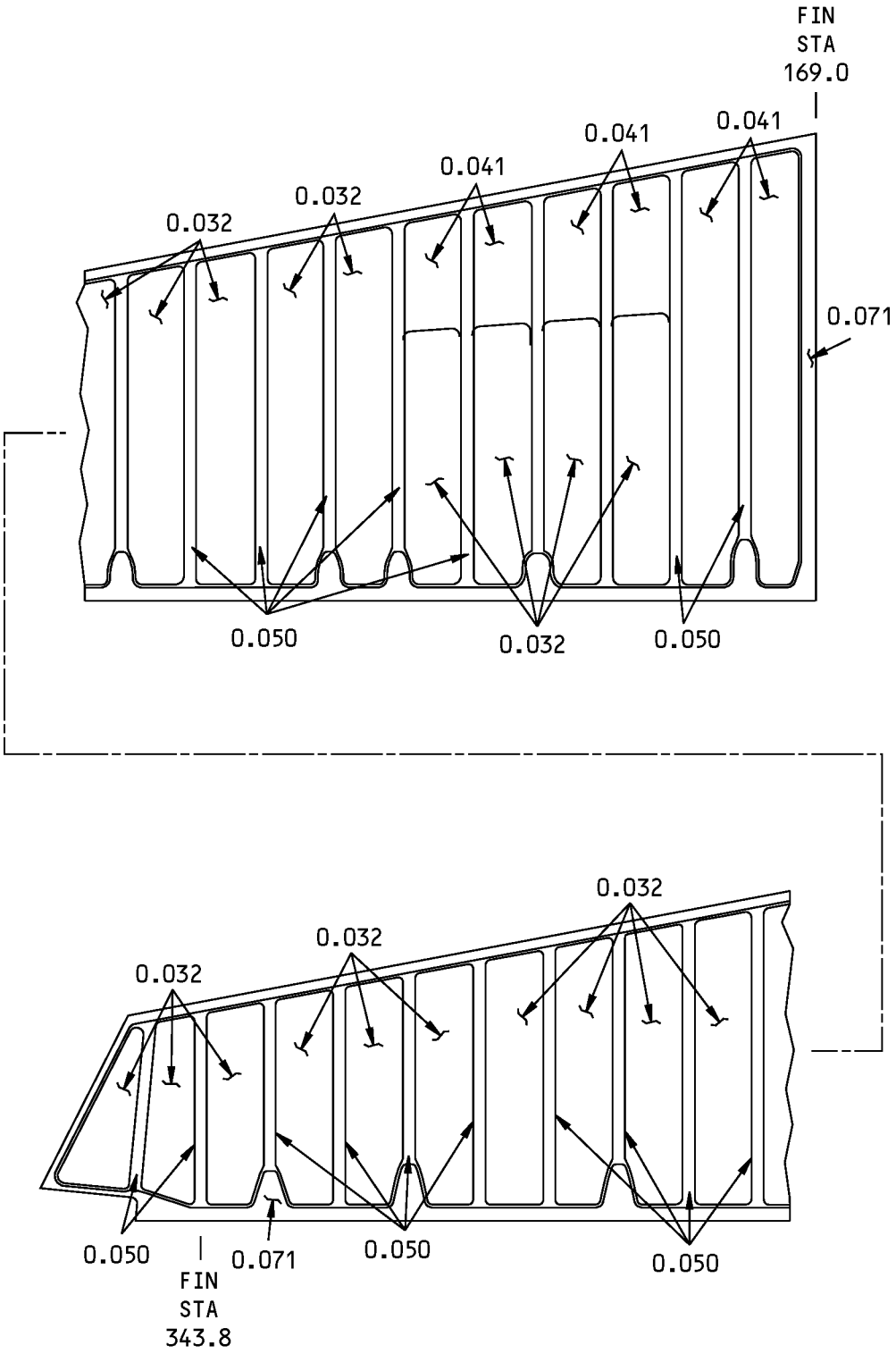
PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P2, P5, P6	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P3, P4	90 degrees	Epoxy/Graphite tape as given in BMS 8-168, Type II, Class I, Grade 145
P7	———	0.001 inch (0.025 mm) thick white bondable tedlar film
P8	———	Bondable teflon



Chem-milled Areas for Figure 2, Item [3]
Figure 5

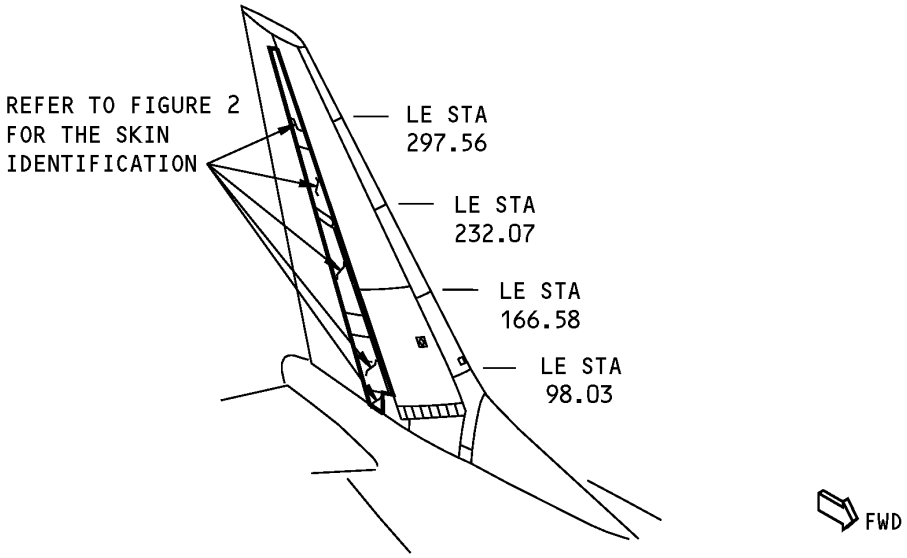


Chem-milled Areas for Figure 2, Item [4]
Figure 6



Chem-milled Areas for Figure 2, Item [5]
Figure 7

IDENTIFICATION 5 - VERTICAL STABILIZER RIGHT TRAILING EDGE PANELS



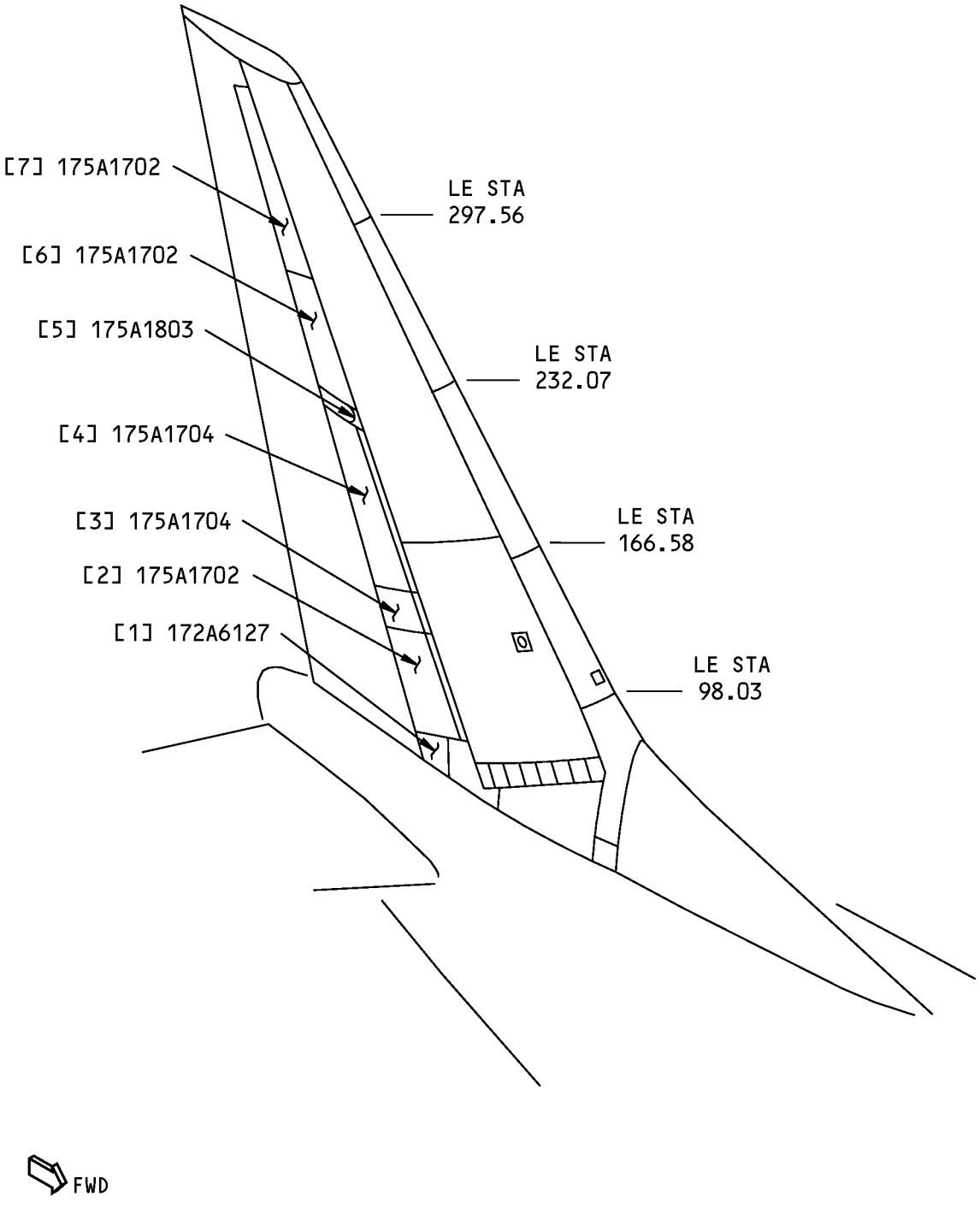
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

RIGHT SIDE IS SHOWN

Vertical Stabilizer Trailing Edge and Closeout Panel Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A0001	Torque Box Functional Collector - Vertical Fin
172A6123	Panel Assembly - Trailing Edge Closeout, Vertical Fin
175A0001	Trailing Edge Functional Collector - Vertical Fin
175A1701	Panel Installation - Trailing Edge, Vertical Fin
175A1703	Door Assembly - Trailing Edge, Vertical Fin
175A1801	Seal Installation - Mass Balance Cavity, Fin WL 151.17, Vertical Fin



RIGHT SIDE IS SHOWN

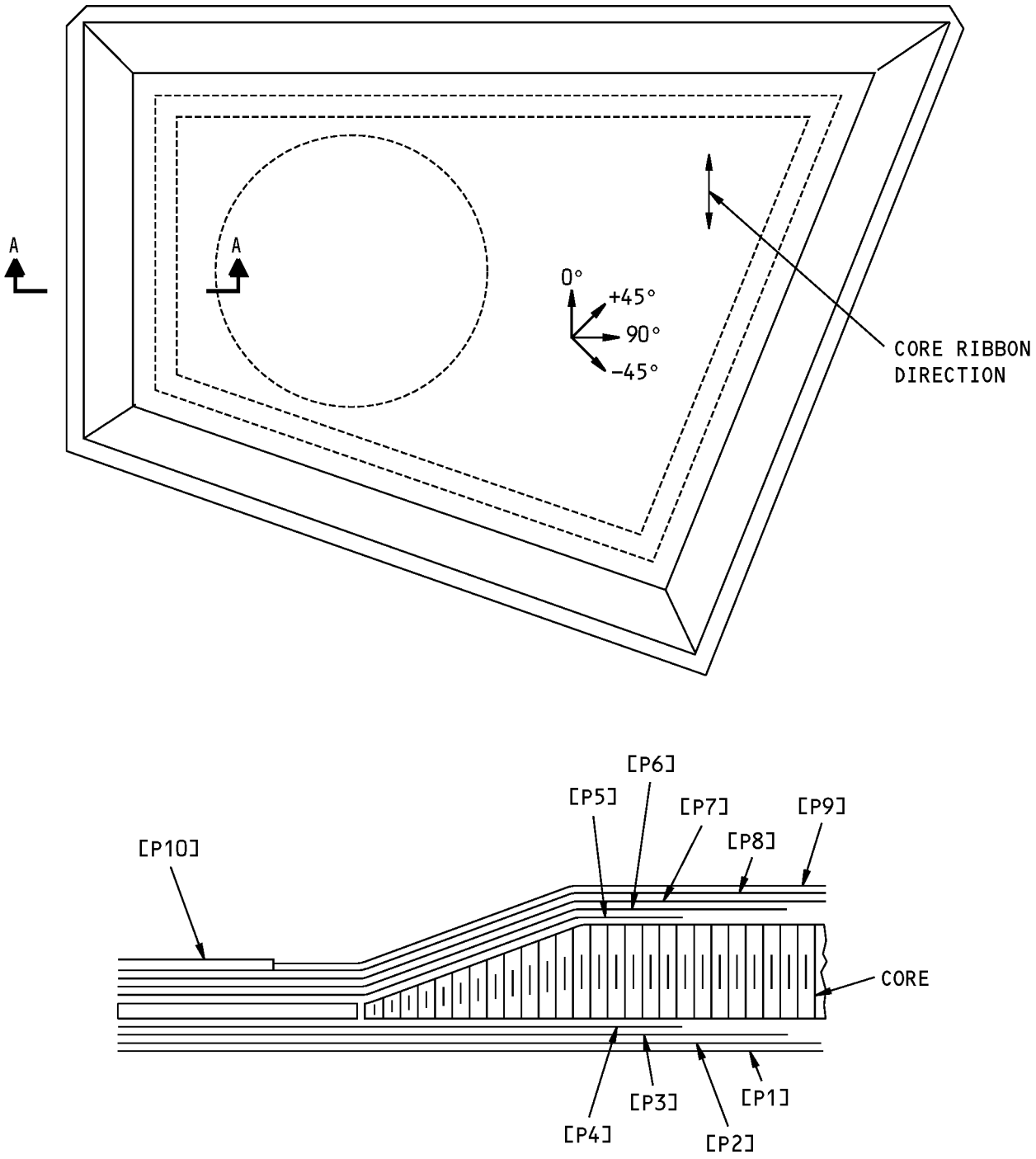
Vertical Stabilizer Trailing Edge and Closeout Panel Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Closeout Panel Assembly - Bonded Panel		Glass Fabric Reinforced Plastic (GFRP) honeycomb sandwich	
	Skin		Refer to Figure 3 for the 0 degree ply, material, and ply sequence	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 3 for the core ribbon direction	
[2]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 4 for the 0 degree ply, material, and ply sequence	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 4 for the core ribbon direction	
[3]	Trailing Edge Skin Panel	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5. Refer to Figure 5 for the chem-mill areas	
[4]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 6 for the 0 degree ply, material, and ply sequence	
	Core (3)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 6 for the core ribbon direction	
	Door	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[5]	Mass Balance Cavity Panel - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 7 for the 0 degree ply, material, and ply sequence	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 7 for the core ribbon direction	
[6]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 8 for the 0 degree ply, material, and ply sequence	
	Core (3)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 8 for the core ribbon direction	
	Cover	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[7]	Trailing Edge Panel Assembly - Bonded Panel		GFRP honeycomb sandwich	
	Skin		Refer to Figure 9 for the 0 degree ply, material, and ply sequence	
	Core (3)		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 9 for the core ribbon direction	
	Cover	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	

LIST OF MATERIALS FOR FIGURE 2				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
[8]	Door	0.100 (2.54)	2024-T3 clad sheet as given in QQ-A-250/5	
[9]	Doubler	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	

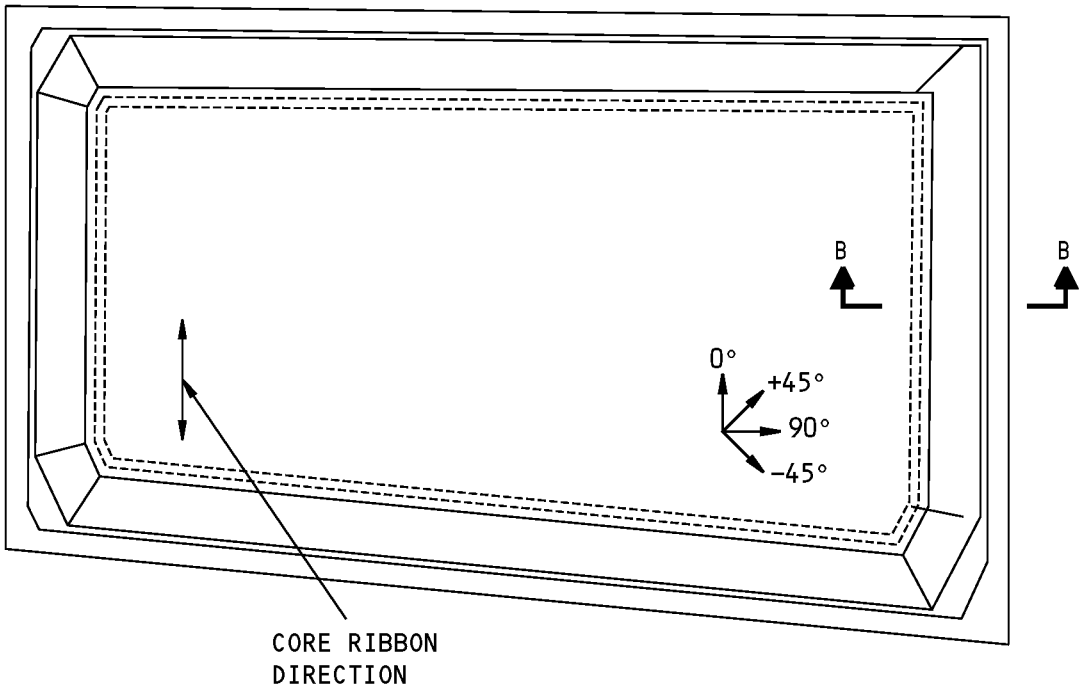
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

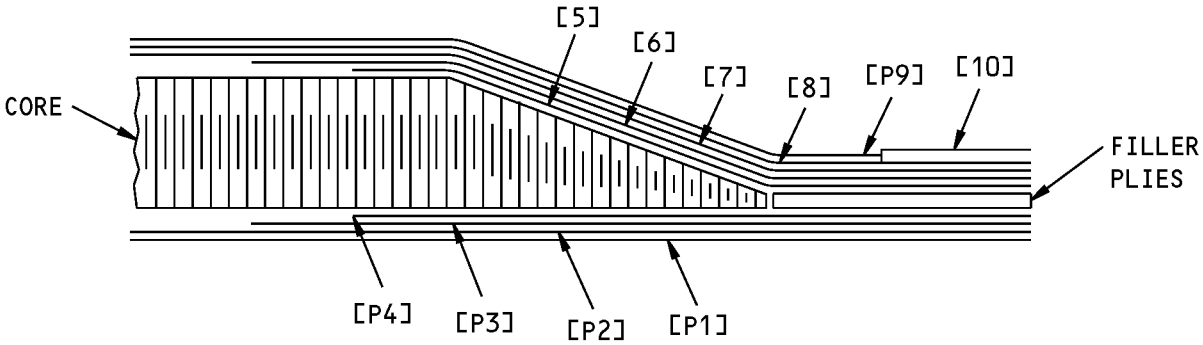


Ply Configuration for Figure 2, Item [1]
Figure 3

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79 Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	White bondable tedlar film 0.001 inch (0.025 mm) thick
P10	———	Bondable teflon



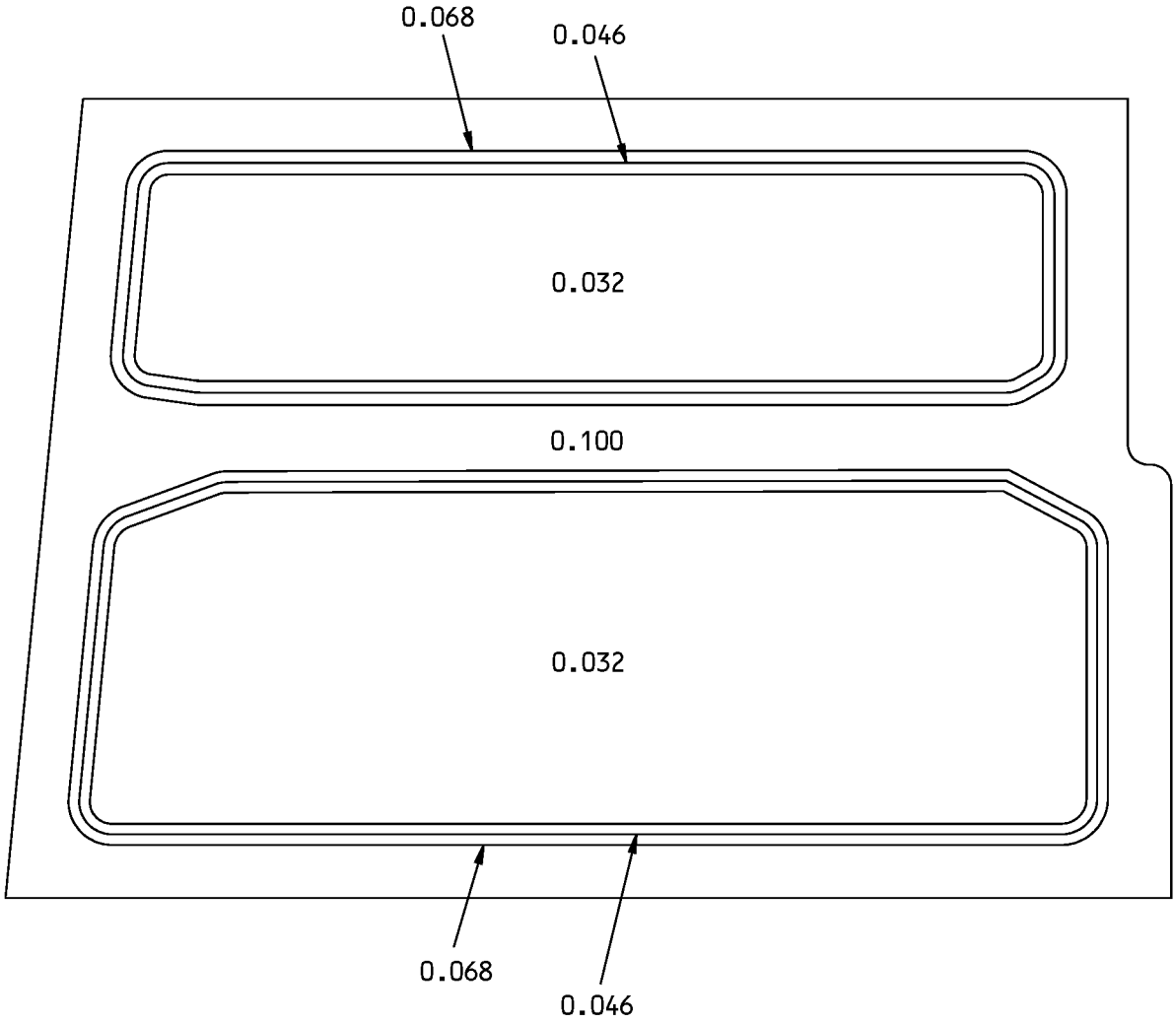


B–B

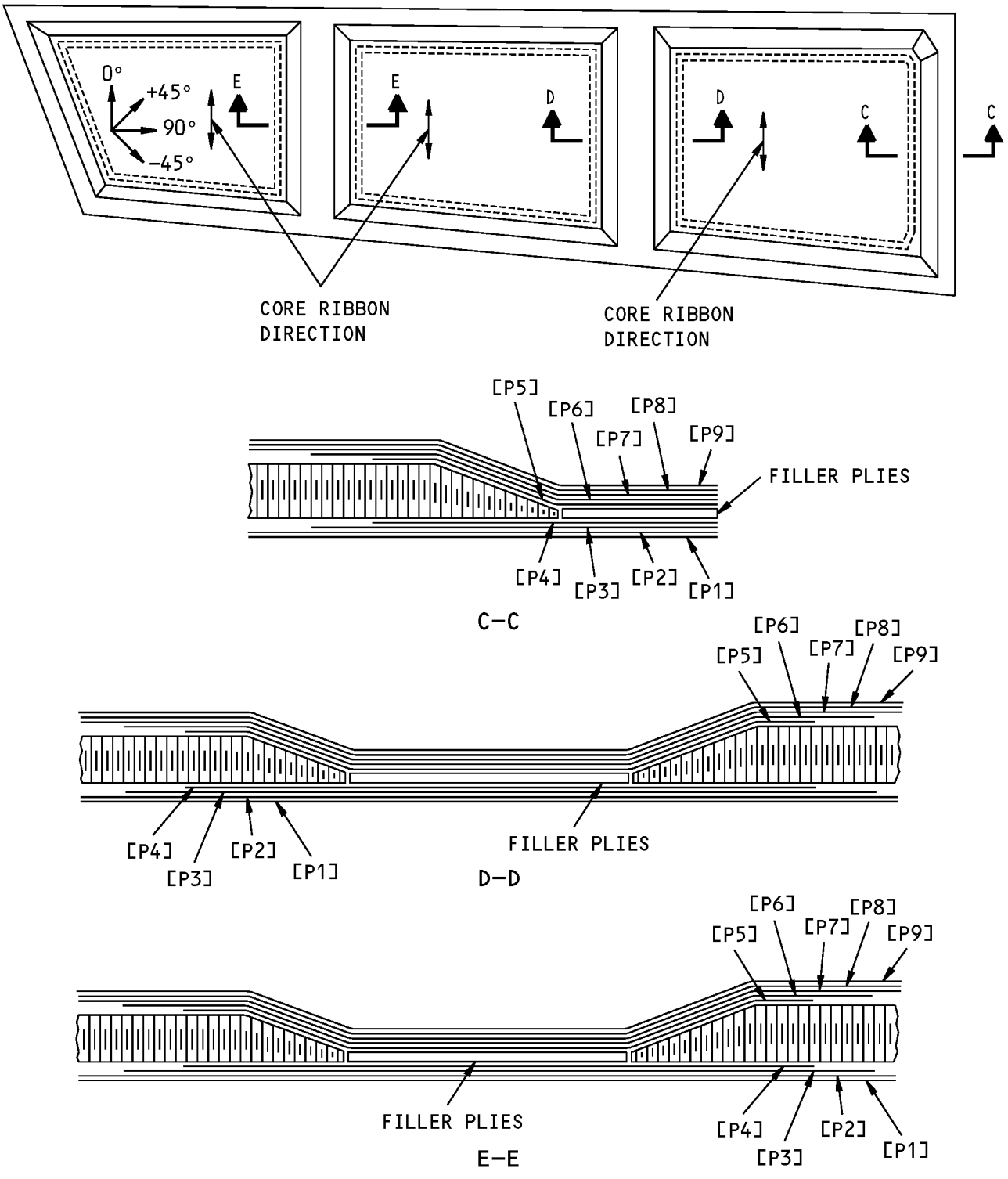
Ply Configuration for Figure 2, Item [2]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	White bondable tedlar film 0.001 inch (0.025 mm) thick
P10	———	Bondable teflon



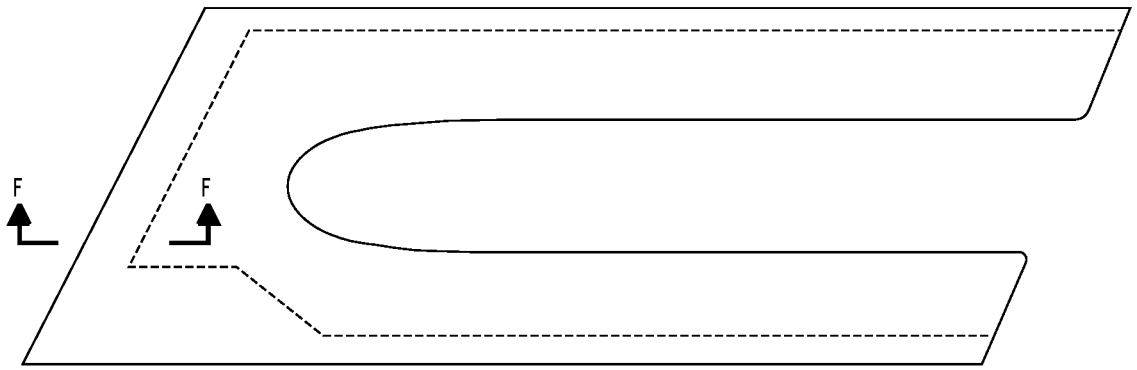
Chem-milled Areas for Figure 2, Item [3]
Figure 5

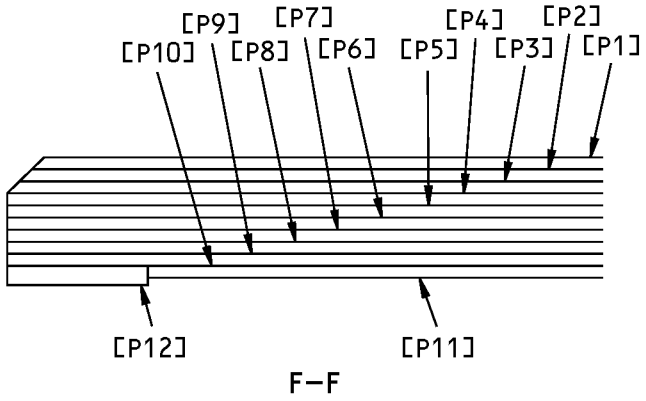


Ply Configuration for Figure 2, Item [4]
Figure 6

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	White bondable tedlar film 0.001 inch (0.025 mm) thick
P10	———	Bondable teflon

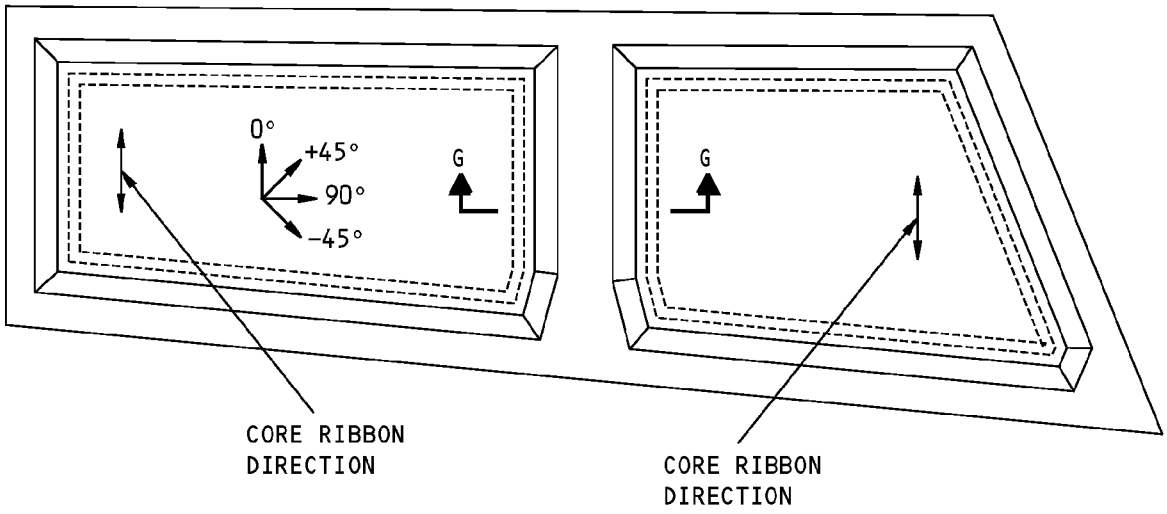


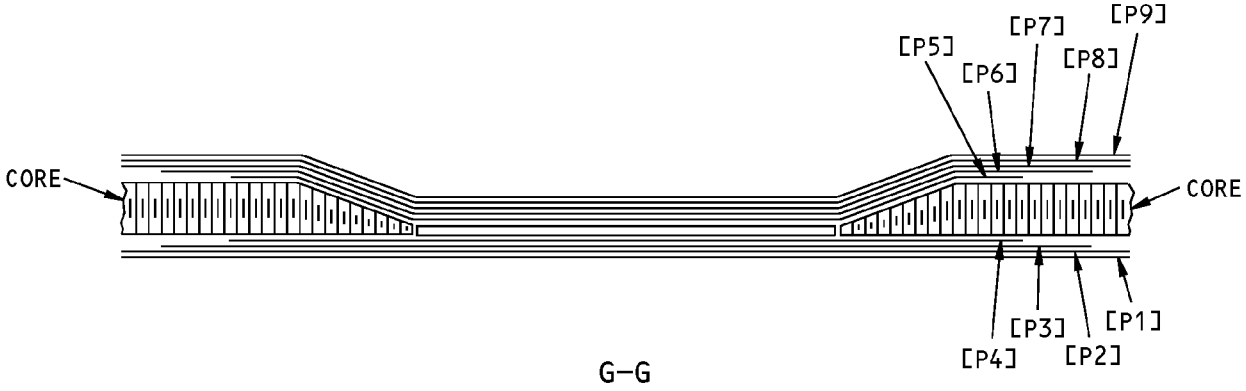


Ply Configuration for Figure 2, Item [5]
Figure 7

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 7		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P6, P8, P10	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P7, P9	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P11	———	White bondable tedlar film 0.001 inch (0.025 mm) thick
P12	———	Bondable teflon

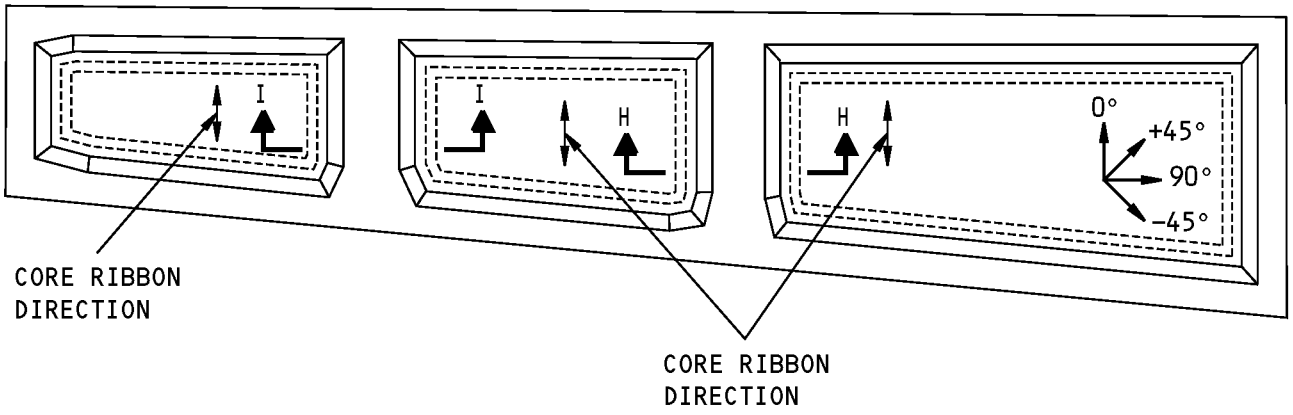


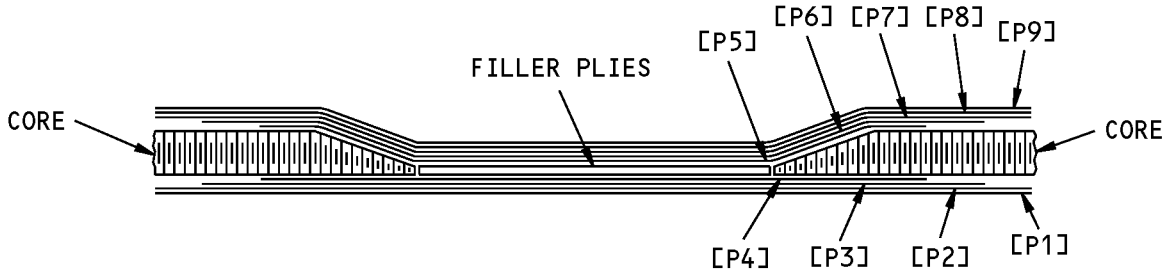


Ply Configuration of Figure 2, Item [6]
Figure 8

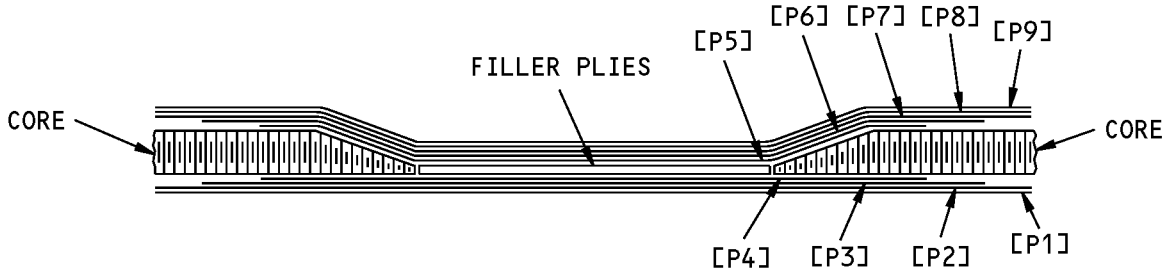
Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 8		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	White bondable tedlar film 0.001 inch (0.025 mm) thick





H–H



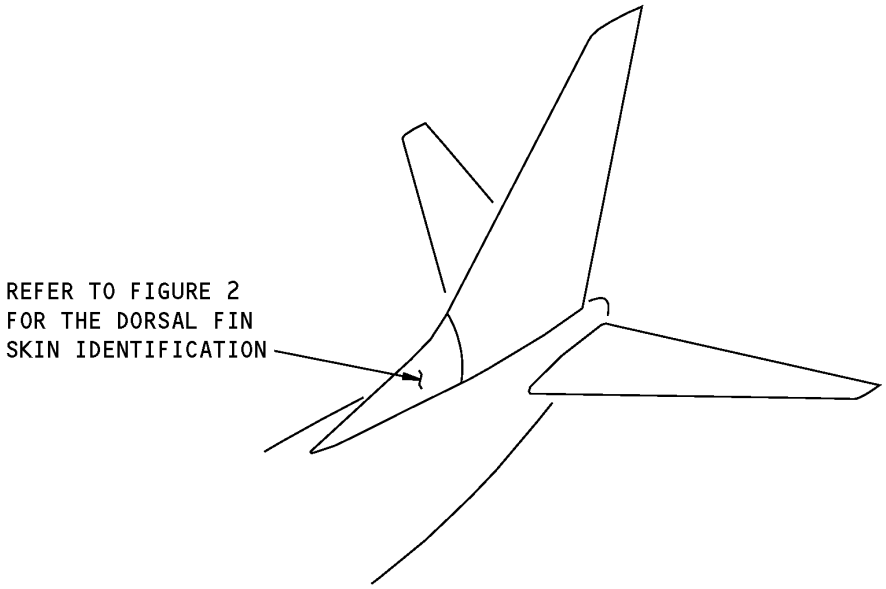
I–I

Ply Configuration for Figure 2, Item [7]
Figure 9

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 9		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	0 or 90 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P2, P4, P5, P7	+ or - 45 degrees	GFRP honeycomb sandwich as given in BMS 8-79, Class III, Grade B, Style 1581 or 7781
P9	———	White bondable tedlar film 0.001 inch (0.025 mm) thick

IDENTIFICATION 6 - DORSAL FIN SKIN

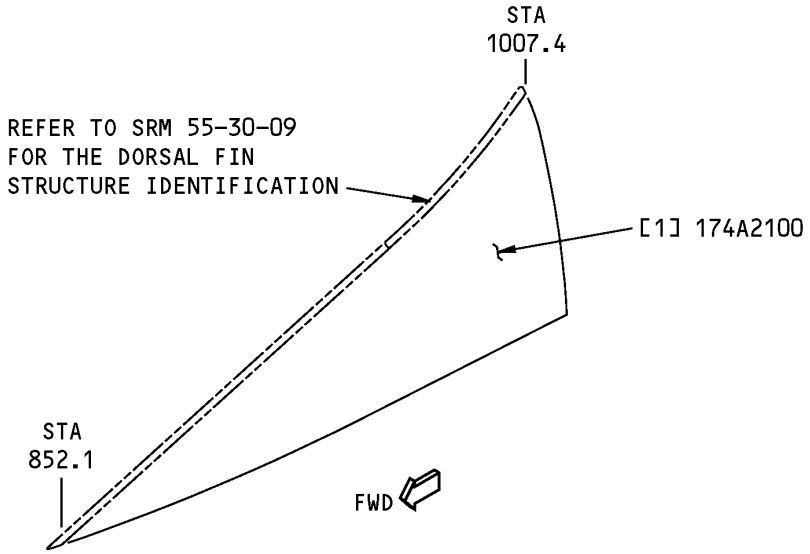


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Dorsal Fin Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
174A0101	Dorsal Fin Installation
174A2100	Dorsal Fin Panel - Bonded Part



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

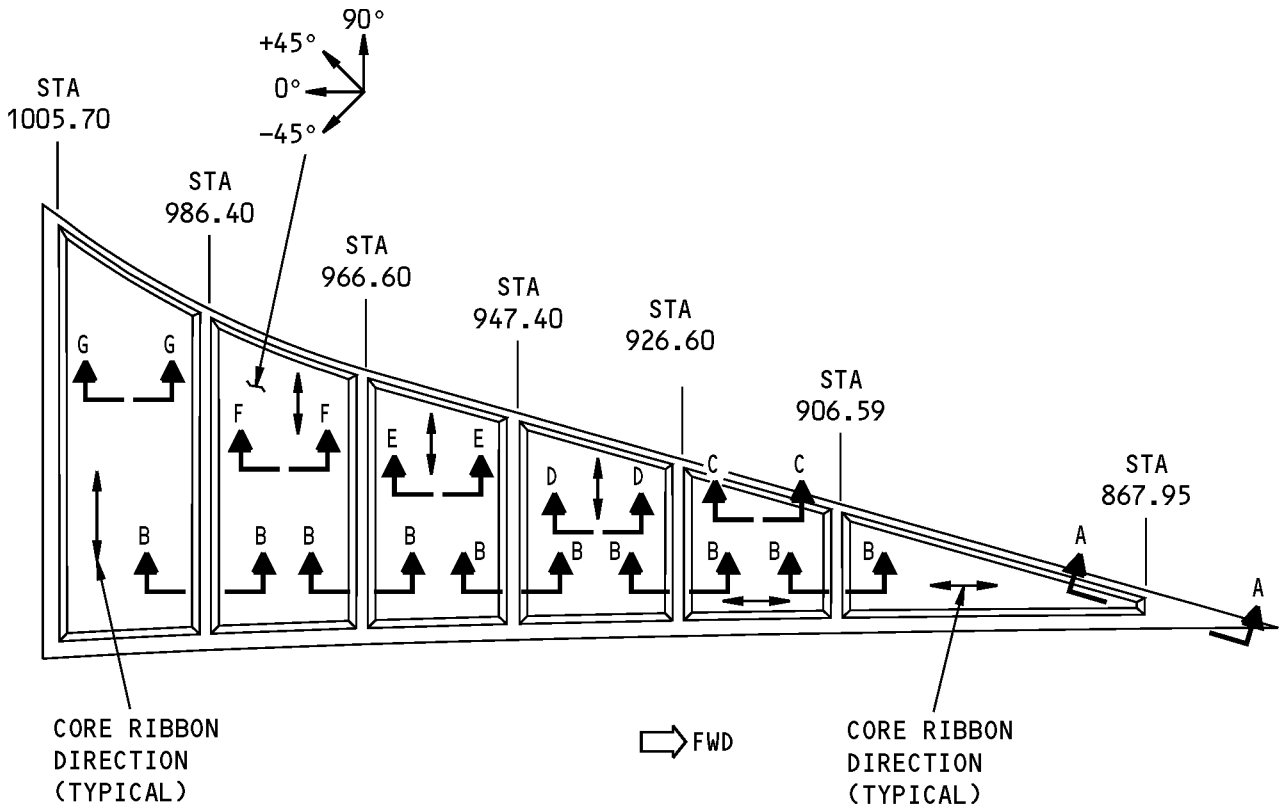
LEFT SIDE PANEL IS SHOWN, RIGHT SIDE PANEL IS OPPOSITE

Dorsal Fin Skin Panel Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Skin Panel - Dorsal Fin - Bonded Part		Glass Fiber Reinforced Plastic (GFRP) honeycomb sandwich	
	Skin		Refer to Figure 3 for the zero degree ply direction and ply layup sequence	
	Core	0.35 (8.89)	Aramid honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0. Refer to Figure 3 for the core ribbon direction	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



LEFT SIDE DORSAL FIN SKIN PANEL IS SHOWN,
RIGHT SIDE DORSAL FIN SKIN PANEL IS OPPOSITE

VIEW IS ON THE BAGSIDE (NON-AERODYNAMIC) SURFACE

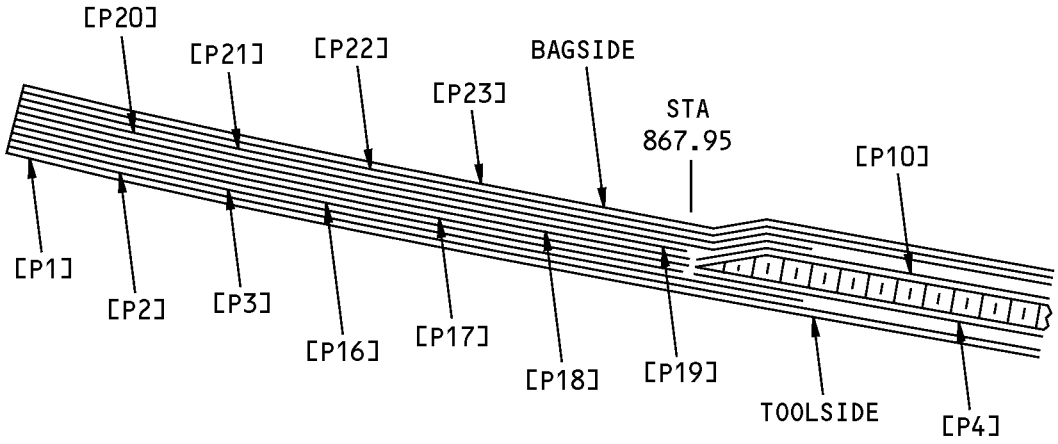
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

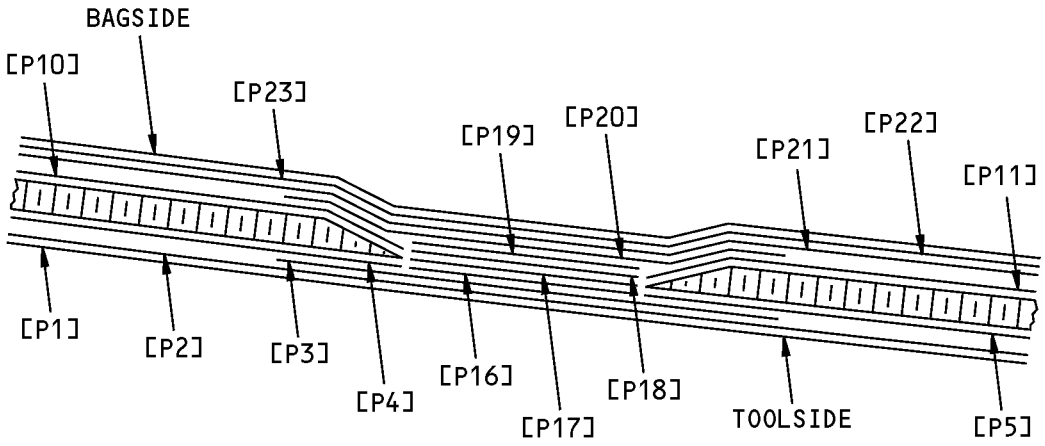
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTIONS A-A, B-B, C-C, D-D, E-E, F-F, AND G-G FOR THE PLY SEQUENCE OVER EACH CORE.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL FOR EACH PLY.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Dorsal Fin Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 1 of 4)

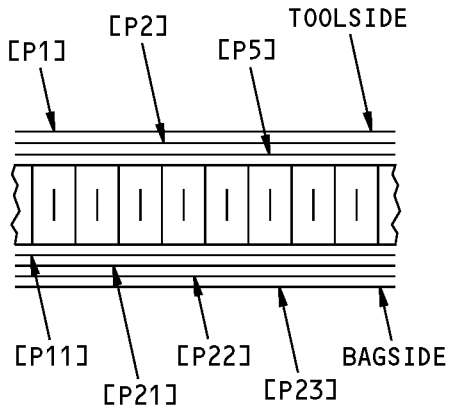


PLY LAYUP SEQUENCE
A–A

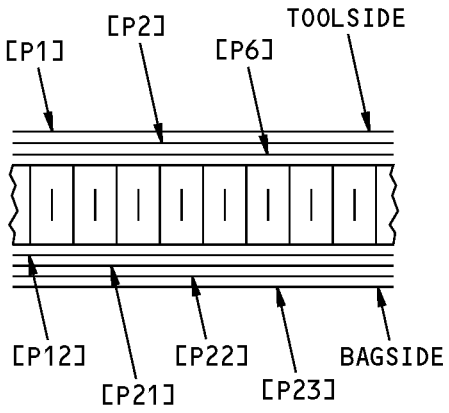


PLY LAYUP SEQUENCE (TYPICAL)
B–B

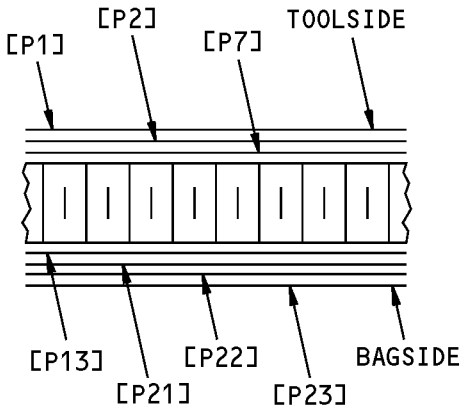
Ply Direction, Core Ribbon Direction, and Ply Sequence for the Dorsal Fin Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 2 of 4)



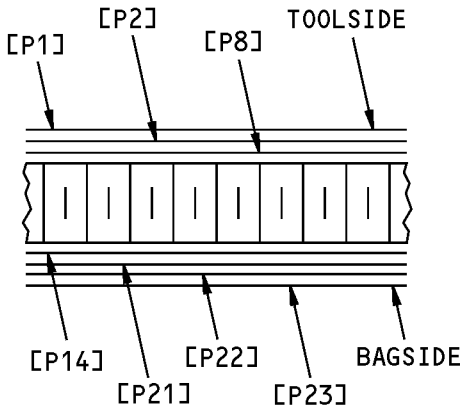
PLY LAYUP SEQUENCE
C–C



PLY LAYUP SEQUENCE
D–D

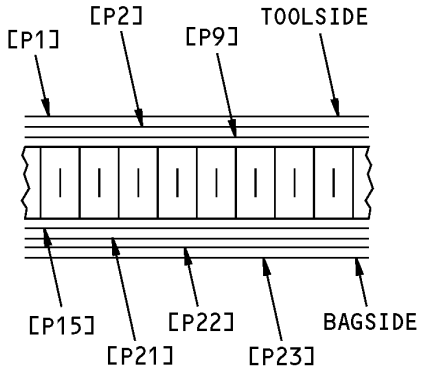


PLY LAYUP SEQUENCE
E–E



PLY LAYUP SEQUENCE
F–F

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Dorsal Fin Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 3 of 4)



PLY LAYUP SEQUENCE
G–G

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Dorsal Fin Skin Panel, Figure 2, Item [1]
Figure 3 (Sheet 4 of 4)

Table 3:

TYPICAL PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P16, P19, P20, P22	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III. (Optional: A ply of BMS 8-79, Style 120 in place of a ply of Style 1581 or add Style 120 plies to agree with the thickness range)
P2, P17, P18, P21	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Cass III. (Optional: A ply of BMS 8-79, Style 120 in place of a ply of Style 1581 or add Style 120 plies to agree with the thickness range)
P4 through P15	———	Adhesive film as given in BMS 5-129, Type 4, Grade 5
P23	Optional	1 mil white Tedlar film

ALLOWABLE DAMAGE 1 - VERTICAL STABILIZER LEADING EDGE SKINS

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer leading edge skins shown in Vertical Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 1.

2. General

A. Remove the damaged material as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) If countersink rivets are removed to clean up the damage, then do the steps that follow:

(a) Install new rivets that have the same material and diameter as the initial rivets.

1) Use oversize rivets as necessary.

2) It is optional to install NAS1399D blind rivets.

3) If you install the NAS1399D blind rivets, make an inspection at each 400 flight hour interval.

4) Replace the blind rivets with solid rivets after no more than 5000 flight hours.

(b) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

1) The maximum head height that is permitted above the skin is 0.006 inch.

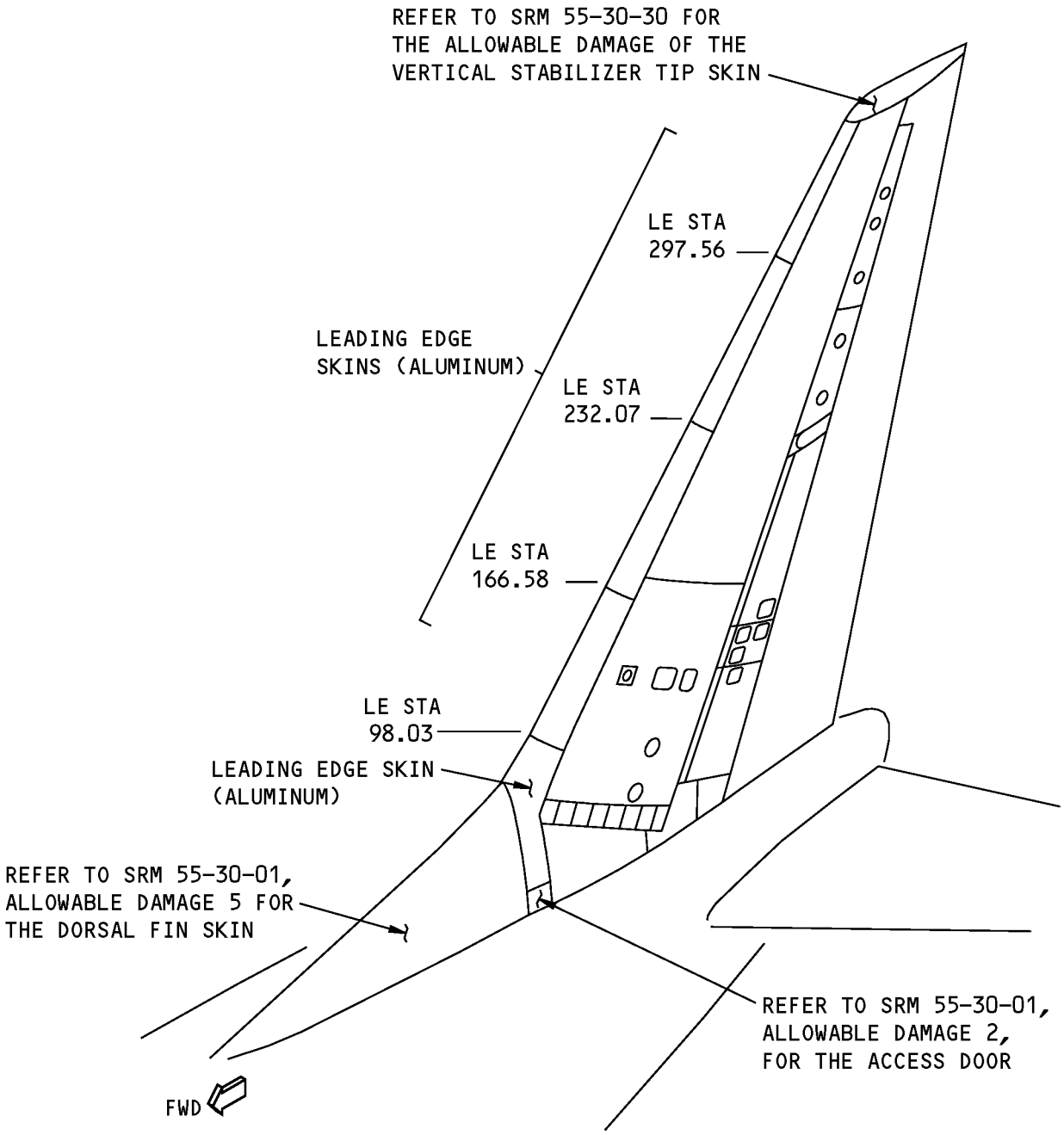
B. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

C. Apply two layers of BMS 10-79, Type II or III, primer to the reworked areas. Refer to SOPM 20-44-04.

D. Apply the decorative finish to the reworked areas as given in AMM PAGEBLOCK 51-21-99/701.

E. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Vertical Stabilizer Leading Edge Skin Locations
Figure 101

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-01	REPAIRS FOR MINOR DENTS IN METALLIC SHEET MATERIALS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Cracks:

(1) Damage is permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail A .

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, D, and E.

(a) Only one area of damage removal, as shown in Detail D, is permitted for each 15.0 square inches of panel.

C. Holes and Punctures are permitted if:

(1) They are a maximum of 0.25 inch in diameter

(2) There is not more than one hole or puncture for each 15.0 square inches of panel area

(3) The edge of the damage is a minimum of 1.00 inch away from the edge of a fastener hole, other damage, or the panel.

(4) They are filled with a 2117-T3 or 2117-T4 aluminum flush head rivet.

(a) If the head is above the skin, use the microshave flush procedure as specified in 51-10-01.

(b) It is optional to install a 2117-T3 or 2117-T4 aluminum protruding head rivet, or a NAS1399D blind rivet. Do the steps that follow when you install the blind rivets:

1) Make an inspection of blind rivets at each 400 flight hour interval.

2) Replace the blind rivets with solid rivets after no more than 5000 flight hours.

D. Dents above LE STA 204 away from the High Frequency (HF) Flush Antenna:

(1) Dents are permitted for the general conditions of Paragraph 4.D.(2)/ALLOWABLE DAMAGE 1 and for the specified conditions of Paragraph 4.D.(3)/ALLOWABLE DAMAGE 1 For dents that are permitted in the area of the HF antenna, refer to Paragraph 4.E./ALLOWABLE DAMAGE 1

(a) Refer to Definition of Dent Dimensions, Figure 103/ALLOWABLE DAMAGE 1 for the definitions of the dimensions for a dent.

(b) Refer to Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 for the relation of dent dimensions.

(c) Refer to Damage Size and Spacing Limits for Adjacent Dents, Figure 105/ALLOWABLE DAMAGE 1 for the definition of the dimensions for adjacent dents.

(d) Refer to Equivalent Length of Dents When the Depth is Large, Figure 106/ALLOWABLE DAMAGE 1 for the definition of the length if there is more than one dent in a bay.

(2) General Conditions:

(a) The edge of the damage is a minimum of 1.0 inch away from a hole.

(b) There are no pulled or loose fasteners or missing fastener locations.

(c) There are no sharp creases, gouges, or cracks.

(d) There is no damage to the structure that is below the skin panels.

(e) There are no dents at the rib chord locations.

(f) The conditions of Table 101/ALLOWABLE DAMAGE 1 are kept.

Table 101:

CONDITIONS FOR THE LOCATIONS AND QUANTITY OF DENTS	
DEPTH OF DENT (Y), INCH	LIMITS FOR PERMITTED DENTS
If (Y) is more than or equal to 0.50 but less than 1.0	There must be 5 bays that are not damaged on each side of the damaged bay. There must be no other damage in the damaged bay
If (Y) is more than or equal to 0.40 but less than 0.50	There must be 3 bays that are not damaged on each side of the damaged bay. There must be no other damage in the damaged bay
If (Y) is more than or equal to 0.30 but less than 0.40	There must be 2 bays that are not damaged on each side of the damaged bay
If (Y) is more than or equal to 0.20 but less than 0.30	There must be 1 bay that is not damaged on each side of the damaged bay

(3) Specified Conditions:

(a) Dents are permitted in Area 1 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1.

1) For dents that are more than the limits shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 1, fill the dents as given in 51-70-01.

(b) Dents are permitted in Area 2 if you make an inspection of the damage after no more than 5000 flight hours. Refer to Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1.

NOTE: It is recommended that you remove or repair the damage after no more than 5000 flight hours or 18 months, that which occurs first.

1) For dents that are more than the limits shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 1, fill the dents as given in 51-70-01.

(c) Dents are permitted in Area 3 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 if you do the steps that follow:

1) Fill the dent as given in 51-70-01.

2) Seal the damage with 3M-436 aluminum foil tape (speed tape) or the equivalent.

3) Make a detailed visual inspection of the damage at each 400 flight hour interval. If there are cracks or the damage has become larger, repair the damage immediately.

4) Install a permanent repair after no more than 5000 flight hours or 18 months, that which occurs first.

(d) Dents are permitted in Area 4 as shown in Allowable Damage Limits for Leading Edge Skin Dents, Figure 104/ALLOWABLE DAMAGE 1 if you do the steps that follow:

1) For dents with a depth less than 0.50 inch, fill the dent as given in 51-70-01.

2) For dents with a depth equal to or greater than 0.50 inch, do the steps that follow:

a) Fill the dent as given in 51-70-01.

b) Fill half of the depth of the dent with potting compound and permit it to fully cure.

c) Fill the remaining depth of the dent and permit the compound to fully cure.

NOTE: BMS 5-92 adhesive is the better alternative to the potting compounds given in 51-70-01.

3) Seal the damage with 3M-436 aluminum foil tape (speed tape) or the equivalent.

4) Make a detailed visual inspection of the damage each day. If there are cracks or the damage has become larger, repair the damage immediately.

5) Install an external doubler repair with blind fasteners or a permanent flush repair in 90 days. If you do a repair that has blind rivets, do the steps that follow:

a) Make an inspection of blind fastener repairs at each 400 flight hour interval

b) Replace the blind fastener repair with a permanent flush repair after no more than 5000 flight hours.

E. Dents below LE STA 204:

(1) Refer to Damage Size and Spacing Limits for Adjacent Dents, Figure 105/ALLOWABLE DAMAGE 1 for the definition of the dimensions for adjacent dents.

(2) Refer to Equivalent Length of Dents When the Depth is Large, Figure 106/ALLOWABLE DAMAGE 1 for the definition of the length if there is more than one dent in a bay.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 107/ALLOWABLE DAMAGE 1, Detail A if:

(a) The edge of the damage is a minimum of 1.0 inch away from a hole

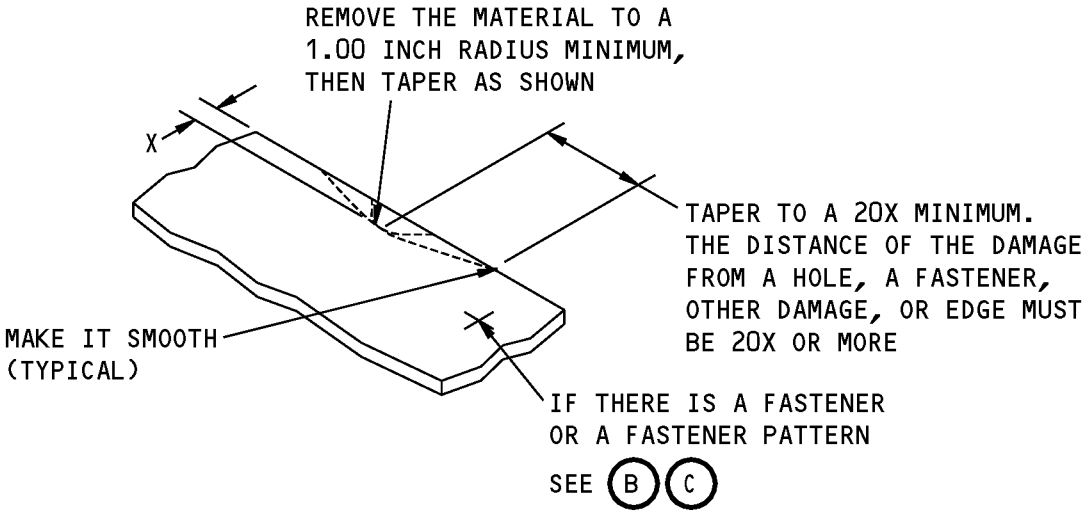
(b) There are no pulled or loose fasteners or missing fastener locations

(c) There are no sharp creases, gouges, or cracks

(d) There is no damage to the structure that is below the skin panels

(e) There are no dents at the rib chord locations.

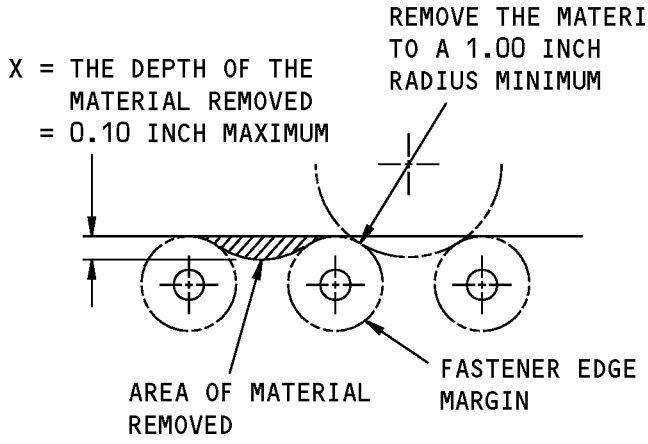
(f) The edge of the dent is a minimum 4D from the edge of any other damage. D is the maximum dimension of the largest damage.



X = THE DEPTH OF THE MATERIAL REMOVED
= 0.10 INCH MAXIMUM

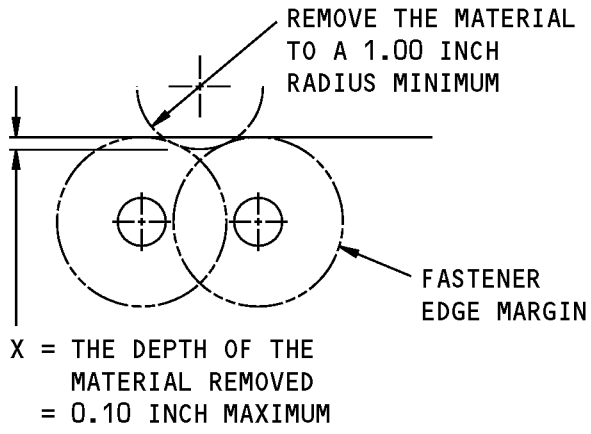
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

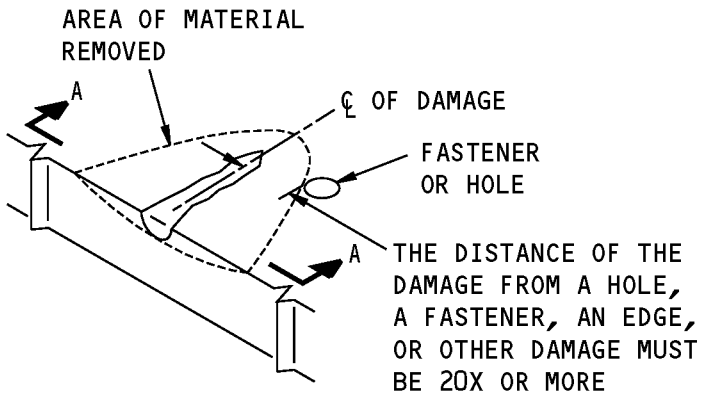
B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

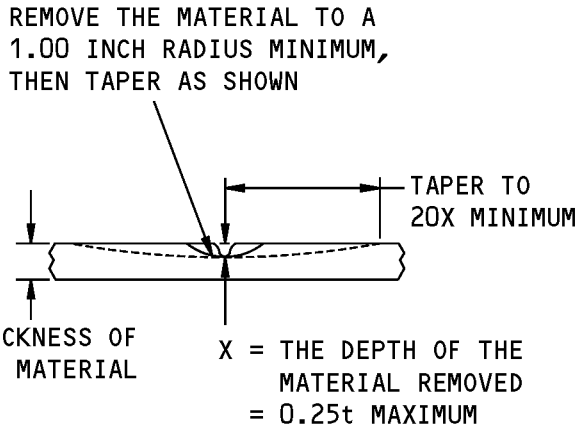
C

Allowable Damage Limits
Figure 102 (Sheet 1 of 2)

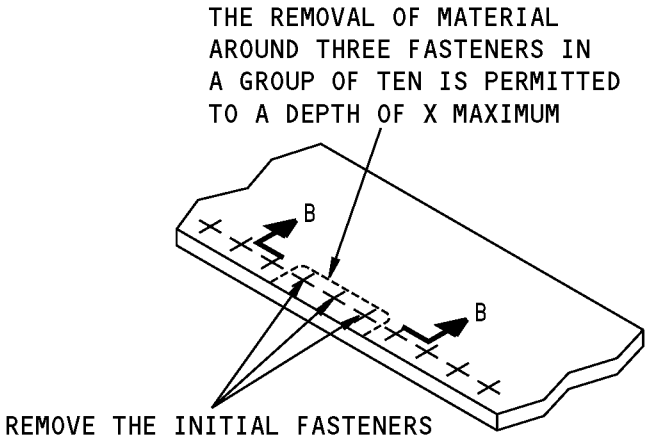


REMOVAL OF DAMAGED MATERIAL ON A SURFACE

D

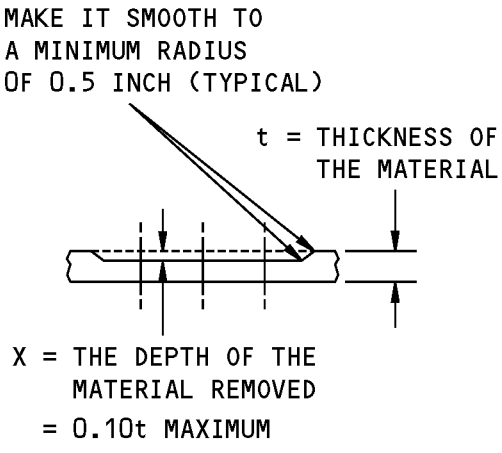


A–A



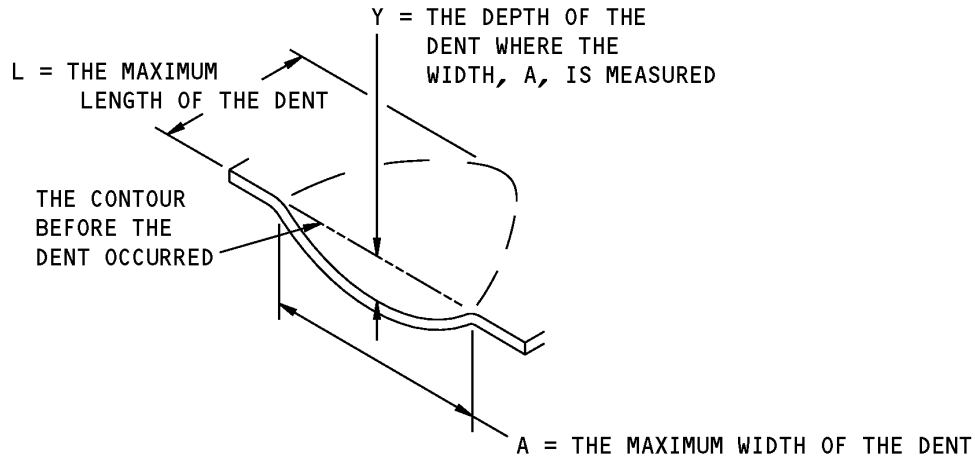
REMOVAL OF CORROSION AROUND THE FASTENERS

E

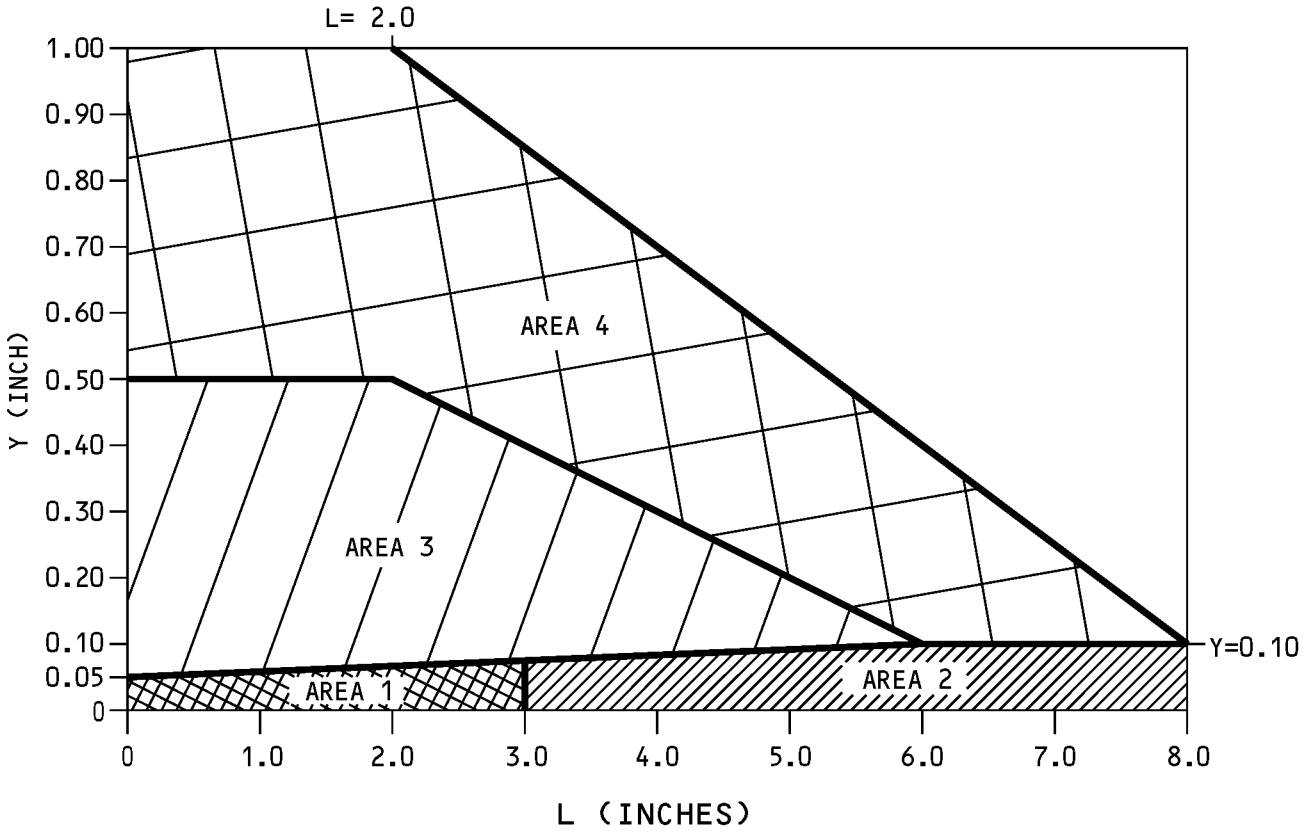


B–B

Allowable Damage Limits
Figure 102 (Sheet 2 of 2)



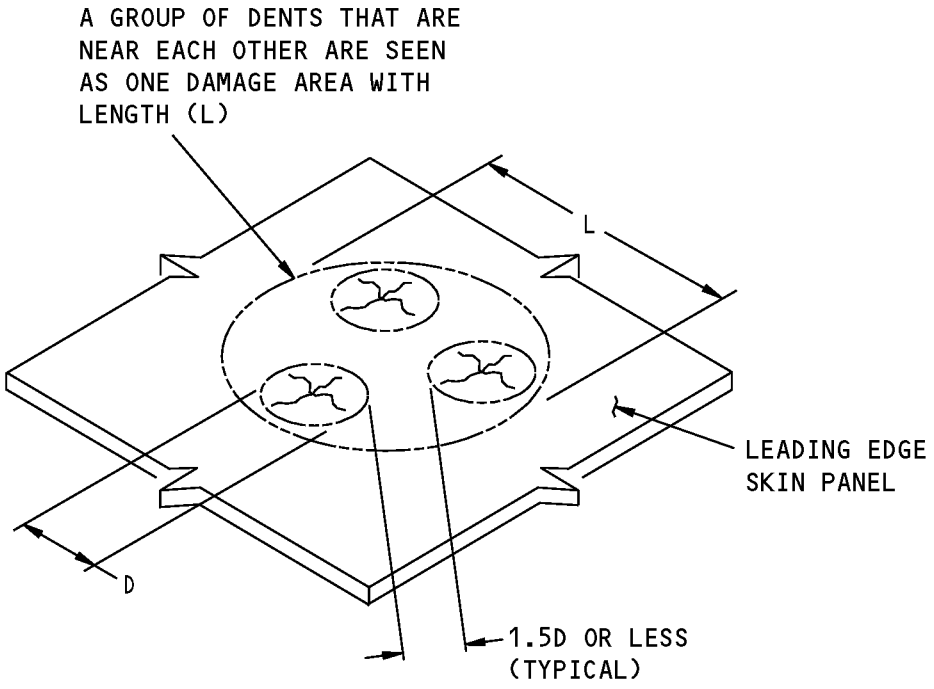
Definition of Dent Dimensions
Figure 103



FOR AREA NUMBER	SEE ALLOWABLE DAMAGE PARAGRAPH
1	4. D. (3) (a)
2	4. D. (3) (b)
3	4. D. (3) (c)
4	4. D. (3) (d)

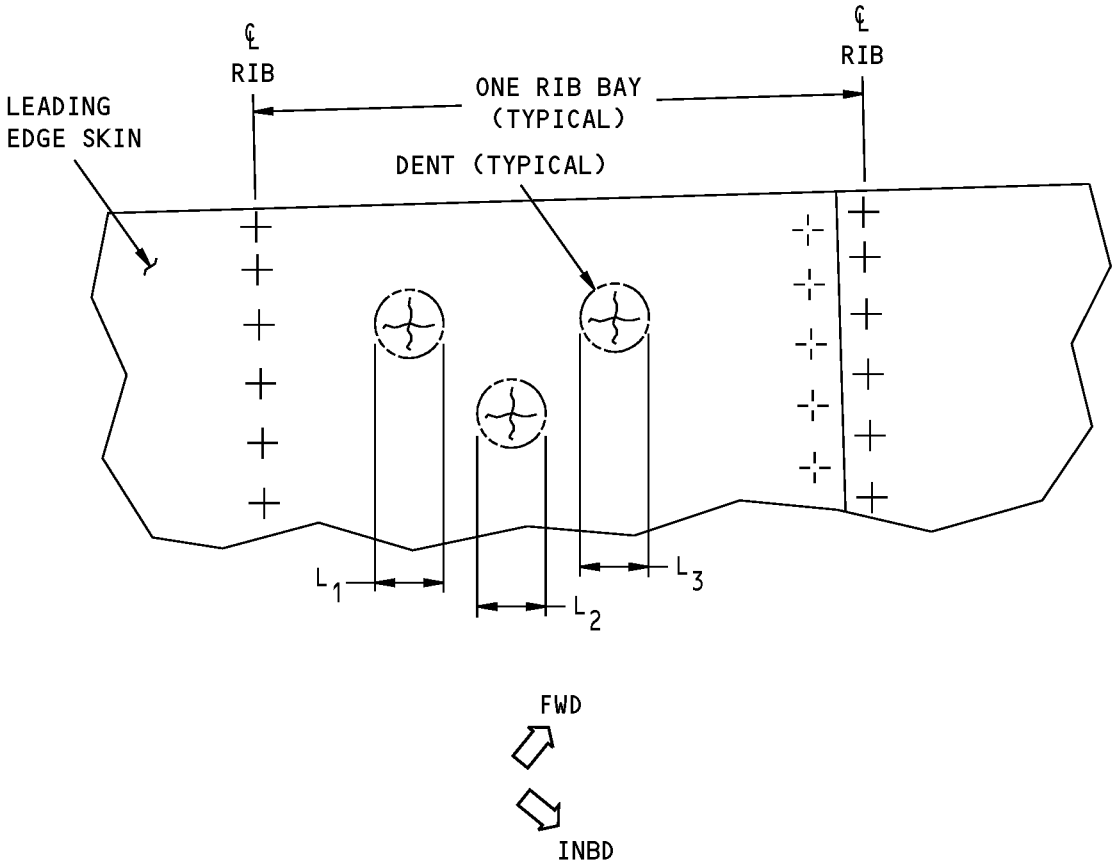
TABLE A

Allowable Damage Limits for Leading Edge Skin Dents
Figure 104



NOTE: D IS THE LARGEST LENGTH OF THE ADJACENT DENTS.

Damage Size and Spacing Limits for Adjacent Dents
Figure 105



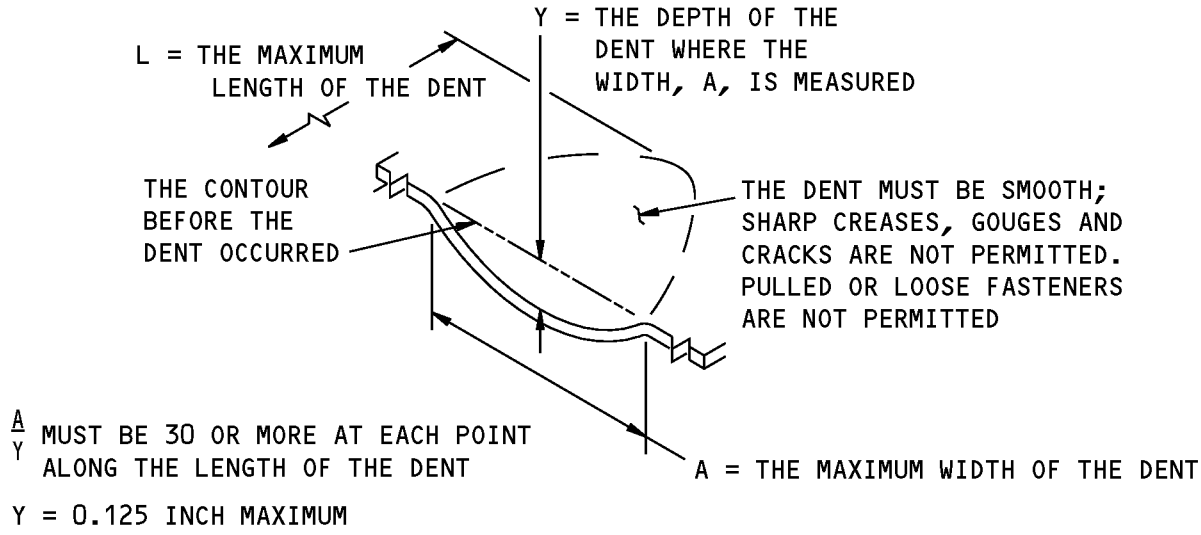
NOTE: IF THE DEPTH OF THE DENT IS 0.050 INCH OR MORE, THEN

1) ADD THE LENGTH OF EACH DENT TO GET THE EQUIVALENT LENGTH (L) OF THE DENTS.

$L = L_1 + L_2 + L_3$

2) AND APPLY THE ALLOWABLE DAMAGE LIMITS FOR ONE DENT.

Equivalent Length of Dents When the Depth is Large
Figure 106



DENT THAT IS PERMITTED

(A)

Allowable Damage Limits
Figure 107

ALLOWABLE DAMAGE 2 - VERTICAL STABILIZER INSPAR SKINS

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer inspar skins, door skins, and the AFT closeout panel. Refer to Vertical Stabilizer Inspar Skin Locations, Figure 101/ALLOWABLE DAMAGE 2 and Vertical Stabilizer Inspar Skin Locations, Figure 102/ALLOWABLE DAMAGE 2.

2. General

A. Remove the damaged material as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) If countersink rivets are removed to clean up the damage, then do the steps that follow:

(a) Install new rivets that have the same material and diameter as the initial rivets.

1) Use oversize rivets as necessary.

2) It is optional to install solid protruding head rivets or NAS1399D blind rivets with countersink washers. Refer to Vertical Stabilizer Inspar Skins - Permitted Locations of Blind Rivets , Figure 103/ALLOWABLE DAMAGE 2 to install blind rivets.

3) If you install the NAS1399D blind rivets, make an inspection at each 400 flight hour interval.

4) Replace the blind rivets with solid rivets after no more than 5000 flight hours.

(b) Make sure the countersink depth is not more than 80 percent of the skin thickness.

(c) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

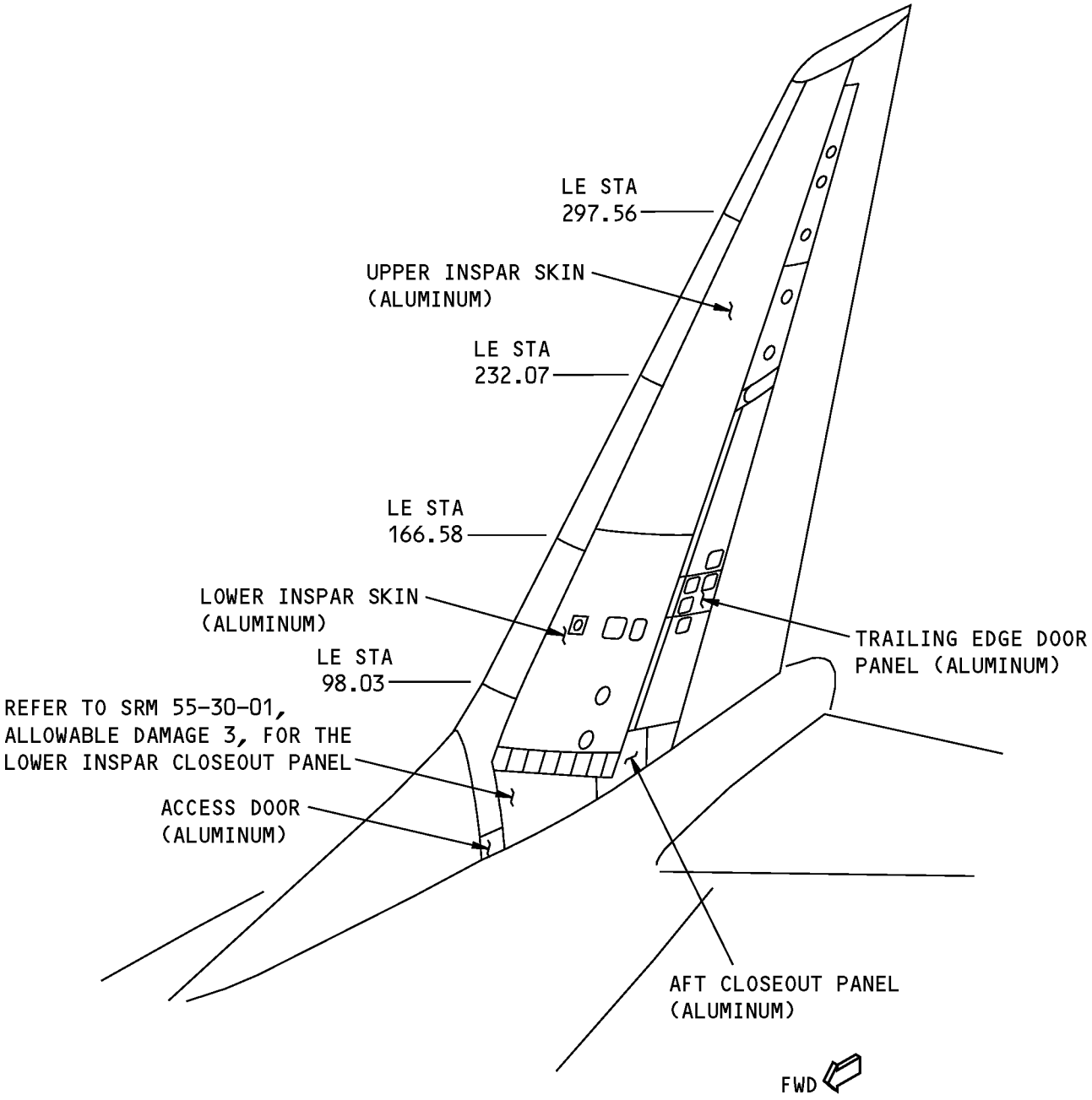
1) The maximum head height that is permitted above the skin is 0.006 inch.

B. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

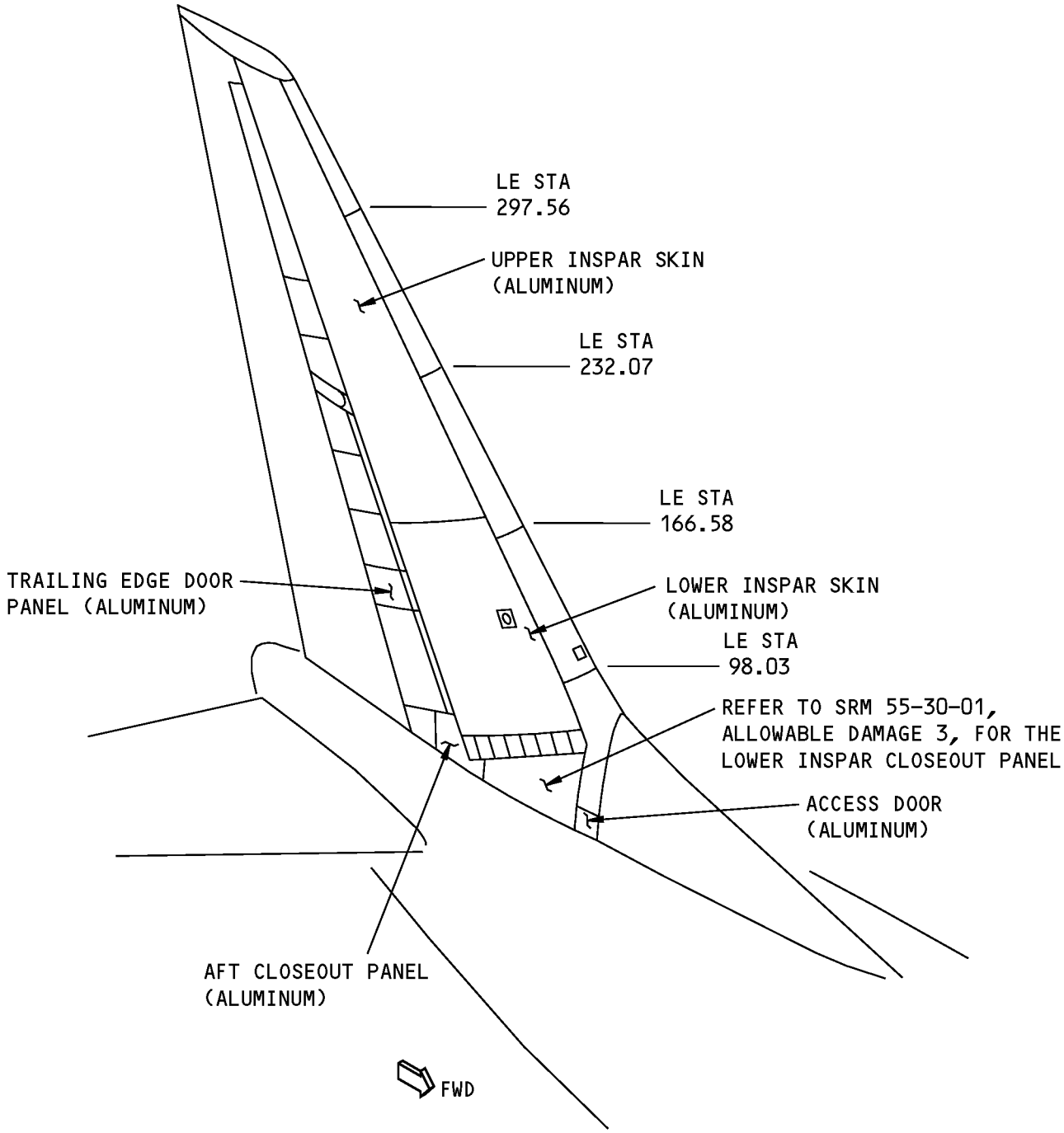
C. Apply two layers of BMS 10-79, Type II or III, primer to the reworked areas. Refer to SOPM 20-44-04.

D. Apply the decorative finish to the reworked areas as given in AMM PAGEBLOCK 51-21-99/701.

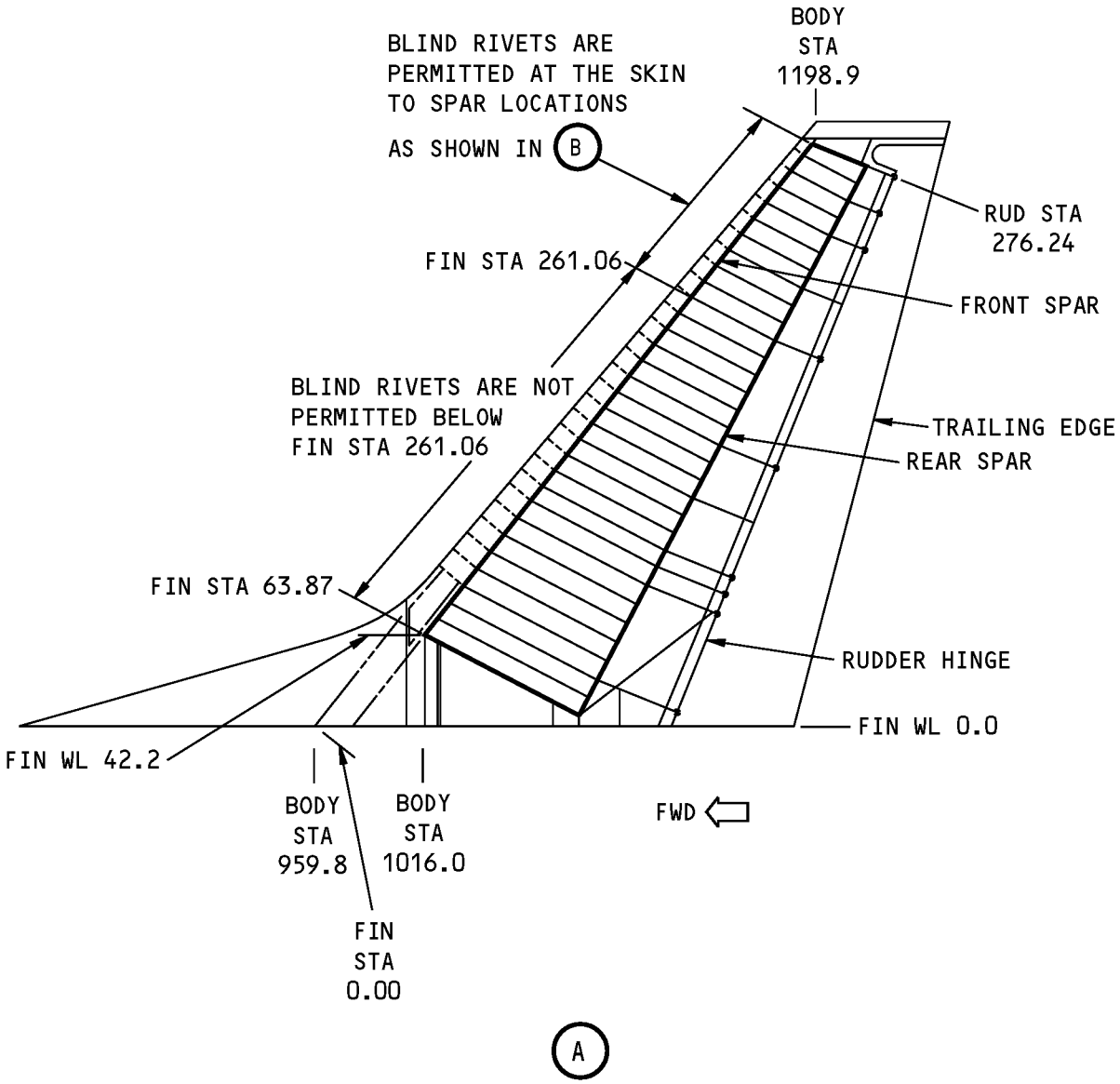
E. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.



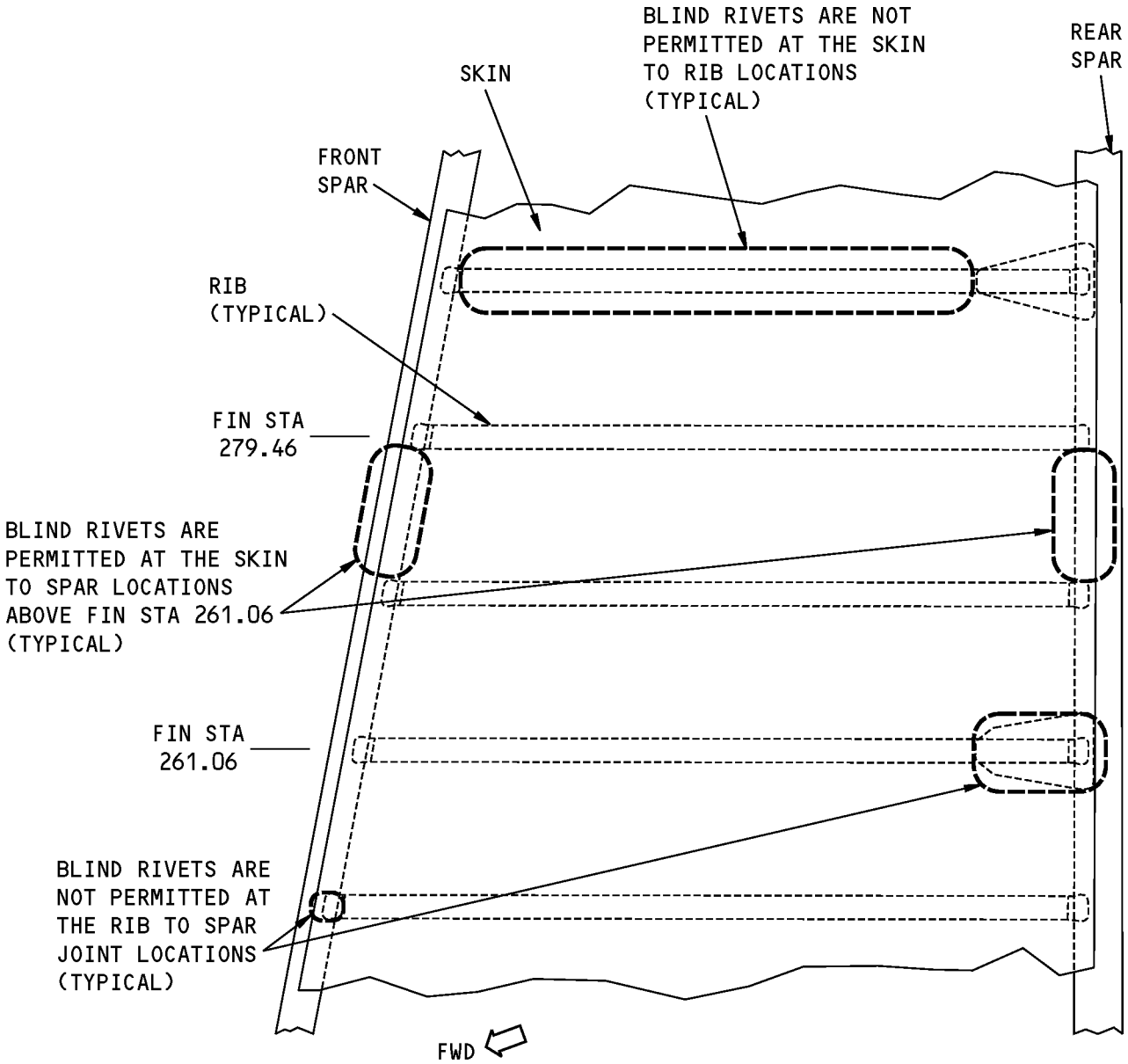
Vertical Stabilizer Inspar Skin Locations
Figure 101



Vertical Stabilizer Inspar Skin Locations
Figure 102



Vertical Stabilizer Inspar Skins - Permitted Locations of Blind Rivets
Figure 103 (Sheet 1 of 2)



Vertical Stabilizer Inspar Skins - Permitted Locations of Blind Rivets
Figure 103 (Sheet 2 of 2)

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Cracks:

(1) Damage is permitted as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Detail A.

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details A, D, F, G, and H.

(a) Only one area of damage removal, as shown in Detail D, is permitted for each 15.0 square inches of panel.

C. Dents are permitted as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Detail E if:

(1) The edge of the dent is a minimum 4D from the edge of any other damage. D is the maximum dimension of the largest damage.

D. Holes and Punctures are permitted if:

(1) They are a maximum of 0.25 inch in diameter

(2) There is not more than one hole or puncture for each 15.0 square inches of panel area

(3) They are not more than the limits shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 2, Details G and H

(4) The edge of the damage is a minimum of 1.00 inch away from the edge of a fastener hole, other damage, or the panel

(5) They are filled with a 2117-T3 or 2117-T4 aluminum flush head rivet.

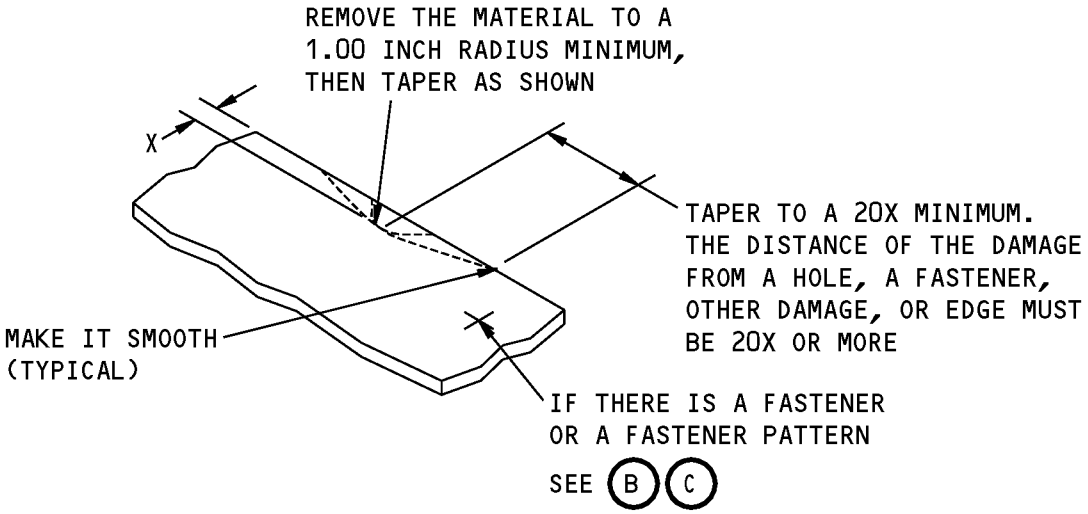
(a) The countersink depth must not be more than 80 percent of the skin thickness.

(b) If the head is above the skin surface, remove the unwanted material with the microshave flush procedure as specified in 51-10-01.

(c) It is optional to install a 2117-T3 or 2117-T4 aluminum protruding head rivet or a NAS1399D blind rivet. Refer to Vertical Stabilizer Inspar Skins - Permitted Locations of Blind Rivets , Figure 103/ALLOWABLE DAMAGE 2 to install blind rivets. Do the steps that follow when you install the blind rivets:

1) Make an inspection of blind rivets at each 400 flight hour interval.

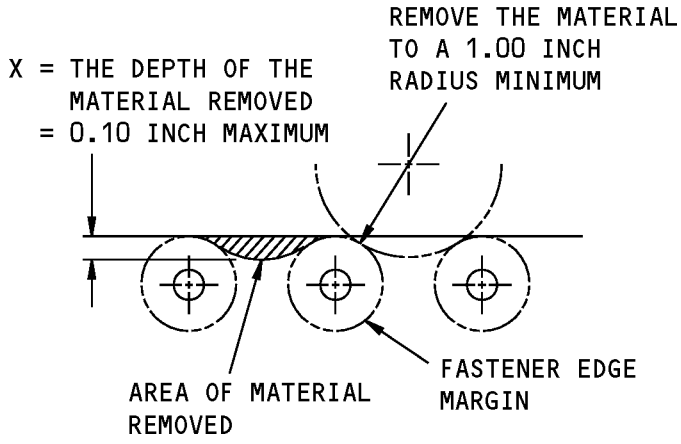
2) Replace the blind rivets with solid rivets before 5000 flight hours.



X = THE DEPTH OF THE MATERIAL REMOVED
= 0.10 INCH MAXIMUM

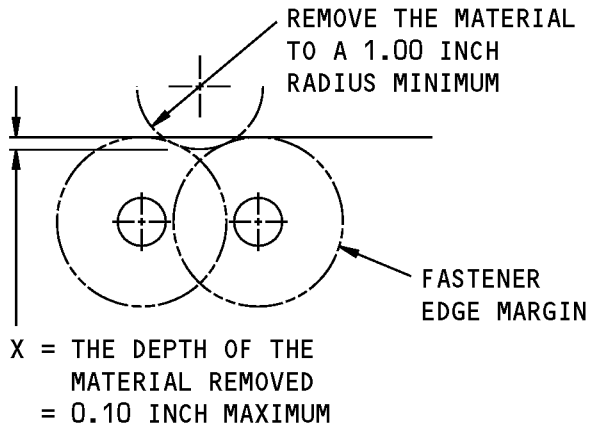
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

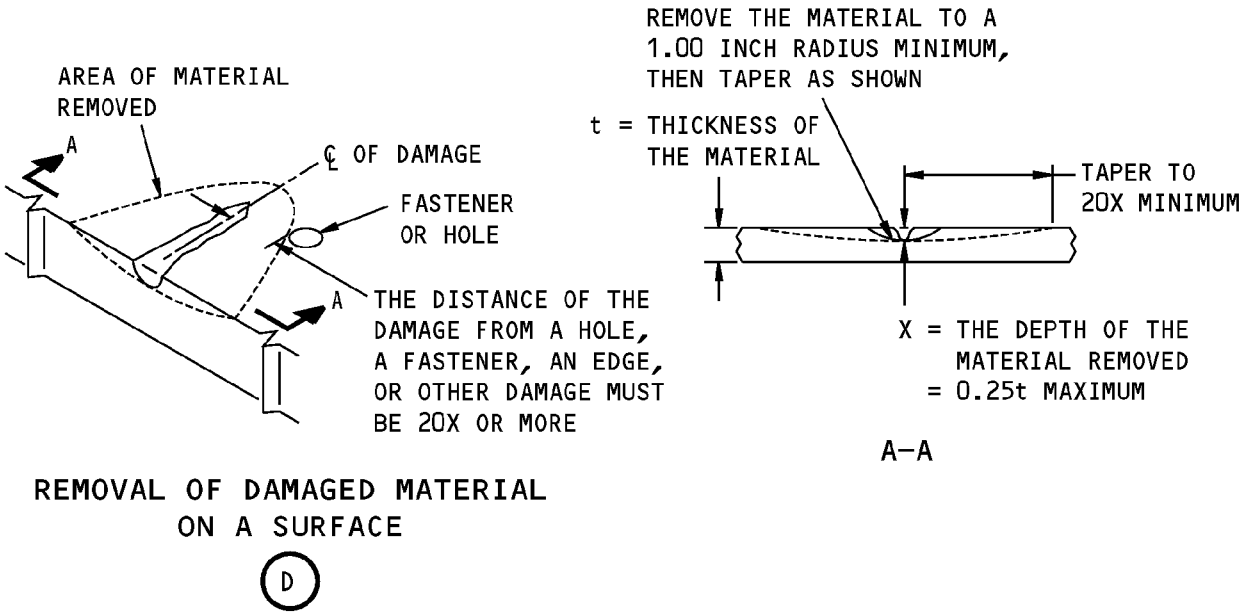
B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

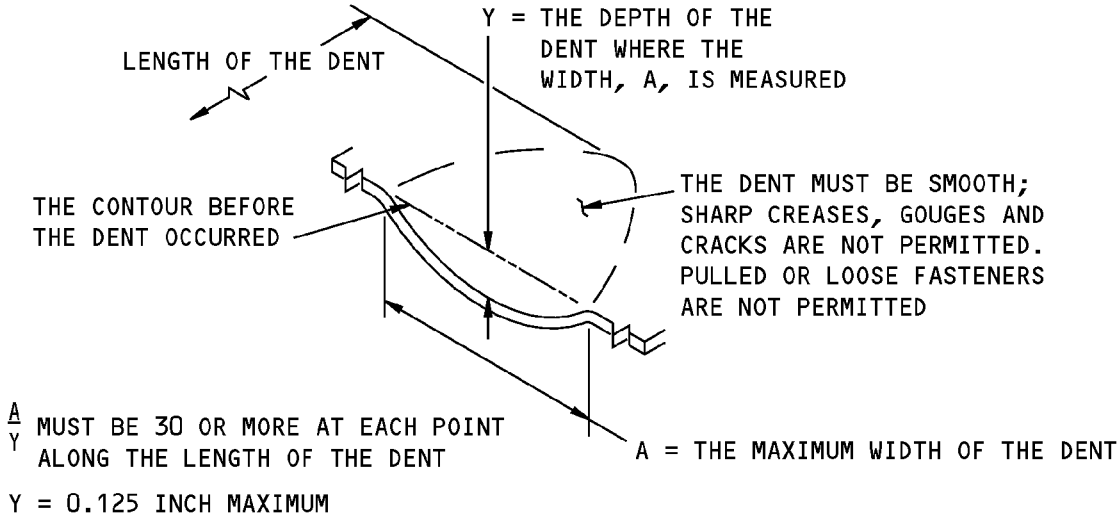
C

Allowable Damage Limits
Figure 104 (Sheet 1 of 6)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

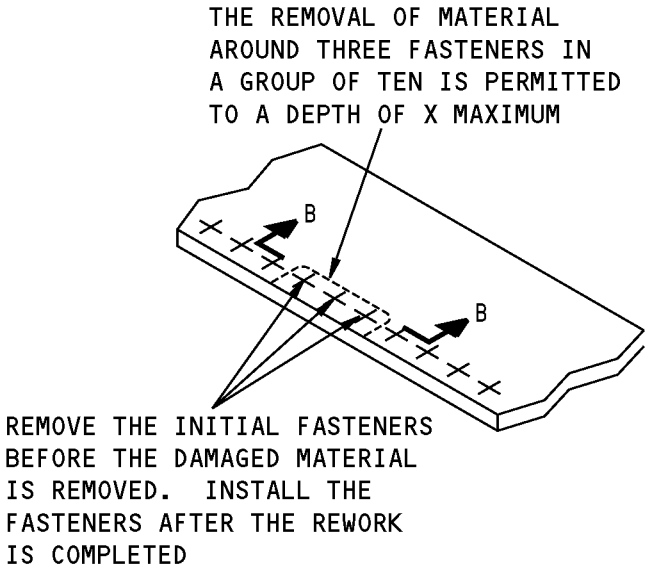
(D)



DENT THAT IS PERMITTED

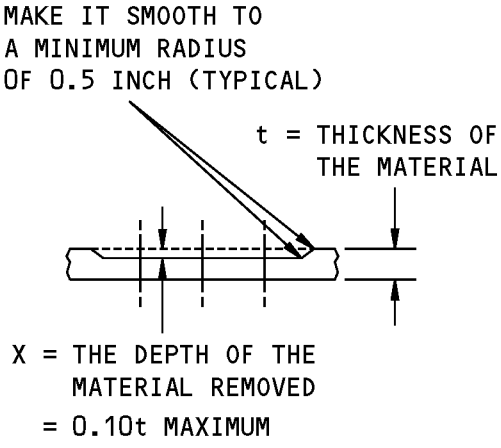
(E)

Allowable Damage Limits
Figure 104 (Sheet 2 of 6)



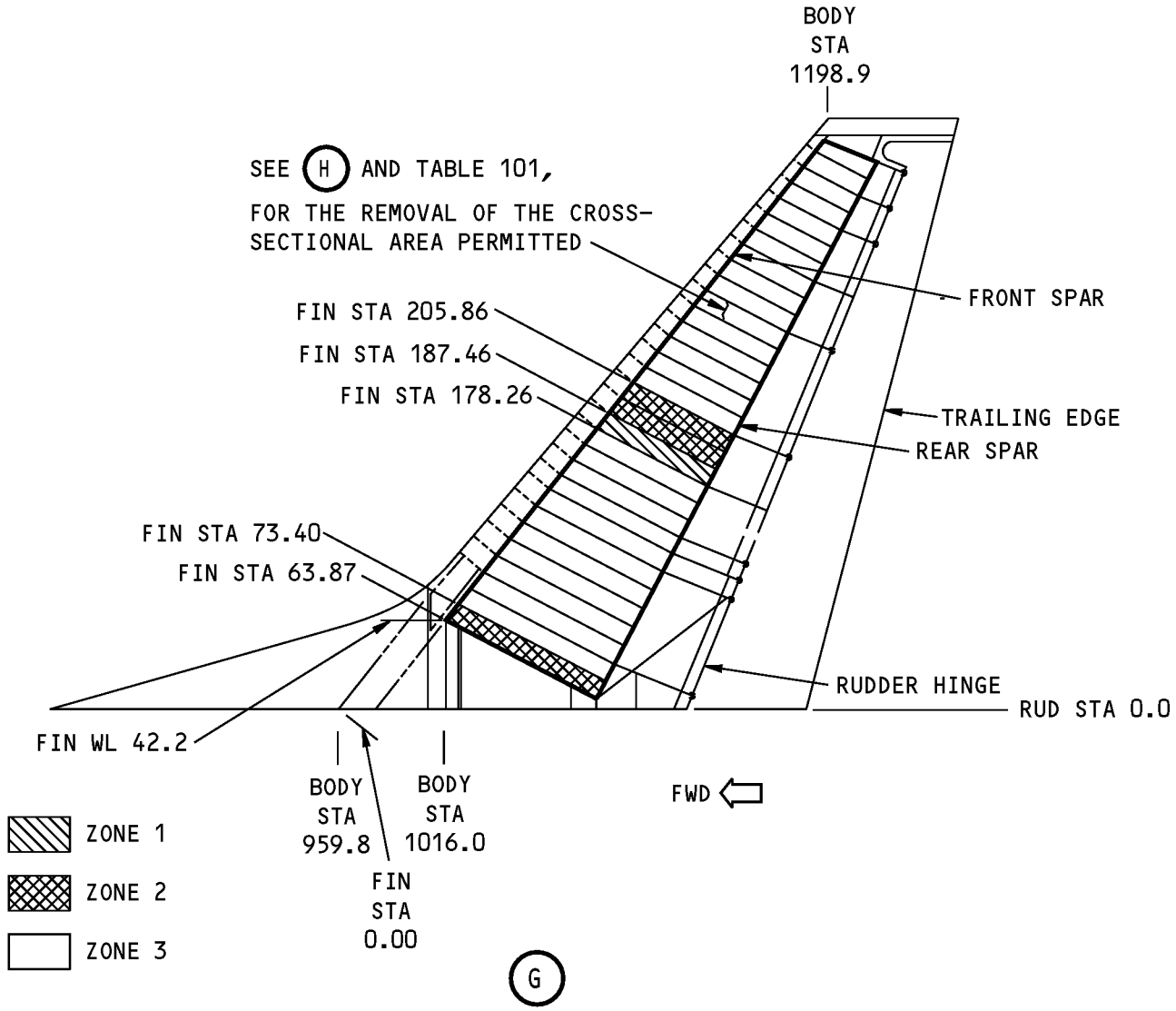
REMOVAL OF CORROSION
AROUND THE FASTENERS

F



B–B

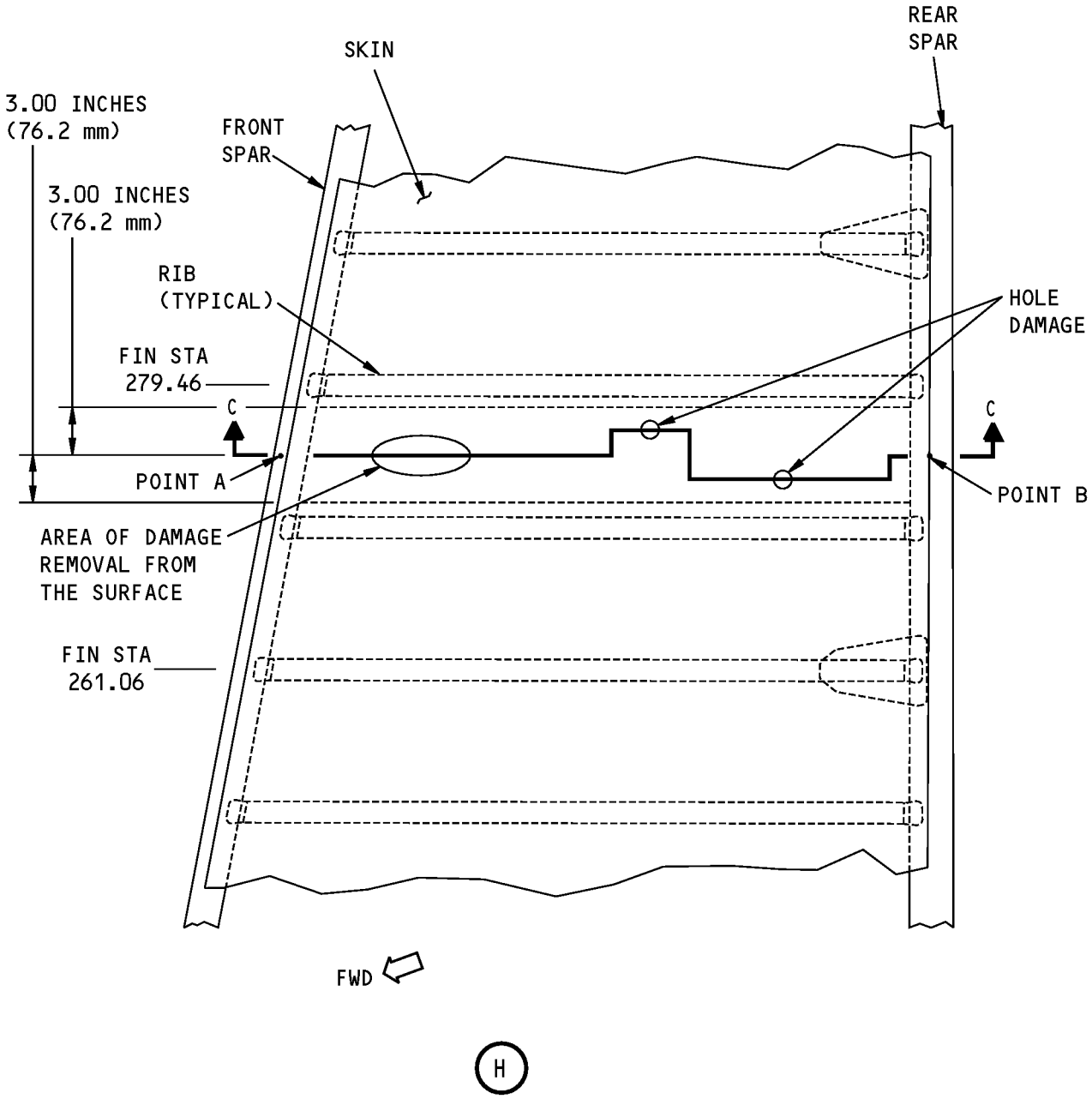
Allowable Damage Limits
Figure 104 (Sheet 3 of 6)



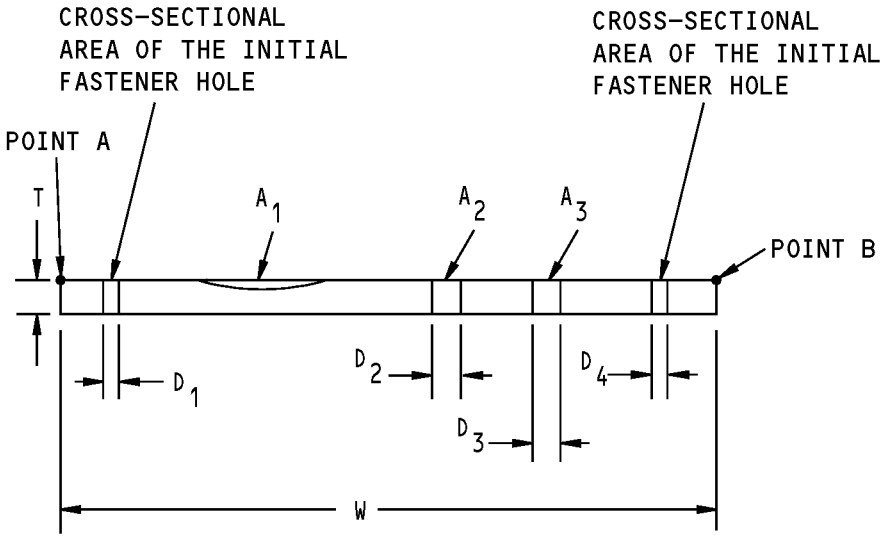
PERCENT OF CROSS-SECTIONAL AREA REMOVED	
ZONE	MAXIMUM PERCENTAGE OF THE INITIAL (AS MANUFACTURED BY BOEING) CROSS-SECTIONAL AREA PERMITTED
1	5
2	10
3	15

TABLE 101

Allowable Damage Limits
Figure 104 (Sheet 4 of 6)



Allowable Damage Limits
Figure 104 (Sheet 5 of 6)



D_1, D_4 = DIAMETERS OF THE INITIAL FASTENER HOLES

D_2, D_3 = DIAMETERS OF THE HOLES WHERE THERE IS DAMAGE

W = WIDTH OF THE SKIN AT THE CROSS-SECTION BETWEEN POINTS A AND B

T = THICKNESS OF THE SKIN AS GIVEN BY THE NOMINAL THICKNESS ON THE PRODUCTION DRAWING

A_i = INITIAL AREA OF THE SKIN
= THE TOTAL CROSS-SECTIONAL AREA MINUS THE CROSS-SECTIONAL AREA OF THE INITIAL FASTENERS HOLES (AS MANUFACTURED BY BOEING)
= $WT - D_1T - D\ T_4$

A_1 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 1

A_2 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 2

A_3 = CROSS-SECTIONAL AREA OF THE DAMAGE THAT IS REMOVED AT LOCATION 3

$\left(\frac{A_1+A_2+A_3}{A_i}\right)$ X 100 = PERCENT OF CROSS-SECTIONAL AREA REMOVED AS GIVEN IN TABLE 101

THE TOTAL CROSS-SECTIONAL AREA REMOVED IN ALL ZONES A-B (3.00 INCH (76.2 mm) ON EACH SIDE OF A LINE A-B) MUST NOT BE MORE THAN THE LIMITS GIVEN IN TABLE 101

C-C

Allowable Damage Limits
Figure 104 (Sheet 6 of 6)

ALLOWABLE DAMAGE 3 - VERTICAL STABILIZER TRAILING EDGE PANELS

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer trailing edge panels shown in Vertical Stabilizer Trailing Edge and Closeout Panel Locations, Figure 101/ALLOWABLE DAMAGE 3 and Vertical Stabilizer Trailing Edge and Closeout Panel Locations, Figure 102/ALLOWABLE DAMAGE 3. Limits are also given for the closeout panels and the balance weight cover panels shown in Vertical Stabilizer Trailing Edge and Closeout Panel Locations, Figure 101/ALLOWABLE DAMAGE 3 and Vertical Stabilizer Trailing Edge and Closeout Panel Locations, Figure 102/ALLOWABLE DAMAGE 3.

2. General

A. Use a Non-Destructive Test (NDT) to find the length, width, and depth of damage.

(1) For the honeycomb core areas that have damage on a facesheet with 3 or less plies, Boeing recommends that you use an instrumented NDT procedure. The tap test procedure is optional. Refer to 737 NDT Part 1, 51-01-02, 737 NDT Part 1, 51-01-03, and 737 NDT Part 1, 51-05-01 for the inspection procedures.

(2) For the honeycomb core areas that have damage on a facesheet with 4 or more plies, Boeing recommends that you use an instrumented NDT procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

NOTE: The tap test procedure as given in 737 NDT Part 1, 51-05-01 is optional only if it can be shown that the defects (that are less than or equal to the allowable damage limits) can be found.

(3) For damage in the solid laminate areas, Boeing recommends that you use an instrumented NDT procedure. Refer to 737 NDT Part 1, 51-01-02 and 737 NDT Part 1, 51-01-03 for the inspection procedures.

(4) Refer to Definitions of Damage Size, Figure 103/ALLOWABLE DAMAGE 3, Details A, B, and C for the definitions of the length, width, and depth of damage.

(5) Refer to Definitions of the Facesheets, Figure 104/ALLOWABLE DAMAGE 3 for the definitions of the facesheets of a honeycomb core area.

B. Remove all contamination and water from the structure.

(1) Refer to 51-30-05 for possible sources of equipment and tools you can use to remove the damage.

(2) Refer to 51-70-04 for the damage removal procedures.

C. Seal all permitted damage areas that are not more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits. Seal the damage with one of the two methods that follow:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure that the tape is in satisfactory condition at each 400 flight hour interval.

(d) Repair the damage after no more than 5000 flight hours.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type 3 primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

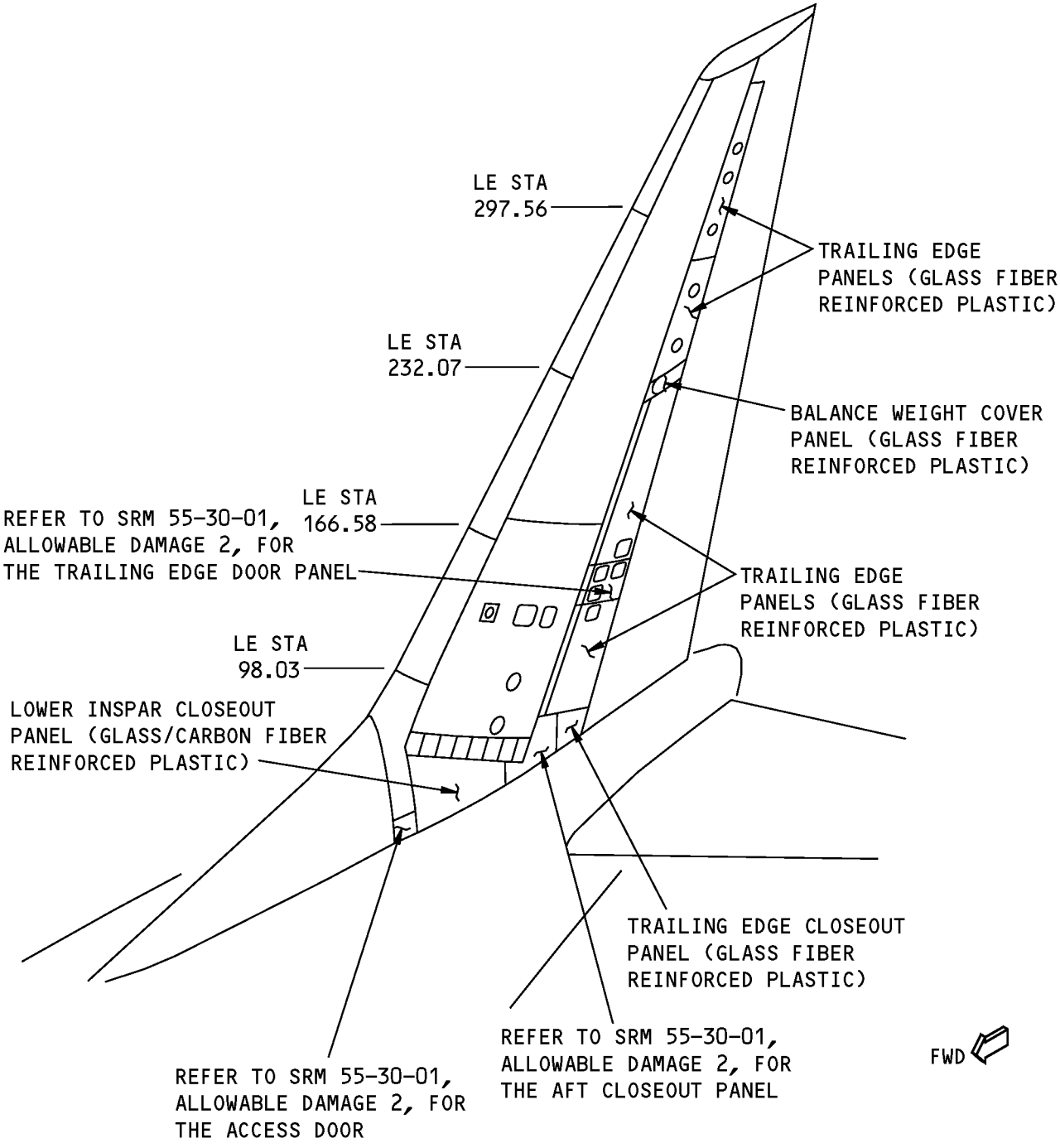
D. Seal all permitted damage areas that are more than one ply deep. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits. Seal the damage as follows:

(1) Use vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

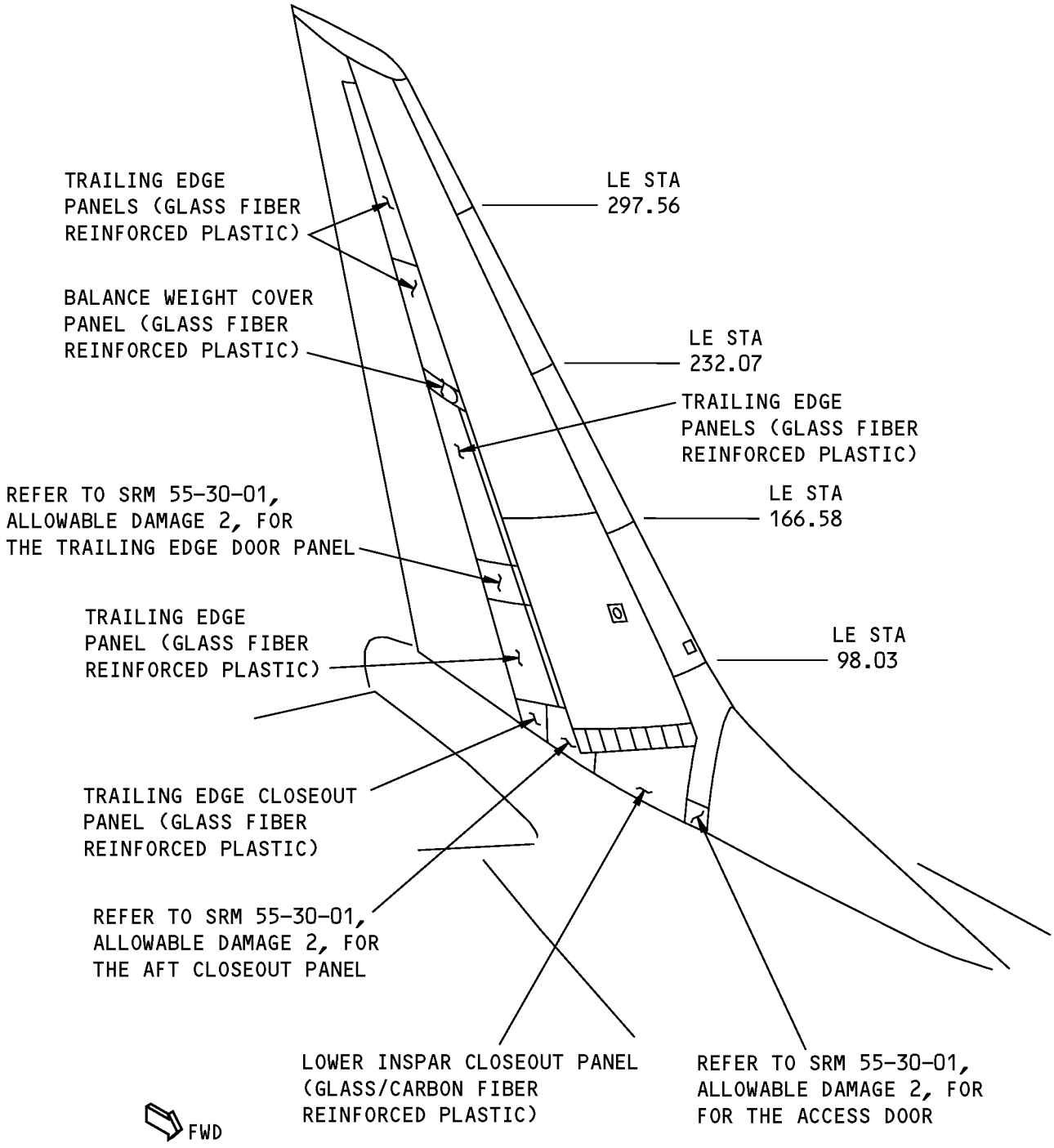
(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

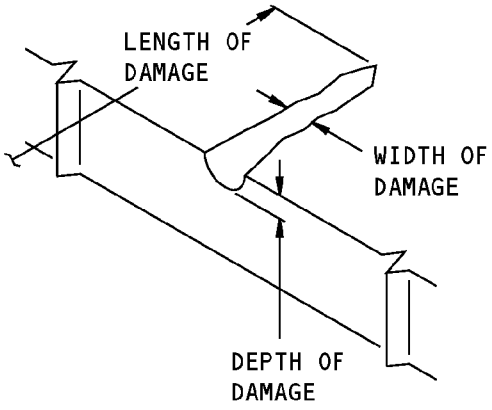
(4) Repair the damage after no more than 400 flight hours.



Vertical Stabilizer Trailing Edge and Closeout Panel Locations
Figure 101

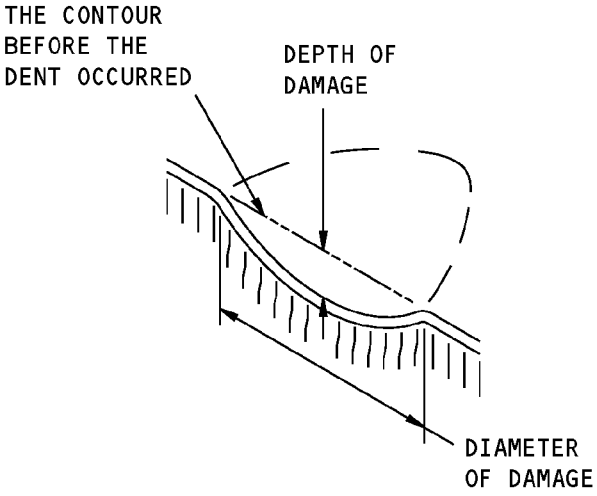


Vertical Stabilizer Trailing Edge and Closeout Panel Locations
Figure 102



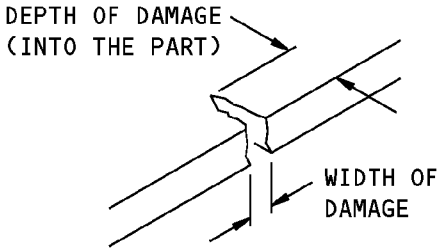
SIZE DEFINITIONS FOR
NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

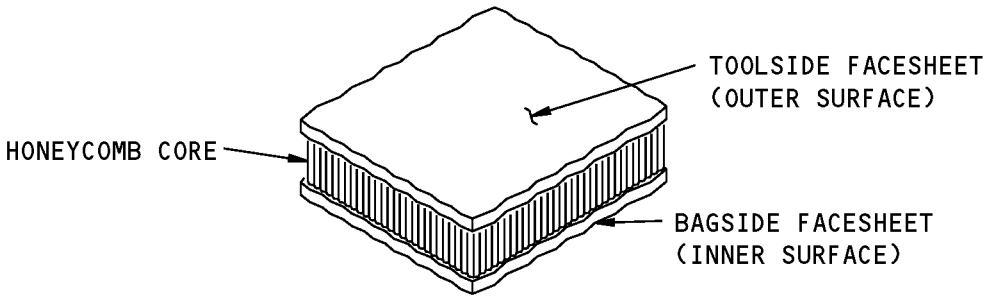
B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of Damage Size
Figure 103



Definitions of the Facesheets
Figure 104

3. References

Reference	Title
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure
737 NDT Part 1, 51-05-01	Tap Test Inspection of Honeycomb Sandwich Structure

4. Allowable Damage Limits

A. Trailing Edge and Closeout Panels - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:

(a) They are sealed as given in Paragrah 2.

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.

(3) Dents are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.

(4) Holes and Punctures are permitted if:

(a) They are a maximum 0.25 inch in diameter

(b) Not more than one fastener hole in six is damaged

(c) Not more than 10 percent of the edgeband for each side of panel is damaged

(d) They are sealed as given in Paragraph 2.

(5) Delaminations are permitted if:
  (a) Not more than one fastener hole in six is damaged
  (b) Not more than 10 percent of the edgeband for each side of panel is damaged
  (c) They are sealed as given in Paragraph 2.

(6) Edge Erosion is permitted as shown in Edge Erosion Damage Removal, Figure 105/ALLOWABLE DAMAGE 3 if:
  (a) Not more than 10 percent of the edgeband for each side of panel is damaged
  (b) It is sealed as given in Paragraph 2.

(7) Edge damage is permitted if:
  (a) It is a maximum 0.10 inch in depth
  (b) Not more than 10 percent of the edgeband for each side of panel is damaged
  (c) It is removed as shown in Allowable Damage Limits, Figure 106/ALLOWABLE DAMAGE 3, Detail A
  (d) It is sealed as given in Paragraph 2.

B. Trailing Edge and Closeout Panels - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:
  (a) They are sealed as given in Paragraph 2.

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if they are:
  (a) A maximum of one ply in depth

    NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

  (b) A maximum length of 1.50 inches
  (c) A maximum width of 1.50 inches
  (d) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 107/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:
    1) Do not cause damage to the glass ply and
    2) Are sealed as given in Paragraph 2.
  (e) Sealed as given in Paragraph 2.

(3) Dents are permitted if:
  (a) They are a maximum of one facesheet
  (b) They are a maximum diameter of 1.50 inches
  (c) They are a minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 107/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:
    1) Do not cause damage to the glass ply and
    2) Are sealed as given in Paragraph 2.
  (d) There is no fiber damage or delamination

(e) The damage is sealed as given in Paragraph 2.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of one facesheet and the core in depth

(b) A maximum diameter of 1.50 inches

(c) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 107/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply and

2) Are sealed as given in Paragraph 2.

(d) Sealed as given in Paragraph 2.

NOTE: Do not remove the damage unless it is necessary to remove resin burrs that extend into the surface contour.

(5) Delaminations are permitted if they are:

(a) On a maximum of one facesheet

(b) A maximum diameter of 1.50 inches

(c) A minimum distance away from the edge of any hole, part edge, or other damage of 4D. Refer to Damage Size and Spacing Limits, Figure 107/ALLOWABLE DAMAGE 3 for damage and spacing limits and the value of D. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass ply and

2) Are sealed as given in Paragraph 2.

(d) Sealed as given in Paragraph 2.

C. Balance Weight Cover Panel - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted if:

(a) They are sealed as given in Paragraph 2.

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(a) Not more than one fastener hole in six is damaged

(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) They are sealed as given in Paragraph 2.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

(5) Delaminations are not permitted.

(6) Edge Erosion is permitted as shown in Edge Erosion Damage Removal, Figure 105/ALLOWABLE DAMAGE 3 if:

(a) Not more than 10 percent of the edgeband for each side of panel is damaged

(b) It is sealed as given in Paragraph 2.

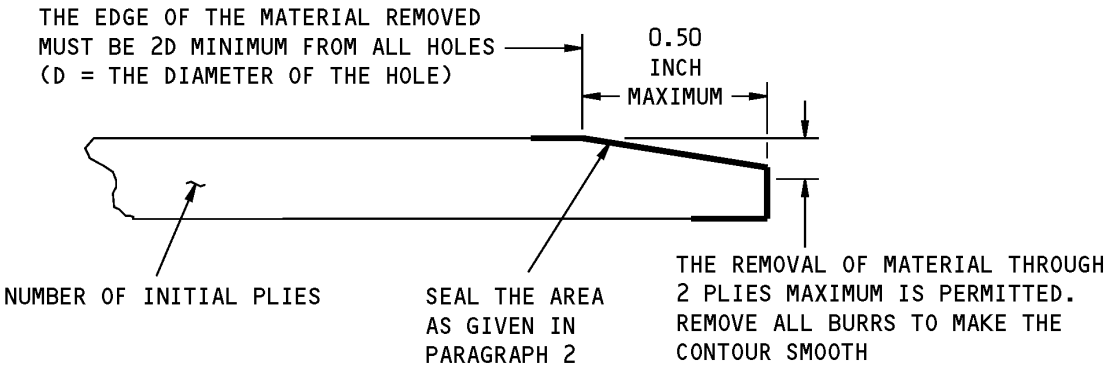
(7) Edge damage is permitted if:

(a) It is a maximum 0.10 inch in depth

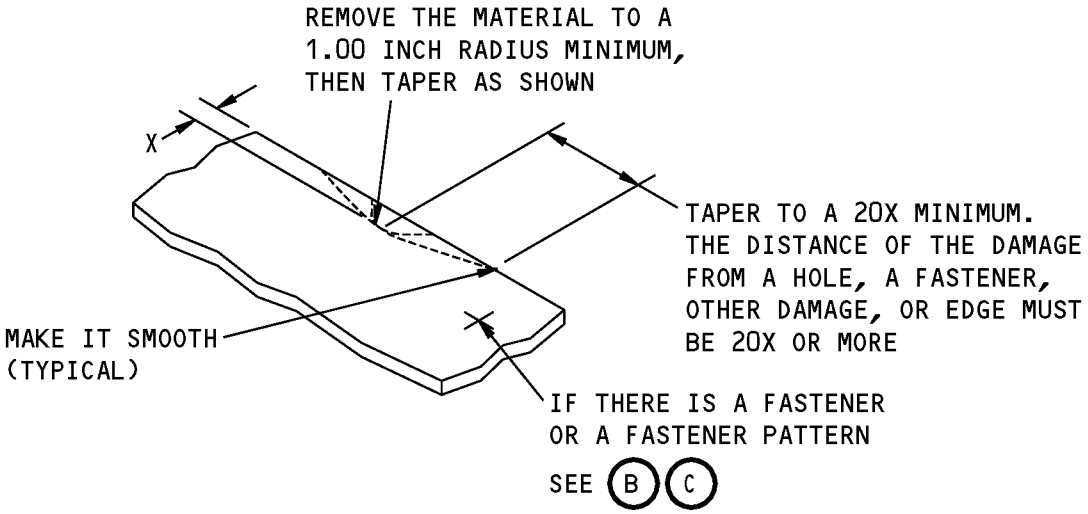
(b) Not more than 10 percent of the edgeband for each side of panel is damaged

(c) It is removed as shown in Allowable Damage Limits, Figure 106/ALLOWABLE DAMAGE 3, Detail A

(d) It is sealed as given in Paragraph 2.

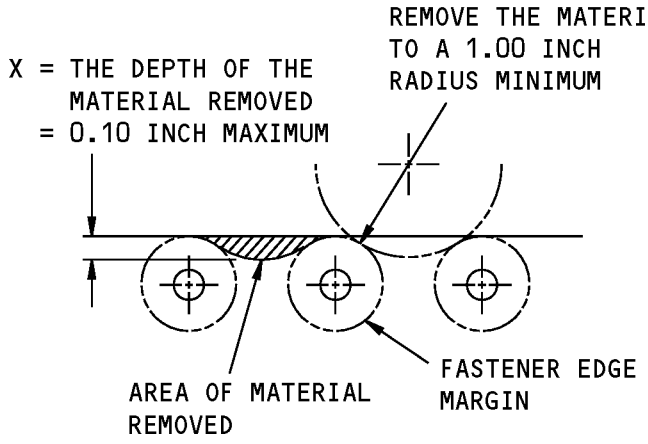


Edge Erosion Damage Removal
Figure 105



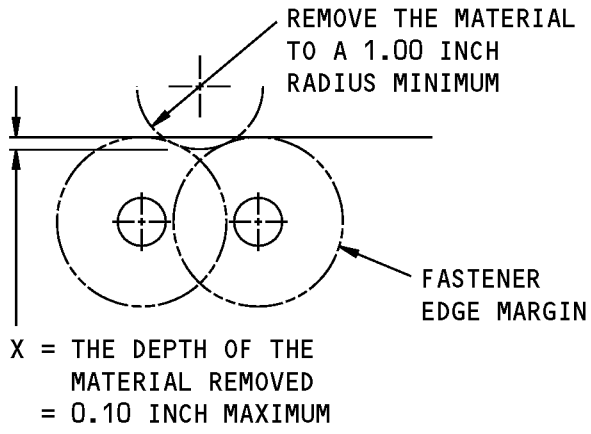
REMOVAL OF DAMAGED MATERIAL ON AN EDGE

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

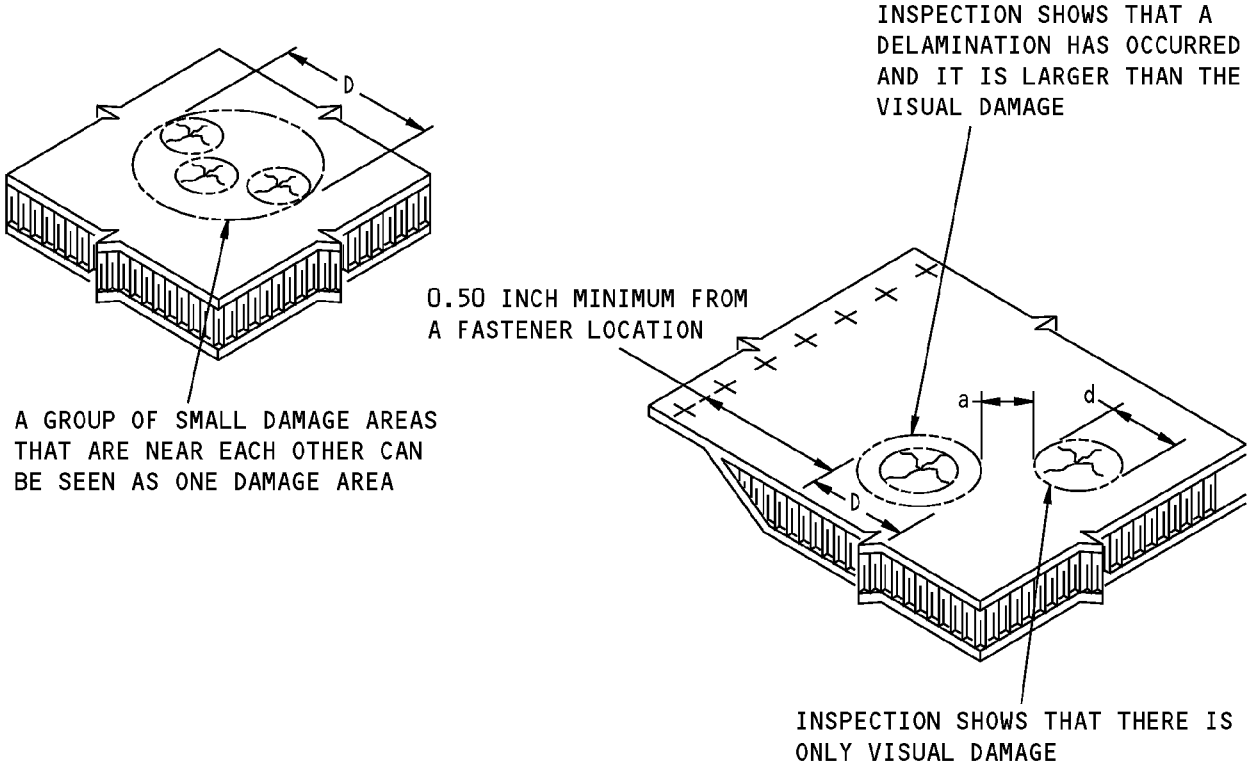
B



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

C

Allowable Damage Limits
Figure 106



NOTE: TO FIND DELAMINATION YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES (REFER TO NDT PART 1, 51-01-02).

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

A DAMAGE AREA DOES NOT INCLUDE NICKS, GOUGES, AND SCRATCHES THAT DO NOT CAUSE DAMAGE TO THE GLASS AND CARBON FIBER PLIES IF:
- YOU MAKE A TEMPORARY SEAL OF THE DAMAGE AS GIVEN IN PARAGRAPH 2 OR
- YOU MAKE A PERMANENT SEAL OF THE DAMAGE AS GIVEN IN PARAGRAPH 2

(D) IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND IS A MAXIMUM OF 1.50 INCHES

(d) IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

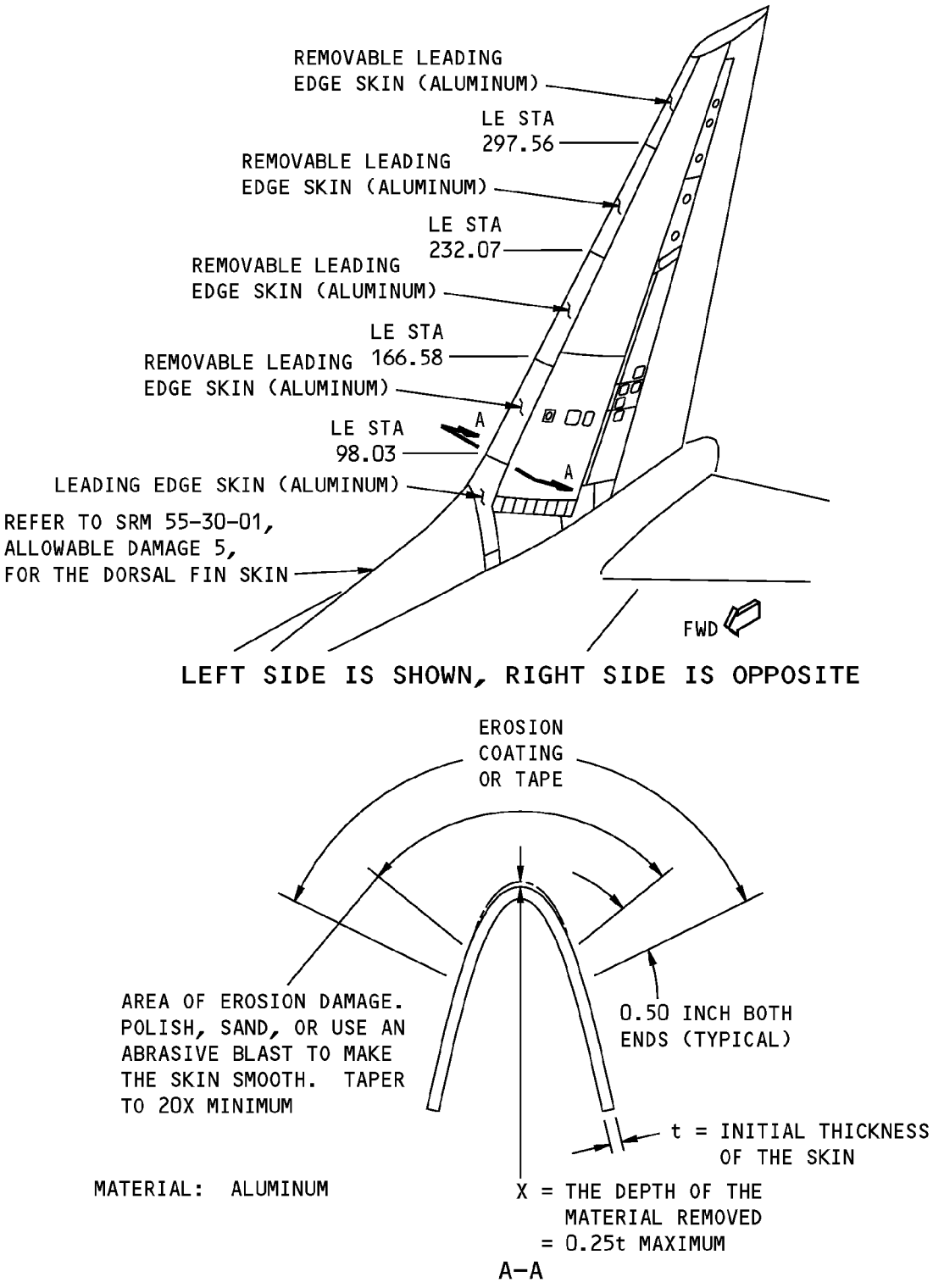
(a) IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS. THE MINIMUM (a) THAT IS PERMITTED IS (4D).

Damage Size and Spacing Limits
Figure 107

ALLOWABLE DAMAGE 4 - VERTICAL STABILIZER LEADING EDGE SKINS, EROSION DAMAGE

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer leading edge skins that have erosion damage. These limits are for the skin panels shown in Vertical Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4. Do not use the limits of this subject for the fin tip. Refer to Allowable Damage 1 for other types of damage limits permitted.



Vertical Stabilizer Leading Edge Skin Locations
Figure 101

2. General

A. Do what follows for the aluminum leading edge skins:

(1) Remove the damaged material as given in Paragraph 4./ALLOWABLE DAMAGE 4 The maximum depth of material that can be removed is equal to 25% of the initial thickness of the skin.

(a) Refer to 51-10-02 for the inspection and removal of damage.

(b) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(c) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(2) Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-08	EROSION PROTECTION
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING

4. Allowable Damage Limits

WARNING: MATERIALS THAT ARE USED TO CLEAN AND COAT ARE TOXIC AND FLAMMABLE. MAKE SURE THERE IS A GOOD FLOW OF AIR AND YOU OBEY ALL FIRE PRECAUTIONS.

A. Light Erosion Damage to the Aluminum Skin:

(1) Make the metal contour smooth.

(a) Apply masking tape to the areas where there is no damage.

(b) Clean the surface with a moist cheesecloth. Use water to make the cheesecloth moist.

(c) Polish or sand the damaged area to make a smooth surface. The maximum depth of removal must not be more than 25% of the initial skin thickness.

NOTE: Use aluminum oxide abrasives or aluminum wool. Do not use silicon carbide abrasives or steel wool.

(d) Where the skin has been pushed in, make the skin contour smooth with the adjacent skin.

1) Use powdered household cleanser or 400-grit aluminum oxide paper.

2) Refer to Vertical Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4, Section A-A, for surface contour limits.

(e) Clean the surface with a moist new cheesecloth. Use MIBK to make the cheesecloth moist.

(f) Find the depth of material that has been removed.

1) Use a Vidigage, Branson digital caliper, dial gage, or a straight edge with feeler gages to find the depth.

2) Repair the leading edge skin if the depth of material removed is more than 25% of the initial skin thickness.

3) Apply a chemical conversion coating if the depth of material removed is less than 25% of the initial skin thickness. Apply the conversion coating to the bare surfaces of the skin as given in 51-20-01.

CAUTION: DO NOT APPLY AN EROSION PROTECTION TO THE AREA OF THE SKIN FORWARD OF THE HIGH FREQUENCY (HF) ANTENNA. THERE COULD BE A DANGEROUS EFFECT TO THE PERFORMANCE OF THE HF SYSTEM. THIS AREA OF THE SKIN IS ADJACENT TO THE HF FIBERGLASS STRAP ATTACHED TO THE SKIN.

(g) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.

2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

B. Moderately damaged to badly damaged areas of the aluminum skin:

(1) Prepare the metal areas.

(a) Apply masking tape to the areas where there is no damage.

(b) Close and seal all openings to keep all material out of the structure.

(c) Static ground the airplane and the abrasive blast equipment.

(d) Use a spray gun with water or toluene to clean the eroded area of the skin.

CAUTION: DO NOT USE A CLOTH OR OTHER FABRIC TO CLEAN THE ABRASIVE BLASTED AREA. UNWANTED LINT ON THE CLEANED AREA WILL DECREASE THE LIFE OF THE EROSION COATING.

(e) Use an abrasive blast to remove the erosion damage as given in 51-10-02.

1) Make sure all of the oxide and corrosion has been removed from the eroded areas.

2) Refer to Vertical Stabilizer Leading Edge Skin Locations, Figure 101/ALLOWABLE DAMAGE 4, Section A-A, for the limits of a good taper.

(f) Find the depth of material that has been removed.

1) Use a Vidigage, Branson digital caliper, dial gage, or a straight edge with feeler gages to find the depth.

2) Repair the leading edge skin if the depth of material removed is more than 25% of the initial skin thickness.

3) Apply a chemical conversion coating if the depth of material removed is less than 25% of the initial skin thickness. Apply the conversion coating to the bare surfaces of the skin as given in 51-20-01.

CAUTION: DO NOT APPLY AN EROSION PROTECTION TO THE AREA OF THE SKIN FORWARD OF THE HIGH FREQUENCY (HF) ANTENNA. THERE COULD BE A DANGEROUS EFFECT TO THE PERFORMANCE OF THE HF SYSTEM. THIS AREA OF THE SKIN IS ADJACENT TO THE HF FIBERGLASS STRAP ATTACHED TO THE SKIN.

(g) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.

2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

C. Damage to the erosion coating on the Fiberglass Strap for the HF antenna:

CAUTION: EROSION OF THE FIBERGLASS SURFACE IS NOT PERMITTED. DO NOT TRY TO REMOVE THE FIBERGLASS DAMAGE. MAKE SURE THERE IS ALWAYS A LAYER OF EROSION TAPE OR AN EROSION COATING ON THE FIBERGLASS SURFACE. STRUCTURAL DAMAGE TO THE FIBERGLASS STRAP WILL OCCUR IF YOU DO NOT OBEY.

(1) Make an inspection of the fiberglass strap at intervals for damage to the erosion protection.

(2) Remove and replace the erosion coating or erosion tape as given in Paragraph 4.D./ALLOWABLE DAMAGE 4 and 51-20-08 if:

(a) The bare fiberglass surface shows

(b) The aerodynamic smoothness limits are not kept as given 51-10-01.

D. Damage to the initial layer of erosion protection:

(1) Areas of bare metal or unsatisfactory aerodynamic smoothness are caused by damage to the erosion protection. Refer to 51-10-01 for the aerodynamic smoothness limits and do what follows for these areas:

(a) Remove the erosion coating with MIBK.

1) Soak the coating with MIBK with the use of cheesecloth.

2) Keep the cheesecloth on the coating until it is soft.

3) Use a plastic scraper to remove the erosion coating.

(b) Remove the erosion tape.

1) Soak the tape edge sealer with MIBK with the use of cheesecloth.

2) Keep the cheesecloth on the edge sealer until it is sufficiently soft to remove.

3) Heat (150°F maximum temperature) can be used to make the tape soft.

4) Use a plastic scraper, razor, or knife to start the removal of the tape at edges. Use your hand to pull the tape away from the metal skin.

(c) For more protection of leading edge skins, apply a new layer of erosion tape or an erosion coating. Refer to 51-20-08.

1) Replace the tape or erosion coating if there is too much wear.

2) When the bare metal shows or the aerodynamic smoothness limits are not kept, there is too much wear. Refer to 51-10-01 for the aerodynamic smoothness limits.

ALLOWABLE DAMAGE 5 - DORSAL FIN SKIN

1. Applicability

A. This subject gives the allowable damage limits for the dorsal fin skin made of Glass Fiber Reinforced Plastic (GFRP) honeycomb sandwich material. Refer to Dorsal Fin Skin Location, Figure 101/ALLOWABLE DAMAGE 5.

B. The composite structure allowable damage limits are applicable only if they are sealed as given in Paragraph 2.

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT procedure.

(2) Refer to Definitions of the Dimensions of the Different Types of Damage, Figure 102/ALLOWABLE DAMAGE 5 for the definitions of the length, width, and depth of the damage.

(3) Refer to Definitions of the Facesheets, Figure 103/ALLOWABLE DAMAGE 5 for the definitions of the facesheets of a honeycomb core area.

B. Remove all of the contamination and water from the fairing.

(1) Refer to 51-70-04 for the damage removal procedures.

(2) Refer to 51-30-03 for possible sources of the non-metallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment you can use to remove the damage.

(4) Seal all the permitted damage areas that are not more than one ply in depth. Refer to the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 5 Seal the damage with one of the two methods that follow:

(a) Make a temporary seal.

1) Apply aluminum foil tape (speed tape).

2) Keep a record of the location.

3) Make sure that the tape is in satisfactory condition at normal maintenance intervals.

(b) Make a permanent seal.

1) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

2) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

3) Apply one layer of BMS 10-60, Type II enamel to the external surfaces sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

(5) Seal all of the damage areas that are more than one ply in depth. Refer to the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 5 Seal the damage as follows:

(a) Use a vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

(b) Make a temporary seal with aluminum foil tape (speed tape).

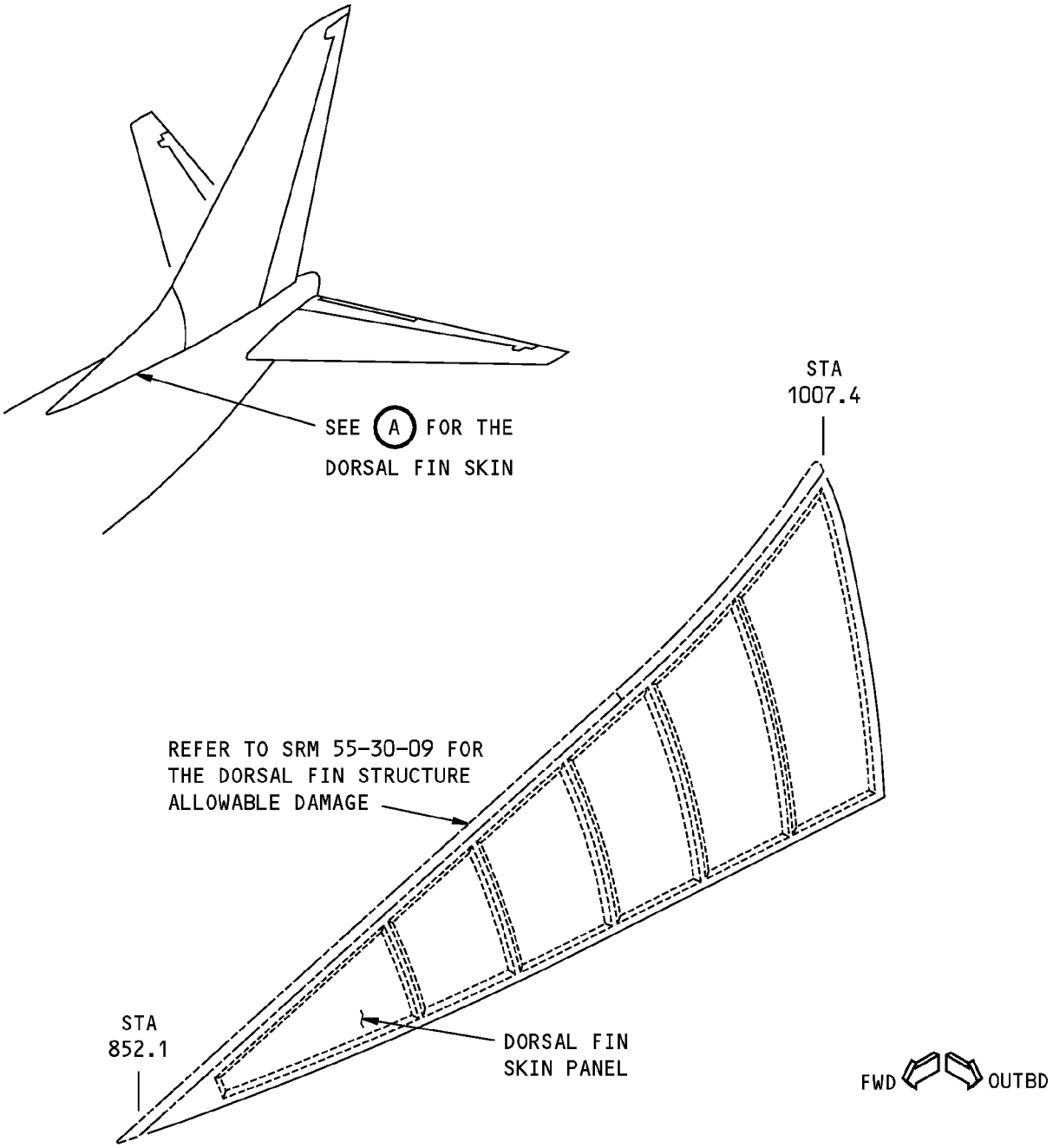
(c) Keep a record of the location.

(d) Repair the damage at or before 24 months from the time the seal was made.

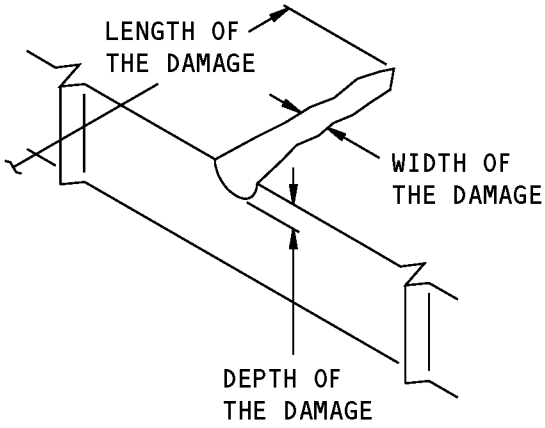
(6) The definition of the words "other damage", as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause damage to the glass fibers and is sealed.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS		
TYPE OF STRUCTURE	**AREA LOCATION**	**PARAGRAPH**
DORSAL FIN SKIN GFRP HONEYCOMB SANDWICH	HONEYCOMB CORE AREA	4.A
	SOLID LAMINATE AREA	4.B

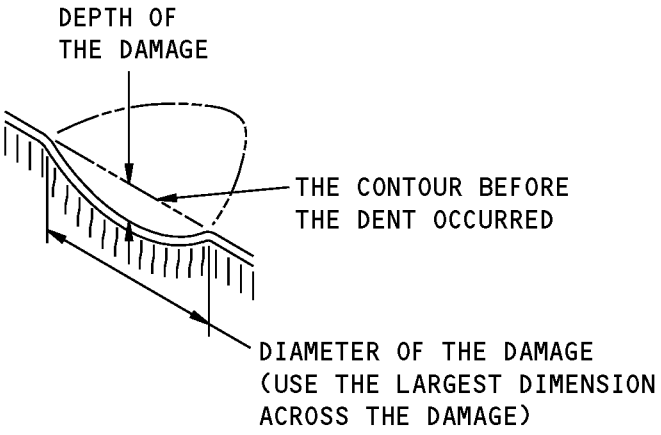


Dorsal Fin Skin Location
Figure 101



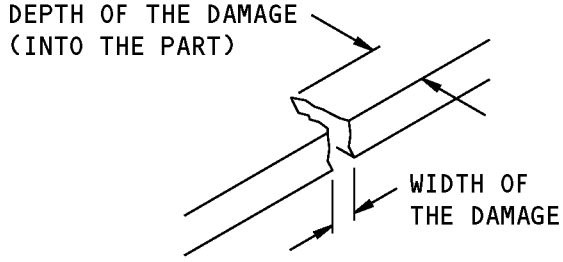
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

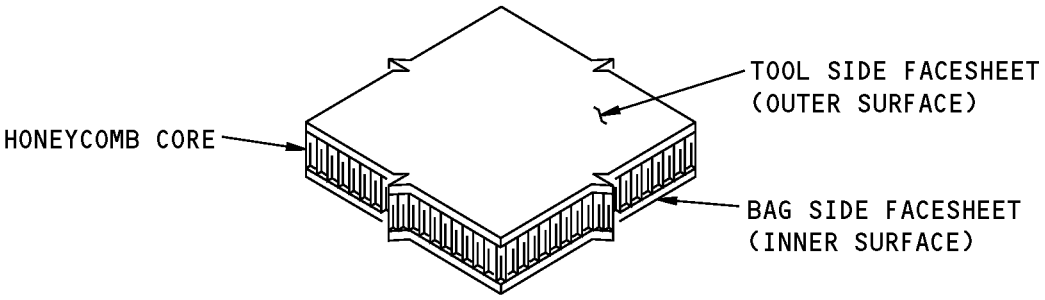
B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Definitions of the Dimensions of the Different Types of Damage
Figure 102



Definitions of the Facesheets
Figure 103

3. References

Reference	Title
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Honeycomb Core Areas

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum depth of one ply

NOTE: Use the limits for holes and punctures if the depth of the damage is more than one ply.

(b) A maximum length of 5.0 inches (127.00 mm)

(c) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(d) A minimum distance from the edge of other damage as shown in Allowable Damage Details for Honeycomb Core Areas, Figure 104/ALLOWABLE DAMAGE 5, Detail A.

(3) Dents that do not cause damage to the glass fibers are permitted if they are:

(a) A maximum depth of 2 plies

(b) A maximum diameter of 2.0 inches (50. 80 mm)

(c) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(d) A minimum distance from the edge of other damage as shown in Allowable Damage Details for Honeycomb Core Areas, Figure 104/ALLOWABLE DAMAGE 5, Detail A.

(4) Holes and Punctures are permitted if they are:

(a) A maximum diameter of 2.0 inches (50.8 mm)

(b) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(c) A minimum distance from the edge of other damage as shown in Allowable Damage Details for Honeycomb Core Areas, Figure 104/ALLOWABLE DAMAGE 5, Detail A.

(5) Delaminations are permitted if they are:

(a) A maximum length of 2.0 inches (50.80 mm)

(b) A maximum width of 2.0 inches (50.80 mm)

(c) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(d) A minimum distance from the edge of other damage as shown in Allowable Damage Details for Honeycomb Core Areas, Figure 104/ALLOWABLE DAMAGE 5, Detail A.

B. Solid Laminate Areas

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum depth of one ply

NOTE: Use the limits for holes and punctures if the depth of the damage is more than one ply.

(b) A maximum length of 1.0 inch (25.4 mm)

(c) A maximum width of 0.25 inch (6.35 mm)

(d) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(e) A minimum distance from the edge of other damage as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail A.

(3) Dents that do not cause damage to the glass fibers are permitted if they are:

(a) A maximum depth of 2 plies

(b) A maximum diameter of 0.625 inch (15.88 mm)

(c) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(d) A minimum distance from the edge of other damage as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail A.

(4) Holes and Punctures are permitted if they are:

(a) A maximum diameter of 0.625 inch (15.88 mm)

(b) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(c) A minimum distance from the edge of other damage as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail A.

(5) Delaminations are permitted if they agree with all of the conditions that follow:

(a) A maximum length of 0.625 inch (15.88 mm) in length

(b) A maximum width of 0.625 inch (15.88 mm)

(c) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

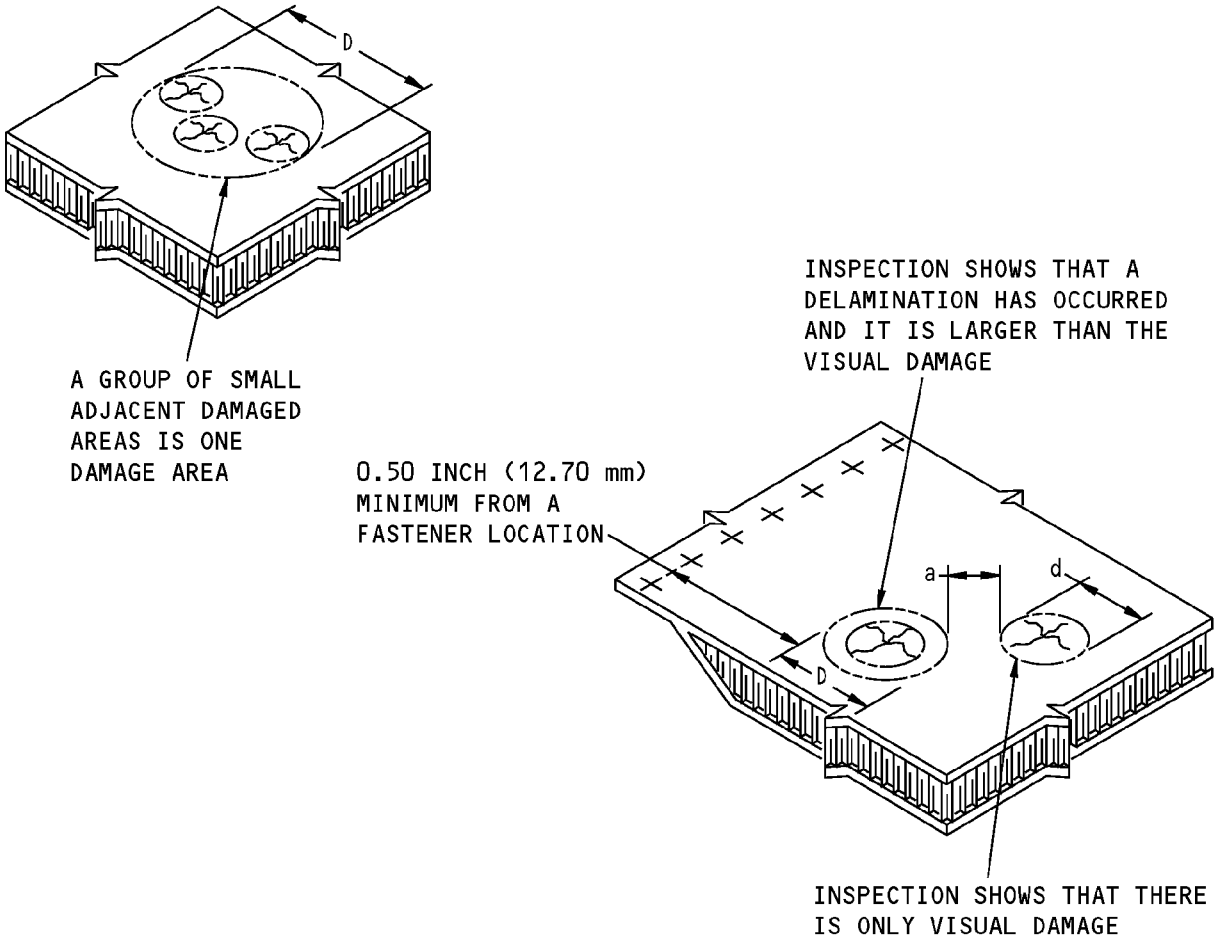
(d) A minimum distance from the edge of other damage as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail A.

(6) Edge damage is permitted as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail A, if it is:

(a) A maximum of 2 plies in depth

(b) A minimum of 0.50 inch (12.70 mm) away from the edge of a fastener hole

(7) Edge erosion damage is permitted as shown in Allowable Damage Limits for the Solid Laminate Areas, Figure 105/ALLOWABLE DAMAGE 5, Detail B.



AREAS OF ADJACENT DAMAGE THAT ARE LESS THAN 3 INCHES (76.2 mm) APART

(A)

NOTE: TO FIND DELAMINATION USE NONDESTRUCTIVE INSPECTION PROCEDURES AS GIVEN IN NDT PART 1, 51-01-02.

THE DIAMETER OF A DAMAGE AREA IS THE LARGER OF THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION.

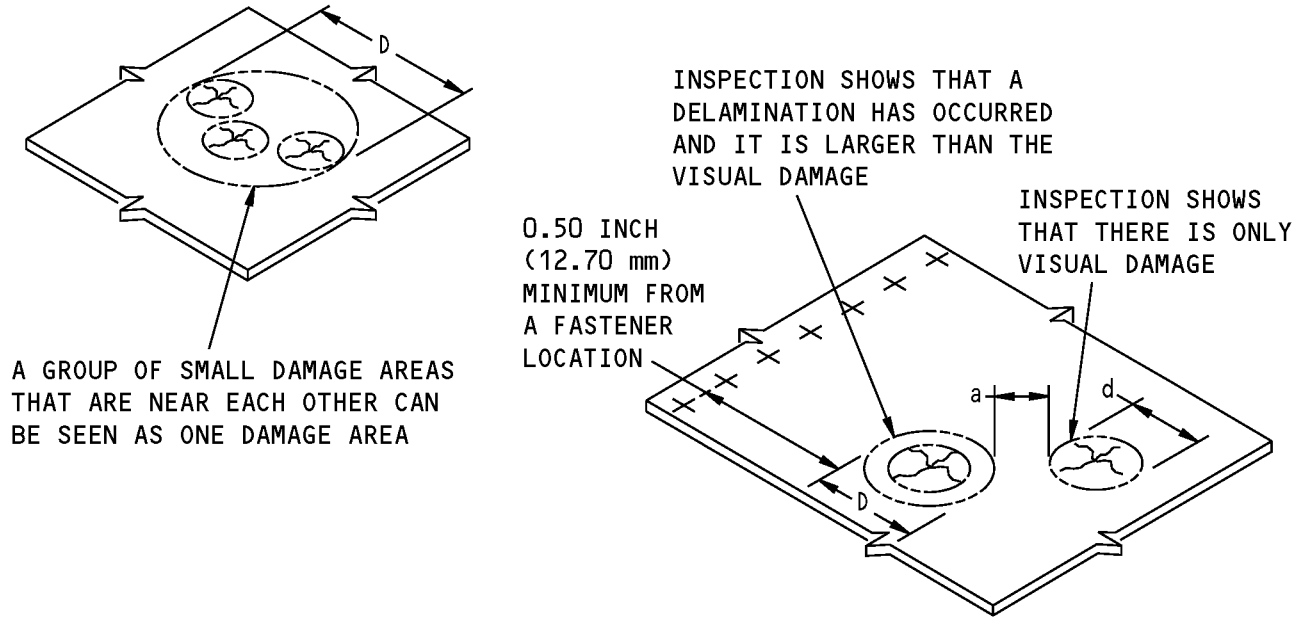
D IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

d IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

a IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS.

THE MINIMUM a THAT IS PERMITTED IS 2.5D.

Allowable Damage Details for Honeycomb Core Areas
Figure 104



NOTE: TO FIND DELAMINATION, YOU CAN USE NONDESTRUCTIVE INSPECTION PROCEDURES. REFER TO NDT PART 1, 51-01-02.

THE DIAMETER OF A DAMAGE AREA IS EITHER THE DIAMETER OF THE VISUAL DAMAGE OR THE DIAMETER OF THE DELAMINATION. USE THE DIAMETER OF THE LARGER DAMAGE.

D IS THE LARGER DIAMETER OF TWO ADJACENT DAMAGE AREAS AND CAN BE A MAXIMUM OF 1.0 INCH.

d IS THE SMALLER DIAMETER OF TWO ADJACENT DAMAGE AREAS.

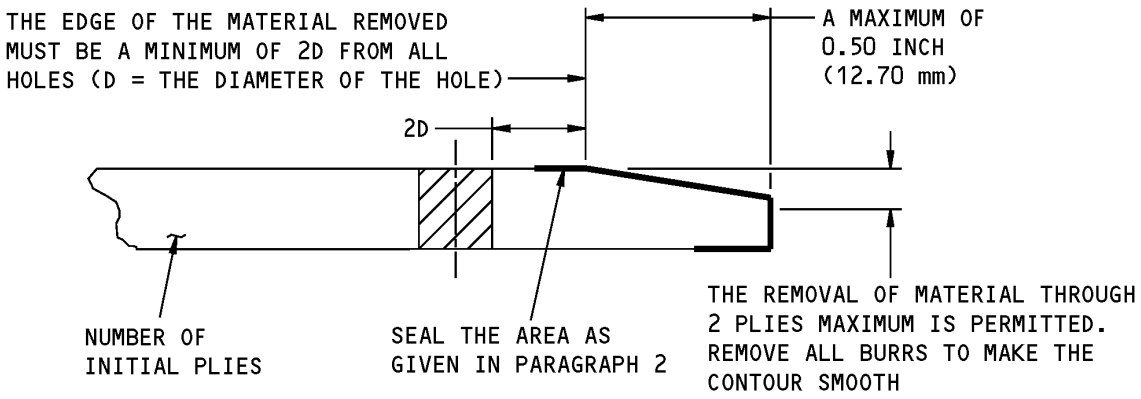
a IS THE DISTANCE BETWEEN TWO ADJACENT DAMAGE AREAS.

THE MINIMUM a THAT IS PERMITTED IS 4D.

DAMAGE THAT IS PERMITTED TO COMPOSITE PANELS

(A)

Allowable Damage Limits for the Solid Laminate Areas
Figure 105 (Sheet 1 of 2)



CLEANUP AND SEALING OF EDGE EROSION DAMAGE

B

Allowable Damage Limits for the Solid Laminate Areas
Figure 105 (Sheet 2 of 2)

REPAIR 1 - VERTICAL STABILIZER LEADING EDGE SKIN EXTERNAL REPAIR

1. Applicability

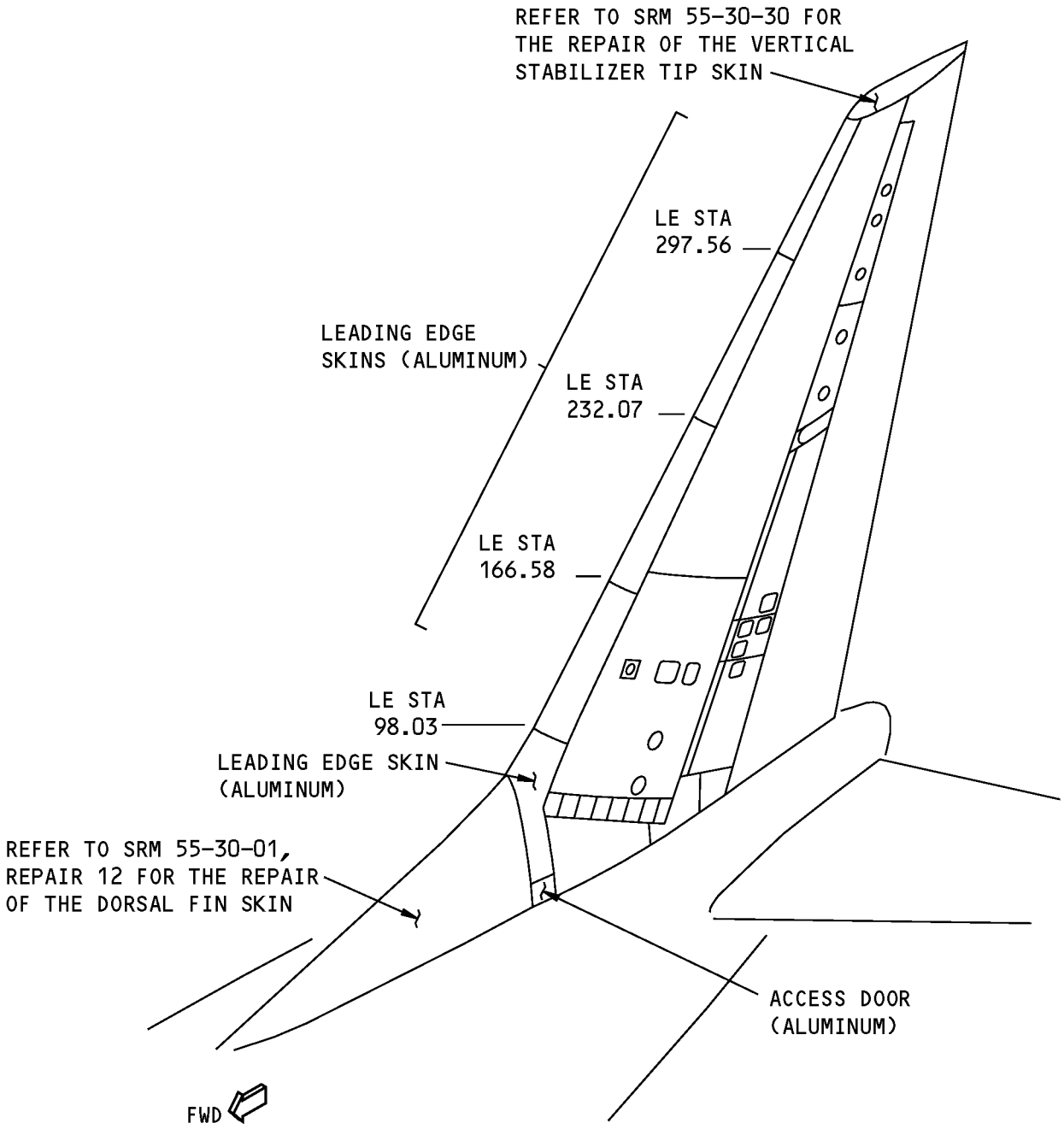
A. Repair 1 is applicable to damage to the vertical stabilizer leading edge skins shown in Vertical Stabilizer Leading Edge Skin Locations, Figure 201/REPAIR 1 if:

(1) You do inspections of the repair as given in Paragraph 5./REPAIR 1

(2) You replace Repair 1 no more than 15,000 hours after installation with one of the repairs that follow:

(a) A permanent flush repair as shown in Repair 2

(b) A replacement of the blind rivets with solid flush rivets for a permanent external repair.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Vertical Stabilizer Leading Edge Skin Locations
Figure 201

2. General

A. Repair 1 gives instructions for a Category C repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

C. Repair 1 can be used only if you install the blind rivets flush against the internal structure.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES

4. Repair Instructions

A. Drill a stop hole at the ends of all skin cracks that do not end at fastener holes. Refer to Vertical Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1. Refer to 51-10-02 for the procedures to remove the damage.

(a) Make the cut in the shape of a rectangle with the longest sides parallel to the leading edge ribs.

(b) Make the corner radii of the cut a minimum of 0.50 inch.

(c) Make sure there is a minimum of two rows of repair fasteners around the edges of the cut.

B. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

C. Make the part [1] doubler as shown in Vertical Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1. Refer to Table 201/REPAIR 1 for the repair material.

(1) Make the contour of the part [1] doubler the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad 2024-T3 that is 0.063 inch thick when the initial skin is 0.040 inch thick. Use clad 2024-T3 that is one gage thicker than the initial skin when the thickness is more than 0.040 inch

D. Assemble the part [1] doubler as shown in Vertical Stabilizer Leading Edge Skin External Repair, Figure 202/REPAIR 1.

E. Drill and countersink the fastener holes.

F. Remove the part [1] doubler.

G. Remove the nicks, scratches, gouges, burrs, and sharp edges from the doubler and the bare surfaces of the skin.

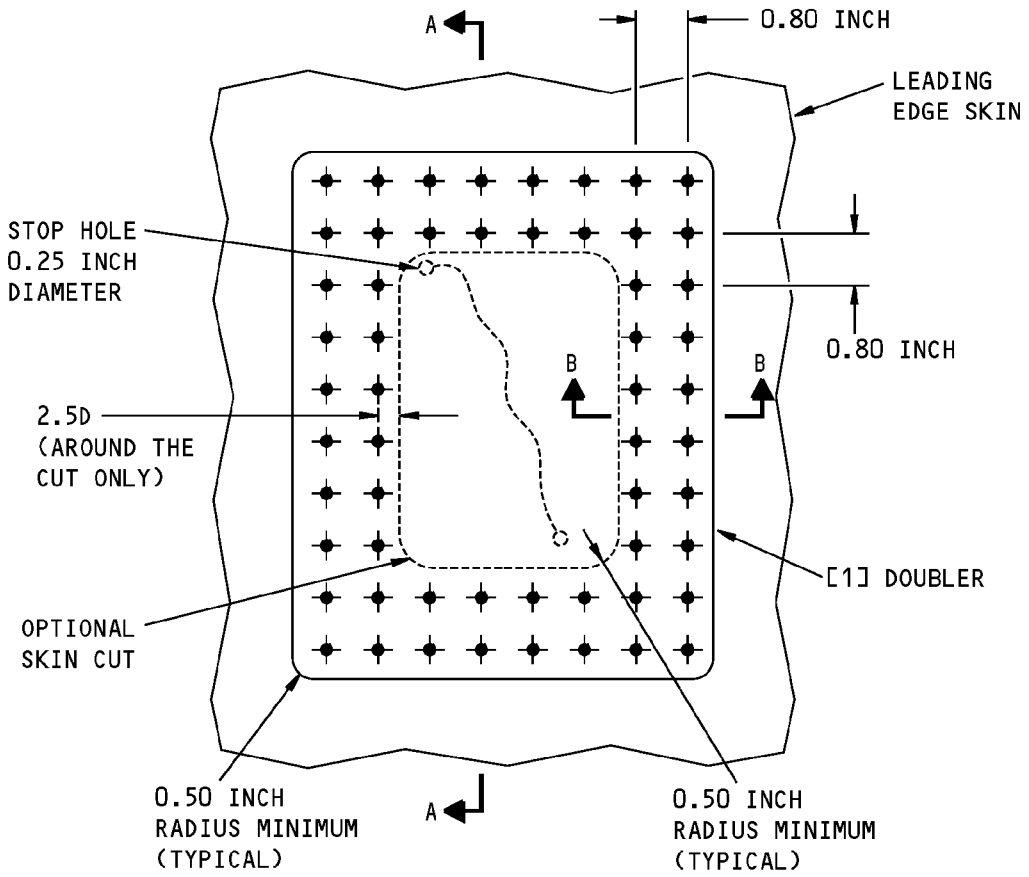
H. Apply a chemical conversion coating to the part [1] doubler and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

I. Install the part [1] doubler with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

J. Install the fasteners dry.

K. Apply BMS 5-95 sealant around the edges of the part [1] doubler as given in 51-20-05.

L. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



FLAT PATTERN OF THE REPAIR

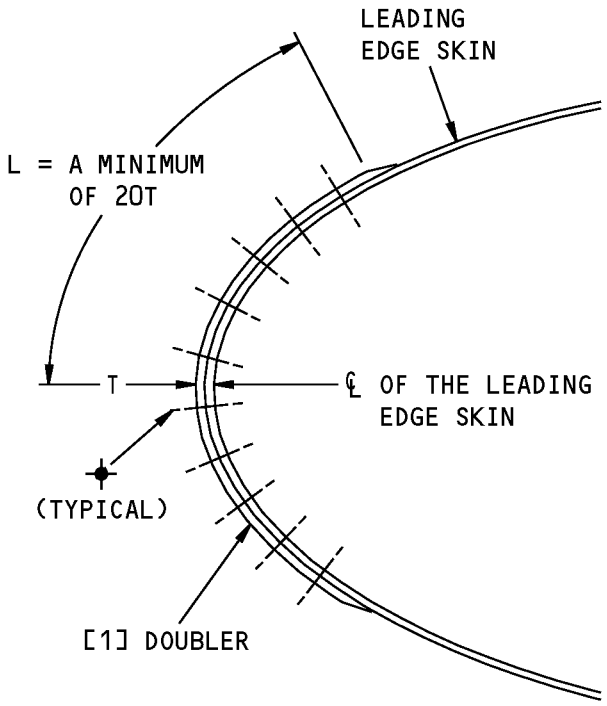
NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENERS. USE (D) TO CALCULATE EDGE MARGINS.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

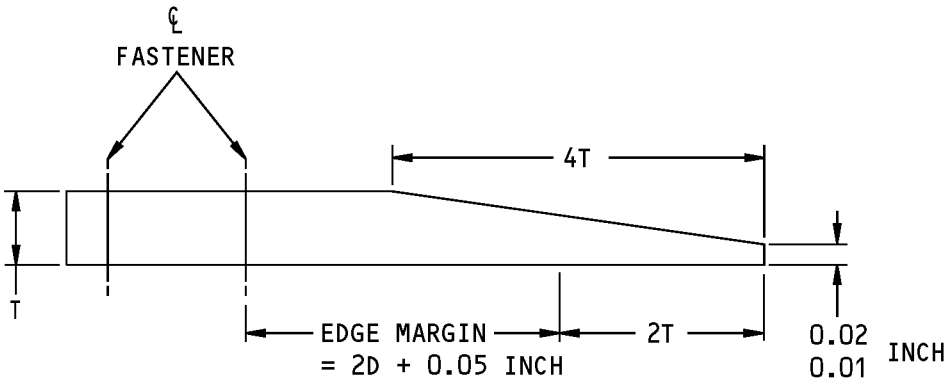
FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E() OR A NAS 1739E5 BLIND RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Vertical Stabilizer Leading Edge Skin External Repair
Figure 202 (Sheet 1 of 2)



A–A



(TYPICAL FOR ALL DOUBLER EDGES)
B–B

Vertical Stabilizer Leading Edge Skin External Repair
Figure 202 (Sheet 2 of 2)

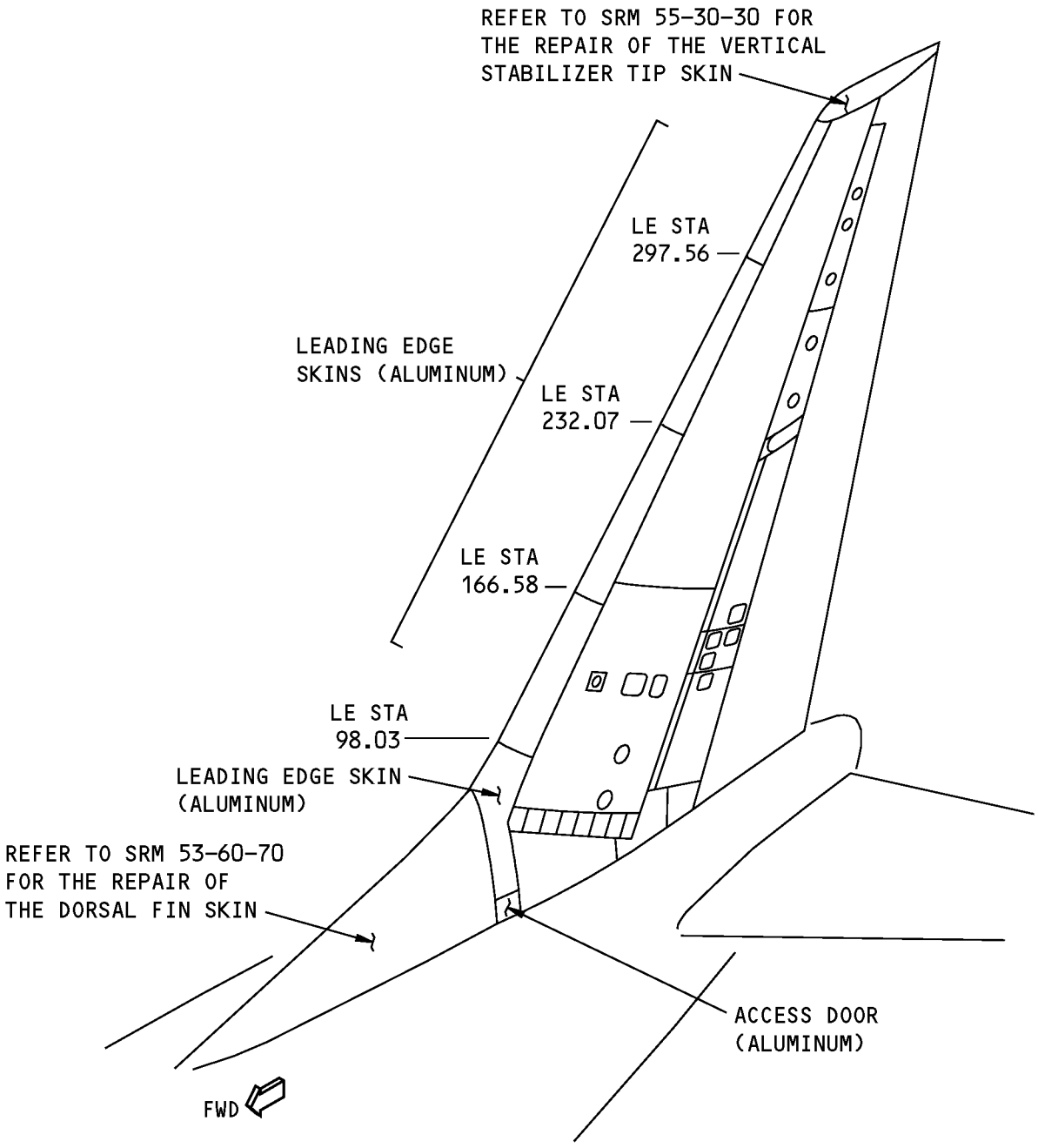
5. Inspection Instructions

A. Do a detailed visual inspection of the repair at each 5000 flight hour interval or more frequently. Inspect the blind rivets carefully. Blind rivets that are loose, missing, or damaged must be replaced.

REPAIR 2 - FLUSH REPAIR OF THE VERTICAL STABILIZER LEADING EDGE SKIN

1. Applicability

A. Repair 2 is applicable to damage to the vertical stabilizer leading edge skins shown in Vertical Stabilizer Leading Edge Skin Locations, Figure 201/REPAIR 2. Repair 2 is also applicable as a replacement repair for Repair 1.



LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Vertical Stabilizer Leading Edge Skin Locations
Figure 201

2. General

A. Repair 2 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the aircraft. Refer to 51-10-01.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Remove the damaged leading edge section.

B. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

C. Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longest sides parallel to the leading edge ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

(3) Make the edges of the cut smooth to a surface finish of 125 microinches.

(4) Make sure there is a minimum of two rows of repair fasteners around the edges of the cut.

D. Put the skin that is around the damage back to the initial contour.

E. Make the repair parts as shown in Vertical Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to Table 201/REPAIR 2 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad 2024-T3 that is 0.063 inch thick when the initial skin is 0.040 inch thick. Use clad 2024-T3 that is one gage thicker than the initial skin when the thickness is more than 0.040 inch
[2]	Filler	1	Use clad 2024-T3 that is the same thickness as the initial skin

F. Assemble the repair parts as shown in Vertical Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2.

G. Drill and countersink the fastener holes.

(1) Align fastener holes in the part [1] doubler with holes in the skin made from an external repair.

H. Remove the repair parts.

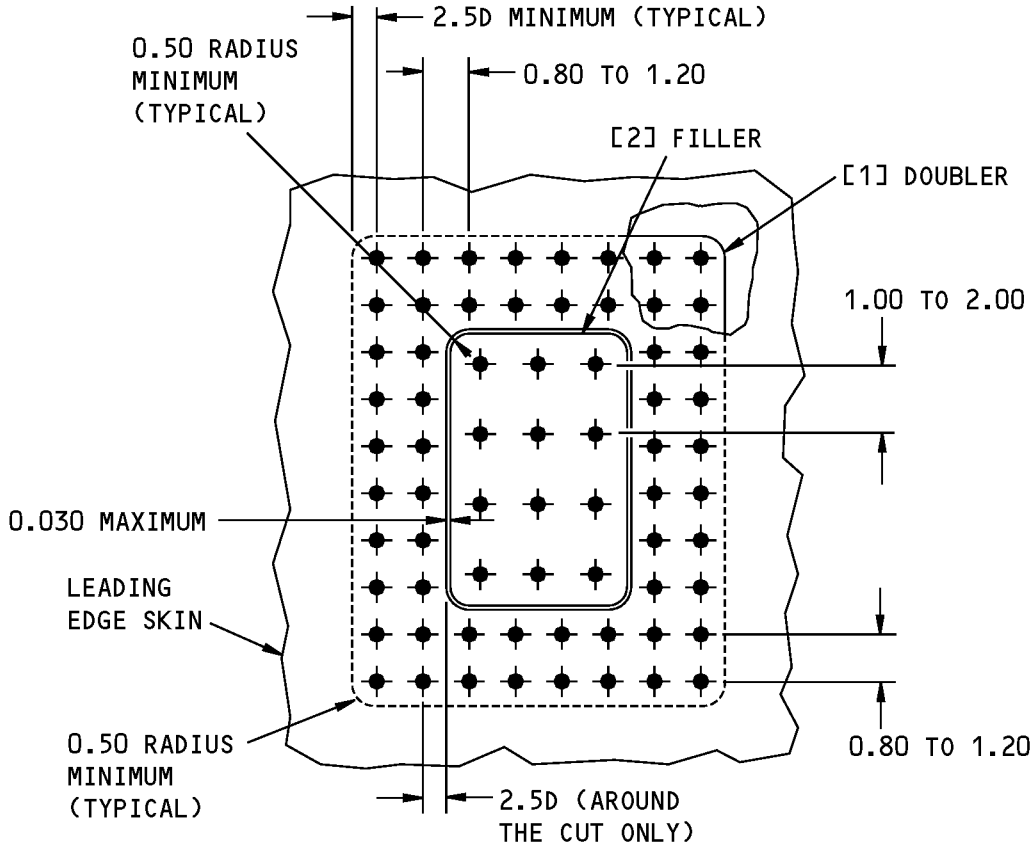
I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

J. Install the repair parts with BMS 5-95 or BMS 5-26 sealant between the mating surfaces as shown in Vertical Stabilizer Leading Edge Skin Flush Repair, Figure 202/REPAIR 2. Refer to 51-20-05 for the procedures to apply the sealant.

K. Install the rivets without sealant.

L. Apply BMS 5-95 or BMS 5-26 sealant in the gap between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

M. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



FLAT PATTERN OF THE REPAIR

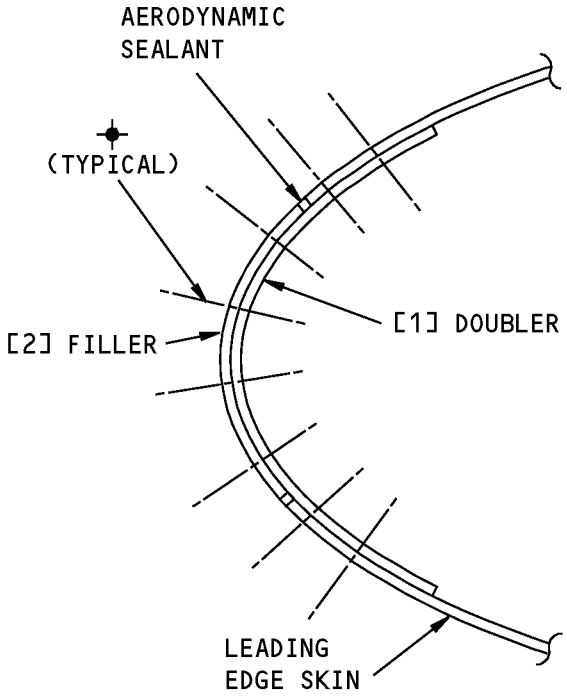
NOTES

- ALL DIMENSIONS ARE IN INCHES
- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS.

FASTENER SYMBOLS

⌖ REPAIR FASTENER LOCATION. INSTALL A BACR15GF5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Vertical Stabilizer Leading Edge Skin Flush Repair
Figure 202 (Sheet 1 of 2)



SECTION THROUGH LEADING EDGE REPAIR

Vertical Stabilizer Leading Edge Skin Flush Repair
Figure 202 (Sheet 2 of 2)

REPAIR 3 - VERTICAL STABILIZER INSPAR SKIN EXTERNAL REPAIR BETWEEN RIBS - FIN STATIONS 73.400 THRU 196.663

1. Applicability

A. Repair 3 is applicable to damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 3 if:

(1) The damage is between Fin Stations 73.400 and 196.663.

(2) You do inspections of the repair as given in Paragraph 5./REPAIR 3

(3) You replace Repair 3 no more than 15,000 hours after installation with one of the repairs that follow:

(a) A permanent flush repair as shown in Repair 5 or Repair 6

(b) A replacement of the blind rivets with solid flush rivets for a permanent external repair.

2. General

A. Repair 3 gives instructions for a Category C repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

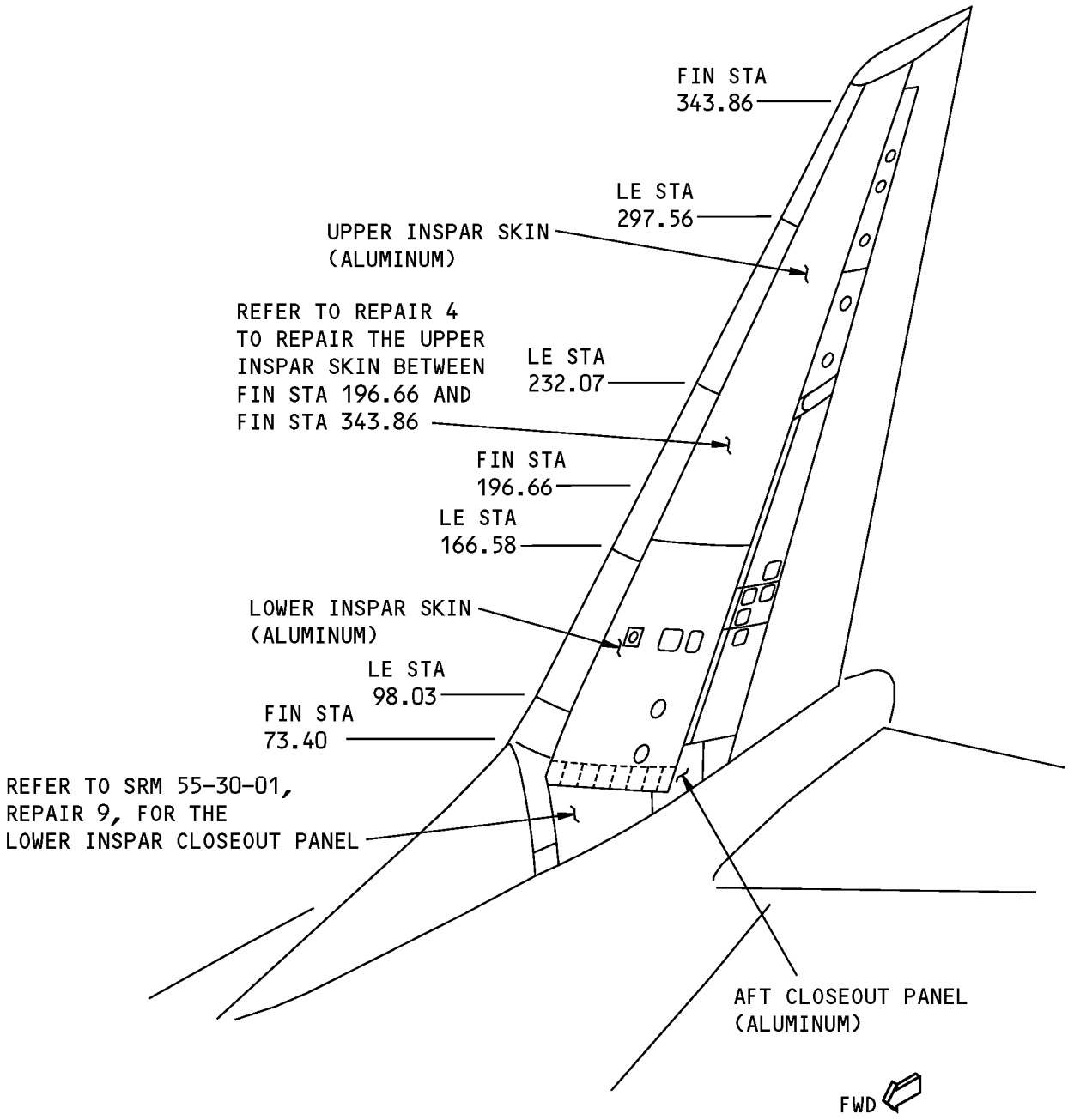
B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 3 must be kept.

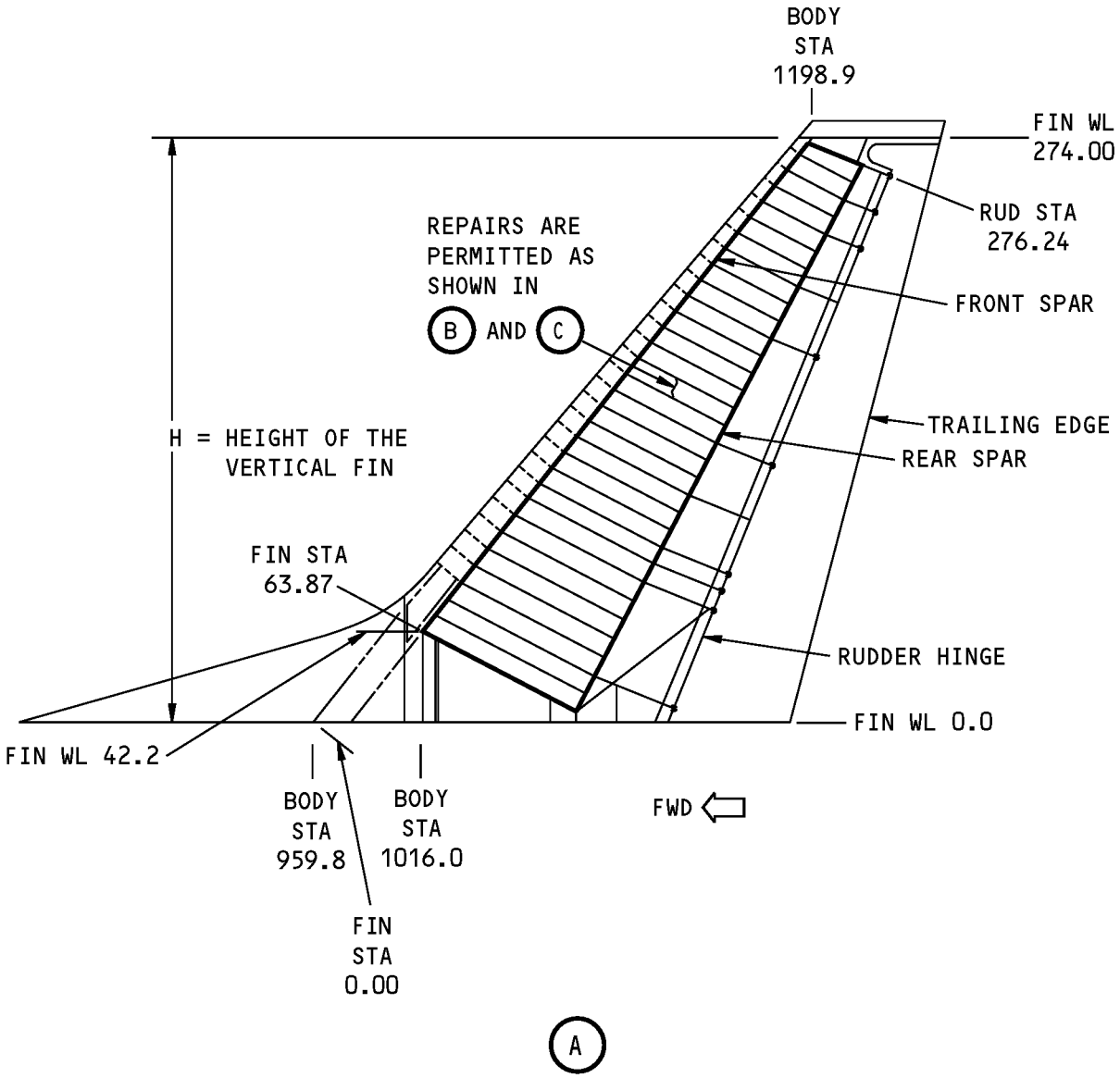
C. Repair 3 can be used only if you install the blind rivets flush against the internal structure.

D. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

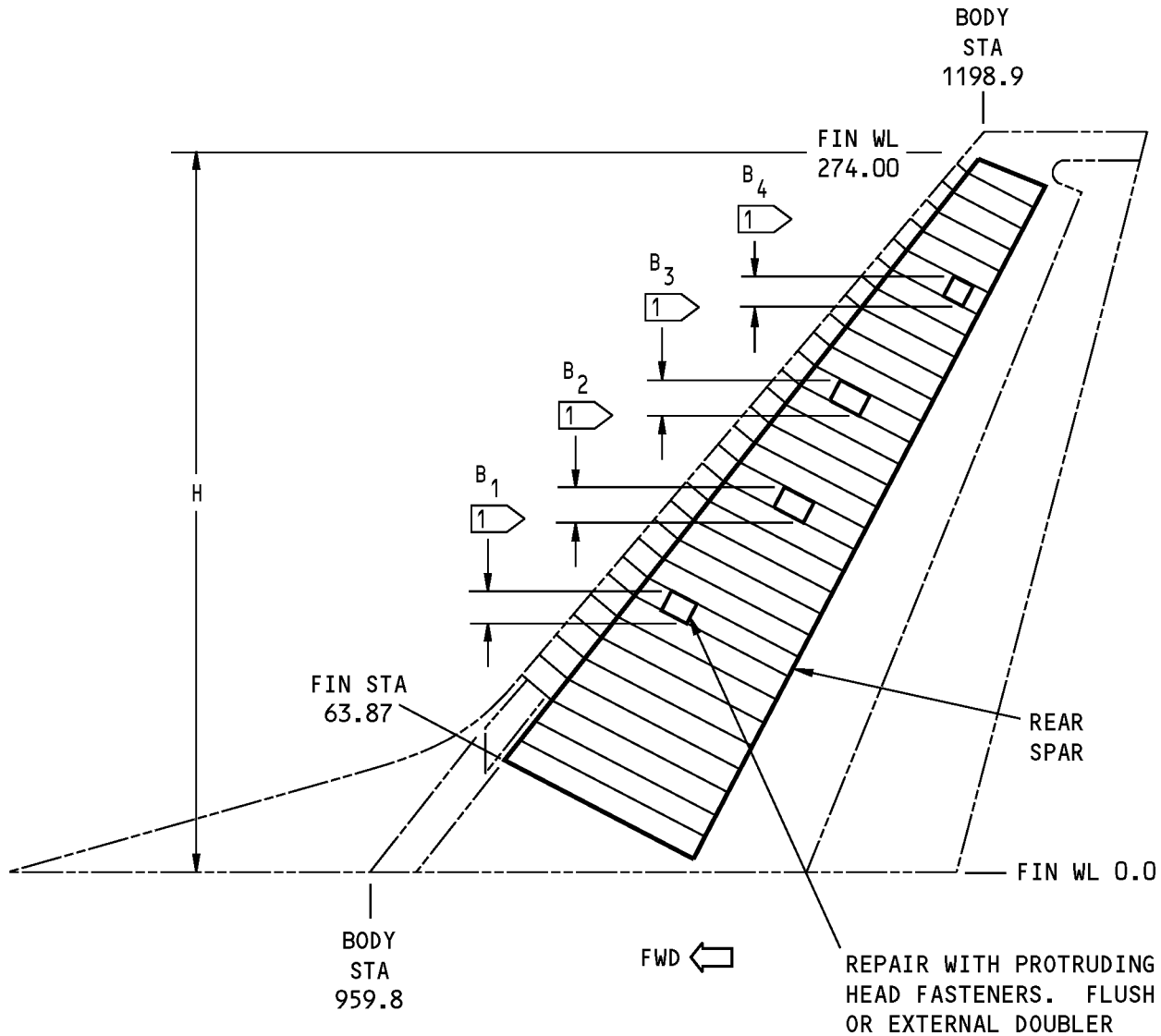


LEFT SIDE IS SHOWN
RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

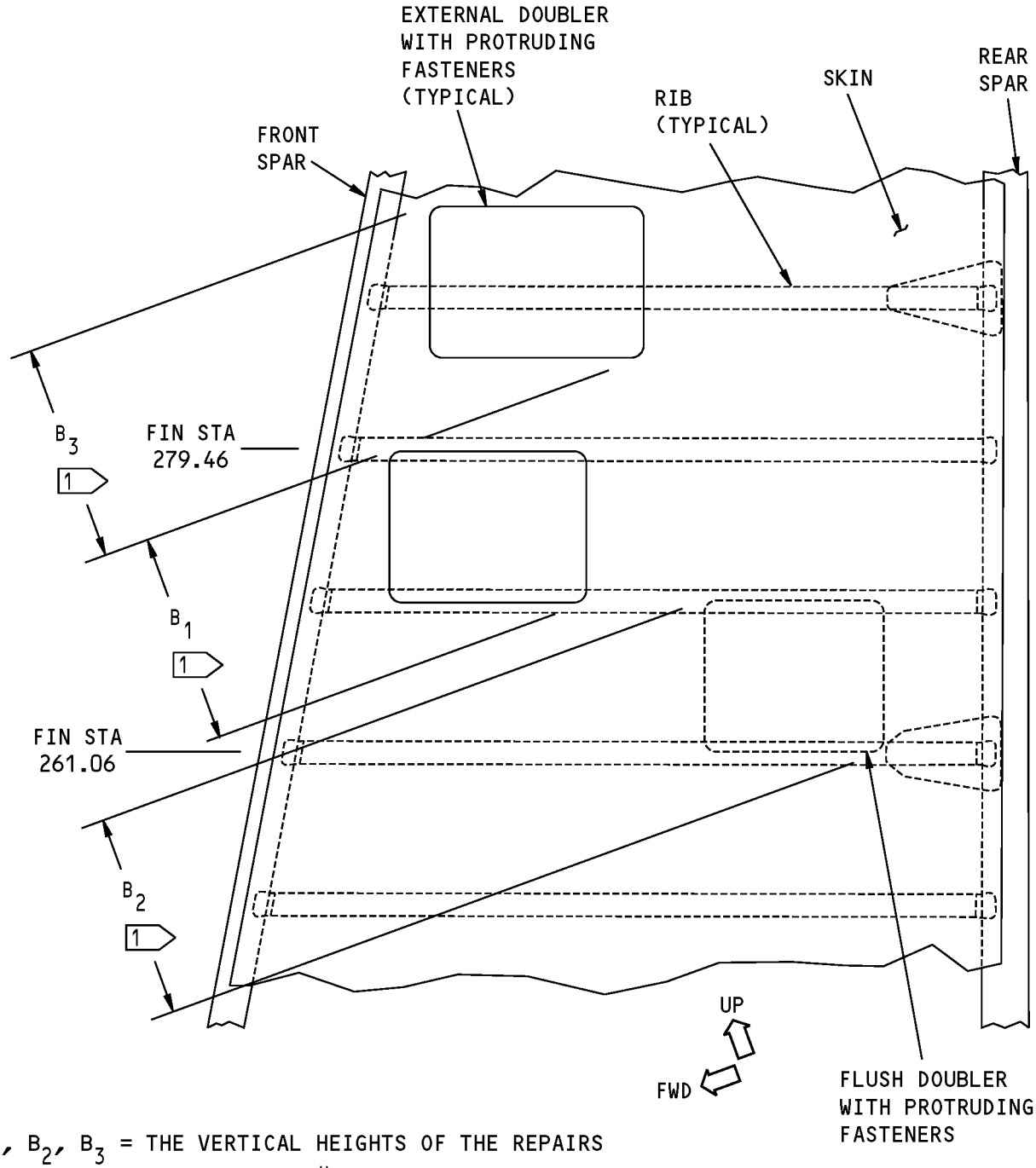
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 6, 51-00-00	Structures - General
737 NDT Part 6, 51-00-00, Figure 1	Fastener Holes in Aluminum Parts (Meter Display)

4. Repair Instructions

A. Drill a stop hole at the ends of all skin cracks that do not end at fastener holes. Refer to Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 203/REPAIR 3, Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 204/REPAIR 3, and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the skin as shown in Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 203/REPAIR 3 or Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 204/REPAIR 3. Refer to 51-10-02 for the procedures to remove the damage.

(a) For large cuts, make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(b) Make the corner radii of the cut a minimum of 0.50 inch.

B. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

C. Make the part [1] doubler as shown in Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 203/REPAIR 3 or Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 204/REPAIR 3. Refer to Table 201/REPAIR 3 for the repair material.

(1) Make the contour of the part [1] doubler the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

D. Assemble the part [1] doubler as shown in Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 203/REPAIR 3 or Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 204/REPAIR 3.

E. Drill the fastener holes.

F. Remove the part [1] doubler.

G. Remove the nicks, scratches, gouges, burrs, and sharp edges from the doubler and the bare surfaces of the skin.

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER THICKNESS (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.032	0.050	5/32
0.040	0.063	5/32
0.041	0.063	5/32
0.060	0.080	5/32
0.071	REPAIR NOT PERMITTED	————

H. Apply a chemical conversion coating to the part [1] doubler and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

I. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the part [1] doubler.

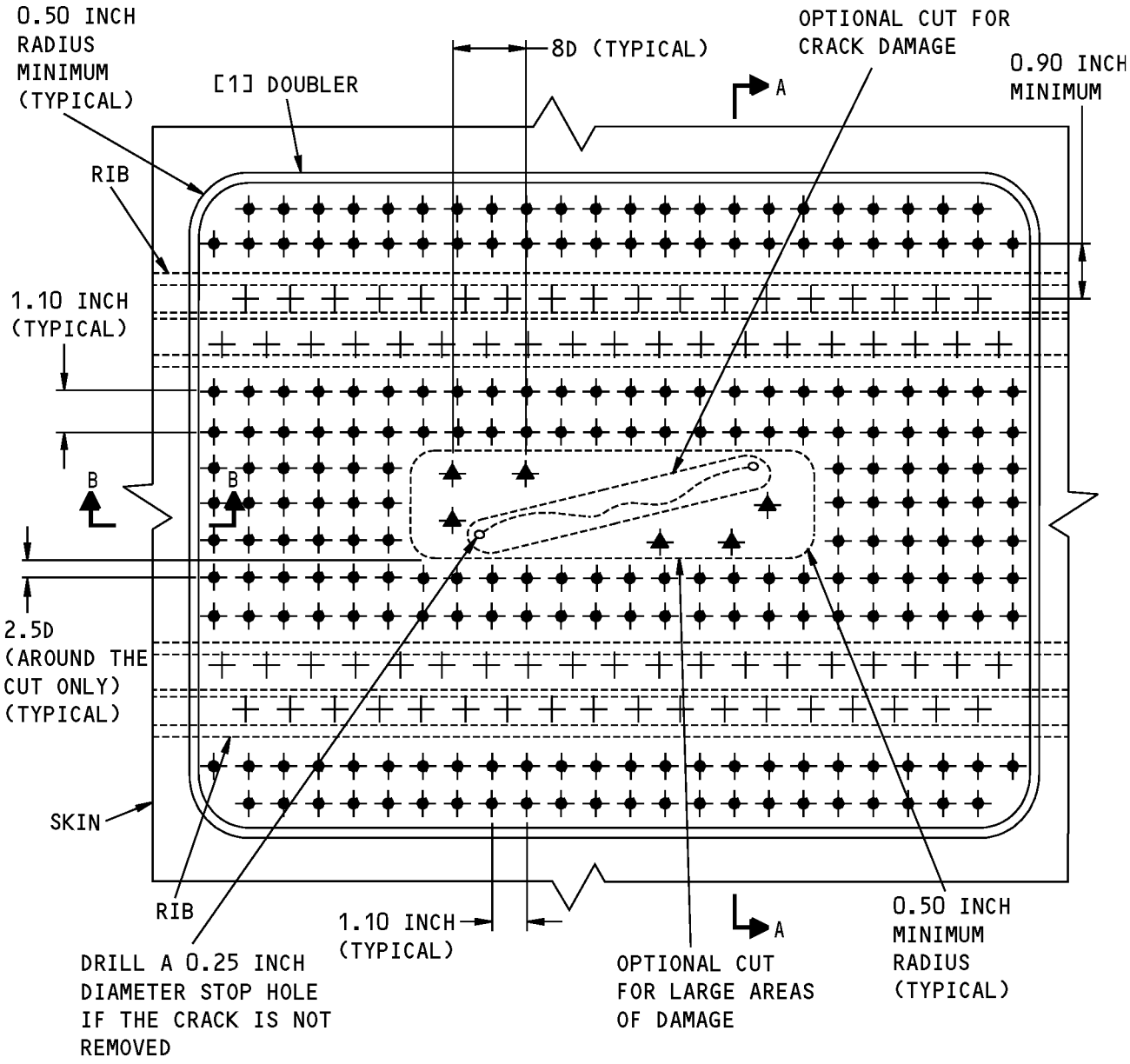
(2) Apply the primer to the bare surfaces of the skin.

J. Install repair washers in countersink holes for the initial fastener locations.

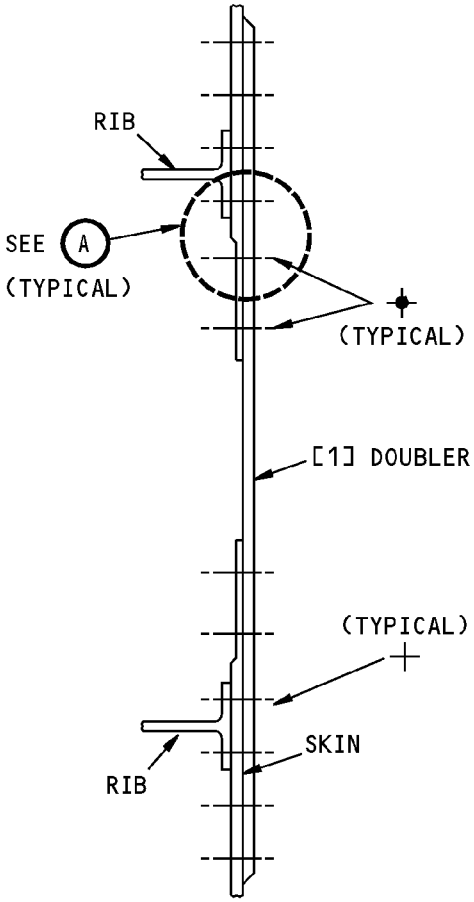
K. Install the part [1] doubler with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

L. Install the fasteners without sealant.

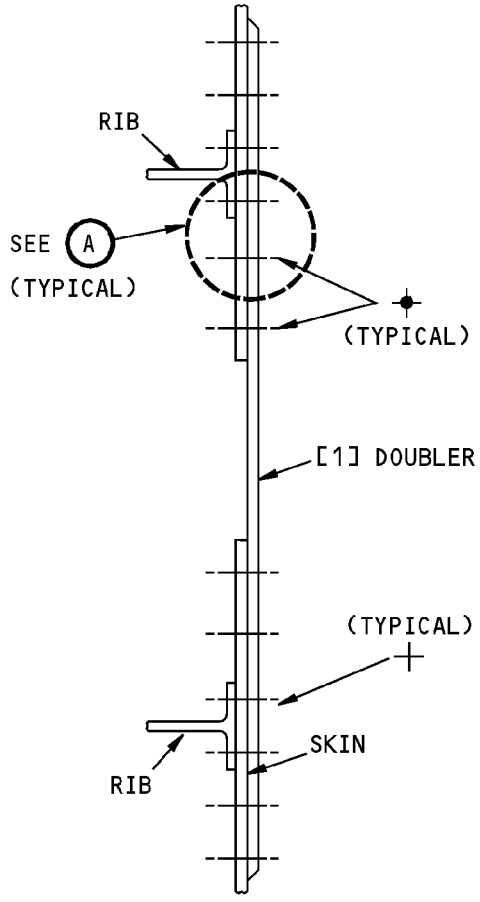
M. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



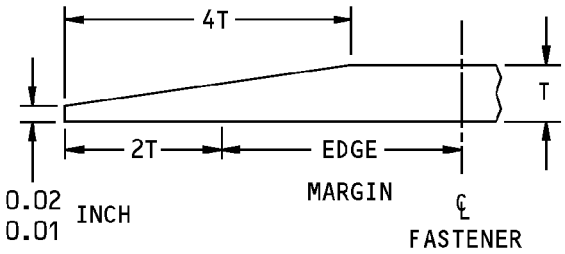
Inspar Skin External Repair - Fin Stations 73.400 thru 196.663
Figure 203 (Sheet 1 of 3)



SECTION THROUGH REPAIR
OF CHEM-MILLED SKIN

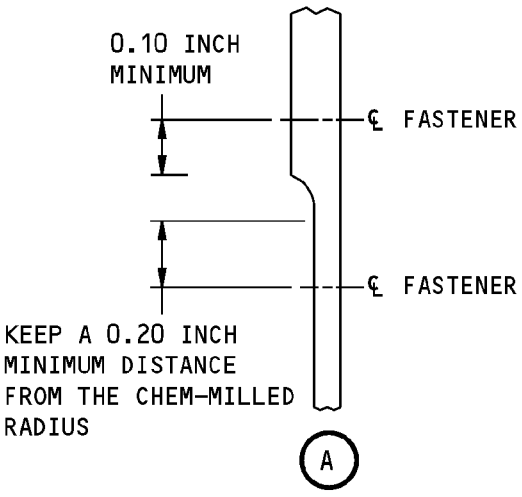


SECTION THROUGH REPAIR OF
SKIN WITH CONSTANT THICKNESS



SECTION OF DOUBLER EDGE
B-B

A-A



Inspar Skin External Repair - Fin Stations 73.400 thru 196.663
Figure 203 (Sheet 2 of 3)

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF SIX ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

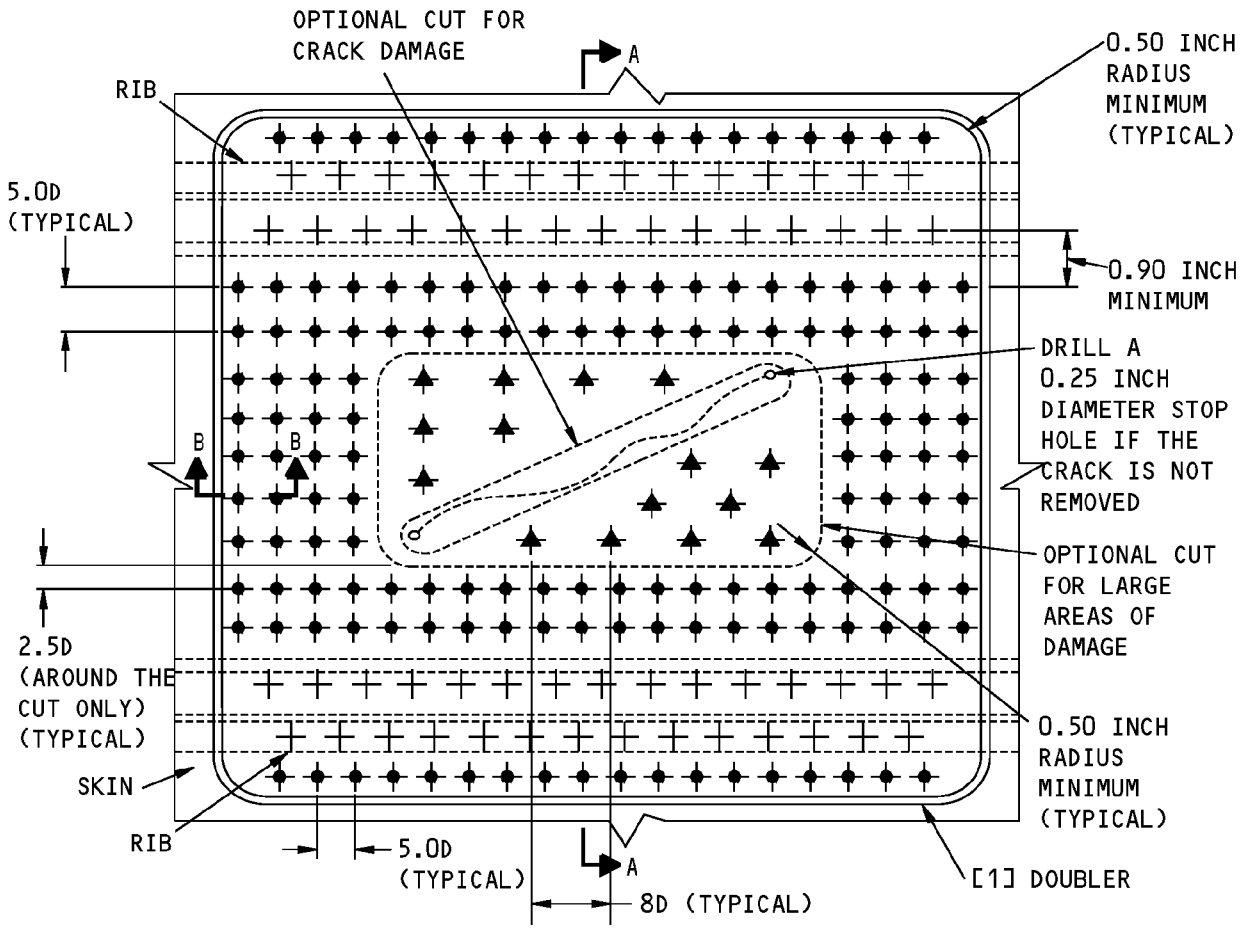
FASTENER SYMBOLS

REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E BLIND RIVET. INSTALL A BACR15DS7D RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

INITIAL FASTENER LOCATION. INSTALL A BACR15FP()E BLIND RIVET THAT IS THE SAME DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER. INSTALL A BACR15CE() RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E BLIND RIVET WHEN THERE IS CRACK DAMAGE. INSTALL A BACR15DS7D RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Inspar Skin External Repair - Fin Stations 73.400 thru 196.663
Figure 203 (Sheet 3 of 3)



NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

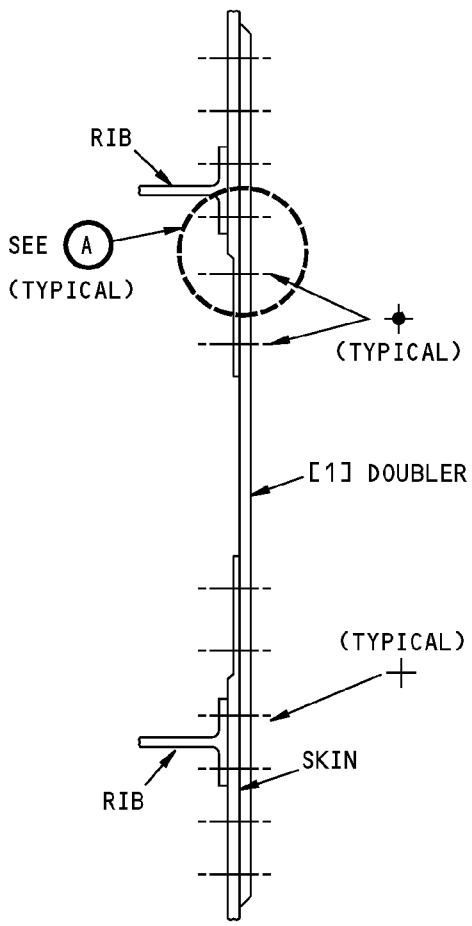
FASTENER SYMBOLS

REPAIR FASTENER LOCATION. INSTALL A BACR15CE6 OR A BACR15CE8 SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

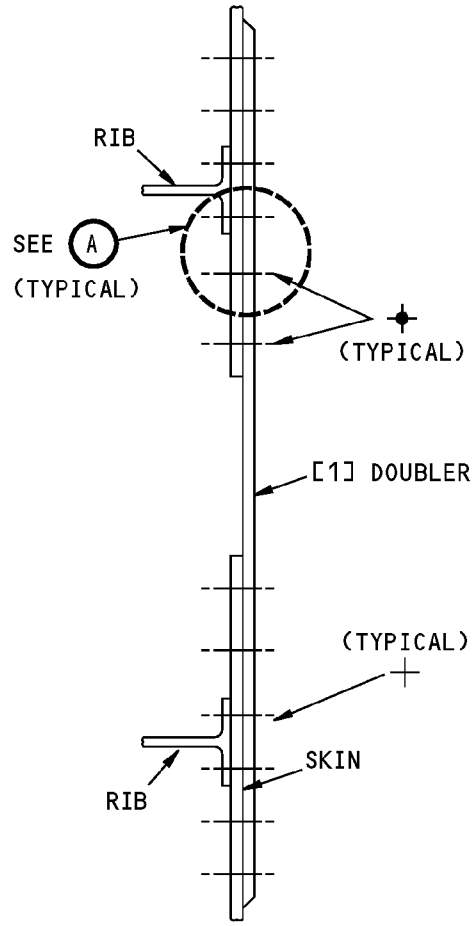
INITIAL FASTENER LOCATION. INSTALL A BACR15CE() SOLID RIVET THAT IS THE SAME DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

REPAIR FASTENER LOCATION. INSTALL A BACR15CE6 OR A BACR15CE8 SOLID RIVET WHEN THERE IS CRACK DAMAGE. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

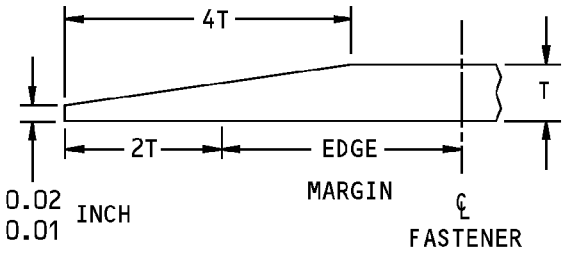
Inspar Skin External Repair - Fin Stations 73.400 thru 196.663
Figure 204 (Sheet 1 of 2)



SECTION THROUGH REPAIR
OF CHEM-MILLED SKIN

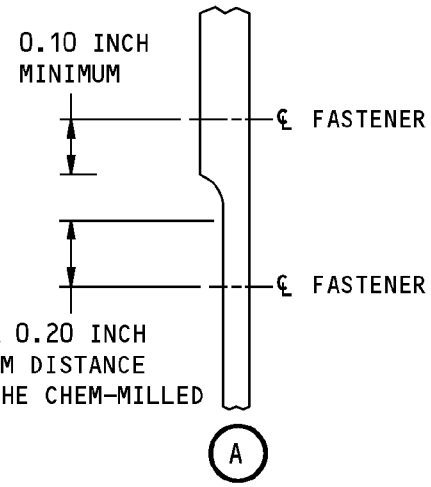


SECTION THROUGH REPAIR OF
SKIN WITH CONSTANT THICKNESS



SECTION OF DOUBLER EDGE
B-B

A-A



Inspar Skin External Repair - Fin Stations 73.400 thru 196.663
Figure 204 (Sheet 2 of 2)

5. Inspection Instructions

A. Do a detailed visual inspection of the repair at each 5000 flight hour interval or more frequently. Inspect the blind rivets carefully. Blind rivets that are loose, missing, or damaged must be replaced.

B. When you remove the temporary repair and replace it with the permanent repair shown in Inspar Skin External Repair - Fin Stations 73.400 thru 196.663, Figure 203/REPAIR 3, do what follows:

(1) Remove the BACR15FP()E rivets and ream the holes 1/64 inch oversize to remove the damage.

(2) Make an inspection of the holes with the eddy current procedures. Refer to 737 NDT Part 6, 51-00-00, Figure 1 or Figure 16 and SRM 51-10-02.

(a) If no cracks are found, make the holes larger to install the BACR15DS7D or BACR15CE() rivets.

(b) If you find cracks, make the holes 1/64 inch larger in diameter to remove all remaining fatigue damaged material.

(c) Make a final inspection of the holes with the eddy current procedures.

REPAIR 4 - VERTICAL STABILIZER INSPAR SKIN EXTERNAL REPAIR BETWEEN RIBS - FIN STATIONS 196.663 THRU 343.863

1. Applicability

A. Repair 4 is applicable to damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 4 if:

(1) The damage is between Fin Stations 196.663 and 343.863.

(2) You do inspections of the repair as given in Paragraph 5./REPAIR 4

(3) You replace Repair 4 no more than 15,000 hours after installation with one of the repairs that follow:

(a) A permanent flush repair as shown in Repair 7 or Repair 8

(b) A replacement of the blind rivets with solid flush rivets for a permanent external repair.

2. General

A. Repair 4 gives instructions for a Category C repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

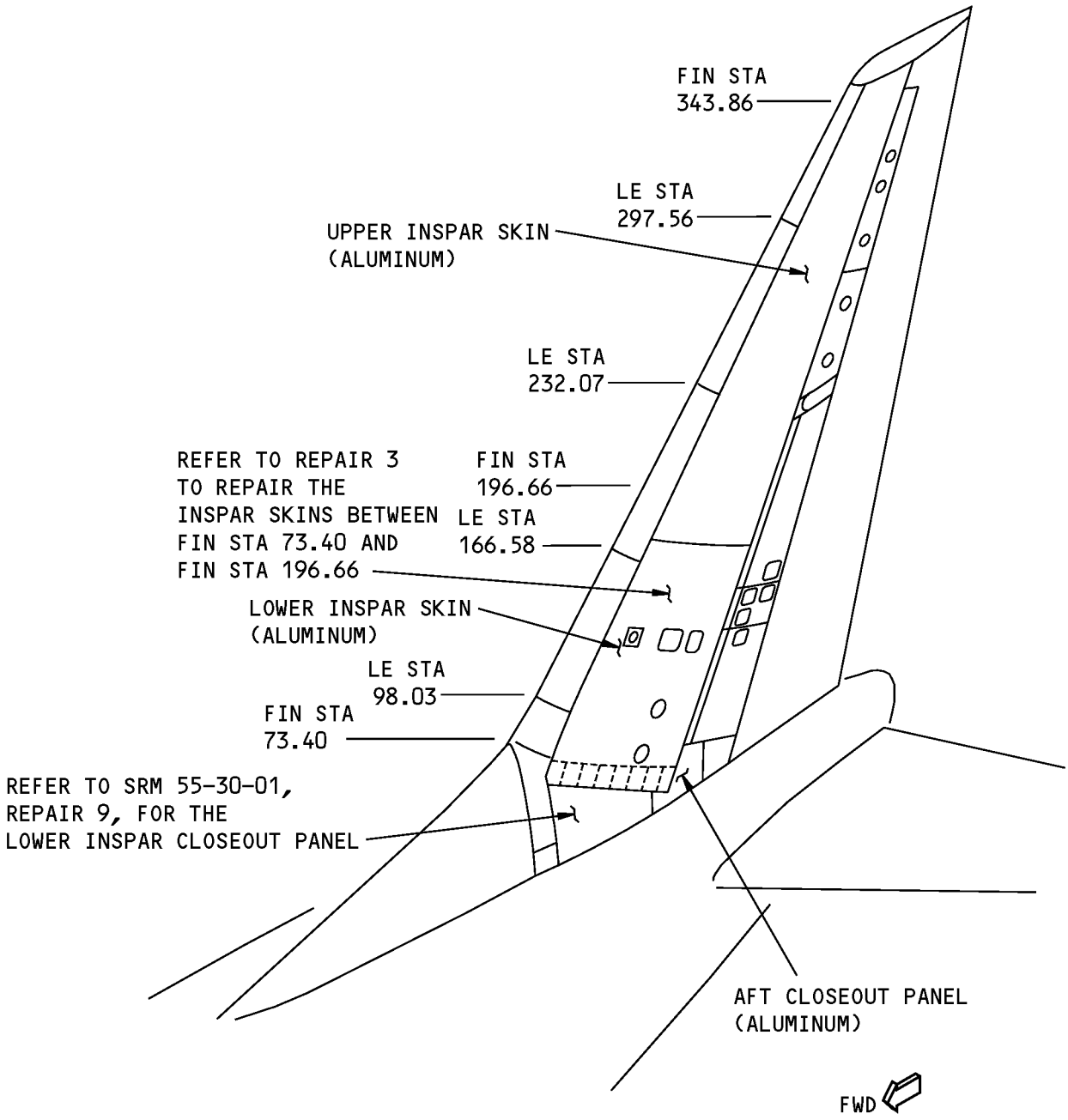
B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 4 must be kept.

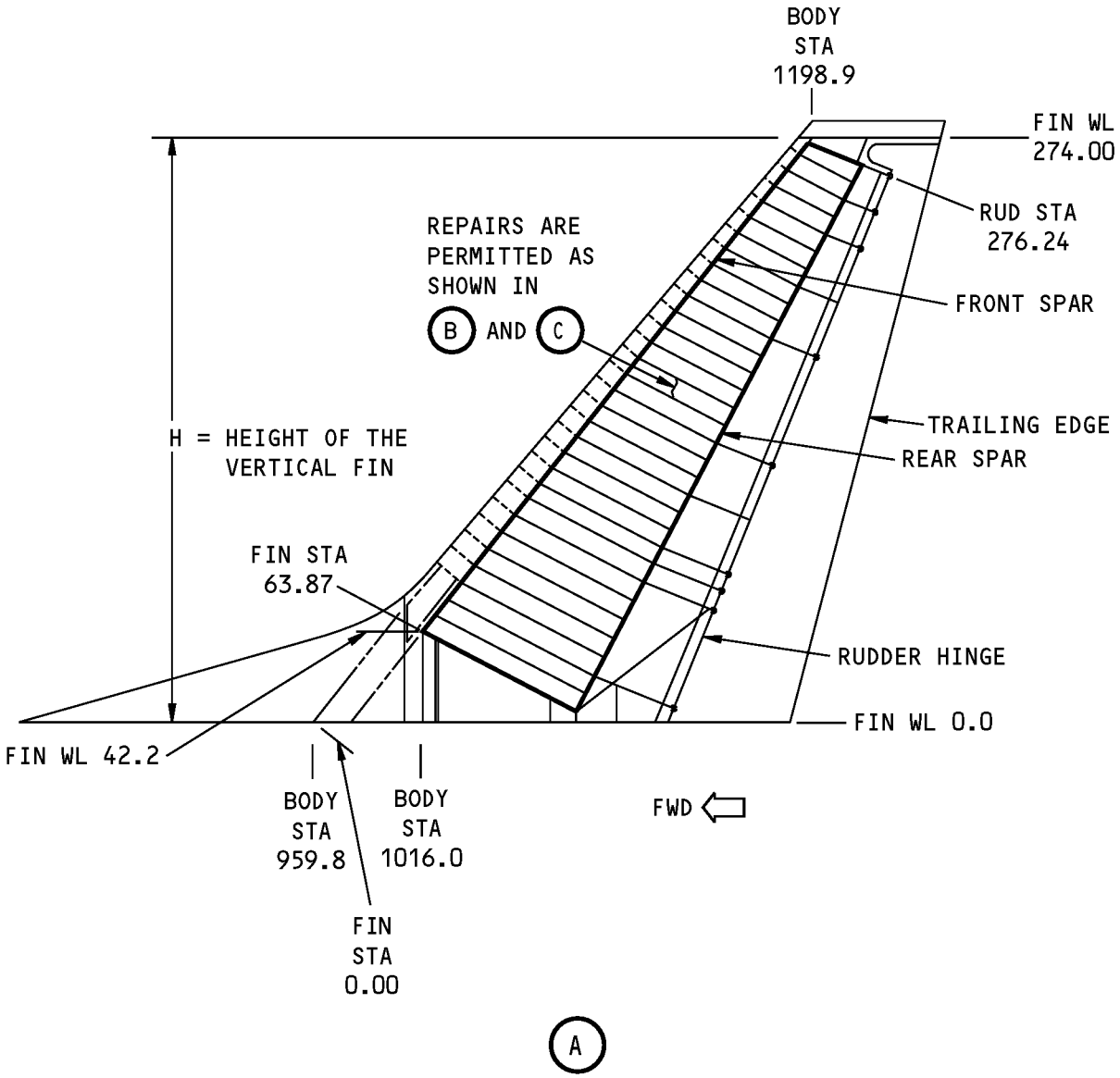
C. Repair 4 can be used only if you install the blind rivets flush against the internal structure.

D. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

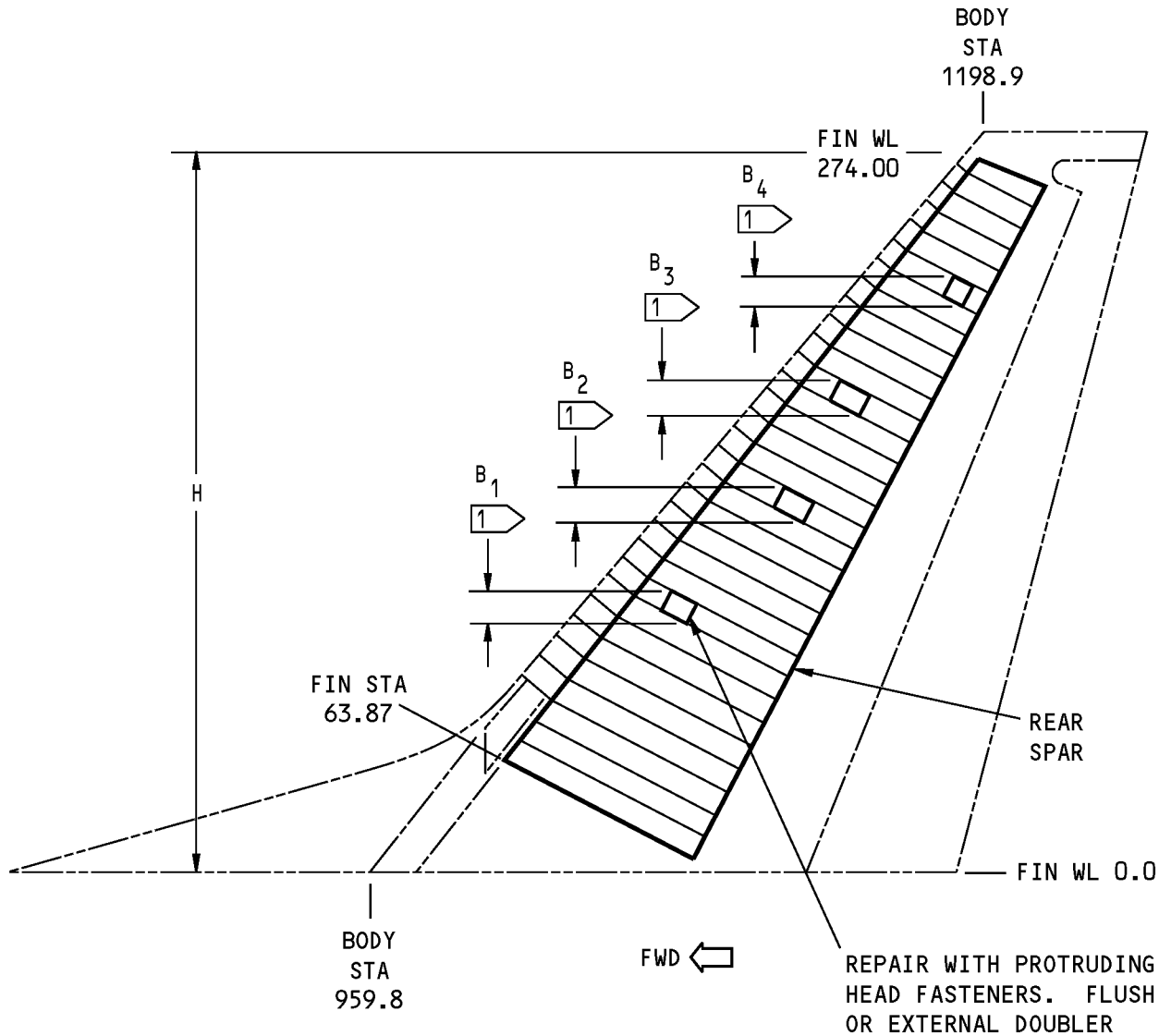


LEFT SIDE IS SHOWN
RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

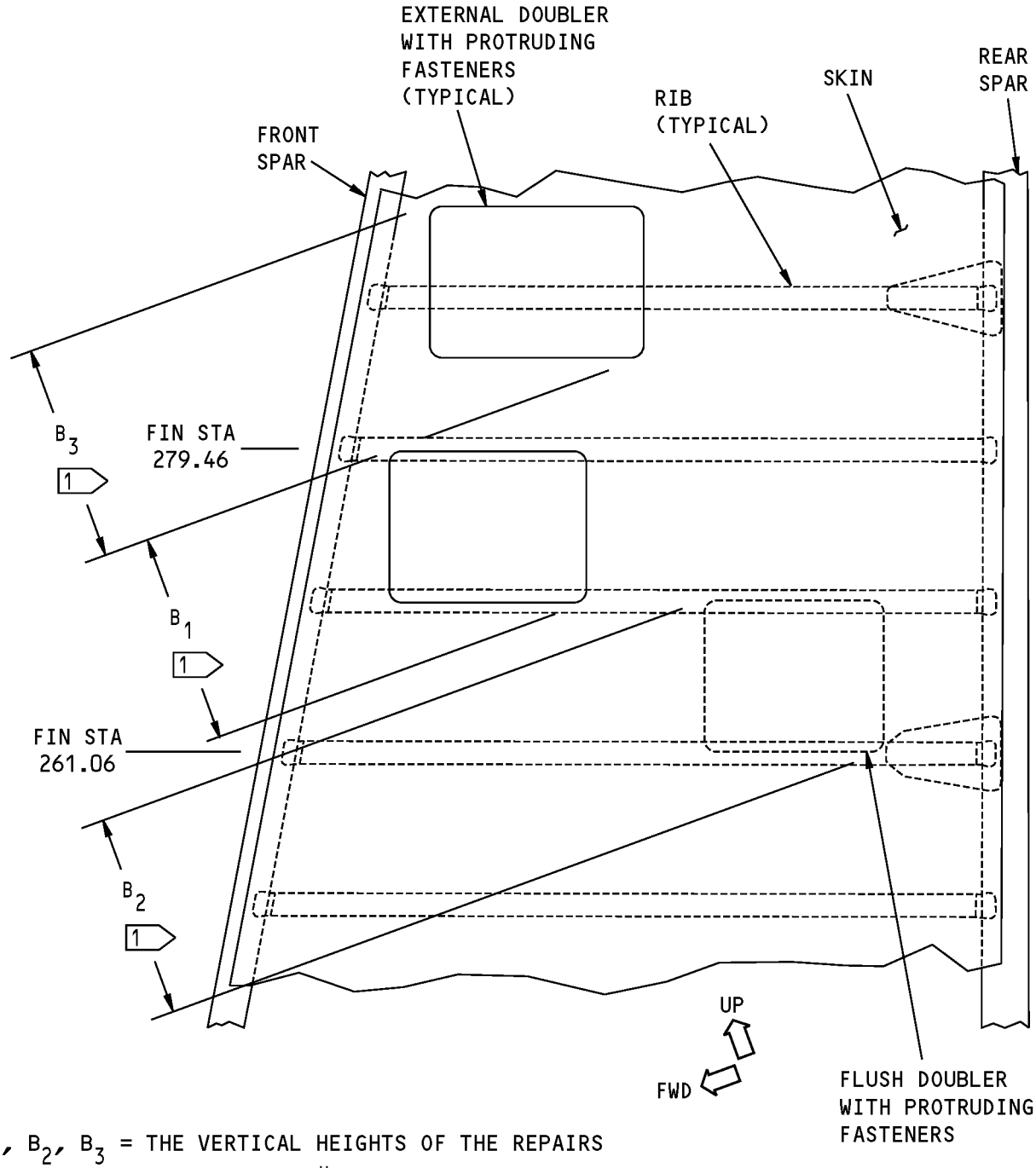
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-01, GENERAL	Fasteners
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 6, 51-00-00	Structures - General
737 NDT Part 6, 51-00-00, Figure 1	Fastener Holes in Aluminum Parts (Meter Display)
737 NDT Part 6, 51-00-00, Figure 16	Aluminum Part Fastener Hole Inspection (Rotary Scanner)

4. Repair Instructions

A. Drill a stop hole at the ends of all skin cracks that do not end at fastener holes. Refer to Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 203/REPAIR 4, Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 204/REPAIR 4, and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the skin as shown in Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 203/REPAIR 4 or Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 204/REPAIR 4. Refer to 51-10-02 for the procedures to remove the damage.

(a) For large cuts, make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(b) Make the corner radii of the cut a minimum of 0.50 inch.

B. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

C. Make the part [1] doubler as shown in Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 203/REPAIR 4 or Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 204/REPAIR 4. Refer to Table 201/REPAIR 4 for the repair material.

(1) Make the contour of the part [1] doubler the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

D. Assemble the part [1] doubler as shown in Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 203/REPAIR 4 or Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 204/REPAIR 4.

E. Drill the fastener holes.

F. Remove the part [1] doubler.

G. Remove the nicks, scratches, gouges, burrs, and sharp edges from the doubler and the bare surfaces of the skin.

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER THICKNESS (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.032	0.050	5/32
0.041	0.063	5/32

H. Apply a chemical conversion coating to the part [1] doubler and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

I. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the part [1] doubler.

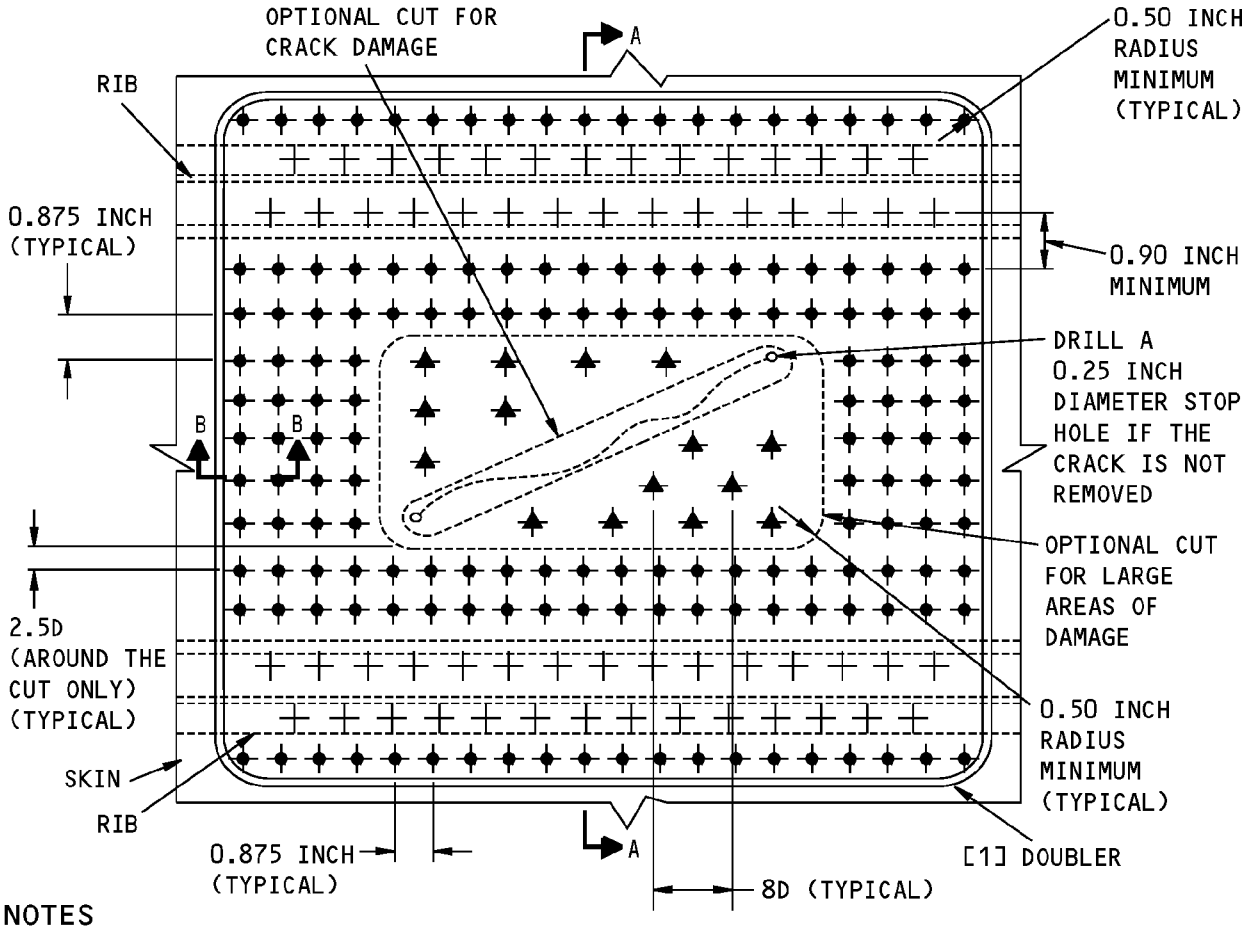
(2) Apply the primer to the bare surfaces of the skin.

J. Install repair washers in countersink holes for the initial fastener locations.

K. Install the part [1] doubler with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

L. Install the fasteners without sealant.

M. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF FOUR ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

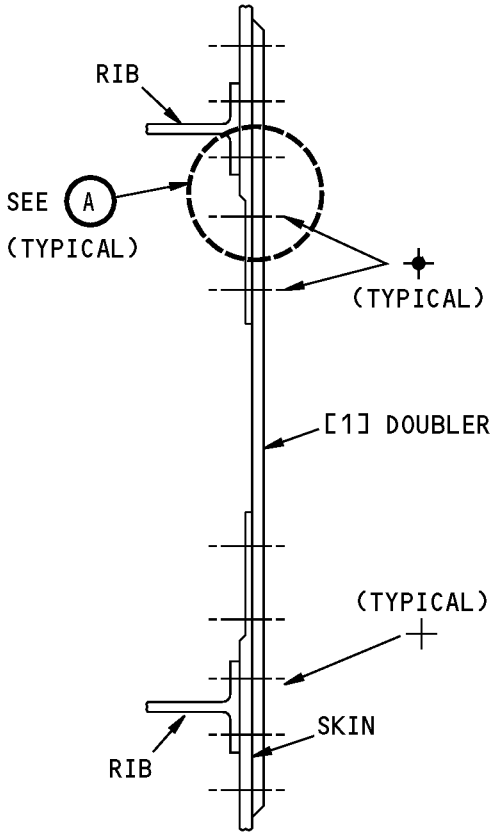
FASTENER SYMBOLS

REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E BLIND RIVET. INSTALL A BACR15DS7D RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

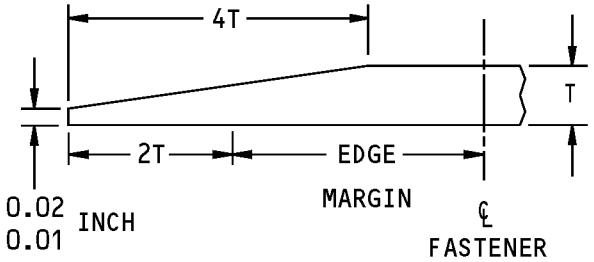
INITIAL FASTENER LOCATION. INSTALL A BACR15FP()E BLIND RIVET THAT IS THE SAME DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER. INSTALL A BACR15CE() RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

REPAIR FASTENER LOCATION. INSTALL A BACR15FP5E BLIND RIVET WHEN THERE IS CRACK DAMAGE. INSTALL A BACR15DS7D RIVET FOR A PERMANENT REPAIR. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Inspar Skin External Repair - Fin Stations 196.663 thru 343.863
Figure 203 (Sheet 1 of 2)

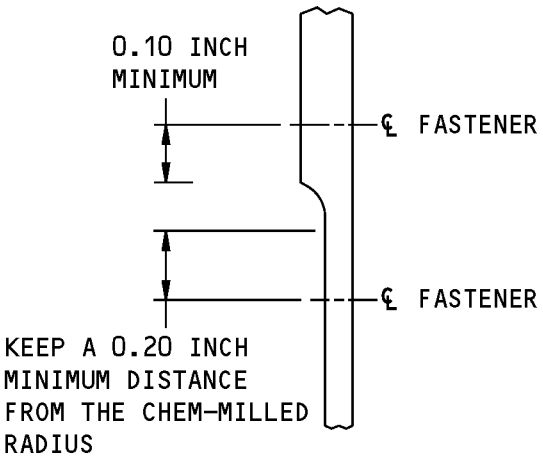


SECTION THROUGH REPAIR
OF CHEM-MILLED SKIN



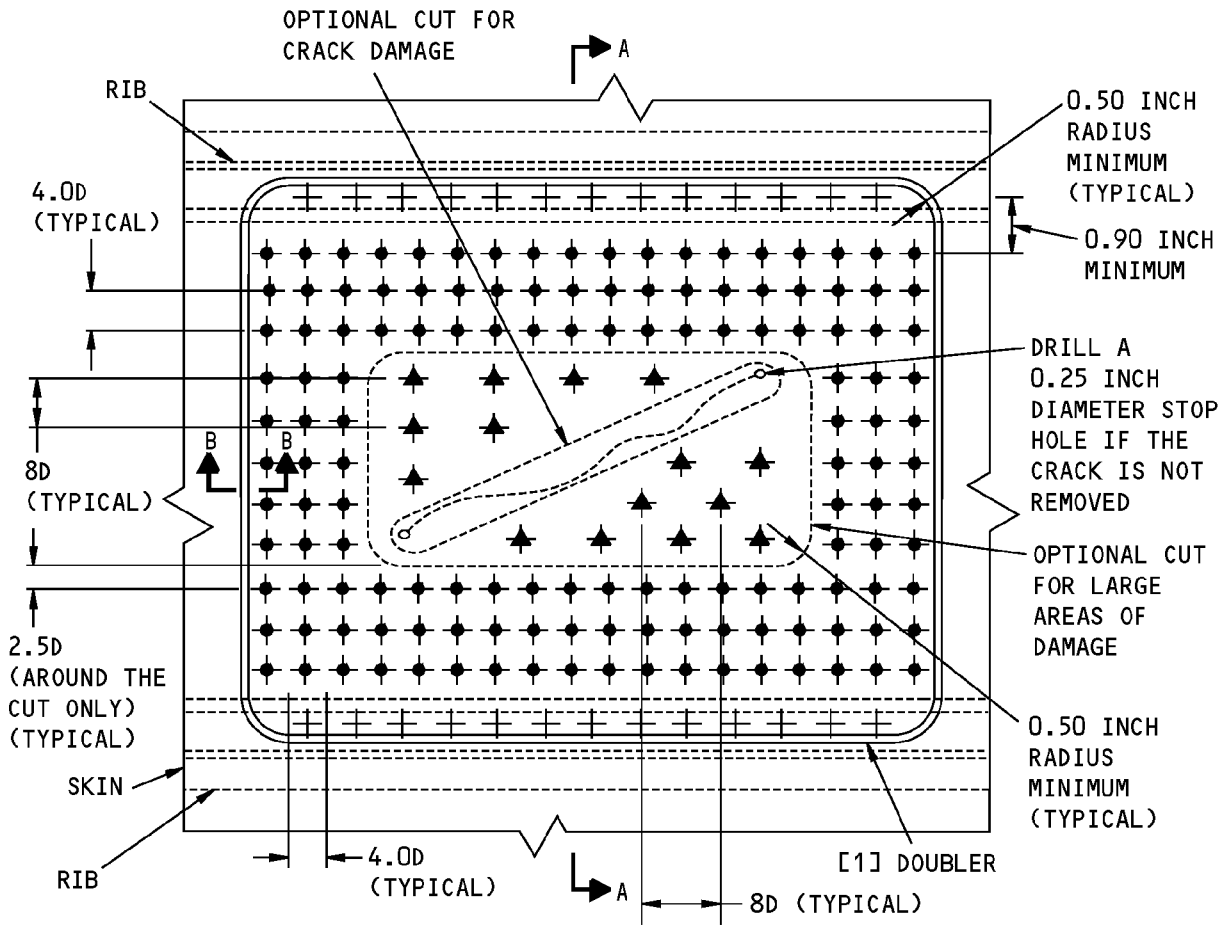
SECTION OF DOUBLER EDGE
B-B

A-A



A

Inspar Skin External Repair - Fin Stations 196.663 thru 343.863
Figure 203 (Sheet 2 of 2)



NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

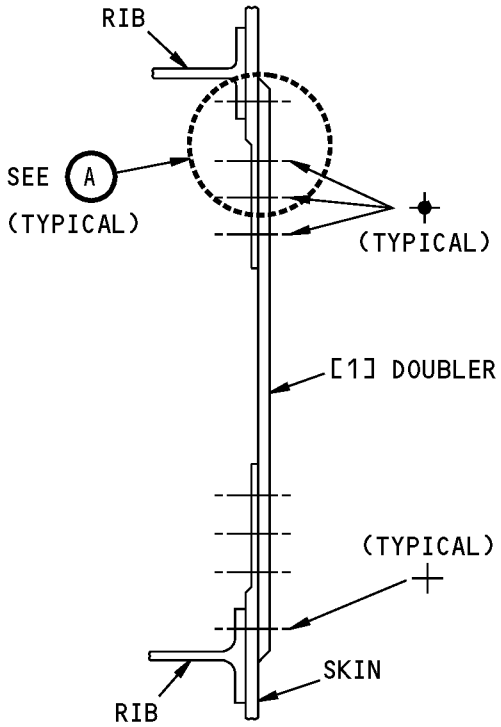
FASTENER SYMBOLS

REPAIR FASTENER LOCATION. INSTALL A BACR15CE6 OR A BACR15CE8 SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

INITIAL FASTENER LOCATION. INSTALL A BACR15CE() SOLID RIVET THAT IS THE SAME DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

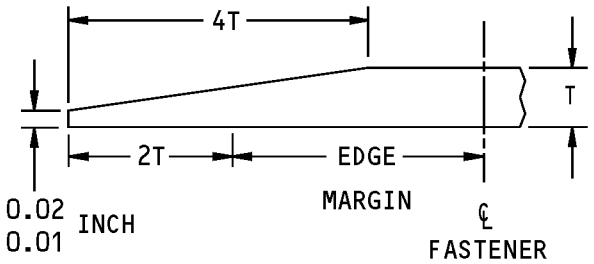
REPAIR FASTENER LOCATION. INSTALL A BACR15CE6 OR A BACR15CE8 SOLID RIVET WHEN THERE IS CRACK DAMAGE. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Inspar Skin External Repair - Fin Stations 196.663 thru 343.863
Figure 204 (Sheet 1 of 2)

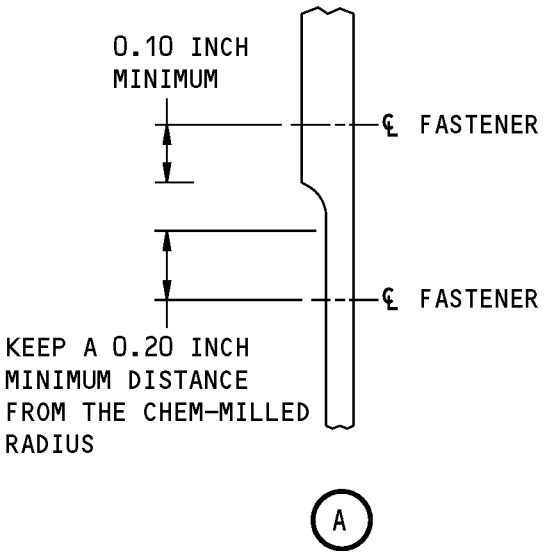


SECTION THROUGH REPAIR
OF CHEM-MILLED SKIN

A-A



SECTION OF DOUBLER EDGE
B-B



Inspar Skin External Repair - Fin Stations 196.663 thru 343.863
Figure 204 (Sheet 2 of 2)

5. Inspection Instructions

A. Do a detailed visual inspection of the repair at each 5000 flight hour interval or more frequently. Inspect the blind rivets carefully. Blind rivets that are loose, missing, or damaged must be replaced.

B. When you remove the temporary repair and replace it with the permanent repair shown in Inspar Skin External Repair - Fin Stations 196.663 thru 343.863, Figure 203/REPAIR 4, do what follows:

(1) Remove the BACR15FP()E rivets and ream the holes 1/64 inch oversize to remove the damage.

(2) Make an inspection of the holes with the eddy current procedures. Refer to 737 NDT Part 6, 51-00-00, Figure 1 or Figure 16 and SRM 51-10-02.

(a) If no cracks are found, make the holes larger to install the BACR15DS7D or BACR15CE() rivets.

(b) If you find cracks, make the holes 1/64 inch larger in diameter to remove all remaining fatigue damaged material.

(c) Make a final inspection of the holes with the eddy current procedures.

REPAIR 5 - VERTICAL STABILIZER INSPAR SKIN FLUSH REPAIR BETWEEN RIBS - FIN STATIONS 73.400 THRU 196.663

1. Applicability

A. Repair 5 is applicable:

(1) To damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 5 between Fin Stations 73.400 and 196.663.

(2) As a replacement repair for Repair 3.

(3) As an alternative to Repair 6.

2. General

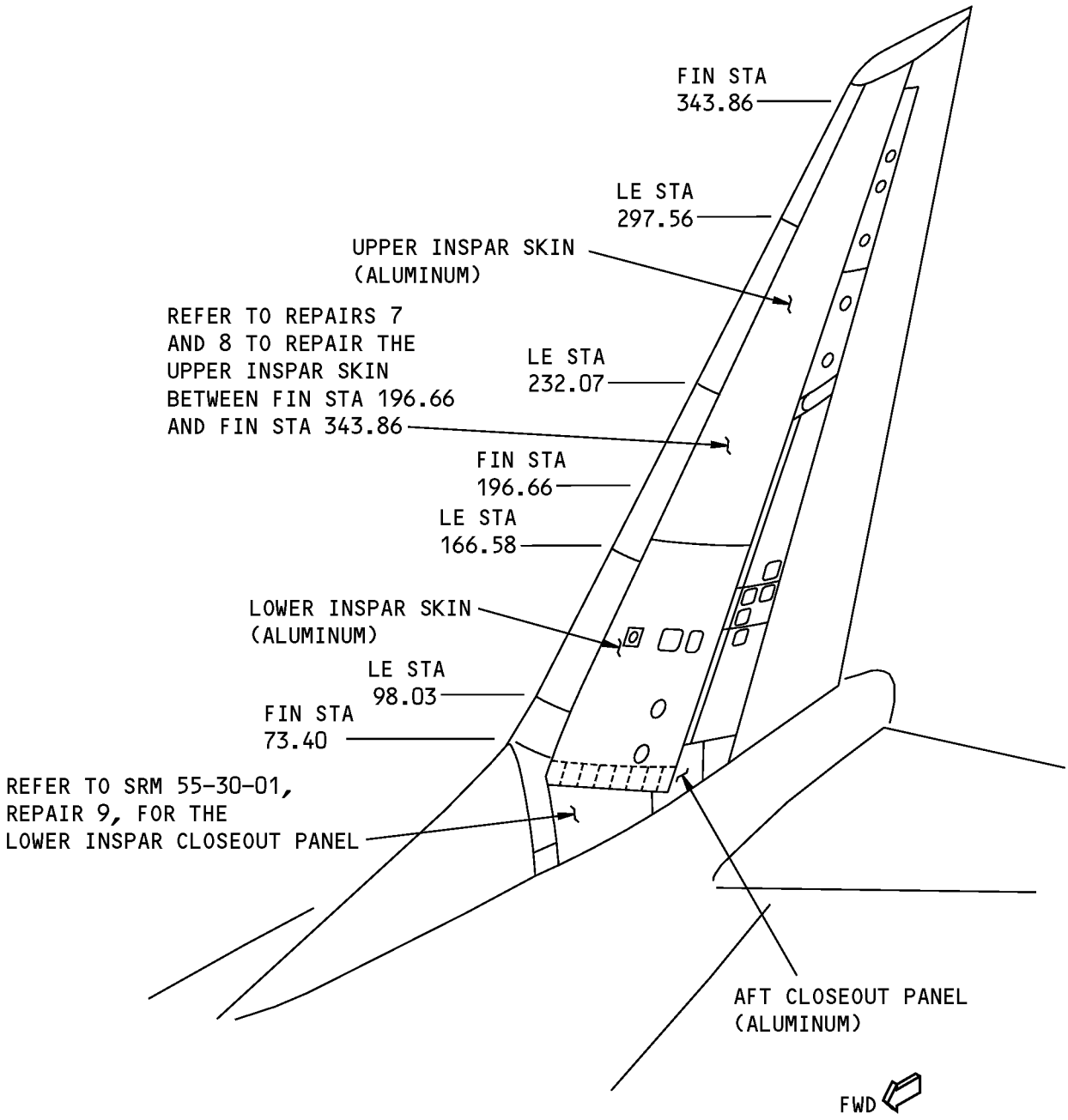
A. Repair 5 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

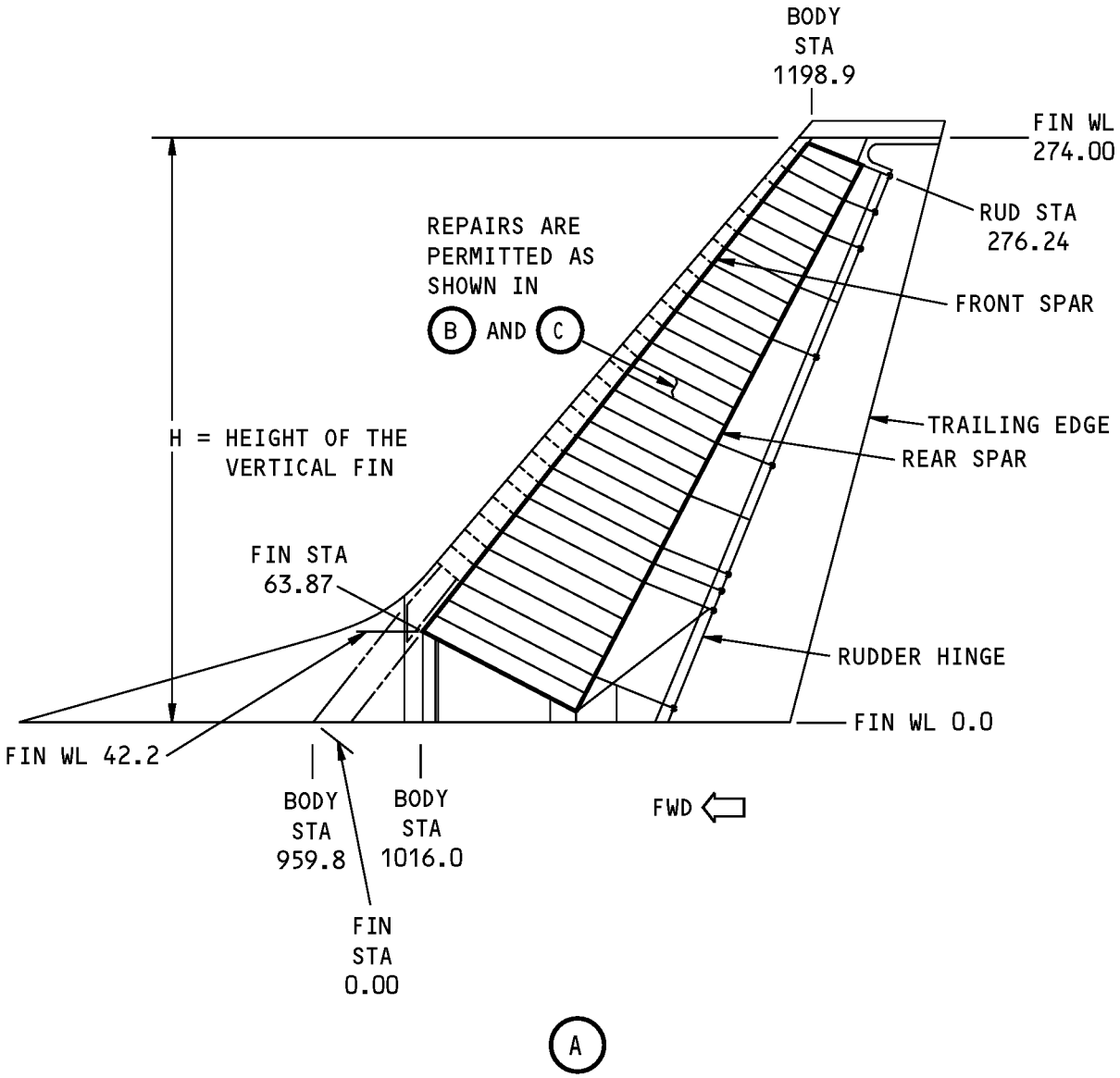
(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 5 must be kept.

C. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

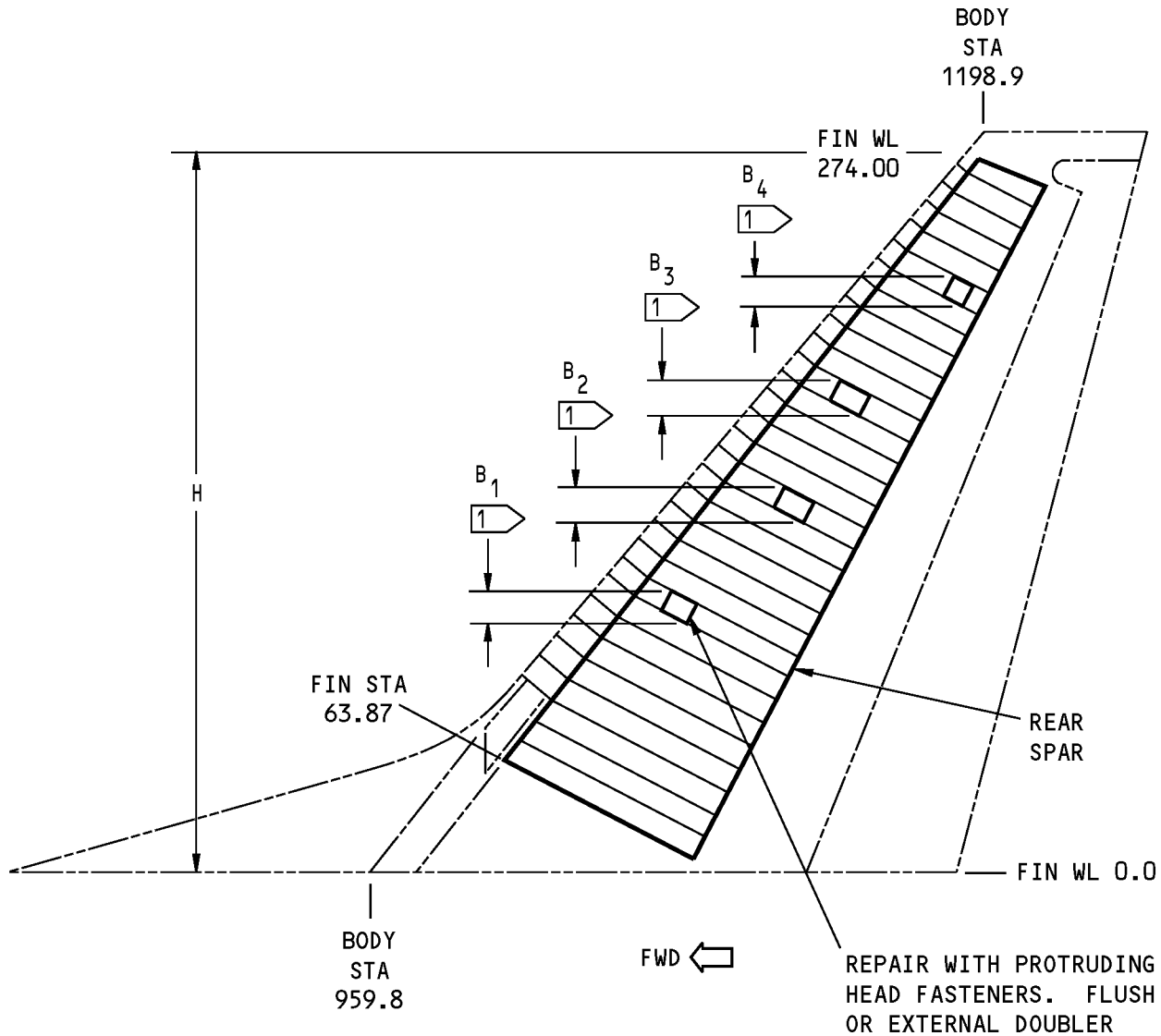


LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

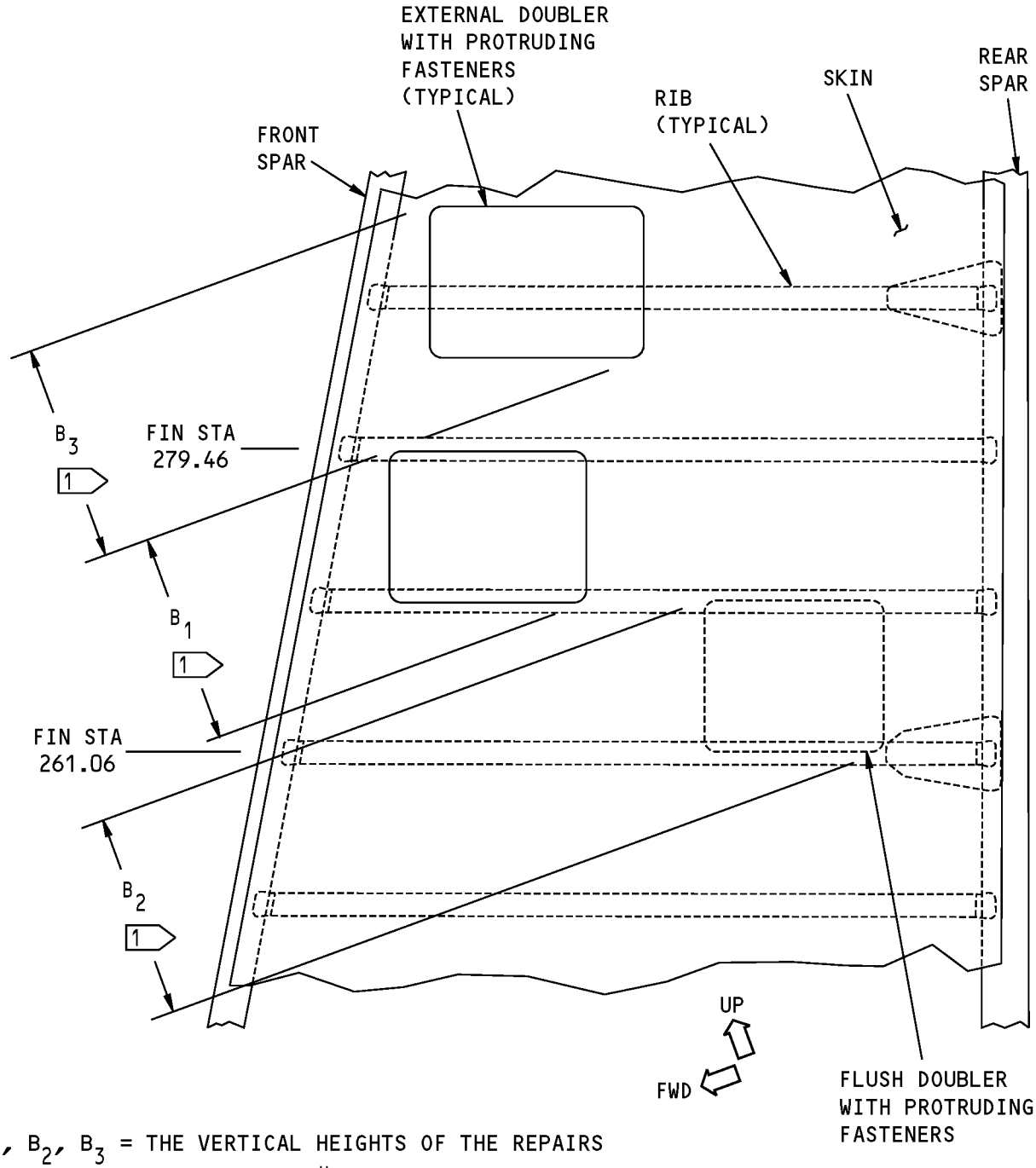
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

B. Get access to the damaged area of the inspar skin as follows:

(1) Remove the leading edge skin panels or install an access door.

C. Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 5. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

D. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

E. Make the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 5. Refer to Table 201/REPAIR 5 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

REPAIR MATERIAL			
ITEM	PART	QUANTITY	MATERIAL
[2]	Filler	1	Use clad or bare 2024-T3 that is the same thickness as the initial skin. The use of clad material is recommended

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	ITEM [1] DOUBLER THICKNESS (INCH)	REPAIR FASTENER DIAMETER (INCH)
0.032	0.050	5/32
0.040	0.063	5/32
0.041	REPAIR NOT PERMITTED	———
0.060	REPAIR NOT PERMITTED	———
0.071	REPAIR N0T PERMITTED	———

F. Assemble the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 5.

G. Drill the fastener holes.

(1) Align fastener holes in the repair parts with holes in the skin made from an external repair.

H. Remove the repair parts.

I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

J. Apply a chemical conversion coating to the repair parts and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

K. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

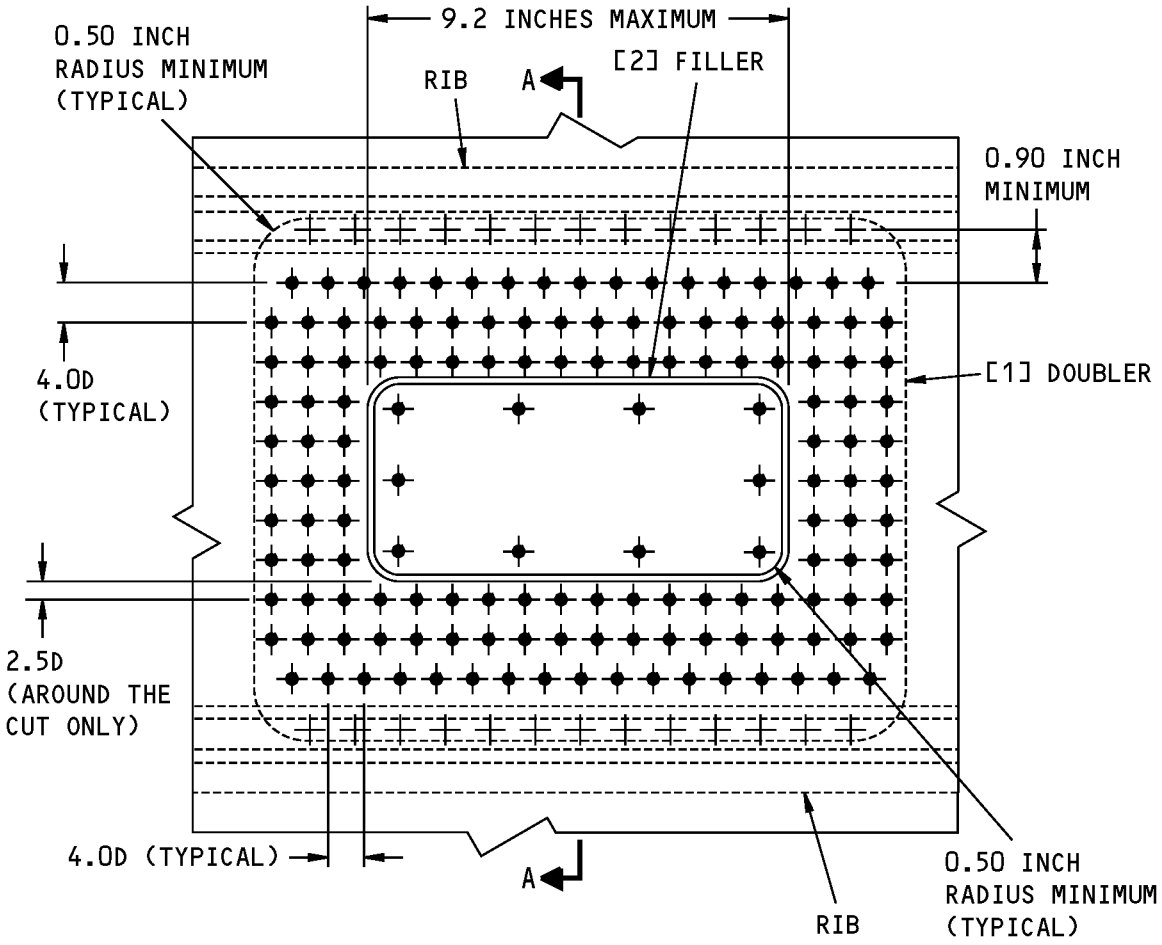
(2) Apply the primer to the bare surfaces of the skin.

L. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

M. Install the rivets without sealant in the repair parts and skin.

N. Apply BMS 5-95 or BMS 5-26 sealant in the space between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

O. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



TYPICAL REPAIR

NOTES

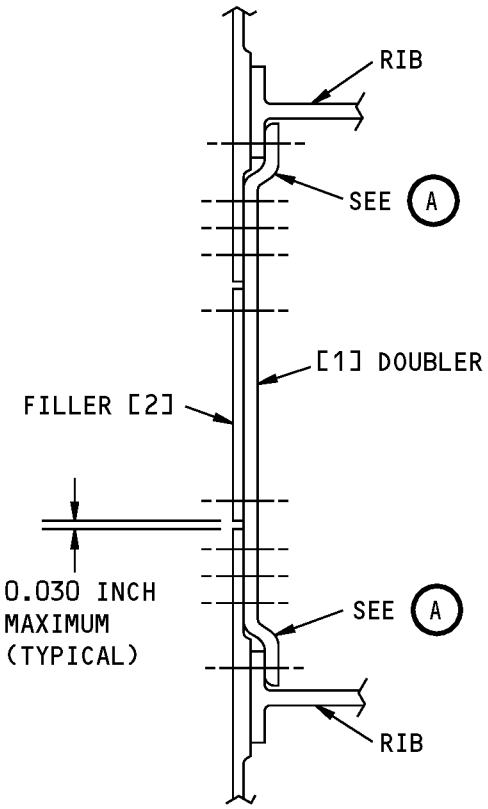
- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

FASTENER SYMBOLS

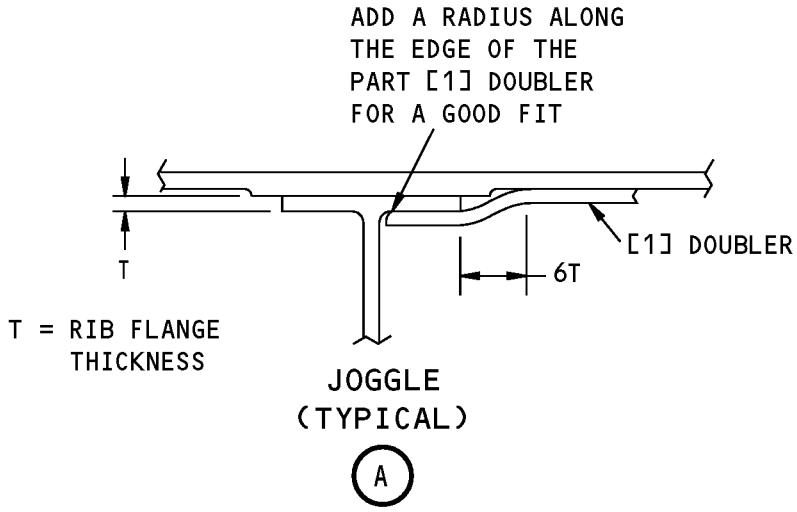
┼ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

✦ REPAIR FASTENER LOCATION. INSTALL A BACR15FT5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 73.400 through 196.663
Figure 203 (Sheet 1 of 2)



A–A



Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 73.400 through 196.663
Figure 203 (Sheet 2 of 2)

REPAIR 6 - VERTICAL STABILIZER INSPAR SKIN FLUSH REPAIR WITH SPLICED DOUBLER BETWEEN RIBS - FIN STATIONS 73.400 THRU 196.663

1. Applicability

A. Repair 6 is applicable:

(1) To damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 6 between Fin Stations 73.400 and 196.663.

(2) As a replacement repair for Repair 3.

(3) As an alternative to Repair 5 if there is not sufficient clearance to install the repair doubler in one piece.

2. General

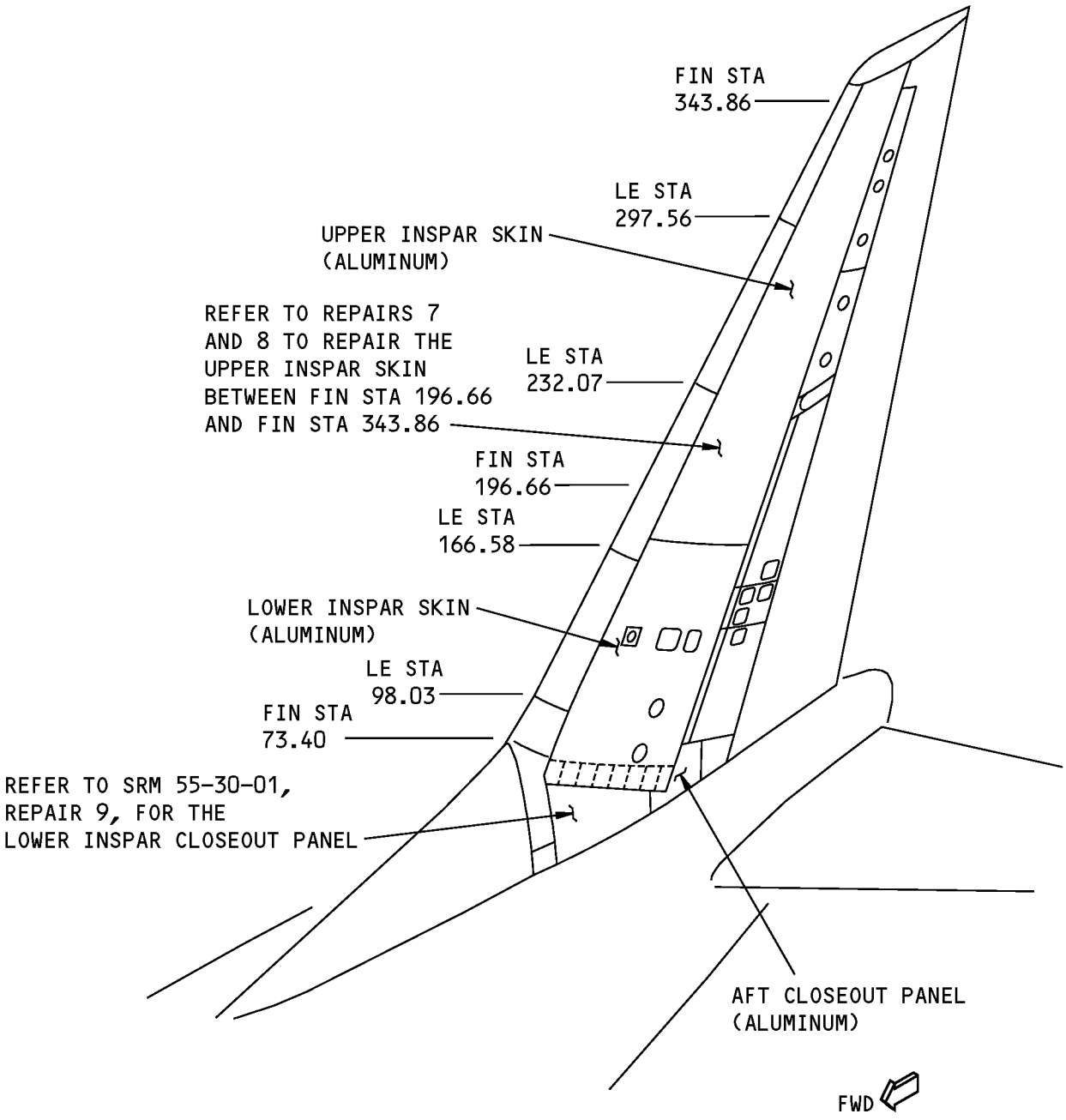
A. Repair 6 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

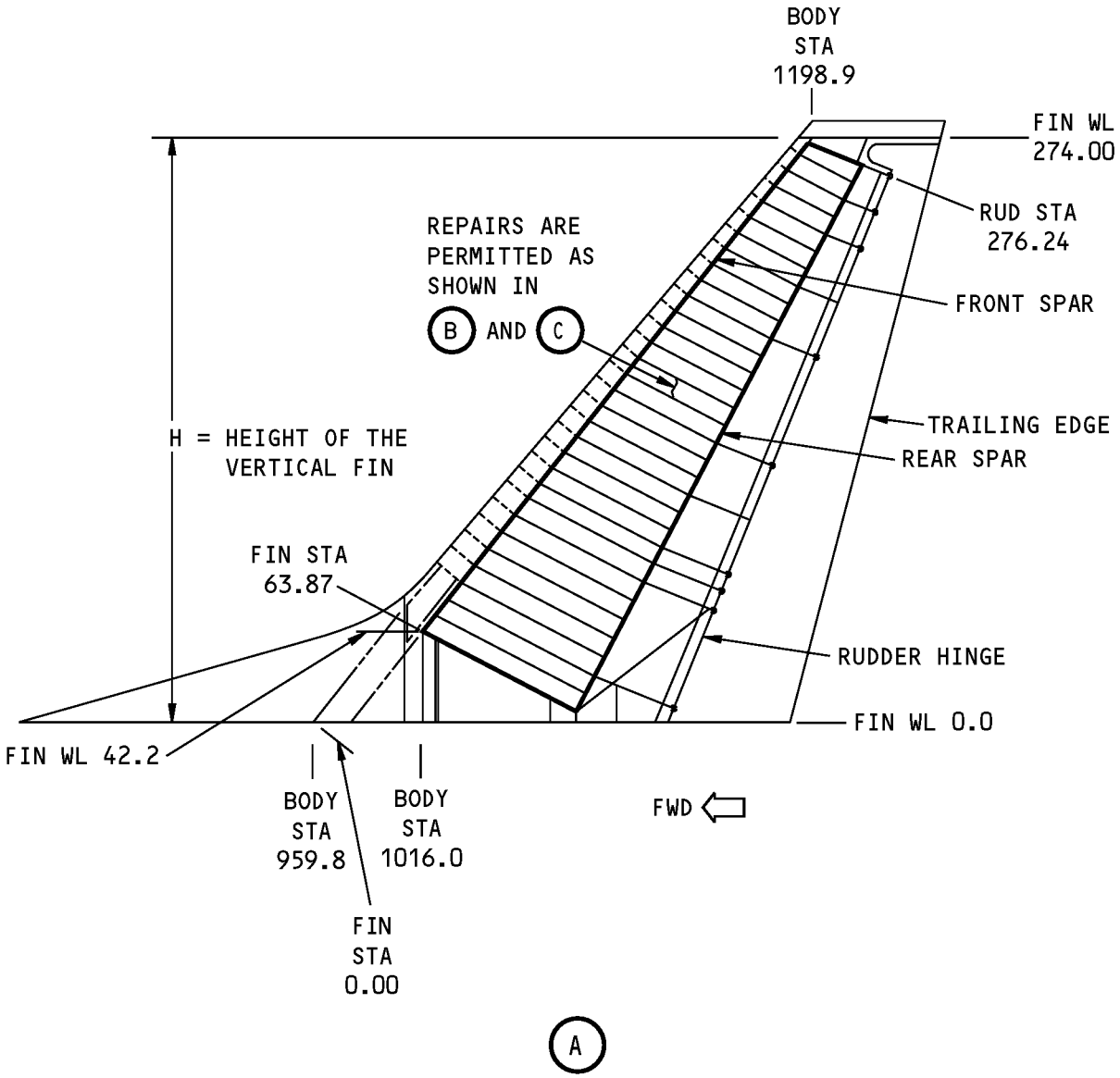
(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 6 must be kept.

C. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

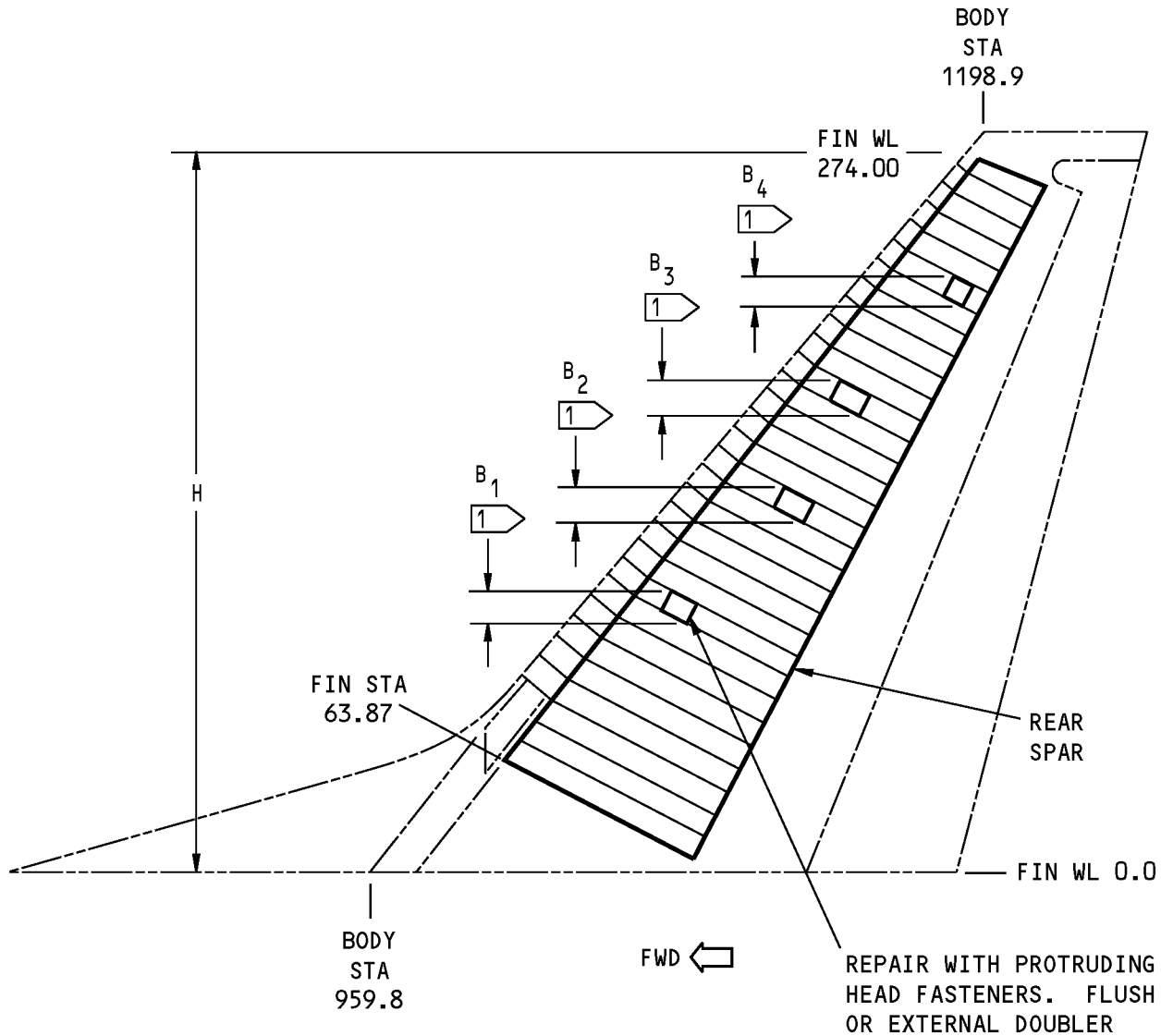


LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

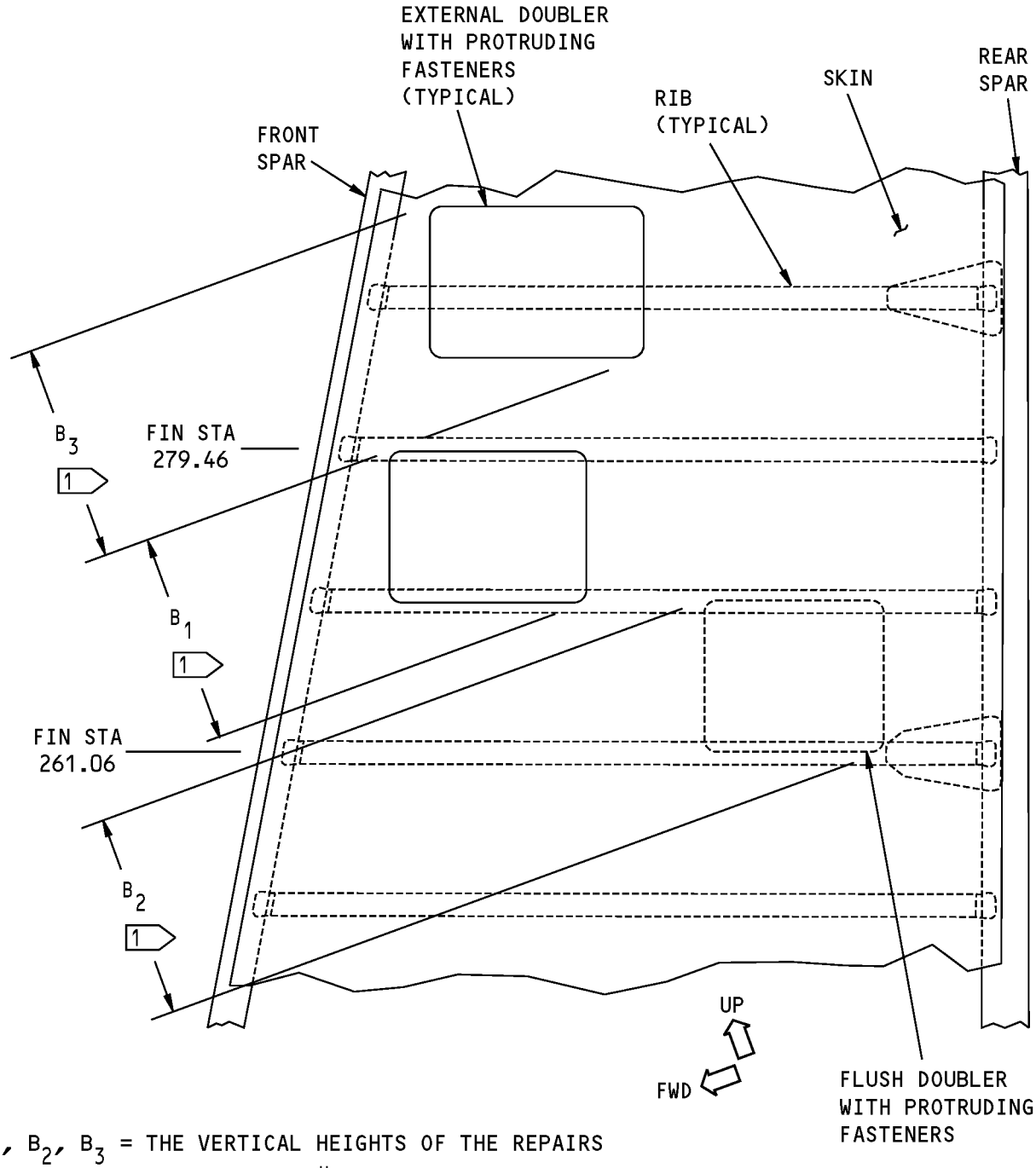
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

B. Get access to the damaged area of the inspar skin as follows:

(1) Remove the leading edge skin panels or install an access door.

C. Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 6. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

D. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

E. Make the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 6. Refer to Table 201/REPAIR 6 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

F. Assemble the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 73.400 through 196.663, Figure 203/REPAIR 6.

G. Drill the fastener holes.

(1) Align fastener holes in the repair parts with holes in the skin made from an external repair.

H. Remove the repair parts.

I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended.
[2]	Filler	1	Use clad or bare 2024-T3 that is the same thickness as the initial skin. The use of clad material is recommended.
[3]	Doubler Splice	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended.

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER AND ITEM [3] DOUBLER SPLICE THICKNESSES (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.032	0.050	5/32
0.040	0.063	5/32
0.041	REPAIR NOT PERMITTED	———
0.060	REPAIR NOT PERMITTED	———
0.071	REPAIR NOT PERMITTED	———

J. Apply a chemical conversion coating to the repair parts and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

K. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

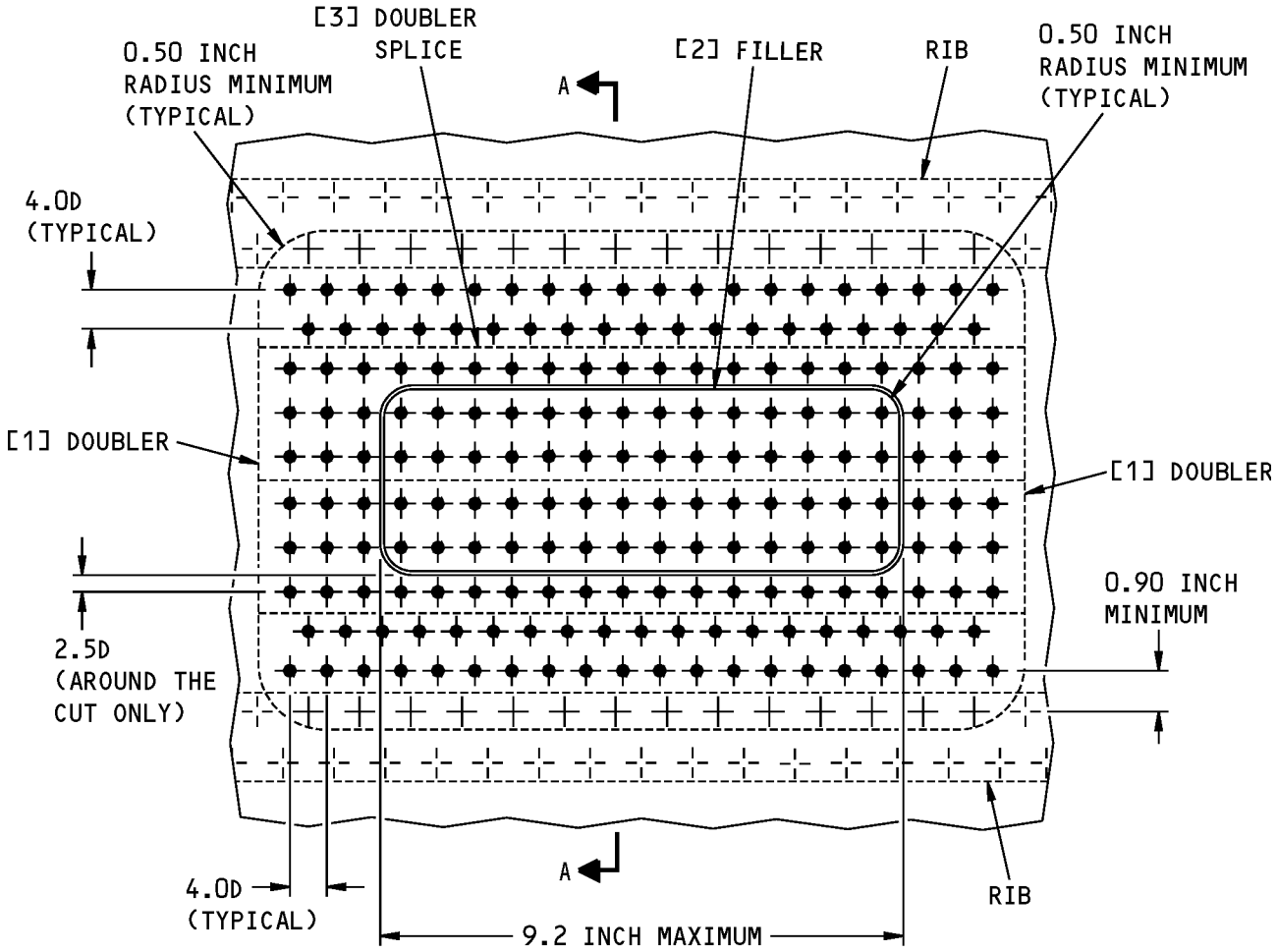
(2) Apply the primer to the bare surfaces of the skin.

L. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

M. Install the rivets without sealant in the repair parts and skin.

N. Apply BMS 5-95 or BMS 5-26 sealant in the space between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

O. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



TYPICAL REPAIR

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

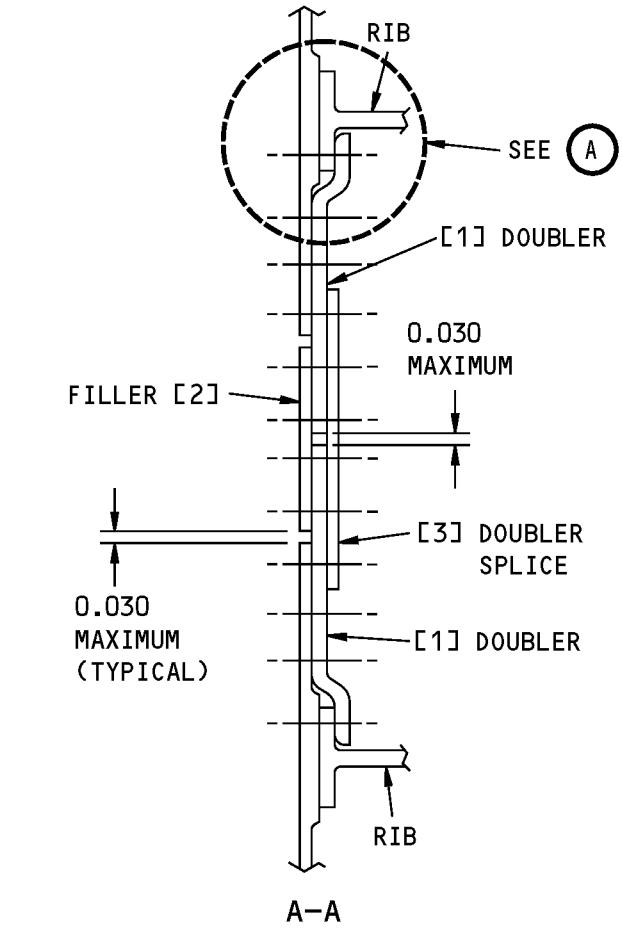
FASTENER SYMBOLS

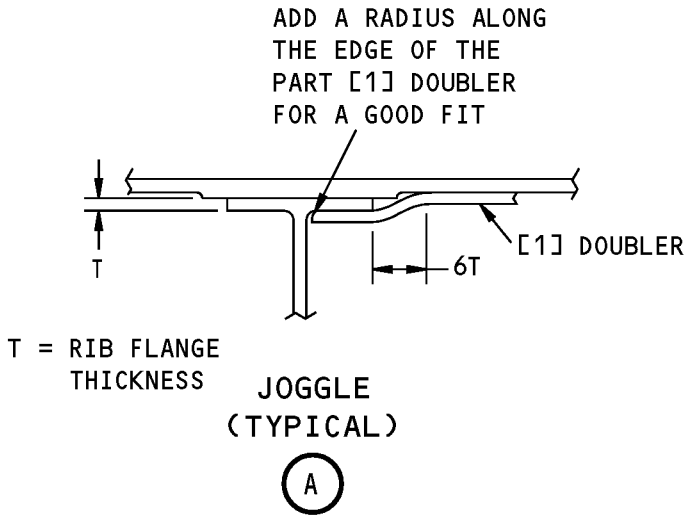
-⊹- REFERENCE FASTENER LOCATION

+ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

⊕ REPAIR FASTENER LOCATION. INSTALL A BACR15FT5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 73.400 through 196.663
Figure 203 (Sheet 1 of 2)





Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 73.400 through 196.663
Figure 203 (Sheet 2 of 2)

REPAIR 7 - VERTICAL STABILIZER INSPAR SKIN FLUSH REPAIR BETWEEN RIBS - FIN STATIONS 196.663 THRU 343.863

1. Applicability

A. Repair 7 is applicable:

(1) To damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 7 between Fin Stations 196.663 and 343.863.

(2) As a replacement repair for Repair 4.

(3) As an alternative to Repair 8.

2. General

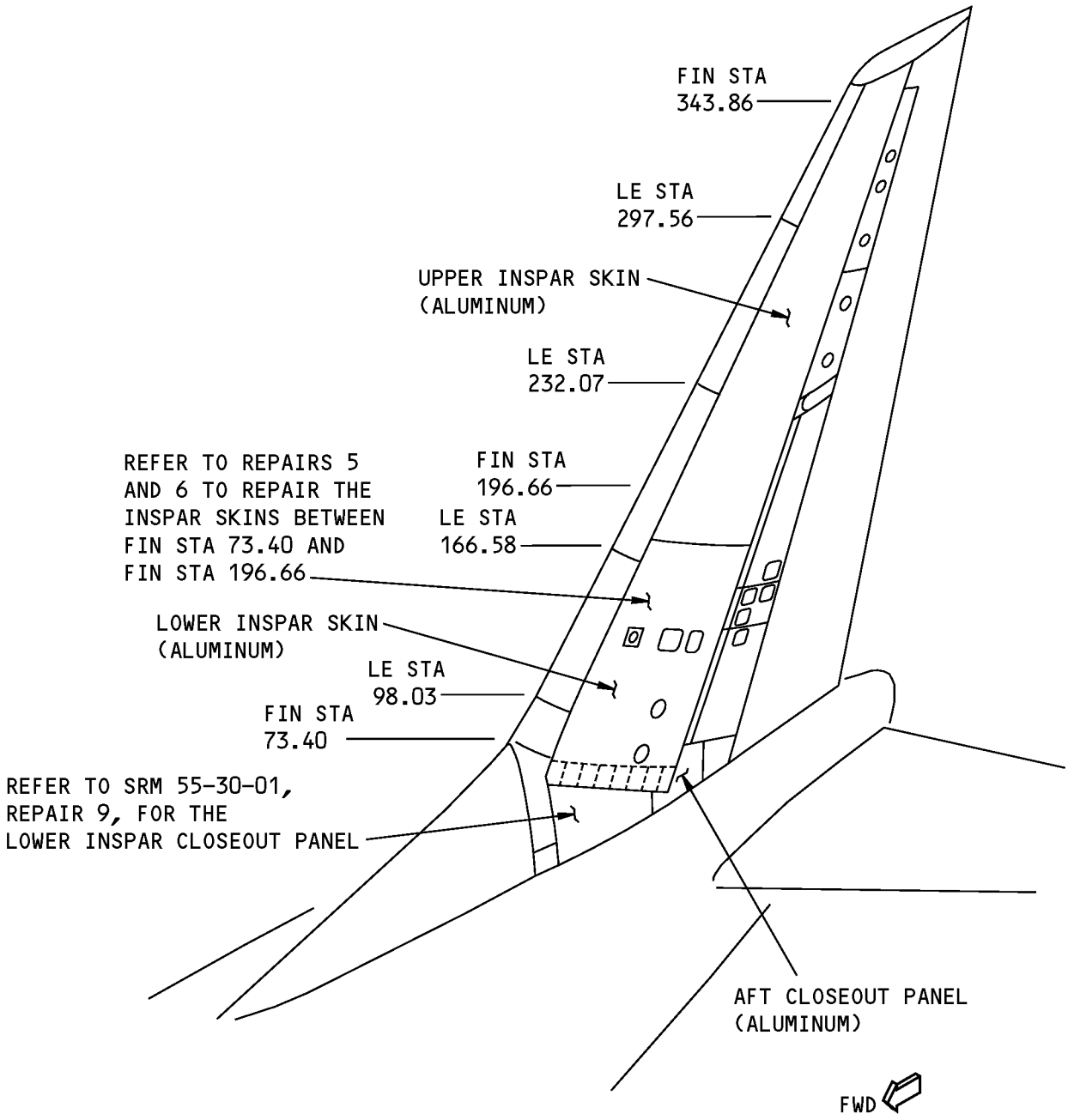
A. Repair 7 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

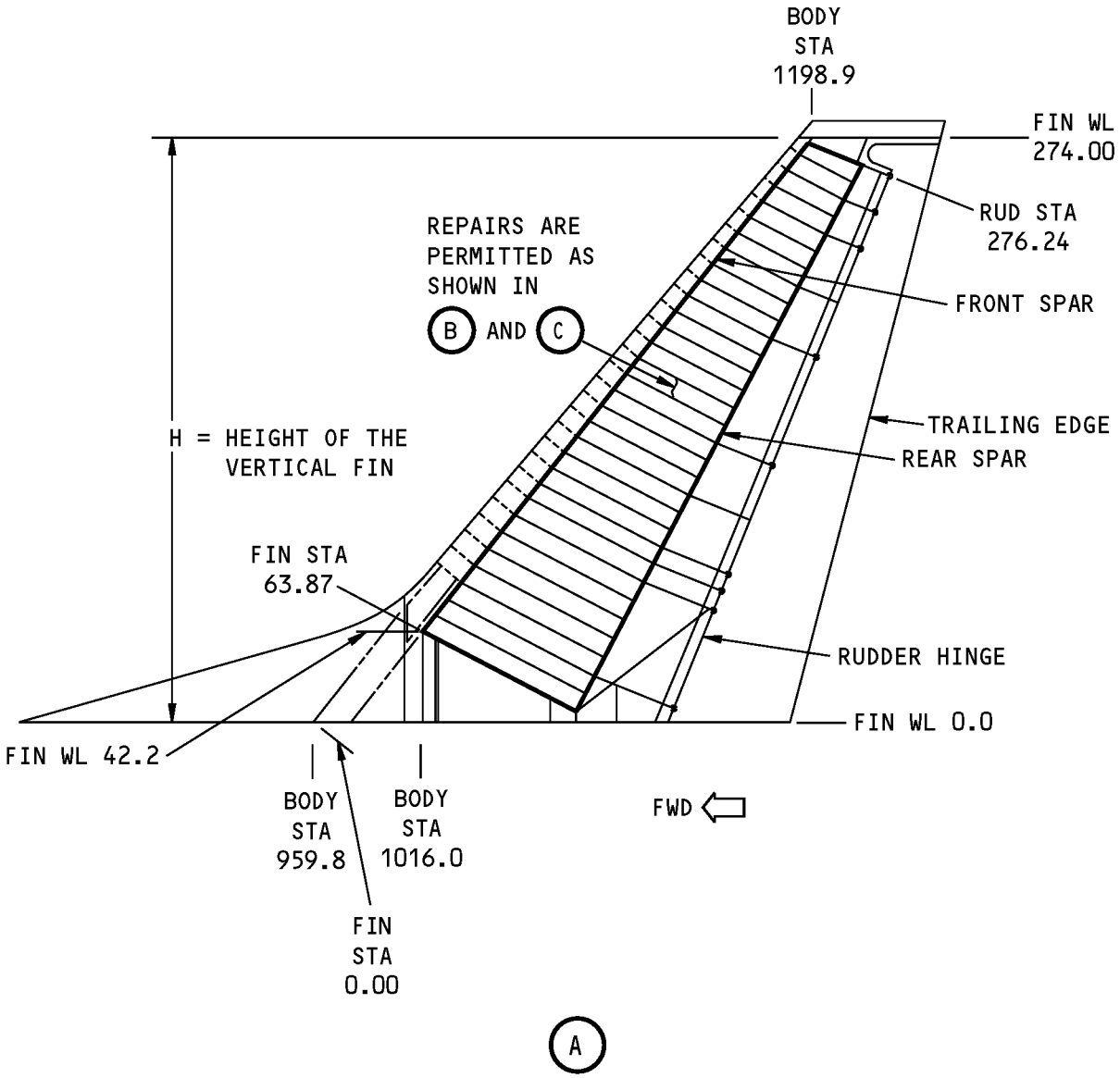
(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 7 must be kept.

C. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

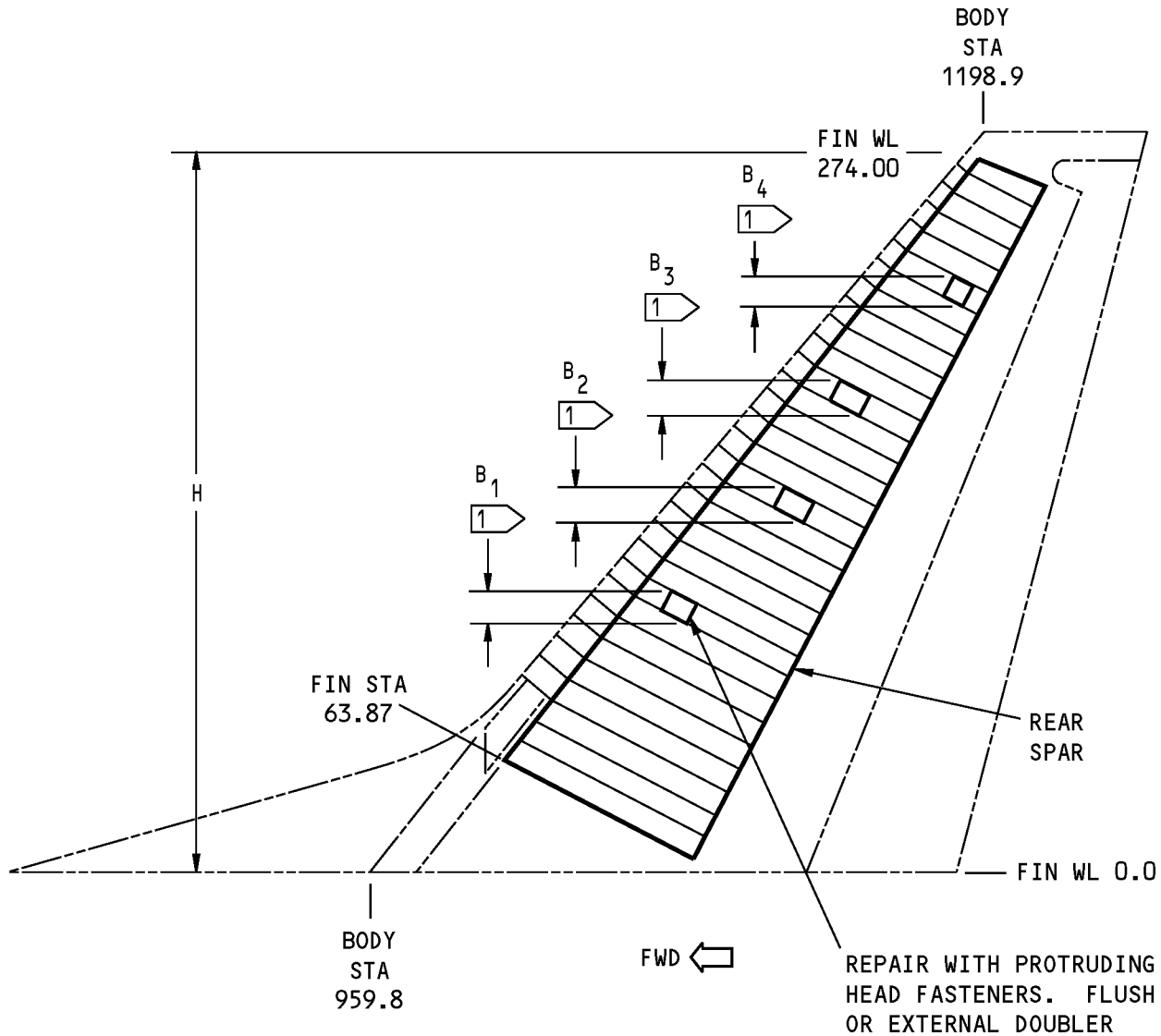


LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

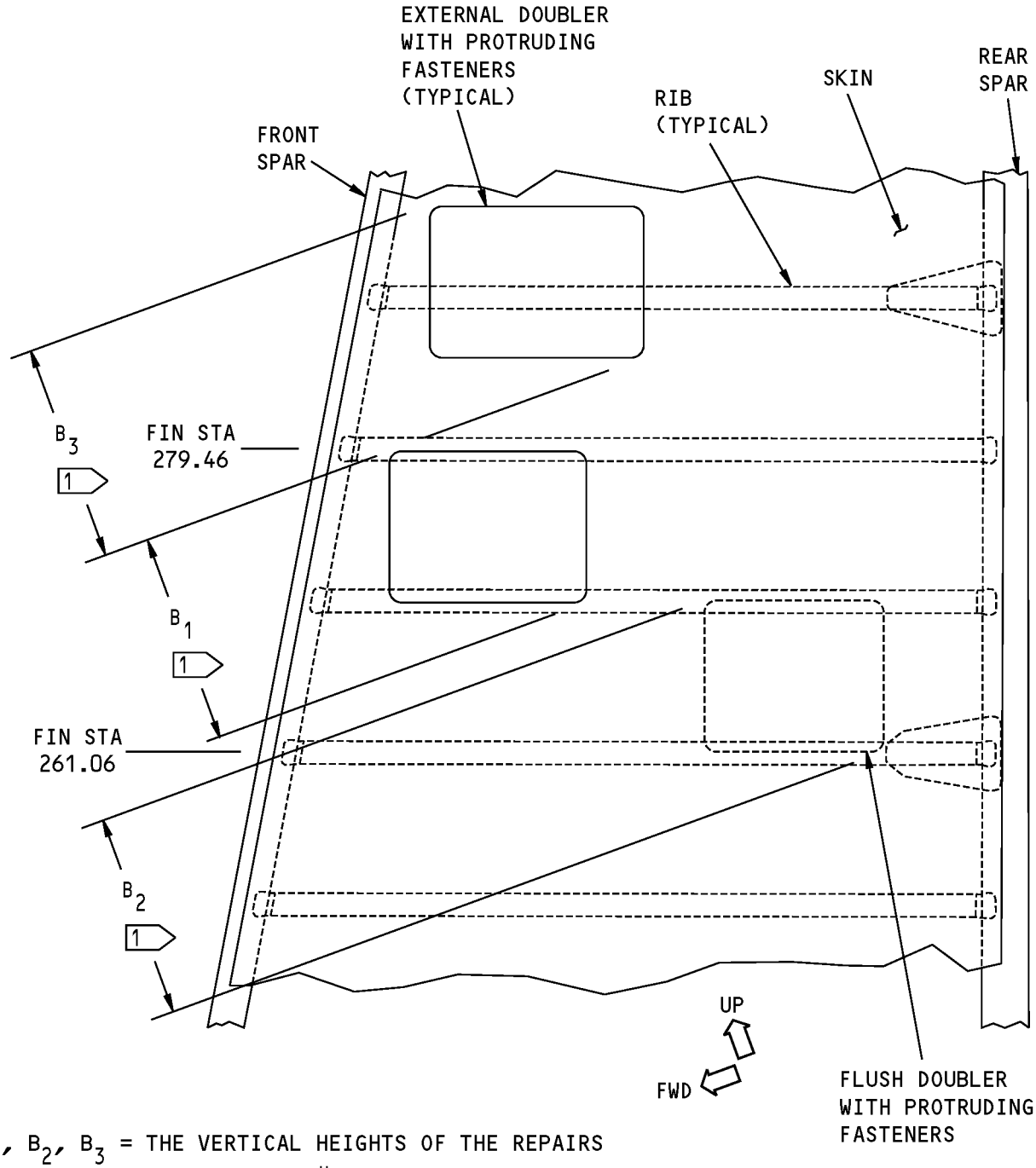
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

B. Get access to the damaged area of the inspar skin as follows:

(1) Remove the leading edge skin panels or install an access door.

C. Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 7. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

D. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

E. Make the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 7. Refer to Table 201/REPAIR 7 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

REPAIR MATERIAL			
ITEM	PART	QUANTITY	MATERIAL
[2]	Filler	1	Use clad or bare 2024-T3 that is the same thickness as the initial skin. The use of clad material is recommended

Table 202:

REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	ITEM [1] DOUBLER THICKNESS (INCH)	REPAIR FASTENER DIAMETER (INCH)
0.032	0.050	5/32
0.041	0.063	5/32

F. Assemble the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 7.

G. Drill the fastener holes.

(1) Align fastener holes in the repair parts with holes in the skin made from an external repair.

H. Remove the repair parts.

I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

J. Apply a chemical conversion coating to the repair parts and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

K. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

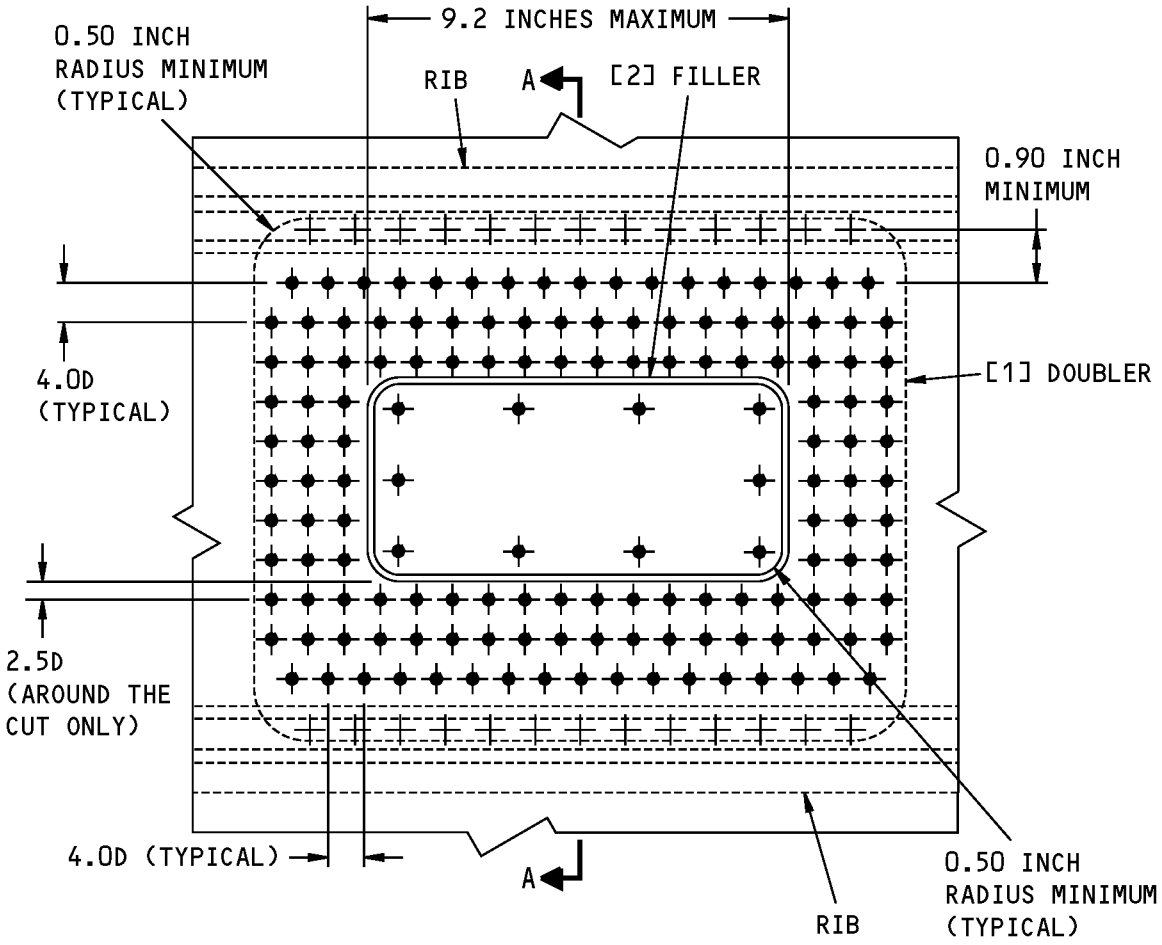
(2) Apply the primer to the bare surfaces of the skin.

L. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

M. Install the rivets without sealant in the repair parts and skin.

N. Apply BMS 5-95 or BMS 5-26 sealant in the space between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

O. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



TYPICAL REPAIR

NOTES

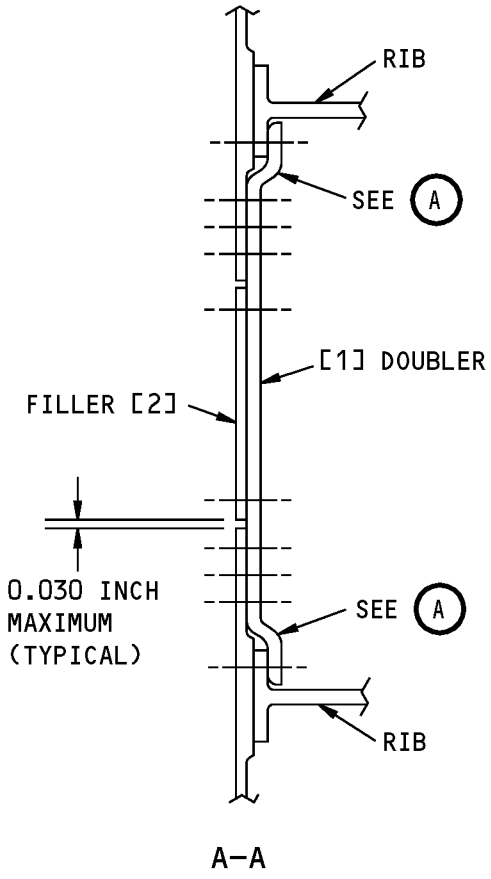
- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

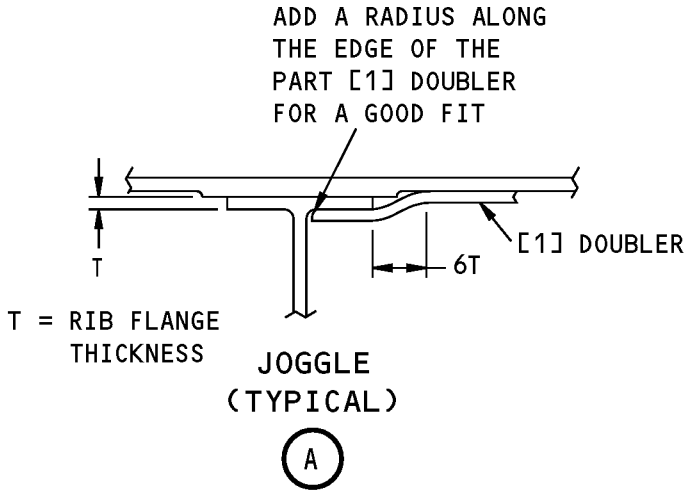
FASTENER SYMBOLS

┼ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

✦ REPAIR FASTENER LOCATION. INSTALL A BACR15FT5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 196.663 through 343.863
Figure 203 (Sheet 1 of 2)





Vertical Stabilizer Inspar Skin Flush Repair Between Ribs - Fin Stations 196.663 through 343.863
Figure 203 (Sheet 2 of 2)

REPAIR 8 - VERTICAL STABILIZER INSPAR SKIN FLUSH REPAIR WITH SPLICED DOUBLER BETWEEN RIBS - FIN STATIONS 196.663 THRU 343.863

1. Applicability

A. Repair 8 is applicable:

(1) To damage to the vertical stabilizer inspar skins shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 8 between Fin Stations 196.663 and 343.863.

(2) As a replacement repair for Repair 4.

(3) As an alternative to Repair 7 if there is not sufficient clearance to install the repair doubler in one piece.

2. General

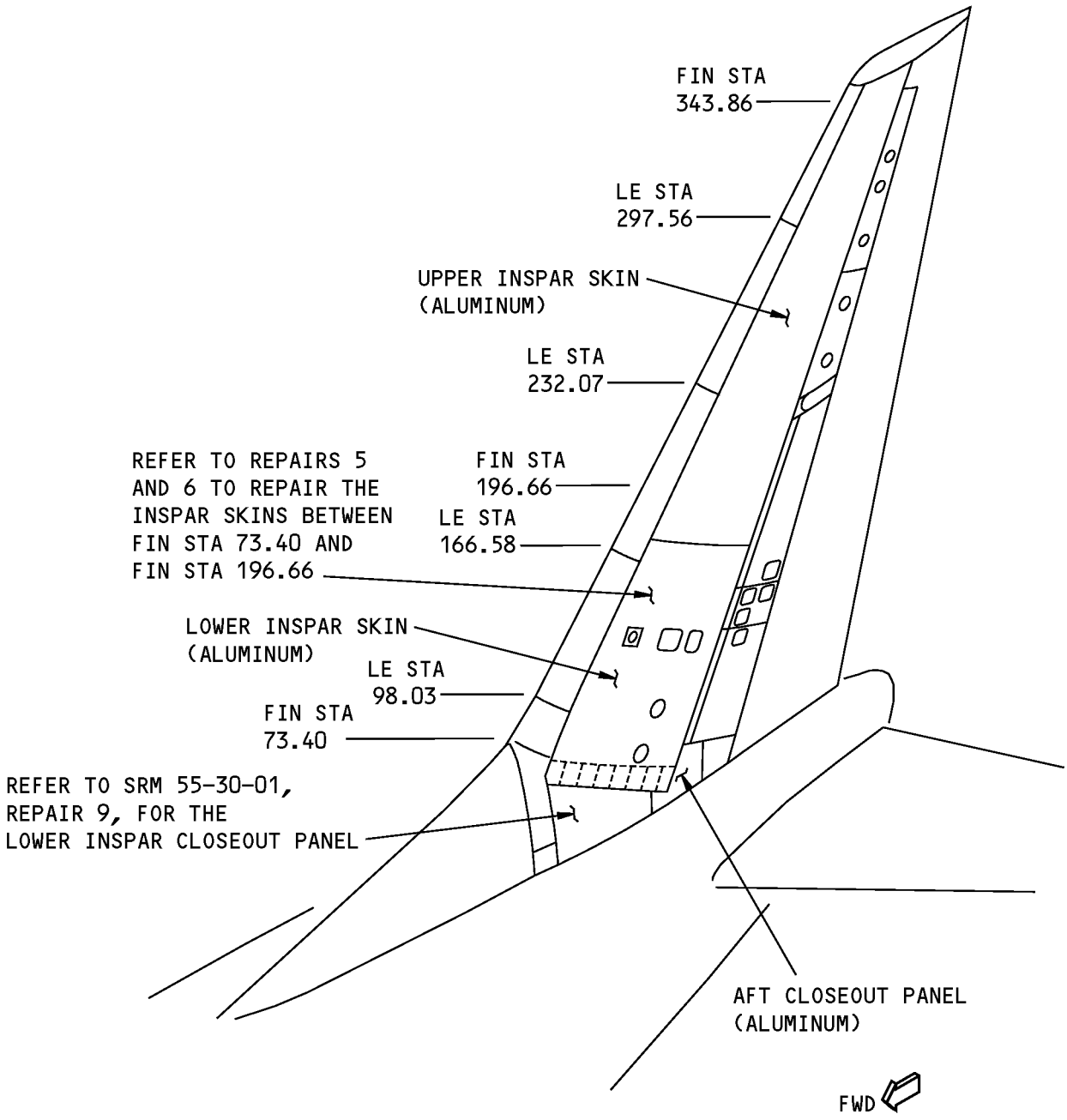
A. Repair 8 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

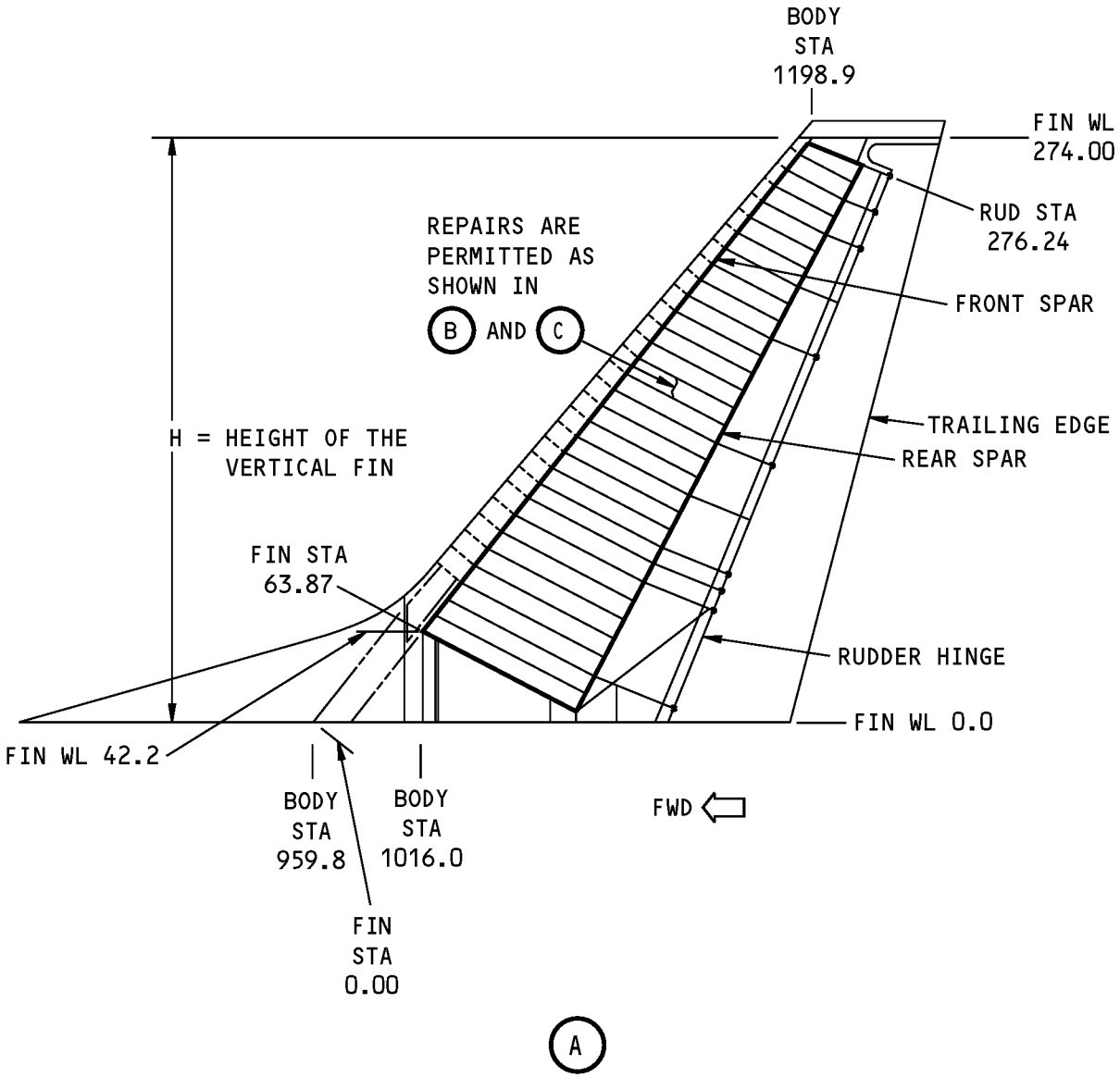
(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 8 must be kept.

C. It is optional to make an access door in the inspar skin. Use these openings to make sure the repair fasteners are installed correctly. Refer to Repairs 10 and 11 to make an access door.

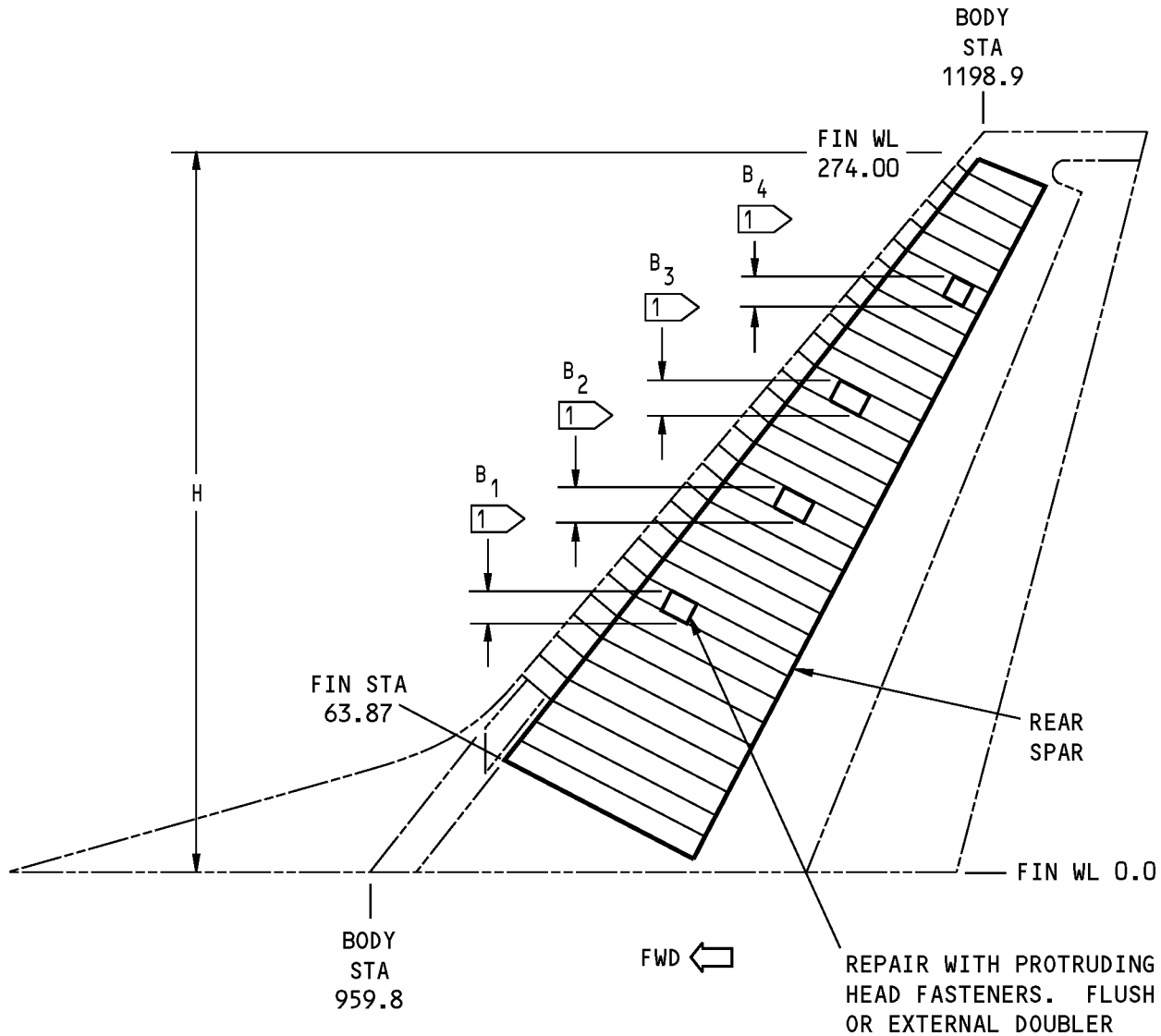


LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

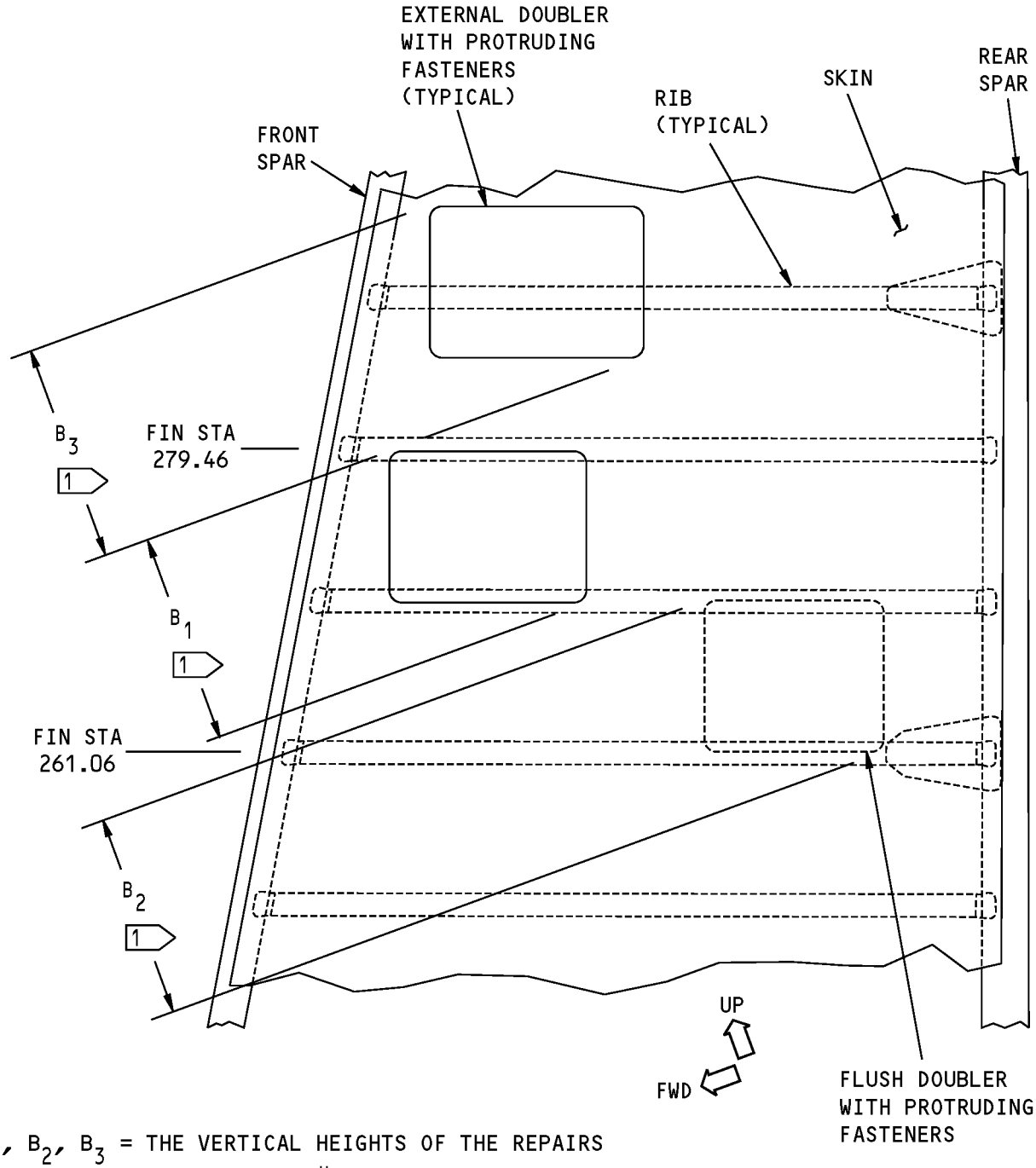
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. If this repair replaces an external repair, remove the repair fasteners, repair doubler, and sealant of the external repair. Refer to 51-40-02 for the procedures to remove the repair fasteners.

B. Get access to the damaged area of the inspar skin as follows:

(1) Remove the leading edge skin panels or install an access door.

C. Cut and remove the damaged part of the skin as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 8. Refer to 51-10-02 for the procedures to remove the damage.

(1) Make the cut in the shape of a rectangle with the longer sides parallel to the inspar ribs.

(2) Make the corner radii of the cut a minimum of 0.50 inch.

D. Put the skin that is around the damage back to the initial contour.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes. Refer to 51-10-01.

E. Make the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 8. Refer to Table 201/REPAIR 8 for the repair material.

(1) Make the contour of the repair parts the same as the initial contour of the skin.

F. Assemble the repair parts as shown in Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 196.663 through 343.863, Figure 203/REPAIR 8.

G. Drill the fastener holes.

(1) Align fastener holes in the repair parts with holes in the skin made from an external repair.

H. Remove the repair parts.

I. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the skin.

J. Apply a chemical conversion coating to the repair parts and bare surfaces of the skin. Refer to 51-20-01 for the chemical conversion coating procedures.

K. Apply one layer of BMS 10-79, Type II or III, primer to the area of the repair. Refer to SOPM 20-44-04 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

(2) Apply the primer to the bare surfaces of the skin.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended
[2]	Filler	1	Use clad or bare 2024-T3 that is the same thickness as the initial skin. The use of clad material is recommended
[3]	Doubler Splice	1	Use clad or bare 2024-T3. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended

Table 202:

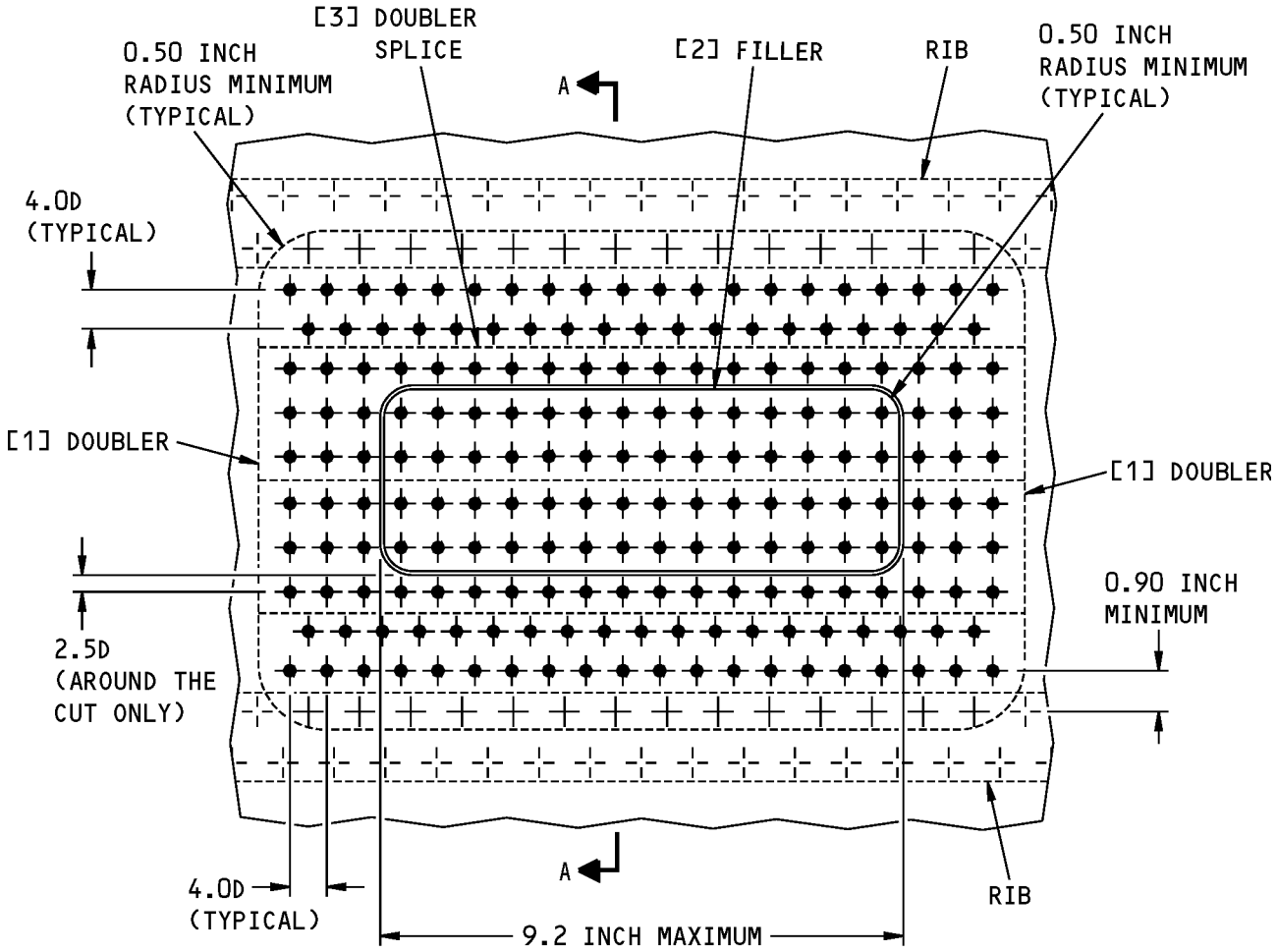
REPAIR PART THICKNESSES AND REPAIR FASTENER DIAMETERS FOR INITIAL SKIN THICKNESSES		
INITIAL SKIN THICKNESS (INCH)	**ITEM [1] DOUBLER AND ITEM [3] DOUBLER SPLICE THICKNESSES (INCH)**	**REPAIR FASTENER DIAMETER (INCH)**
0.032	0.050	5/32
0.041	0.063	5/32

L. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

M. Install the rivets without sealant in the repair parts and skin.

N. Apply BMS 5-95 or BMS 5-26 sealant in the space between the filler and the edge of the skin cut. Refer 51-20-05 for the procedures to apply the sealant.

O. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.



TYPICAL REPAIR

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER. USE (D) TO CALCULATE EDGE MARGINS AND THE DISTANCE BETWEEN FASTENERS.
- MAKE SURE THAT THERE IS A MINIMUM OF THREE ROWS OF FASTENERS AROUND THE DAMAGE.
- MAKE SURE THAT THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

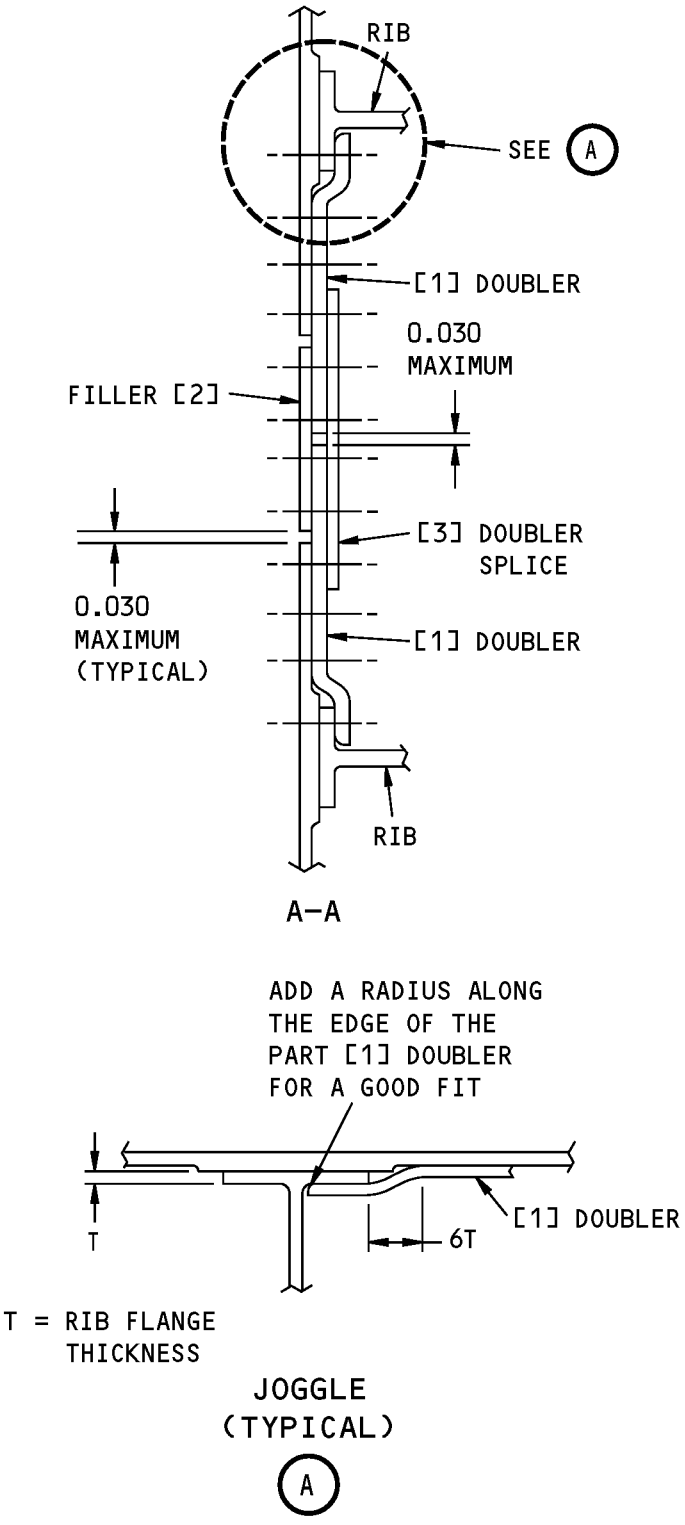
FASTENER SYMBOLS

-|- REFERENCE FASTENER LOCATION

+ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

REPAIR FASTENER LOCATION. INSTALL A BACR15FT5D() SOLID RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-06 FOR THE FASTENER DATA.

Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 196.663 through 343.863
Figure 203 (Sheet 1 of 2)



Vertical Stabilizer Inspar Skin Flush Repair with Spliced Doubler Between Ribs - Fin Stations 196.663 through 343.863
Figure 203 (Sheet 2 of 2)

REPAIR 9 - VERTICAL STABILIZER TRAILING EDGE AND CLOSEOUT PANELS

1. Applicability

A. Repair 9 is applicable to damage to the vertical stabilizer trailing edge and closeout panels shown in Vertical Stabilizer Trailing Edge and Closeout Panel Locations, Figure 201/REPAIR 9. These panels are made of Glass Fiber Reinforced Plastic (GFRP) and Carbon Fiber Reinforced Plastic (CFRP).

B. Repair 9 is applicable to damage that is more than the limits permitted in Allowable Damage 3. Refer to Allowable Damage 3 for the type and size of damage that is permitted.

2. General

A. Repair 9 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the trailing edge panels as given in AMM 55-30-00/401.

(2) Refer to 51-40-02 for information on fastener removal.

C. Refer to Damage Definitions, Figure 202/REPAIR 9, Details A, B, and C for the definitions of the length, width, and depth of damage.

D. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definitions of the facesheets of a honeycomb core area.

E. Some trailing edge panels have a protective layer of Teflon film. If damage occurs, refer to AMM 51-21-81/701 for the procedures to repair the Teflon film.

F. The conditions that follow must be true for panel areas other than the edgeband:

(1) The edges of the room-temperature Category B repairs must be 6 inches or more away from:

(a) The edge of other repairs

(b) The panel edge

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 3.

(2) The edges of the 150°F (66°C) and 200° F(93°C) cure Category A repairs must be 3 inches or more away from:

(a) The edge of other repairs

(b) The panel edge

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 3.

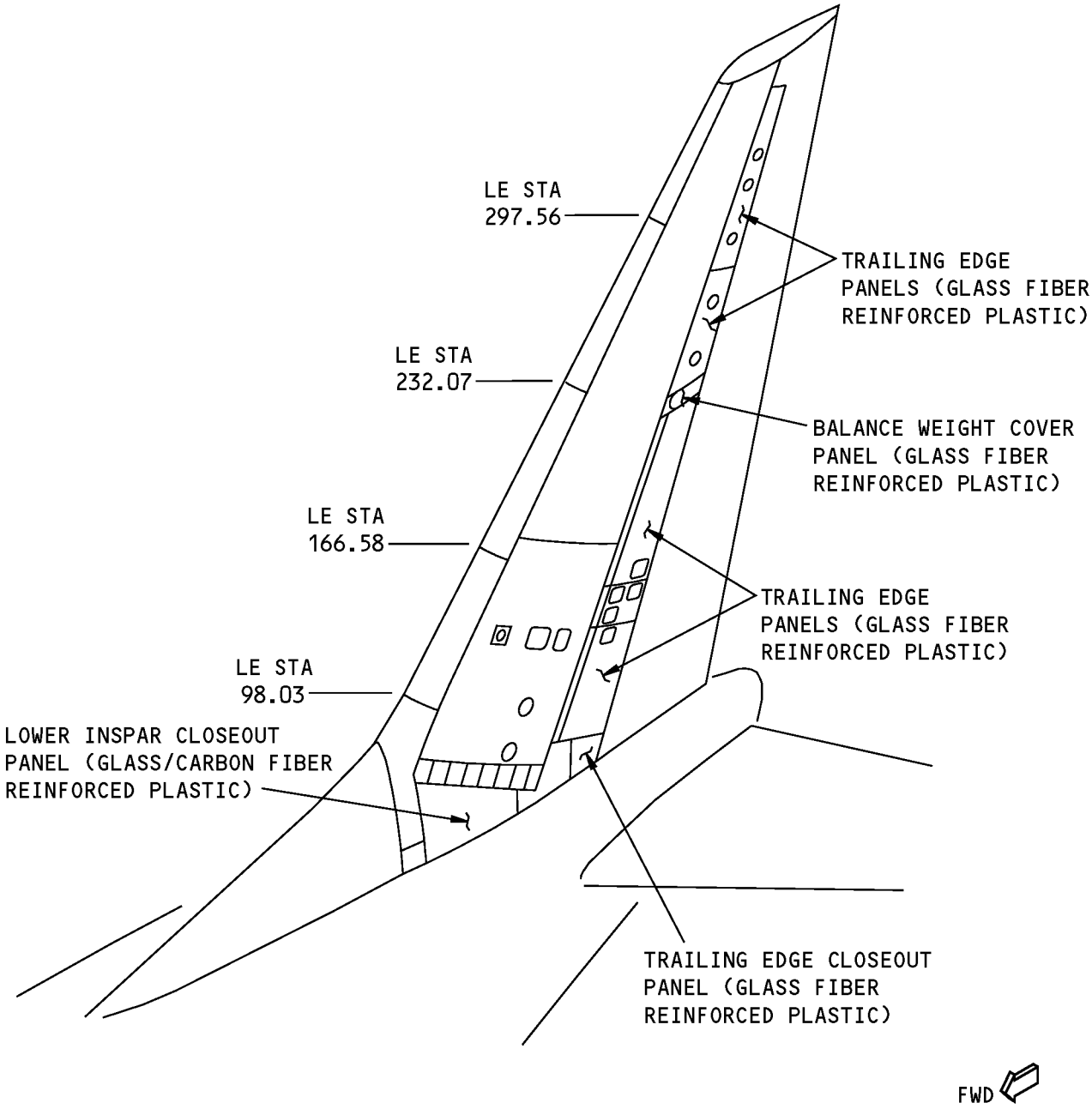
G. Do the repair as given in Paragraph 4./REPAIR 9

H. Put the trailing edge panels back to the initial condition, as applicable.

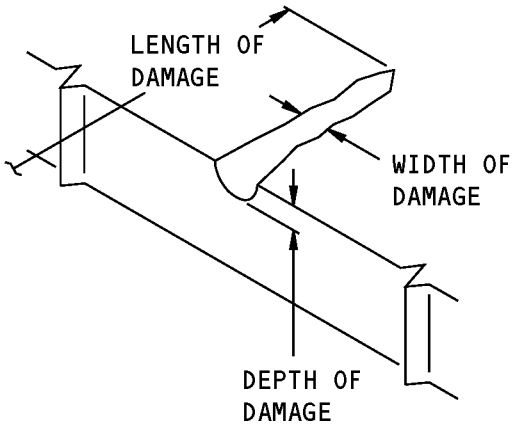
(1) Install the trailing edge panels as given in AMM 55-30-00/401, if they were removed.

(a) Refer to 51-40-02 for information on fastener installation.

(2) Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the airplane. Refer to 51-10-01.

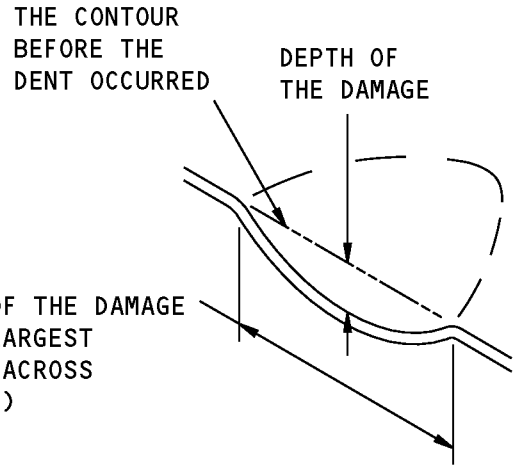


Vertical Stabilizer Trailing Edge and Closeout Panel Locations
Figure 201



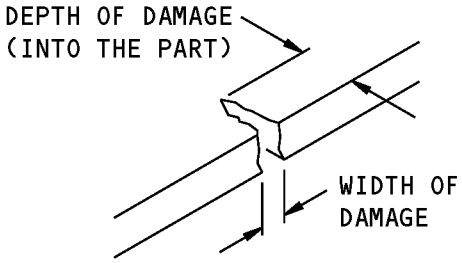
DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



DEFINITIONS FOR DENT DAMAGE

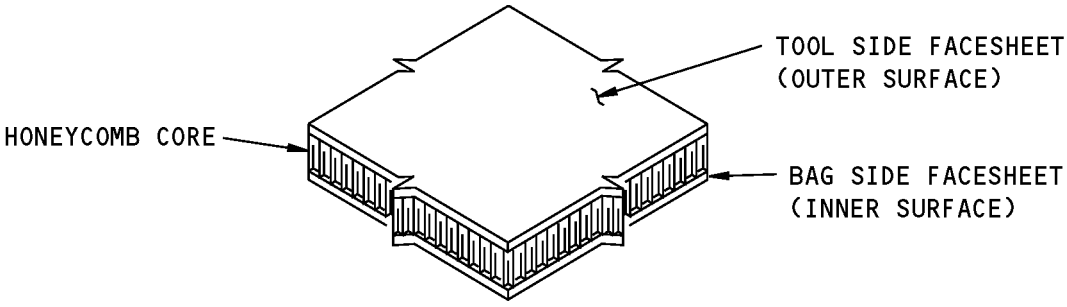
B



DEFINITIONS FOR EDGE DAMAGE

C

Damage Definitions
Figure 202



Definitions of the Facesheets
Figure 203

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS
51-70-14, REPAIR GENERAL	Structures With Aluminum Coatings and Foils
55-30-01, ALLOWABLE DAMAGE 3	Vertical Stabilizer Trailing Edge Panels
AMM 51-21-81/701	Abrasion-resistant Teflon Finish - Cleaning/Painting
AMM 55-30-00/401	Vertical Stabilizer Removal/Installation

4. Repair Instructions

A. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound.

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

B. For dents that are not permitted by Paragraph 4.A./REPAIR 9 and for other damage that is not permitted by Allowable Damage 3, refer to:

(1) Table 201/REPAIR 9 for panel areas other than the edgeband

(2) Table 202/REPAIR 9 for the edgebands.

C. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) Repair the damage as given in 51-70-06, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

(d) You must do an inspection at the repair every 800 flight hours or sooner.

Table 201:

REPAIR DATA FOR THE 250° F (121° C) CURE TRAILING EDGE PANELS FOR PANEL AREAS OTHER THAN THE EDGEBANDS				
REPAIR TYPE	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-06**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A PREIMPREGNATED LAYUP REPAIR AS GIVEN IN SRM 51-70-05**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 2.0 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location - One facesheet and the honeycomb core in depth	Damage that is a maximum of: - 4.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	Damage that is a maximum of: - 6.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	There are no limits on the size of the repair
REPAIR INSTRUCTIONS	Refer to Paragraph 4.C	Refer to Paragraph 4.D	Refer to Paragraph 4.E	Refer to Paragraph 4.F

Table 202:

REPAIR DATA FOR THE EDGEBANDS OF 250°F (121°C) CURE TRAILING EDGE PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP REPAIR AS GIVEN IN SRM 51-70-06**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A WET LAYUP REPAIR AS GIVEN IN SRM 51-70-04**	**CATEGORY A PREIMPREGNATED LAYUP REPAIR AS GIVEN IN SRM 51-70-05**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 15 percent of the cross-sectional area of the edgeband at the damage location - 10 percent of the length of the edgeband on the side of the damage	Damage that is a maximum of: - 15 percent of the crosssectional area of the edgeband at the damage location - 10 percent of the length of the edgeband on the side of the damage	There are no size limits on the dimensions of the repair	There are no limits on the size of the repair
REPAIR INSTRUCTIONS	Refer to Paragraph 4.C	Refer to Paragraph 4.D	Refer to Paragraph 4.E	Refer to Paragraph 4.F

D. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.

(1) Repair the damage as given in 51-70-04, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.

(1) Repair the damage as given in 51-70-04, but for each facesheet or solid laminate area that is damaged, do the steps that follow:

(a) Use the same number of repair plies as the number of initial plies that were removed. Refer to Definitions of the Facesheets, Figure 203/REPAIR 9 for the definition of a facesheet.

(b) Add one ply (structural) of BMS 9-3, Type H-2, (or Type H-3) glass fabric that is ±45 degrees.

(c) Add a second ply (structural) of BMS 9-3, Type H-2 (or Type H-3) glass fabric that is 0 or 90 degrees.

F. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

(1) Use the same number and type of repair plies as the initial plies that were removed.

REPAIR 10 - VERTICAL STABILIZER ACCESS PANEL INSTALLATION WITH A ONE-PIECE DOUBLER

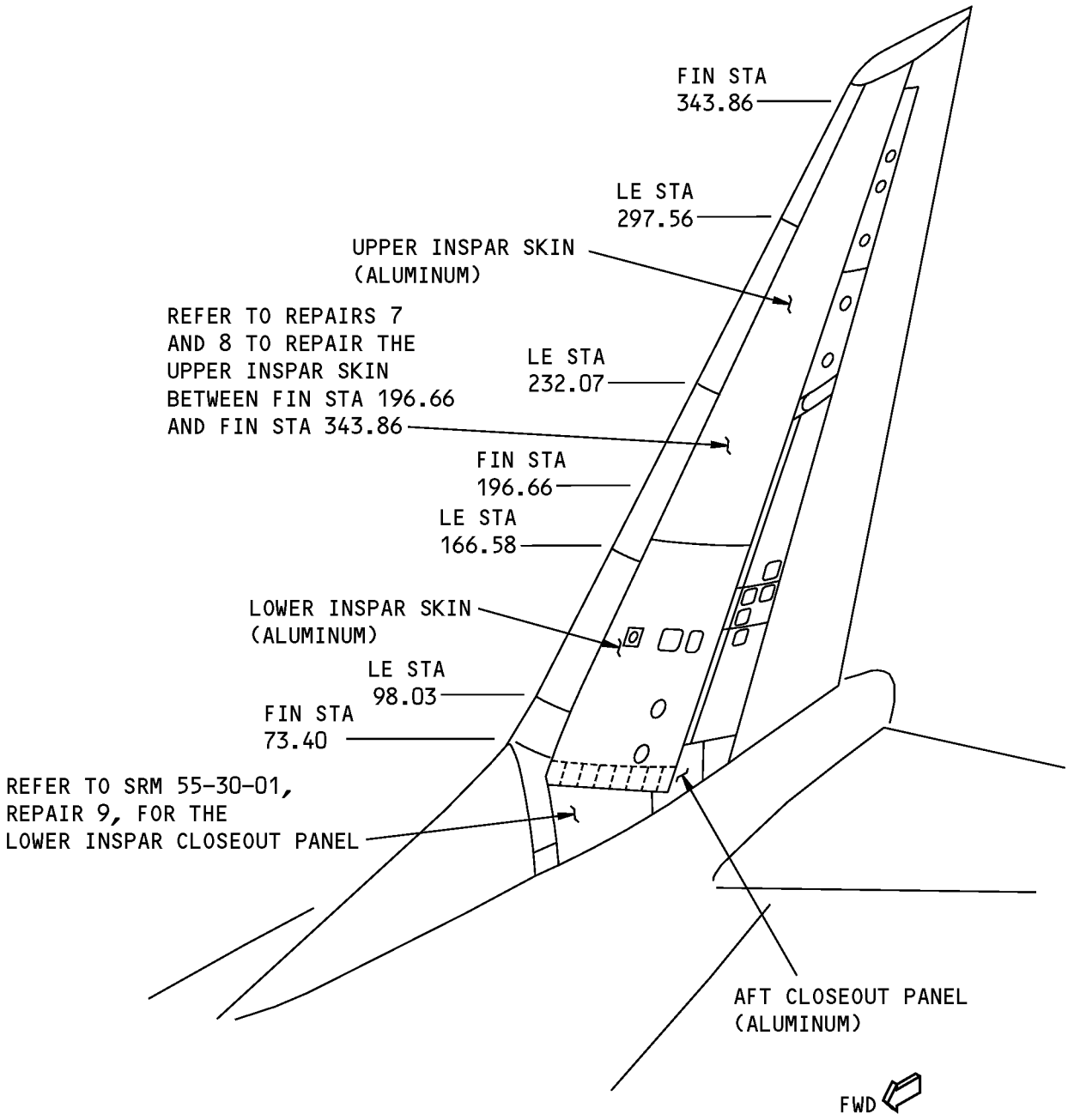
1. Applicability

A. Repair 10 can be used to make an access hole in the inspar skins of the vertical stabilizer shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 10.

B. Repair 10 is applicable to:

(1) The vertical stabilizer skin from Fin WL 150.67 and above to the tip

(2) Locations where there is sufficient clearance to install a one-piece doubler.



LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201

2. General

A. Repair 10 is a Category A repair. Refer to 51-00-06 for the definitions of the different categories of repairs.

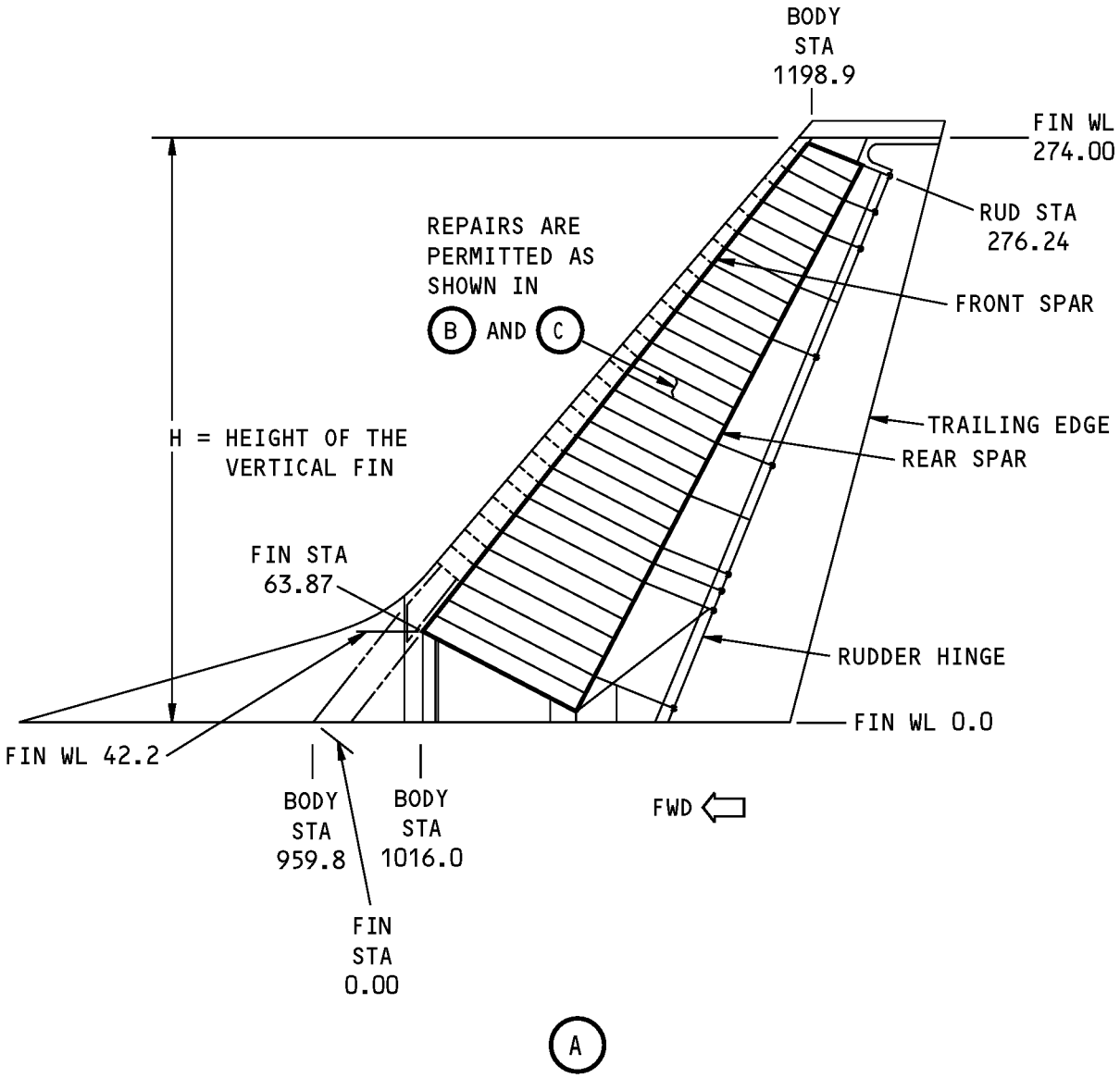
B. The repair that follows is an alternative to Repair 10:

(1) Repair 11 is an access panel installation with a two-piece doubler for locations where there is not sufficient clearance to install a one-piece doubler.

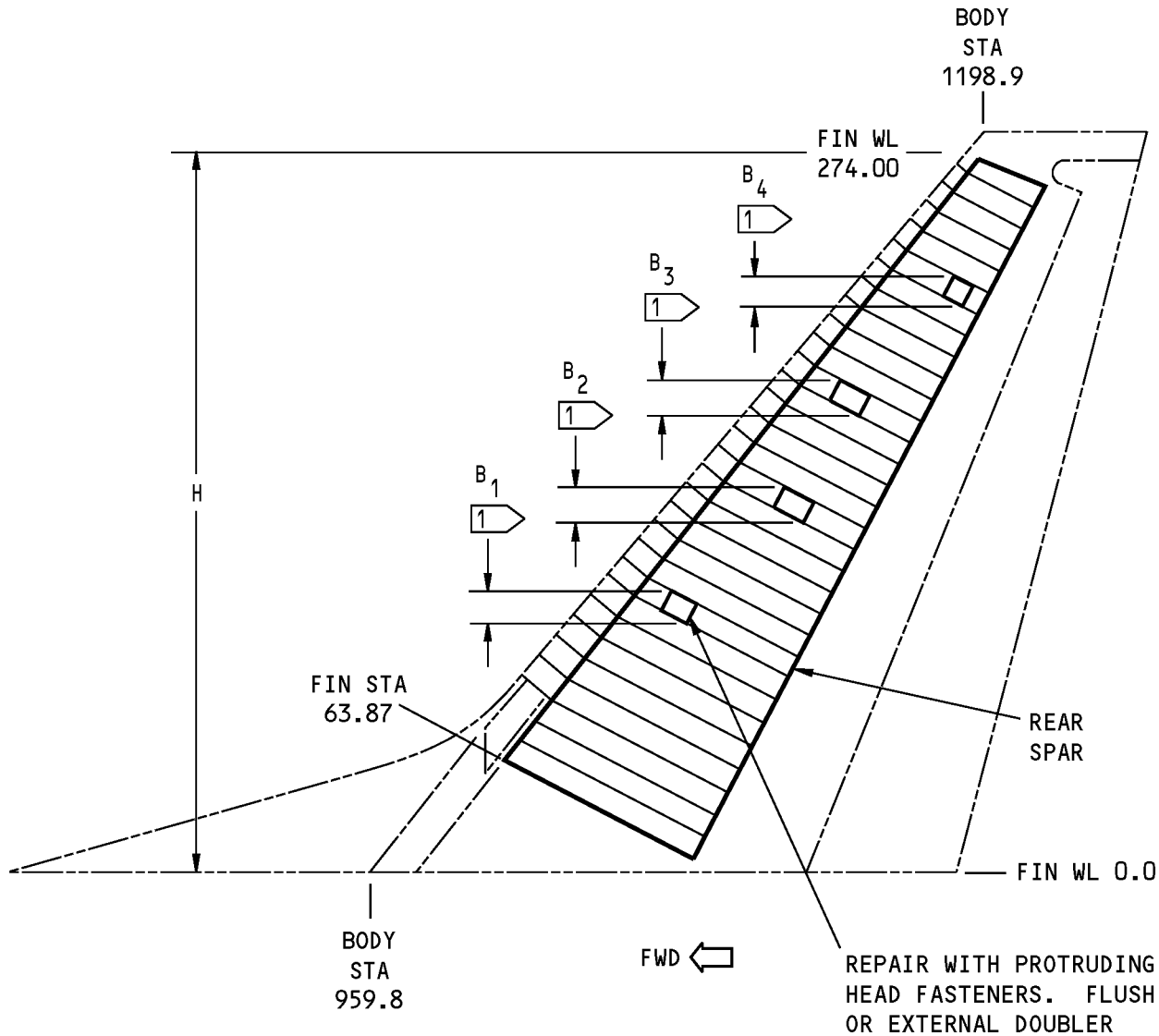
C. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 10 must be kept.



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

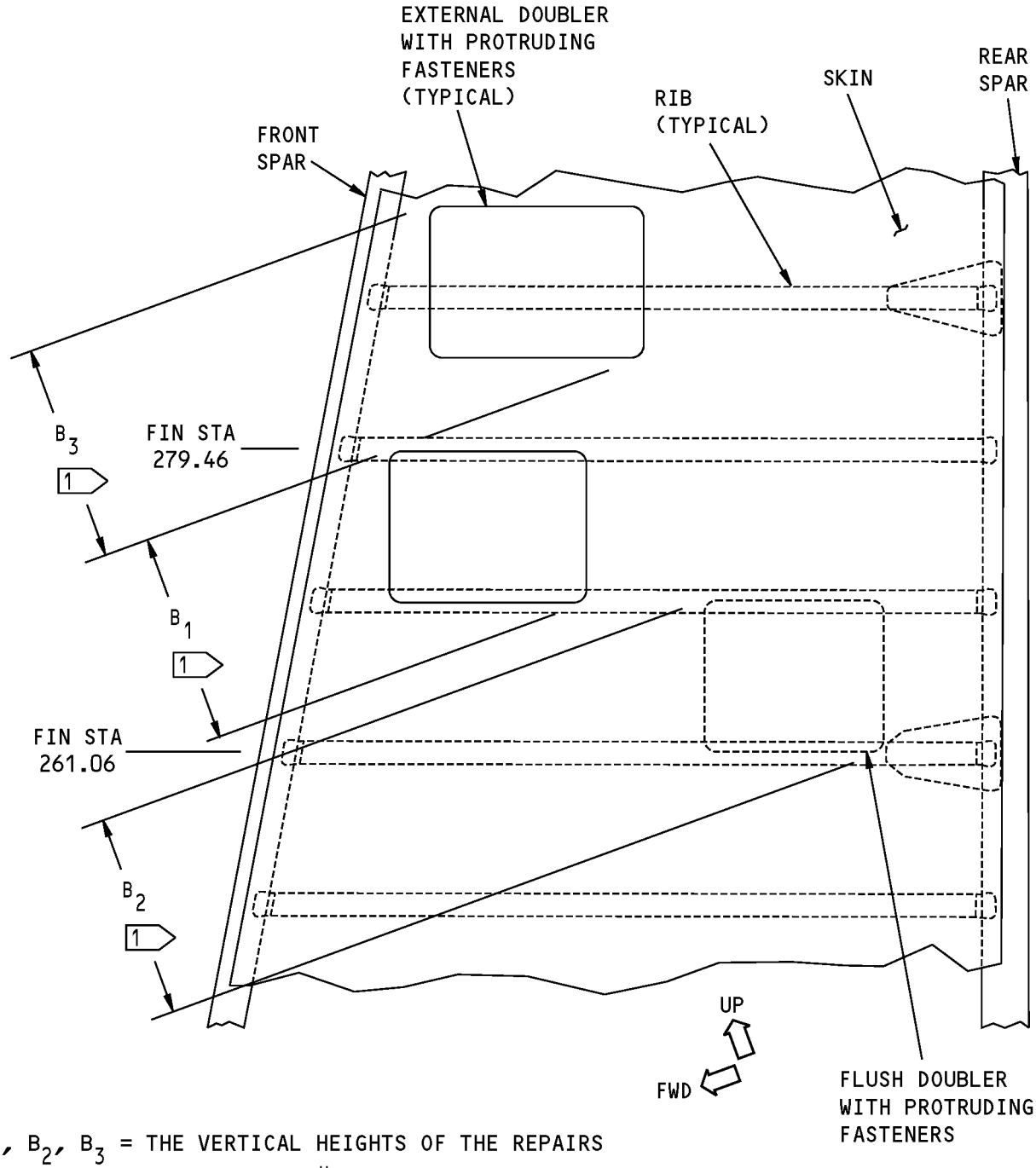
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-01	Application of Special Purpose Coatings and Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Cut the hole in the skin.

(1) Make the cut in the shape shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 10.

(2) Refer to 51-10-02 for the procedures to cut the skin.

B. Remove the fasteners from the rib chords as necessary.

(1) Refer to 51-40-02.

C. Make the repair parts. Refer to Table 201/REPAIR 10.

D. Assemble the part [2] doubler and the part [3] shim as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 10.

E. Drill the fastener holes that go through the skin, rib chords, the part [2] doubler, and the part [3] shim. Refer to 51-40-05 for the fastener hole dimensions.

F. Disassemble the repair parts.

G. Remove the nicks, scratches, gouges, and burrs from the initial parts and from the part [2] doubler and the part [3] shim.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Cover Plate	1	Use bare or clad 2024-T3 that is 0.070 inch thick
[2]	Doubler	1	Use bare or clad 2024-T3 that is 0.190 inch thick
[3]	Shim	1	Use bare or clad 2024-T3 that is 0.030 inch thick

H. Apply a chemical conversion coating to the bare surfaces of the initial parts and to the part [2] doubler and the part [3] shim. Refer to 51-20-01.

I. Apply one layer of BMS 10-79, Type II or III, primer to the bare surfaces of the initial parts and to the part [2] doubler and the part [3] shim. Refer to SOPM 20-44-04.

J. Install the part [2] doubler and the part [3] shim.
   (1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.
   (2) Install the rivets without sealant.
   (3) If you use hex drive bolts, install the fasteners wet with BMS 5-95 sealant.

K. Put the part [1] cover plate in position as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 10.

L. Drill the 0.190 to 0.199 inch diameter holes for the nutplates as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 10.

M. Remove part [1].

N. Put the nutplates in position on the part [2] doubler and drill the holes for the rivets.

O. Remove the nicks, scratches, gouges, and burrs from the part [1] cover plate, the part [2] doubler, and the part [3] shim.

P. Apply a chemical conversion coating to the part [1] cover plate and the bare surfaces of the part [2] doubler and the part [3] shim. Refer to 51-20-01.

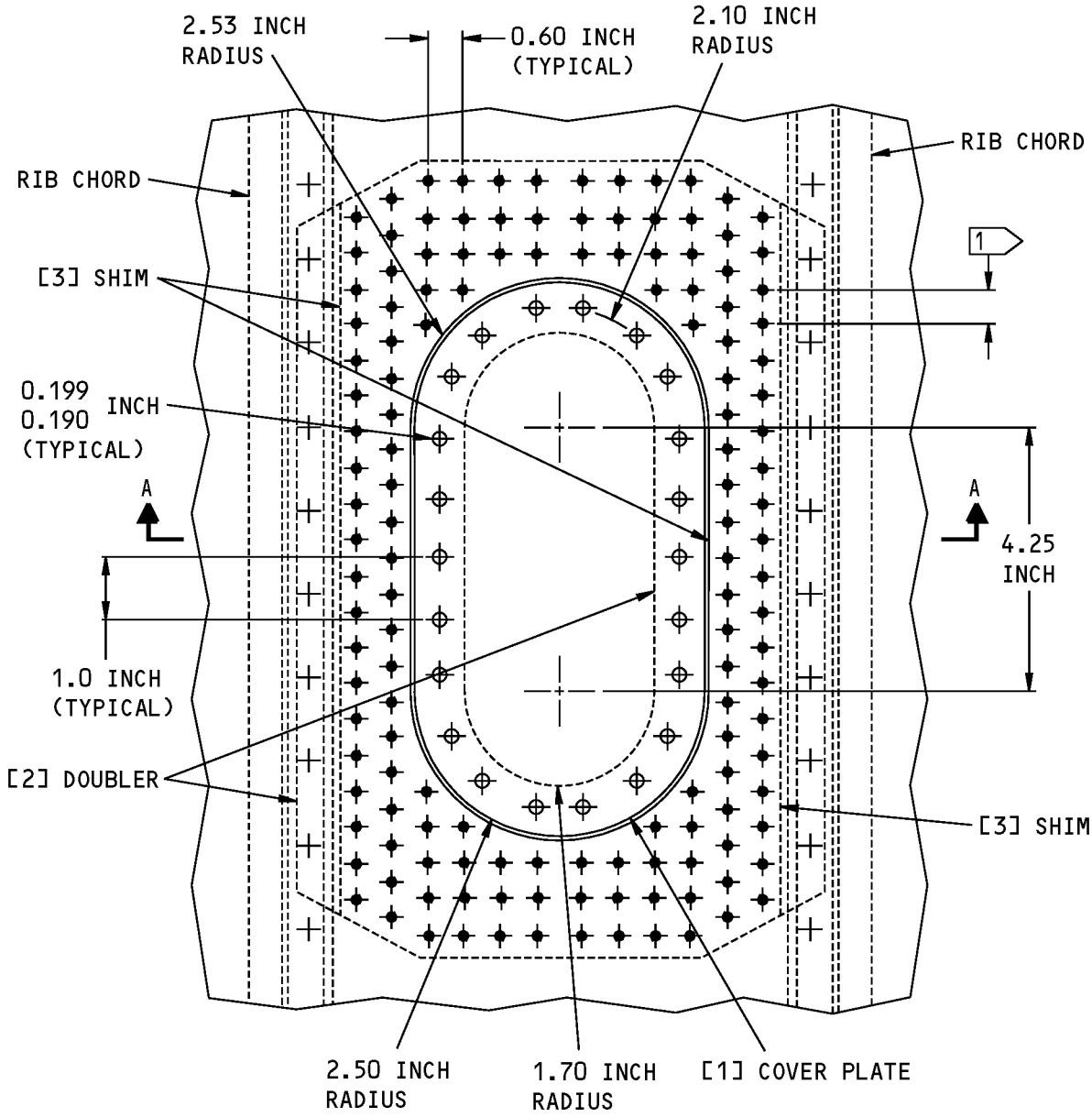
Q. Apply one layer of BMS 10-79, Type II or III, primer to the part [1] cover plate and the bare surfaces of the part [2] doubler and the part [3] shim. Refer to SOPM 20-44-04.

R. Install the nutplates on the part [2] doubler.
   (1) Install the rivets without sealant.

S. Apply BMS 10-86, Type I white abrasion resistant coating to the mating surfaces of the part [1] cover plate and the part [2] doubler. Refer to SOPM 20-44-01.

T. Install the part [1] cover plate.
   (1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.
   (2) Install the fasteners wet with BMS 5-95 sealant.
   (3) Put BMS 5-95 sealant into the space between the skin and the part [1] cover plate.

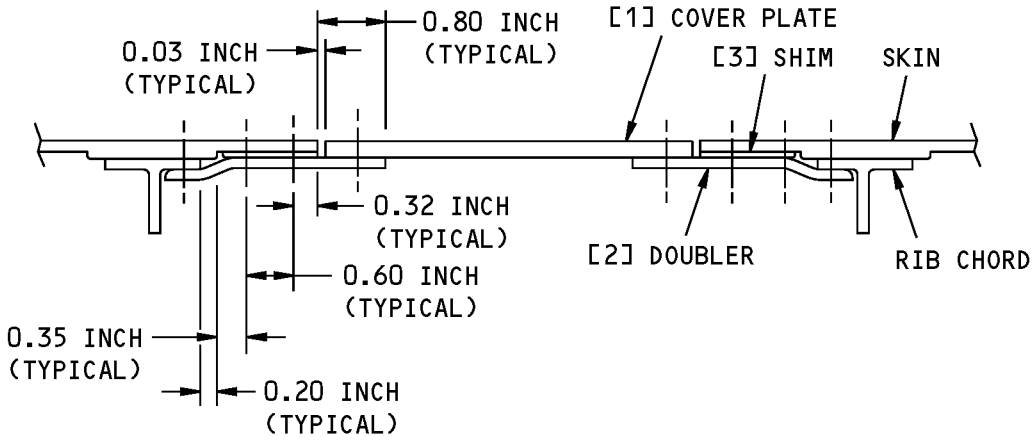
U. Apply the decorative finish to the repair area if necessary. Refer to AMM PAGEBLOCK 51-21-99/701.



NOTES

1 USE THE FASTENER SPACING AS FOLLOWS:
- 0.80 INCH FOR FIN WL 150.67 TO THE TIP

Vertical Stabilizer Access Panel Installation
Figure 203 (Sheet 1 of 2)



A–A

FASTENER SYMBOLS

- INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER AS THE INITIAL FASTENER. YOU CAN INSTALL A FASTENER THAT IS UP TO 1/32 INCH DIAMETER OVERSIZE.
- REPAIR FASTENER LOCATION. INSTALL A BACB30VT5K HEX DRIVE BOLT.
- REPAIR FASTENER LOCATION. INSTALL BACN10JR03CFM NUTPLATE WITH BACR15BA3D RIVETS. INSTALL A BACB30EL3-() BOLT TO ATTACH THE PART [1] COVER PLATE.

Vertical Stabilizer Access Panel Installation
Figure 203 (Sheet 2 of 2)

REPAIR 11 - VERTICAL STABILIZER ACCESS PANEL INSTALLATION WITH A TWO-PIECE DOUBLER

1. Applicability

A. Repair 11 can be used to make an access hole in the inspar skins of the vertical stabilizer shown in Vertical Stabilizer Inspar Skin Locations, Figure 201/REPAIR 11.

B. Repair 11 is applicable to:

(1) The vertical stabilizer skin from Fin WL 150.67 and above to the tip

(2) Locations where there is not sufficient clearance to install a one-piece part [2] doubler.

2. General

A. Repair 11 is a Category A repair. Refer to 51-00-06 for the definitions of the different categories of repairs.

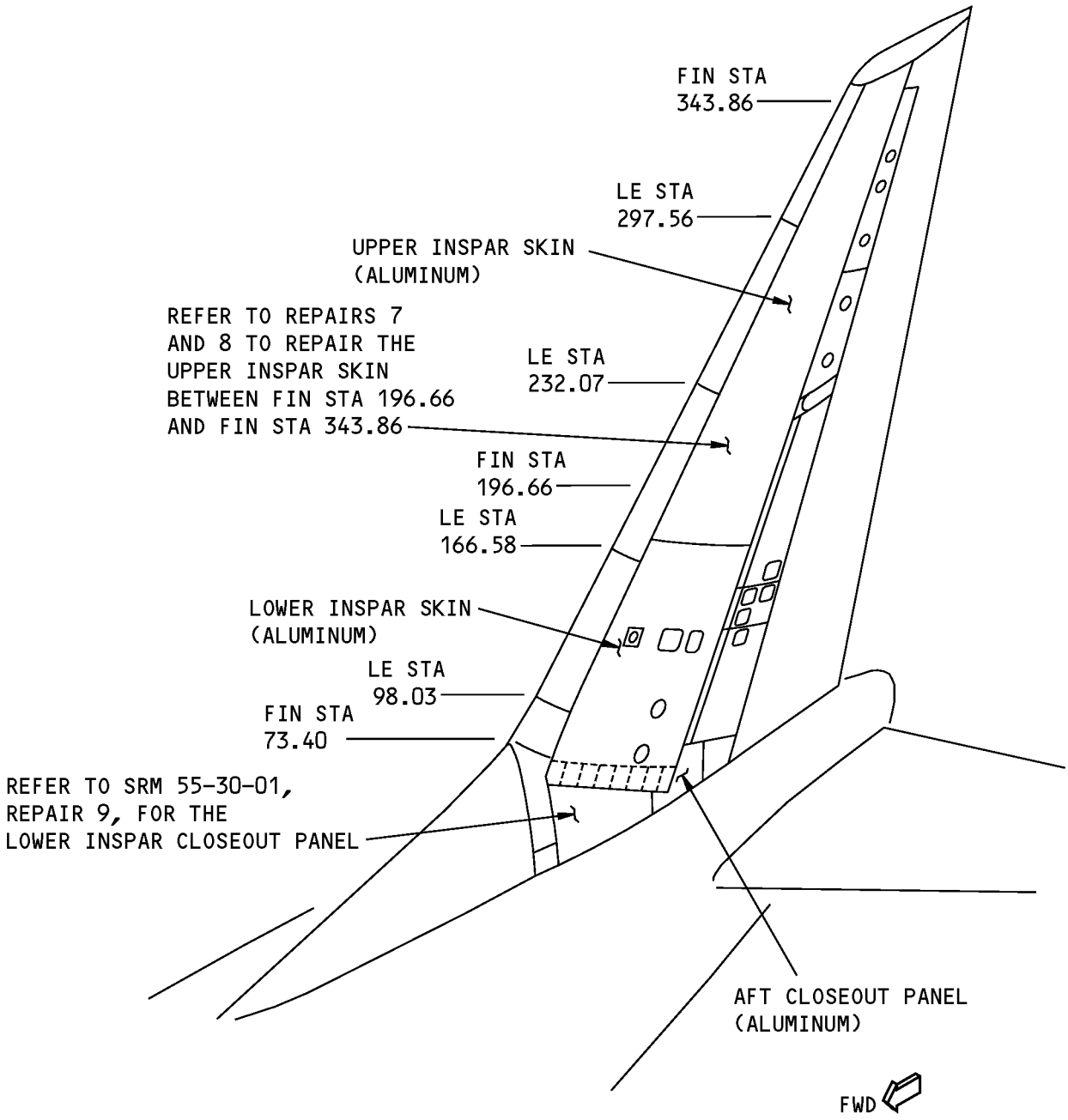
B. The repair that follows is an alternative to Repair 11:

(1) Repair 10 is an access panel installation for locations where there is sufficient clearance to install a one-piece doubler.

C. Make sure the aerodynamic smoothness is satisfactory and not more than the limits given in 51-10-01. If the aerodynamic smoothness is not satisfactory, there will be a decrease in the performance of the aircraft.

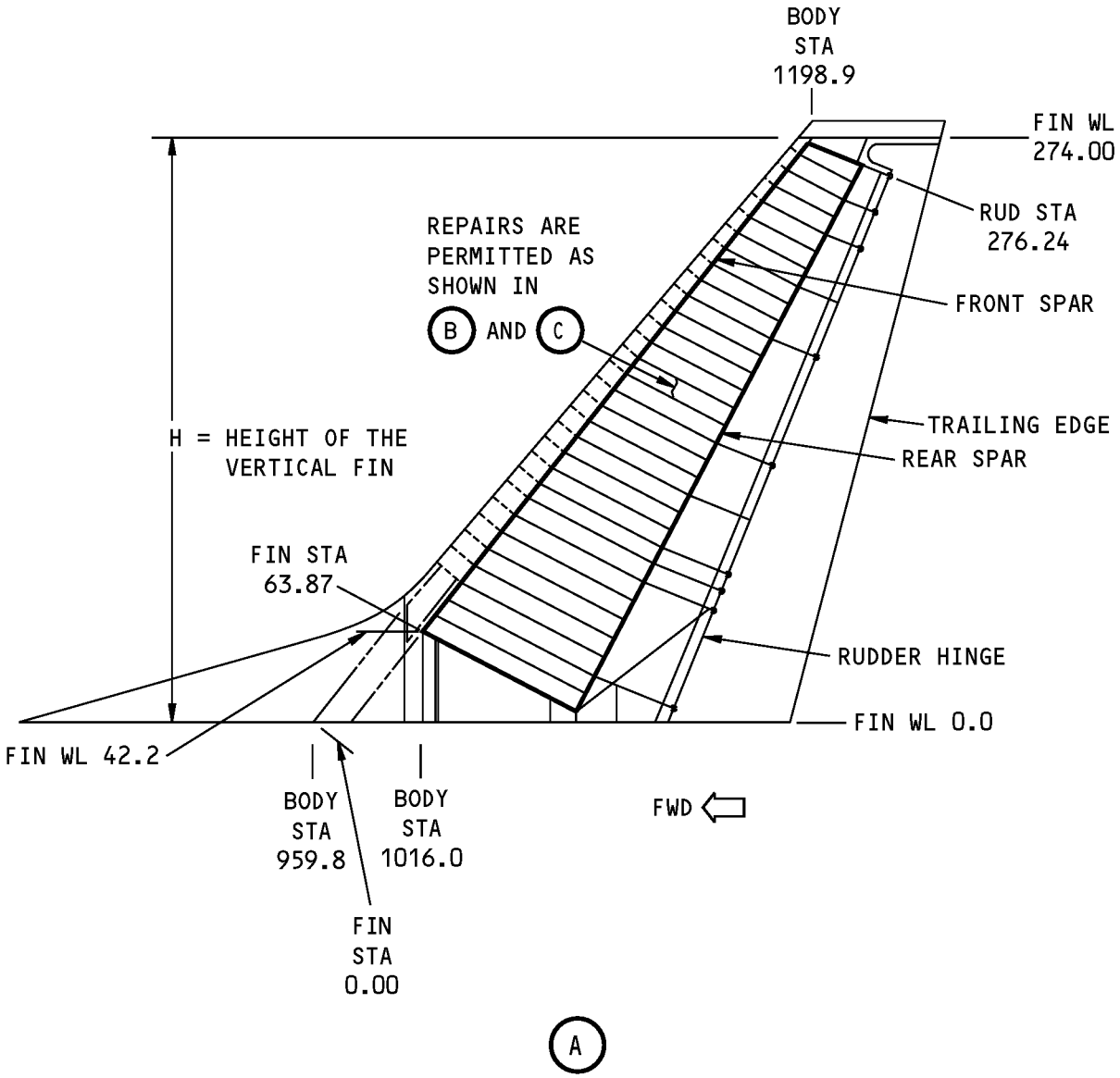
(1) The conditions for aerodynamic smoothness must be kept for the area around or upstream of the feel system pitot probes.

(2) The conditions for aerodynamic smoothness shown in Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners, Figure 202/REPAIR 11 must be kept.

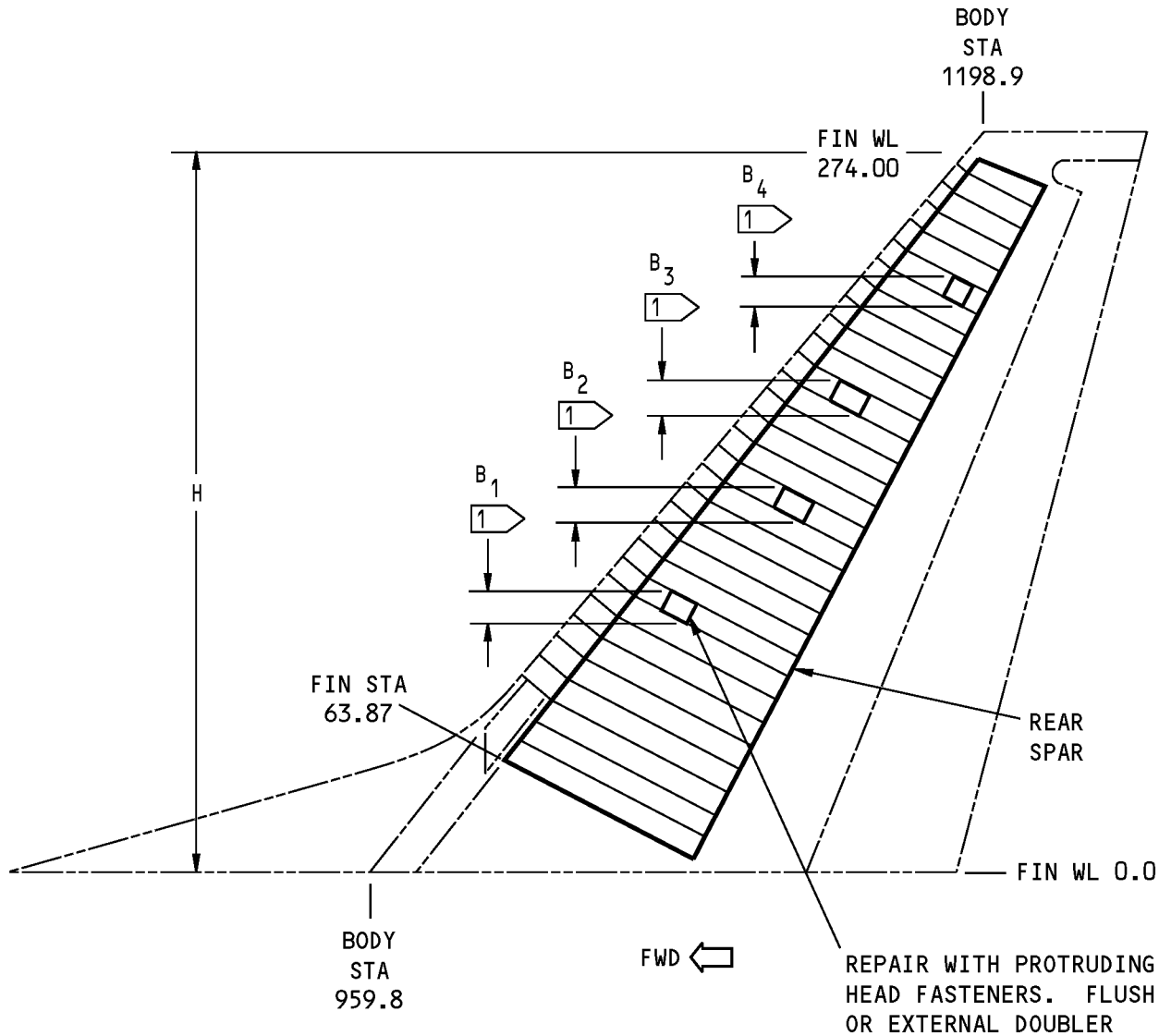


LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME

Vertical Stabilizer Inspar Skin Locations
Figure 201



Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 1 of 3)



H = THE VERTICAL HEIGHT OF THE VERTICAL FIN

B_1, B_2, B_3, B_4 = THE VERTICAL HEIGHTS OF THE REPAIRS

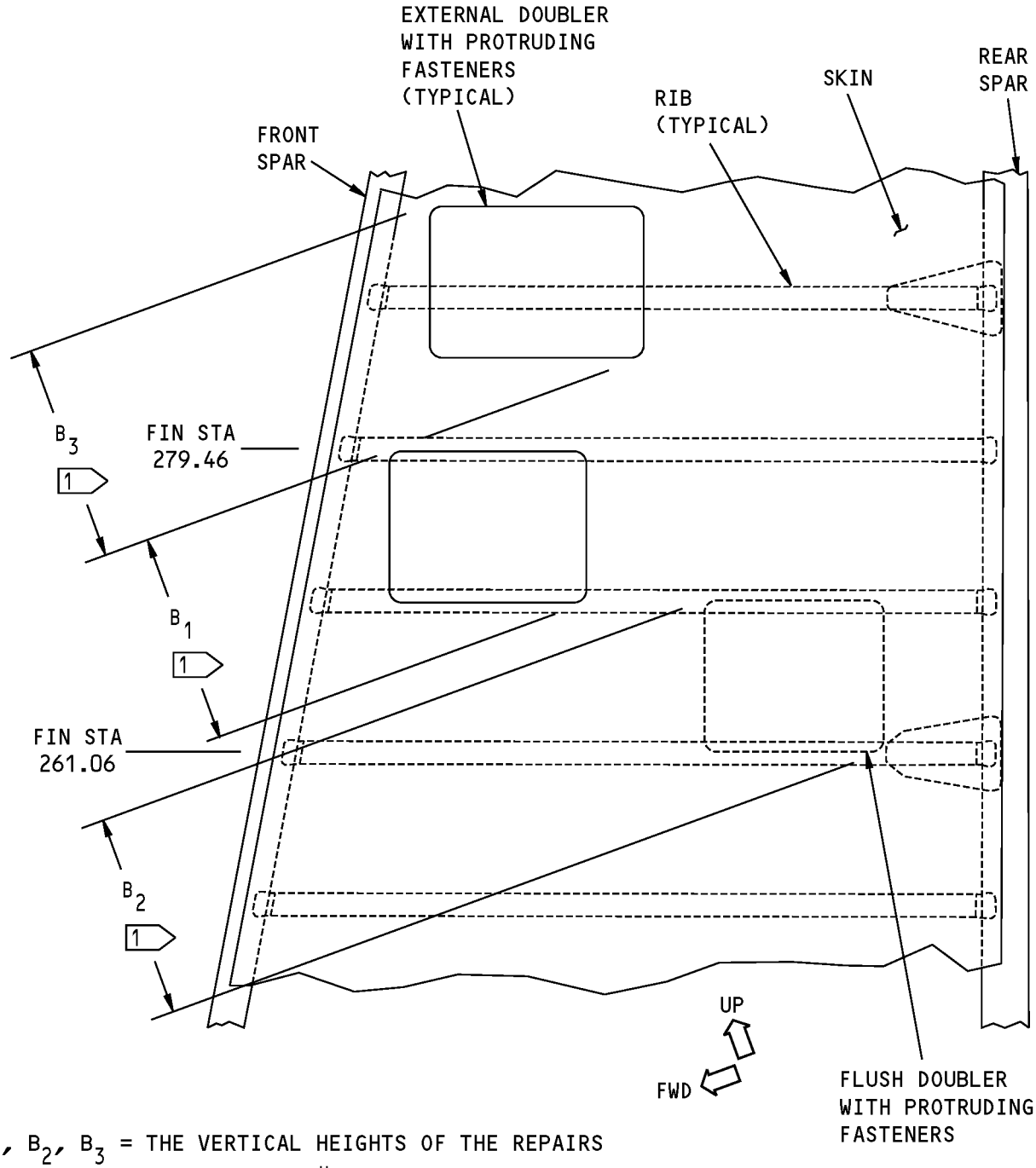
$B_1 + B_2 + B_3 + B_4$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

(B)

NOTES

1 ONLY ONE REPAIR IS PERMITTED ACROSS THE AIRFLOW. A SECOND REPAIR DOWNSTREAM IS NOT PERMITTED.

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 2 of 3)



B_1, B_2, B_3 = THE VERTICAL HEIGHTS OF THE REPAIRS

$B_1 + B_2 + B_3$ = A MAXIMUM OF $\frac{H}{4}$ = 68.5 INCHES MAXIMUM

C

Vertical Stabilizer Inspar Skins - Aerodynamic Limits of Repairs with Protruding Head Fasteners
Figure 202 (Sheet 3 of 3)

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-01	Application of Special Purpose Coatings and Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Repair Instructions

A. Cut the hole in the skin.

(1) Cut the hole in the shape shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 11.

(2) Refer to 51-10-02 for the procedures to cut the skin.

B. Remove the fasteners from the rib chords as necessary.

(1) Refer to 51-40-02.

C. Make the repair parts. Refer to Table 201/REPAIR 11.

D. Assemble the part [2] doublers and the part [3] shims as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 11.

E. Drill the fastener holes that go through the skin, the rib chords, the part [2] doublers, and the part [3] shims. Refer to 51-40-05 for the fastener hole dimensions.

F. Assemble the part [4] splice plates as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 11.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Cover Plate	1	Use bare or clad 2024-T3 that is 0.070 inch thick
[2]	Doubler	2	Use bare or clad 2024-T3 that is 0.190 inch thick
[3]	Shim	2	Use bare or clad 2024-T3 that is 0.030 inch thick
[4]	Splice Plate	2	Use bare or clad 2024-T3 that is 0.190 inch thick

G. Drill the fastener holes that go through the skin, the part [2] doublers, and the part [4] splice plates. Refer to 51-40-05 for the fastener hole dimensions.

H. Disassemble the repair parts.

I. Remove the nicks, scratches, gouges, and burrs from the initial parts and from the part [2] doublers, the part [3] shims, and the part [4] splice plates.

J. Apply a chemical conversion coating to the bare surfaces of the initial parts and to the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to 51-20-01.

K. Apply one layer of BMS 10-79, Type II or III, primer to the bare surfaces of the initial parts and to the part [2] doubler, the part [3] shims, and the part [4] splice plate. Refer to SOPM 20-44-04.

L. Install the part [2] doubler, the part [3] shims, and the part [4] splice plate.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the rivets without sealant.

(3) If you use hex drive bolts, install the fasteners wet with BMS 5-95 sealant.

M. Put the part [1] cover plate in position as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 11.

N. Drill the 0.190 to 0.199 inch diameter holes for the nutplates as shown in Vertical Stabilizer Access Panel Installation, Figure 203/REPAIR 11.

O. Remove the part [1] cover plate.

P. Put the nutplates in position on the part [2] doubler and drill the holes for the rivets.

Q. Remove the nicks, scratches, gouges, and burrs from the repair parts.

R. Apply a chemical conversion coating to the part [1] cover plate and the bare surfaces of the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to 51-20-01.

S. Apply one layer of BMS 10-79, Type II or III, primer to part [1] cover plate and the bare surfaces of the part [2] doublers, the part [3] shims, and the part [4] splice plates. Refer to SOPM 20-44-04.

T. Install the nutplates on the part [2] doubler.

(1) Install the rivets without sealant.

U. Apply BMS 10-86, Type I white abrasion resistant coating to the mating surfaces of the part [1] cover plate and the part [2] doublers. Refer to SOPM 20-44-01.

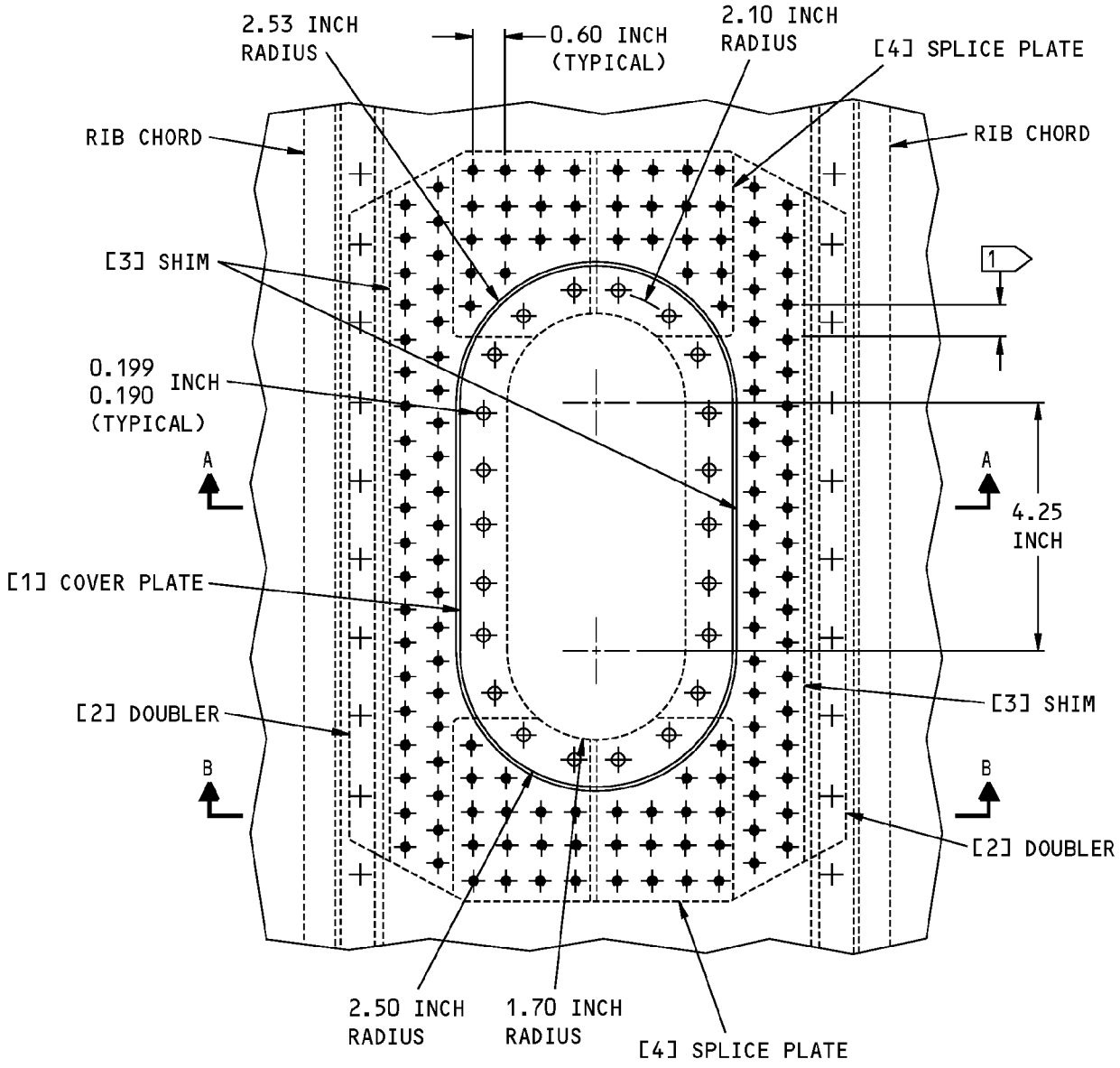
V. Install the part [1] cover plate.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

(2) Install the fasteners wet with BMS 5-95 sealant.

(3) Put BMS 5-95 sealant into the space between the skin and the part [1] cover plate.

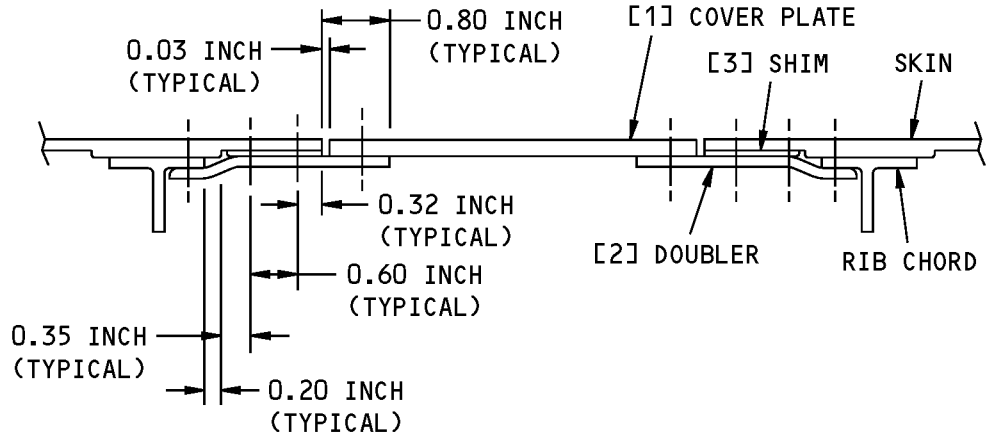
W. Apply the decorative finish to the repair area if necessary. Refer to AMM PAGEBLOCK 51-21-99/701.



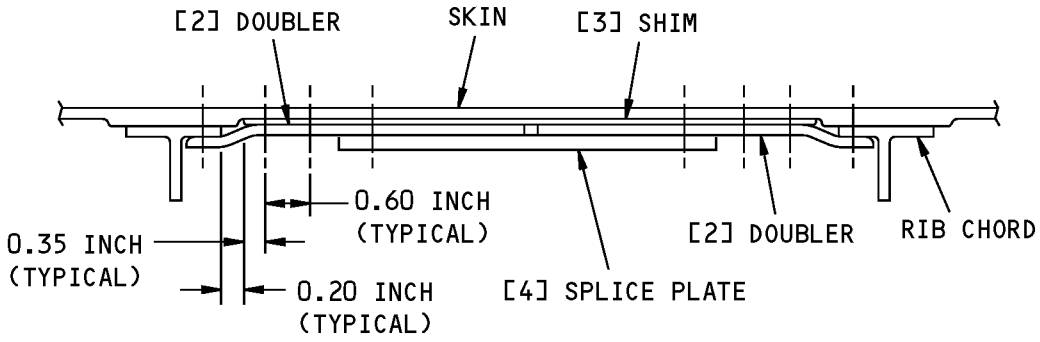
NOTES

1 USE THE FASTENER SPACING AS FOLLOWS:
- 0.80 INCH FOR FIN WL 150.67 TO THE TIP

Vertical Stabilizer Access Panel Installation
Figure 203 (Sheet 1 of 2)



A–A



B–B

FASTENER SYMBOLS

- INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER AS THE INITIAL FASTENER. YOU CAN INSTALL A FASTENER THAT IS UP TO 1/32 INCH DIAMETER OVERSIZE.
- REPAIR FASTENER LOCATION. INSTALL A BACB30VT5K HEX DRIVE BOLT.
- REPAIR FASTENER LOCATION. INSTALL BACN10JR03CFM NUTPLATE WITH BACR15BA3D RIVETS. INSTALL A BACB30EL3-() BOLT TO ATTACH THE PART [1] COVER PLATE.

Vertical Stabilizer Access Panel Installation
Figure 203 (Sheet 2 of 2)

REPAIR 12 - DORSAL FIN SKIN

1. Applicability

A. Repair 12 is applicable to the dorsal fin skins made of Glass Fiber Reinforced Plastic (GFRP) and non-metallic honeycomb core shown in Dorsal Fin Skin Location, Figure 201/REPAIR 12.

B. Repair 12 is applicable to damage that is more than the limits permitted in Allowable Damage 5. Refer to Allowable Damage 2 for the type and size of damage that is permitted.

2. General

A. Repair 12 gives the instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the dorsal fin skin. Refer to AMM 55-32-11/401.

C. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for the inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(2) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT procedure.

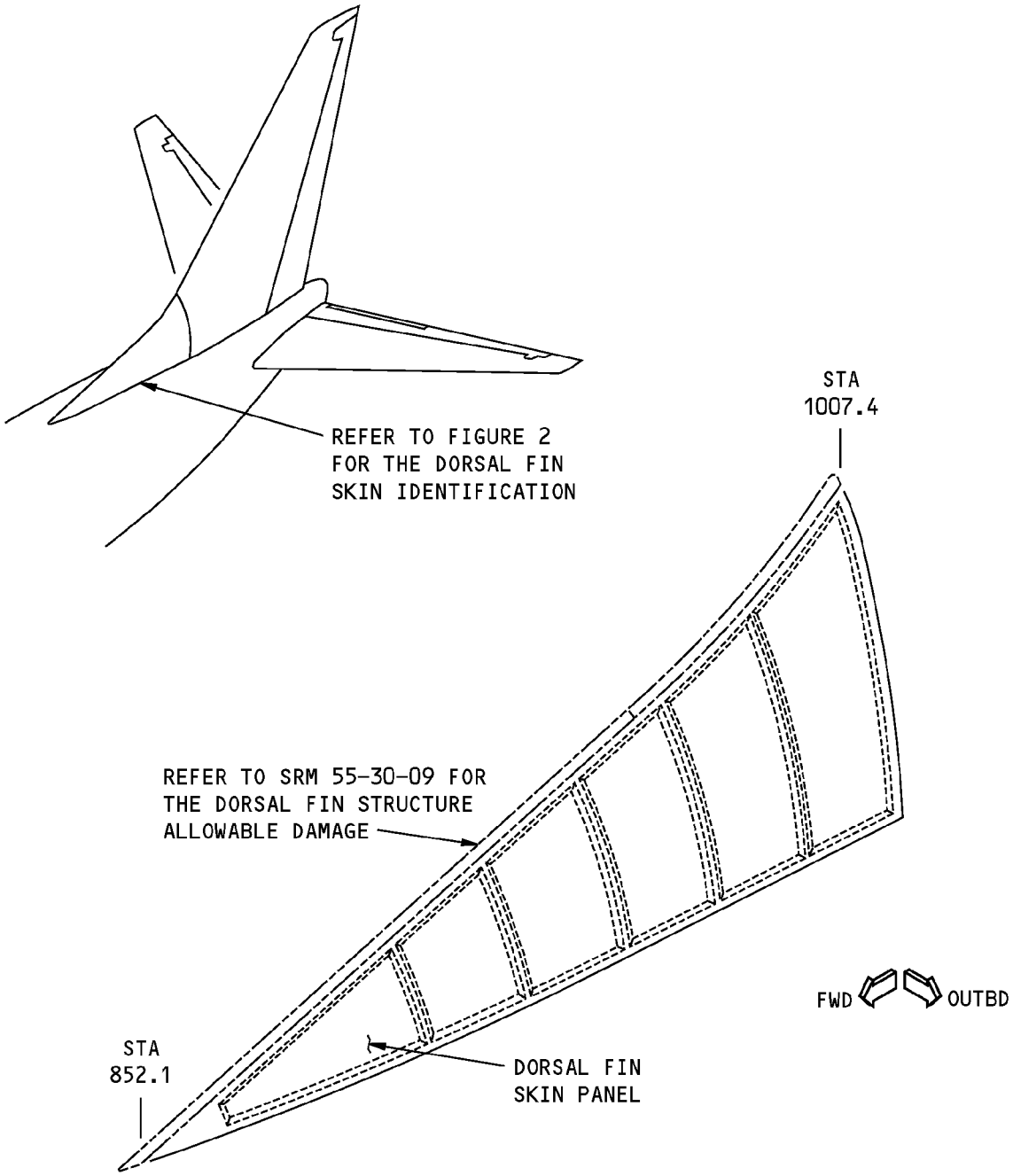
(3) Refer to Damage Definitions, Figure 202/REPAIR 12, for the definitions of the length, width, and depth of damage.

D. Do the repair as given in Paragraph 4./REPAIR 12

E. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the airplane. Refer to 51-10-01.

F. Put the dorsal fin skin back to the initial condition, as applicable.

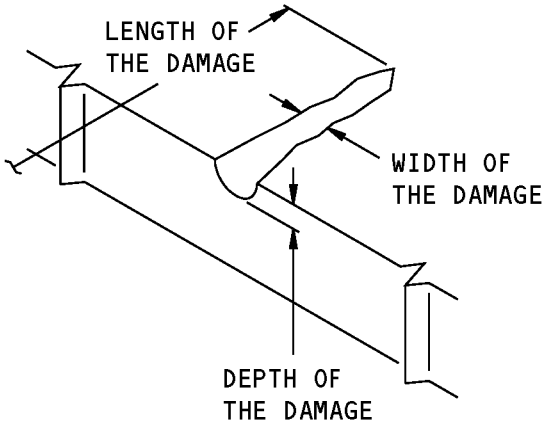
(1) Install the skin if it was removed. Refer to AMM 55-32-11/401.



THE LEFT SIDE DORSAL FIN SKIN PANEL IS SHOWN,
THE RIGHT SIDE IS OPPOSITE

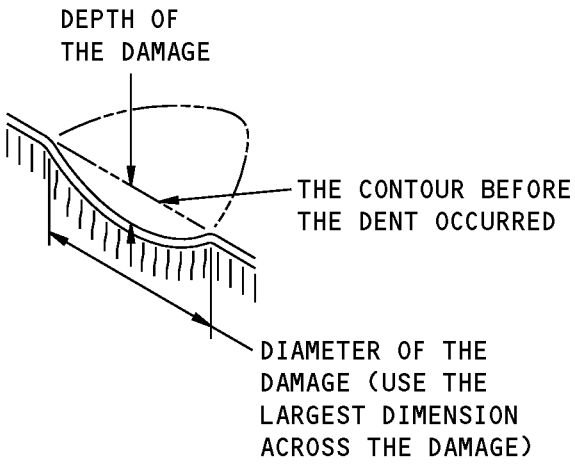
(A)

Dorsal Fin Skin Location
Figure 201



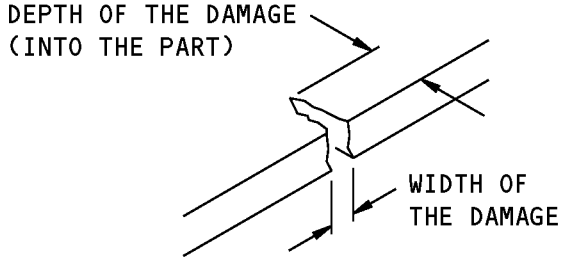
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Damage Definitions
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02, GENERAL	Inspection and Removal of Damage
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06, REPAIR GENERAL	Room Temperature Cure Repairs With Wet Layup Materials For Glass Fabric Reinforced Plastic Solid Laminates and Honeycomb Core Panels
51-70-14	STRUCTURES WITH ALUMINUM COATINGS AND FOILS
AMM 51-21	INTERIOR AND EXTERIOR FINISHES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 55-32-11/401	Removal and Installation of the Dorsal Fin
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. If a dent is 2 inches (50.80 mm) in diameter or less, and has no fiber damage or delamination, then fill the dent with potting compound and apply a fiberglass patch as given in Repair 14 of 51-70-04.

B. If Paragraph 4.A./REPAIR 12 is not applicable, then refer to:

(1) Table 201/REPAIR 12 for the repair data that is applicable to damage in the honeycomb sandwich areas

(2) Table 202/REPAIR 12 for the repair data that is applicable to damage in the edgeband or solid laminate areas.

C. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees. Refer to Identification 6 for the ply materials and ply direction.

NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2D (D = the fastener diameter) away from a fastener hole.

(3) Examine Category B repairs after each interval of 800 flight hours or more frequently. Refer to 737 NDT Part 1, 51-01-01 for the inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

NOTE: Other inspection methods, equivalent to the methods used by Boeing, that have been examined and found to be satisfactory by the operator can be used.

D. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged.

E. For repairs made to parts that have BMS 8-278 aluminum coated glass fabric, BMS 8-289 bonded aluminum foil, or BMS 8-336 expanded aluminum mesh, refer to 51-70-14.

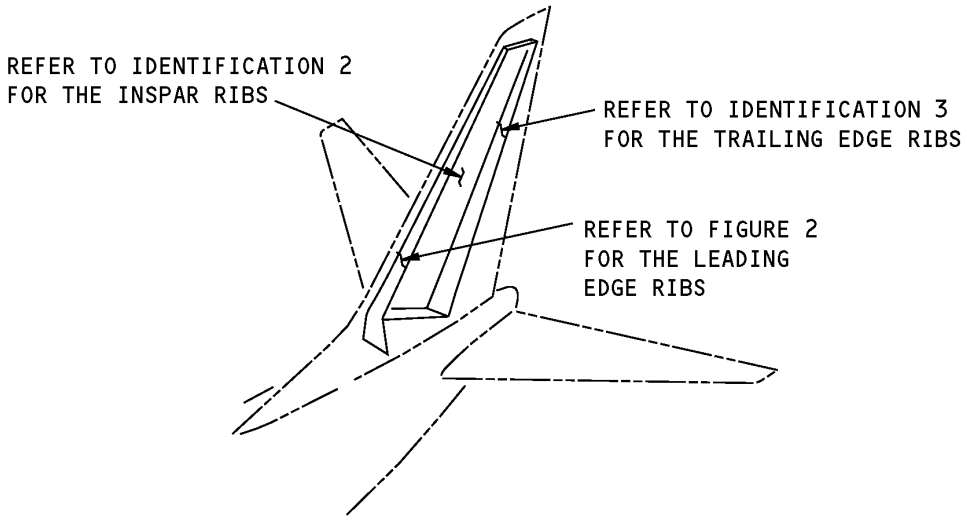
Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE DORSAL FIN SKIN PANELS IN THE HONEYCOMB CORE AREAS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREPREG LAYUP REPAIR**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Contact The Boeing Company	Damage that is a maximum of: - 3.0 inches (76.2 mm) in diameter - One repair for each 144 square inches (929.03 cm^2) - 2.0 inches (50.8 mm) minimum clearance from: - other repair - fastener holes - panel edges	Damage that is a maximum of: - 6.0 inches (152.4 mm) in diameter - One repair for each 144 square inches (929.03 cm^2) - 2.0 inches (50.8 mm) minimum clearance from: - other repairs - fastener holes - panel edges	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	———————	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

Table 202:

REPAIR DATA FOR THE 250°F (121°C) CURE EDGEBAND AND SOLID LAMINATE AREAS OF THE DORSAL FIN SKIN				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREPREG LAYUP REPAIR**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Contact The Boeing Company	Damage that is a maximum of: - 3.0 inches (76.2 mm) across the largest dimension of the damage - 10 percent of the edgeband length on the damage side	Damage that is a maximum of - 6.0 inches (152.4 mm) across the largest dimension of the damage - 30 percent of the edgeband length on the damage side	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	———————	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

IDENTIFICATION 1 - VERTICAL STABILIZER LEADING EDGE RIBS

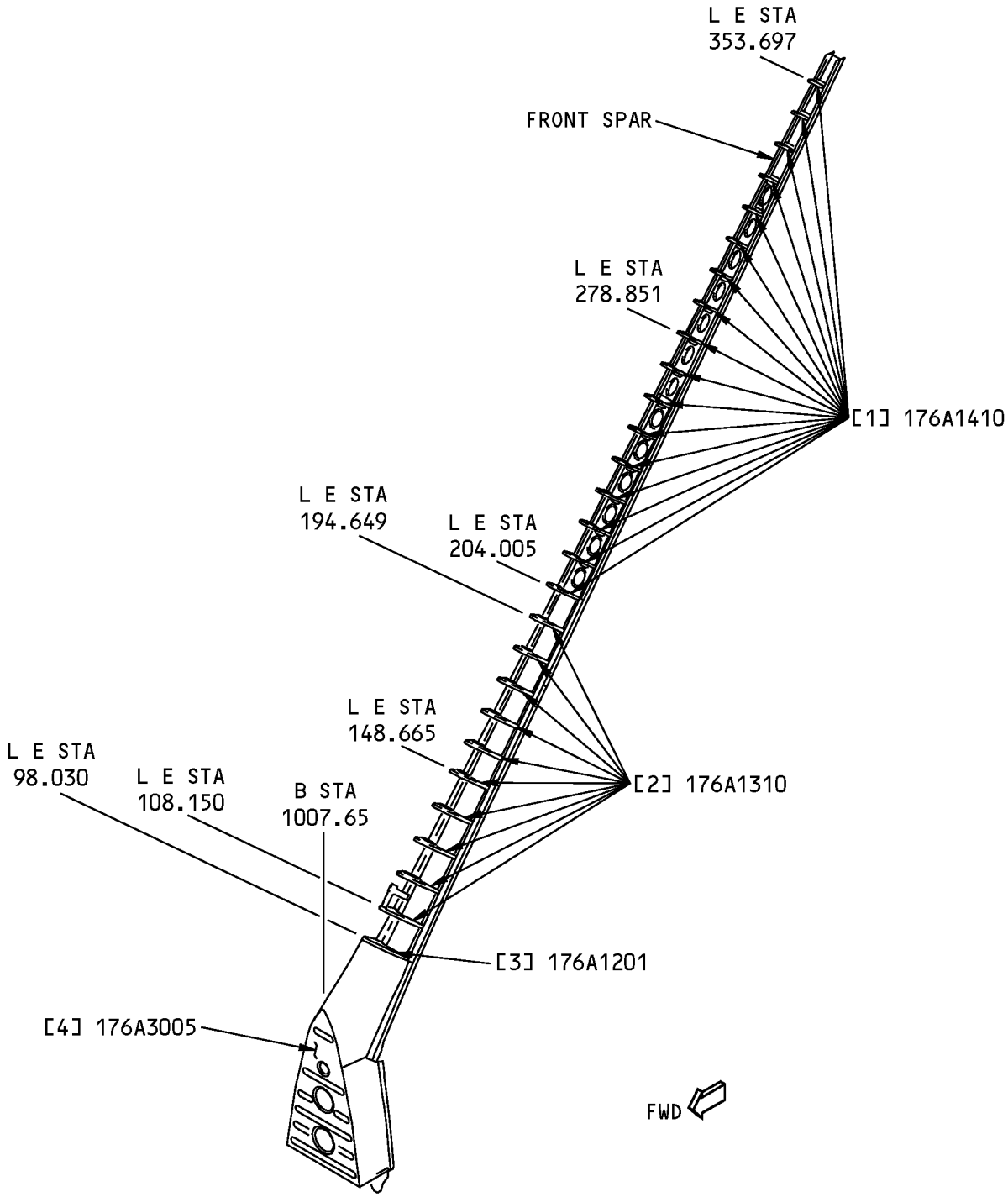


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Leading Edge Rib Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
176A0001	Leading Edge and Miscellaneous Functional Collector - Vertical Fin
176A1001	Removable Leading Edge Assembly/Installation Vertical Fin
176A1201	Rib Assembly - Leading Edge Station 98.030 Vertical Fin
176A1202	Rib Assembly - Leading Edge Station 108.150 Vertical Fin
176A3001	Fixed Leading Edge Installation - Vertical Fin
176A3002	Rib Assembly - Body Station 1007.65, Fixed Leading Edge



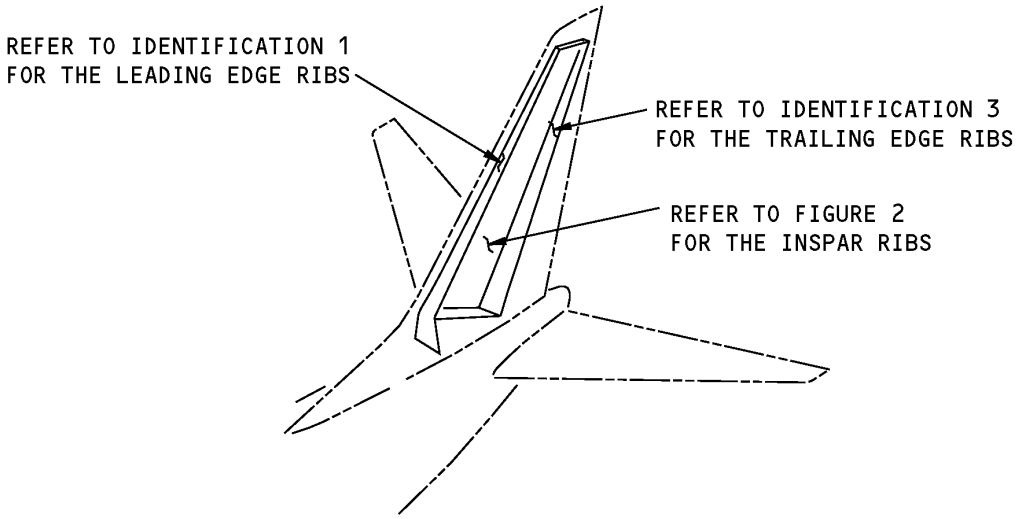
Vertical Stabilizer Leading Edge Rib Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib, Removable LE	0.040 (1.016)	2024-T42 clad sheet as given in QQ-A-250/5	
[2]	Rib, Removable LE		Glass Fiber Reinforced Plastic (GFRP) laminate as given in BMS 8-79, Style 1581, Class III, Grade A	
[3]	Rib Assembly			
	Web	0.050 (1.270)	2024-T42 clad sheet as given in QQ-A-250/5	
	Chord		BAC1506-1950 7075-T62 extrusion as given in QQ-A-200/11	
[4]	Rib, Fixed LE	0.040 (1.016)	2024-T42 high formability clad sheet as given in BMS 7-305	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - VERTICAL STABILIZER INSPAR RIBS

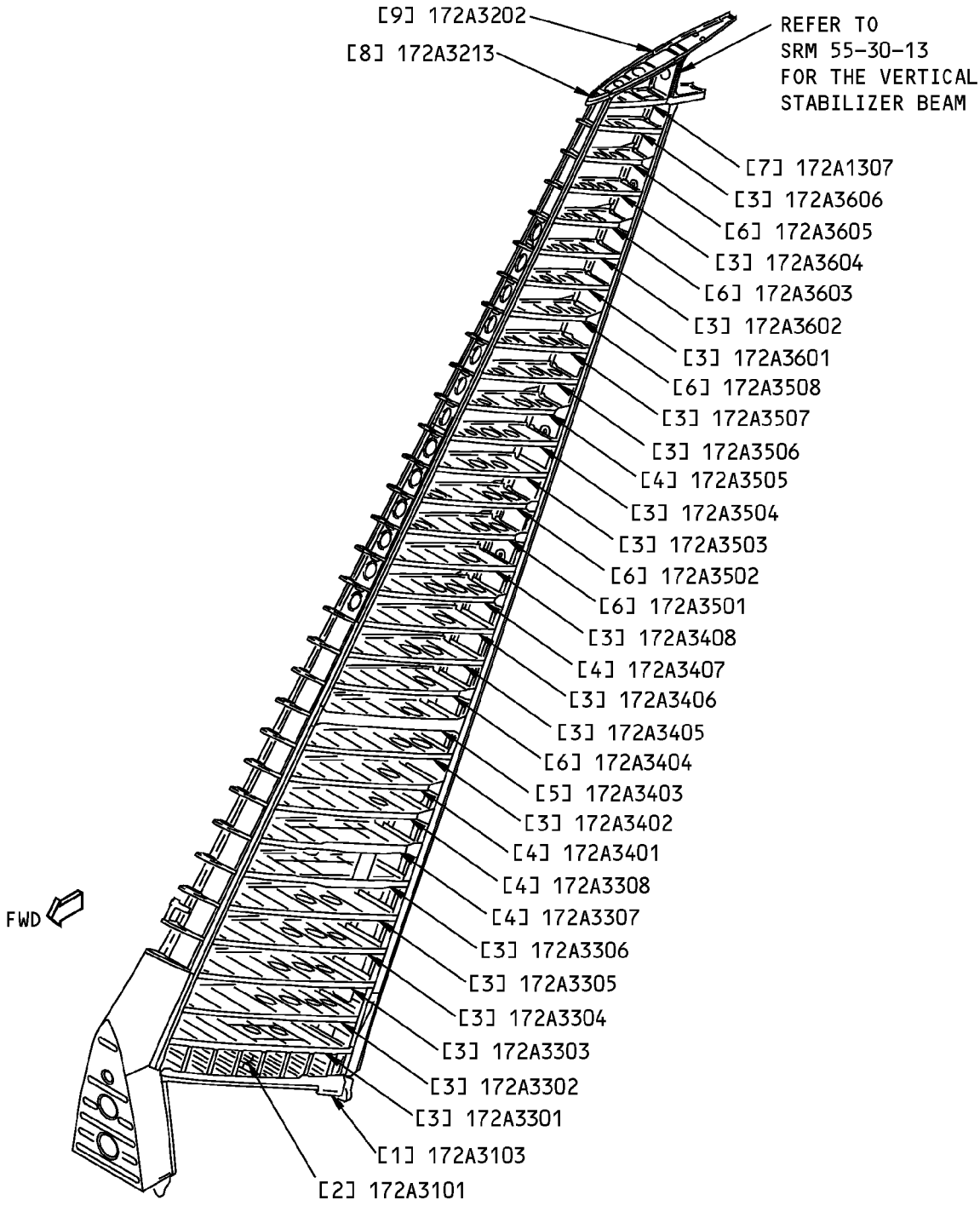


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Inspar Rib Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
172A0001	Torque Box Functional Collector - Vertical Fin
172A3101	Closure Rib Assembly/Installation-Lower, Vertical Fin
172A3202	Rib Installation-Fin WL 274.000, Vertical Fin
175A1307	Inspar and T.E. Hinge Rib Installation-Rudder Station 276.24



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

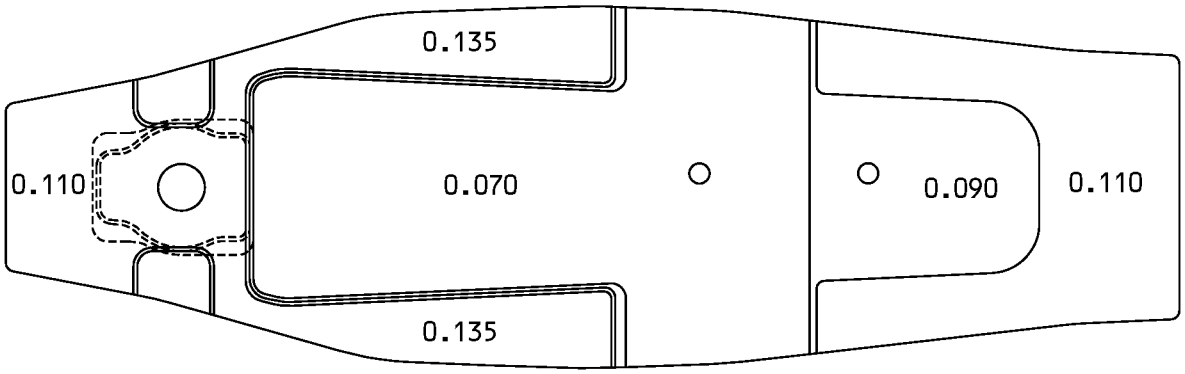
Vertical Stabilizer Inspar Rib Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Strap (2)	0.300 (7.620)	7075-T7351 plate as given in QQ-A-250/12	
[2]	Closure Rib Assembly-			
	Primary Chord (2)		BAC1506-4289 2024-T3511 extrusion as given in QQ-A-200/3	
	Failsafe Chord (2)		BAC1506-1785 7075-T6511 extrusion as given in QQ-A-200/11	
	Stiffener		BAC1506-4288 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.200 (5.080)	7075-T6 as given in QQ-A-250/12. Refer to Figure 3 for the chem-milled thicknesses	
	Doubler	0.063 (1.600)	7075-T6 as given in QQ-A-250/12	
	Doubler (2)	0.100 (2.540)	7075-T6 as given in QQ-A-250/12	
[3]	Rib		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses. Refer to Figure 4 for an example of a typical machined rib	
[4]	Rib Assembly			
	Rib		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses. Refer to Figure 5 for an example of a typical machined rib	
	Doubler	0.050 (1.270)	2024-T3 clad as given in QQ-A-250/5	
[5]	Rib Assembly			
	Rib		7075 T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses. Refer to Figure 6 for an example of a typical machined rib	
	Splice Strap	0.063 (1.600)	2024-T3 clad as given in QQ-A-250/5	
[6]	Rib Assembly			
	Rib		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses. Refer to Figure 7 for an example of a typical machined rib	
	Doubler	0.040 (1.016)	2024-T3 clad as given in QQ-A-250/5	
[7]	Fitting Assembly			
	Stiffener		BAC1506-1844 7075-T6511 as given in QQ-A-200/11	
	Stiffener		BAC1503-1509 7075-T6511 as given in QQ-A-200/11	
	Fitting		7050-T7451 plate as given in BMS 7-323, Type I	
[8]	Angle	0.063 (1.600)	7075-T62 clad as given in QQ-A-250/13	

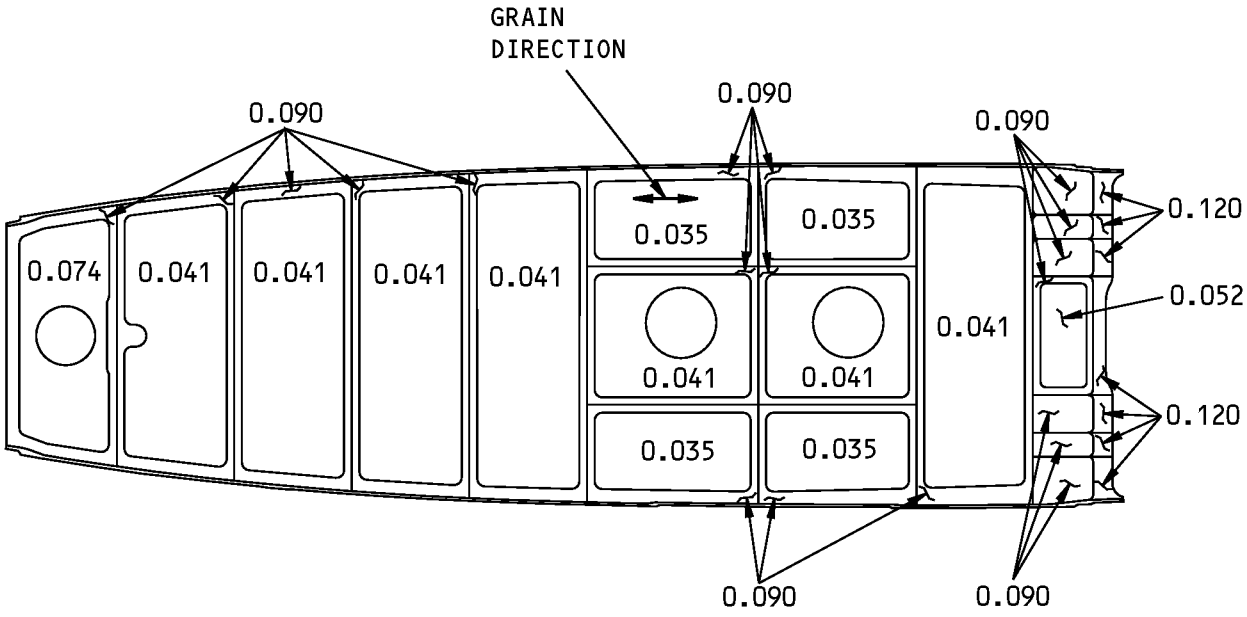
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[9]	Rib Assembly			
	Strap (2)		Glass Fiber Reinforced Plastic (GFRP) as given in BMS 8-79, Style 1581 or 7781, Class III	
	Chord (2)		Glass Fiber Reinforced Plastic (GFRP) as given in BMS 8-79, Style 1581 or 7781, Class III (Optional: BAC 5317-2, die mold, minimum 50 psi, cured at 265°F ± 10°F for a minimum of 60 minutes)	
	Web	0.040 (1.016)	2024-T3 clad sheet as given in QQ-A-250/5	
	Plate	0.040 (1.016)	2024-T42 clad sheet as given in QQ-A-250/5	
	Chord (2)		BAC1514-3145 7075-T62 extrusion as given in QQ-A-200/11	
	Stiffener (3)		BAC1503-470 7075-T62 extrusion as given in QQ-A-200/11	
	Stiffener		AND10136-1301 7075-T6511 extrusion as given in QQ-A-200/11	
	Angle	0.063 (1.600)	7075-T62 clad sheet as given in QQ-A-250/13	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



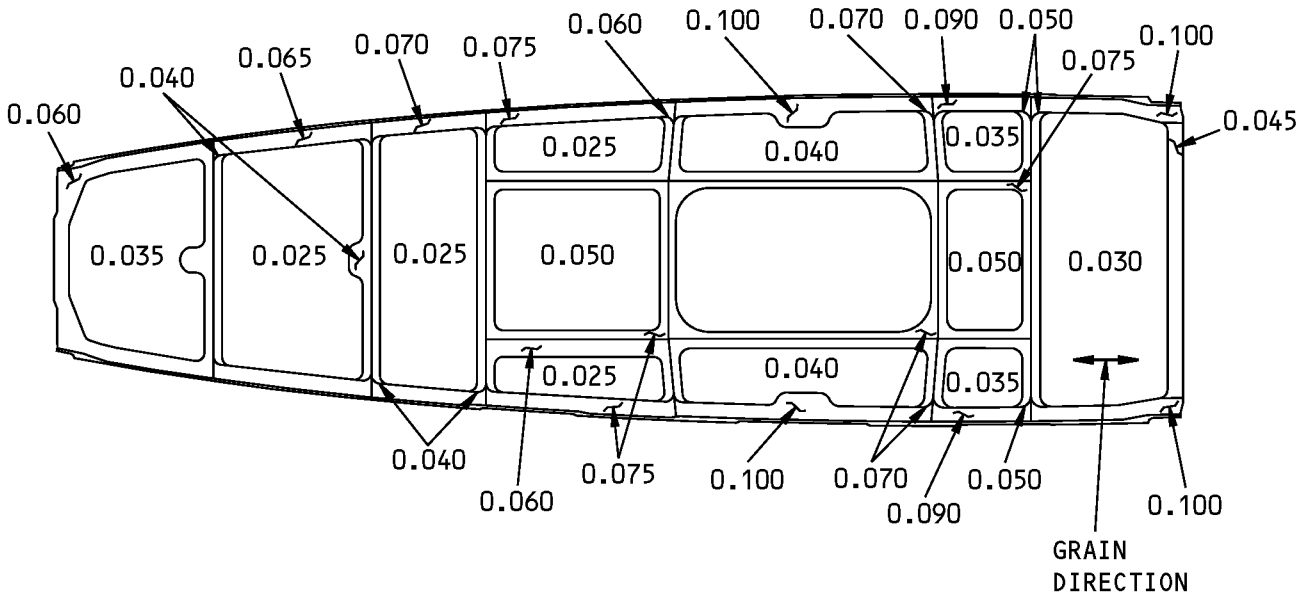
NOTE: ALL DIMENSIONS ARE IN INCHES.

Chem-Milled Areas of Figure 2, Item [2]
Figure 3



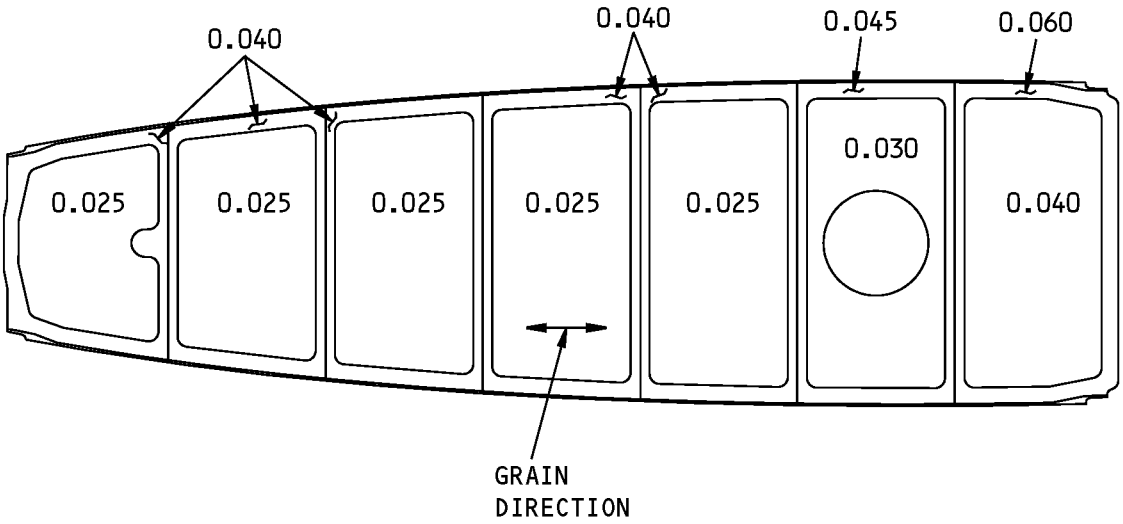
TYPICAL MACHINED RIB

Machined Areas for Figure 2, Item [3]
Figure 4



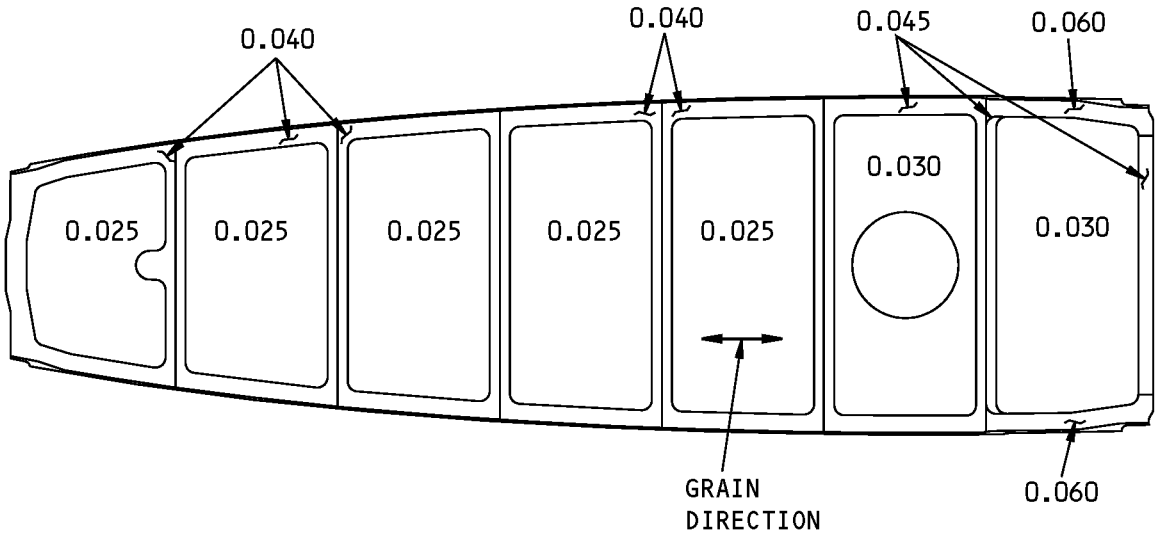
TYPICAL MACHINED RIB

Machined Areas for Figure 2, Item [4]
Figure 5



TYPICAL MACHINED RIB

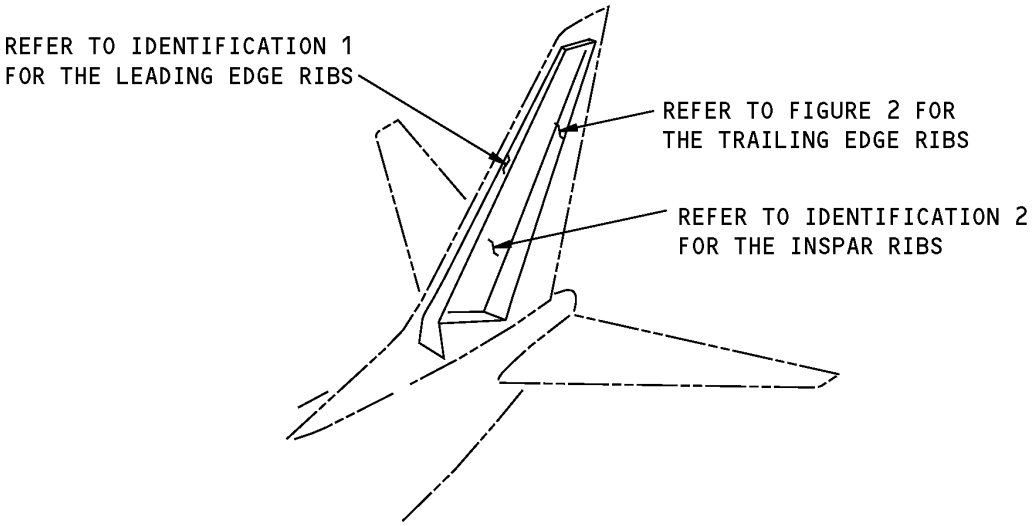
Machined Areas for Figure 2, Item [5]
Figure 6



TYPICAL MACHINED RIB

Machined Areas for Figure 2, Item [6]
Figure 7

IDENTIFICATION 3 - VERTICAL STABILIZER TRAILING EDGE RIBS



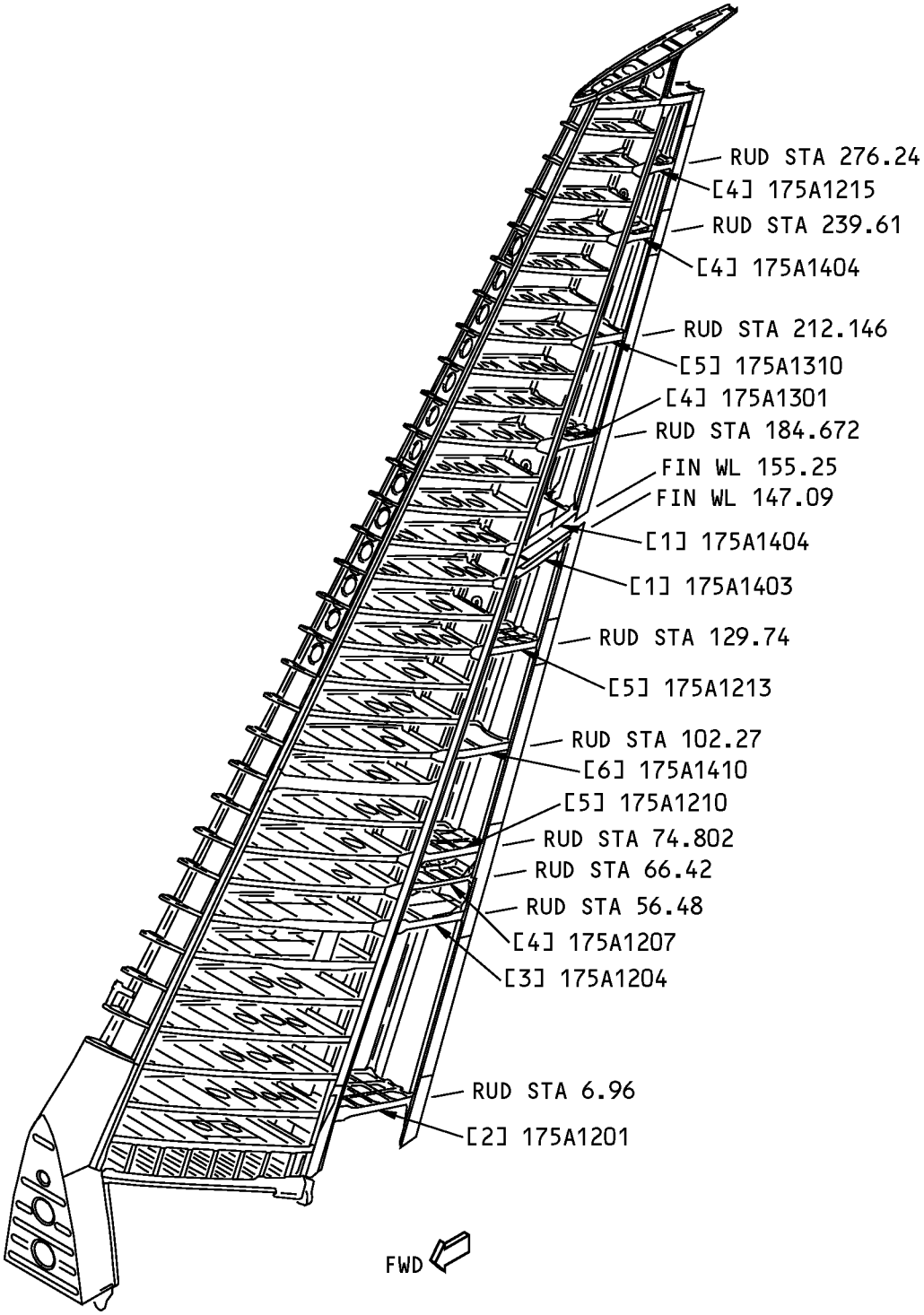
NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Trailing Edge Rib Locations
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
170A1540	Vertical Fin Centerline Diagram
175A0001	Trailing Edge Functional Collector - Vertical Fin
175A1201	Trailing Edge Hinge Rib Assembly/Installation-Rudder Station 6.96
175A1204	Trailing Edge Hinge Rib Installation - Rudder Station 56.48
175A1207	Trailing Edge Hinge Rib Assembly/Installation-Rudder Station 66.42

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
175A1210	Trailing Edge Hinge Rib Installation - Rudder Station 74.80
175A1213	Trailing Edge Hinge Rib Assembly/Installation-Rudder Station 129.74
175A1215	Trailing Edge Hinge Rib Installation - Rudder Station 257.93
175A1301	Trailing Edge Rib Installation - Rudder Station 184.67
175A1304	Trailing Edge Hinge Rib Installation - Rudder Station 239.61
175A1310	Trailing Edge Rib Installation - Rudder Station 212.15
175A1403	Trailing Edge Rib Assembly/Installation - Fin WL 147.09
175A1404	Trailing Edge Rib Assembly/Installation - Fin WL 155.25
175A1410	Trailing Edge Rib Installation - Rudder Station 102.27



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

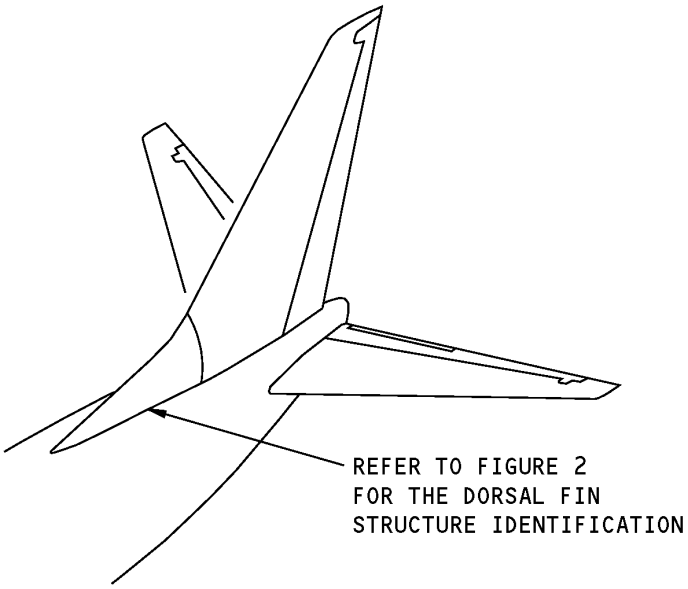
Vertical Stabilizer Trailing Edge Rib Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Assembly			
	Angle (2)		7050-T7451 plate as given in AMS 4050 (Grain direction controlled part). Refer to the production drawings for the grain direction	
	Chord (2)		7050-T7451 plate as given in AMS 4050 (Grain direction controlled part). Refer to the production drawings for the grain direction	
	Stiffener		BAC1503-100593 7075-T6511 extrusion as given in QQ-A-200/11	
	Web	0.040 (1.016)	2024-T3 clad as given in QQ-A-250/5	
[2]	Rib Assembly			
	Fitting		7050-T7451 plate as given in BMS 7-323, Type I (Grain direction controlled part). Refer to the production drawings for the grain direction	
	Channel (2)	0.040 (1.016)	2024-T3 clad sheet as given in QQ-A-250/5	
	Support (3)	0.040 (1.016)	2024-T3 clad sheet as given in QQ-A-250/5	
[3]	Rib Assembly			
	Fitting		7050-T7451 plate as given in BMS 7-323, Type I (Grain direction controlled part). Refer to the production drawings for the grain direction	
	Pan	0.032 (0.813)	2024-T3 clad sheet as given in QQ-A-250/5	
[4]	Rib Assembly			
	Fitting		7050-T7451 plate as given in BMS 7-323, Type I (Grain direction controlled part). Refer to the production drawings for the grain direction	
[5]	Rib Assembly			
	Fitting		7050-T7451 plate as given in AMS 4050 (Grain direction controlled part). Refer to the production drawings for the grain direction	
[6]	Rib Assembly			
	Fitting		7050-T7451 plate as given in AMS 4050 (Grain direction controlled part). Refer to the production drawings for the grain direction	
	Support	0.063 (1.600)	2024-T42 clad as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 4 - DORSAL FIN STRUCTURE

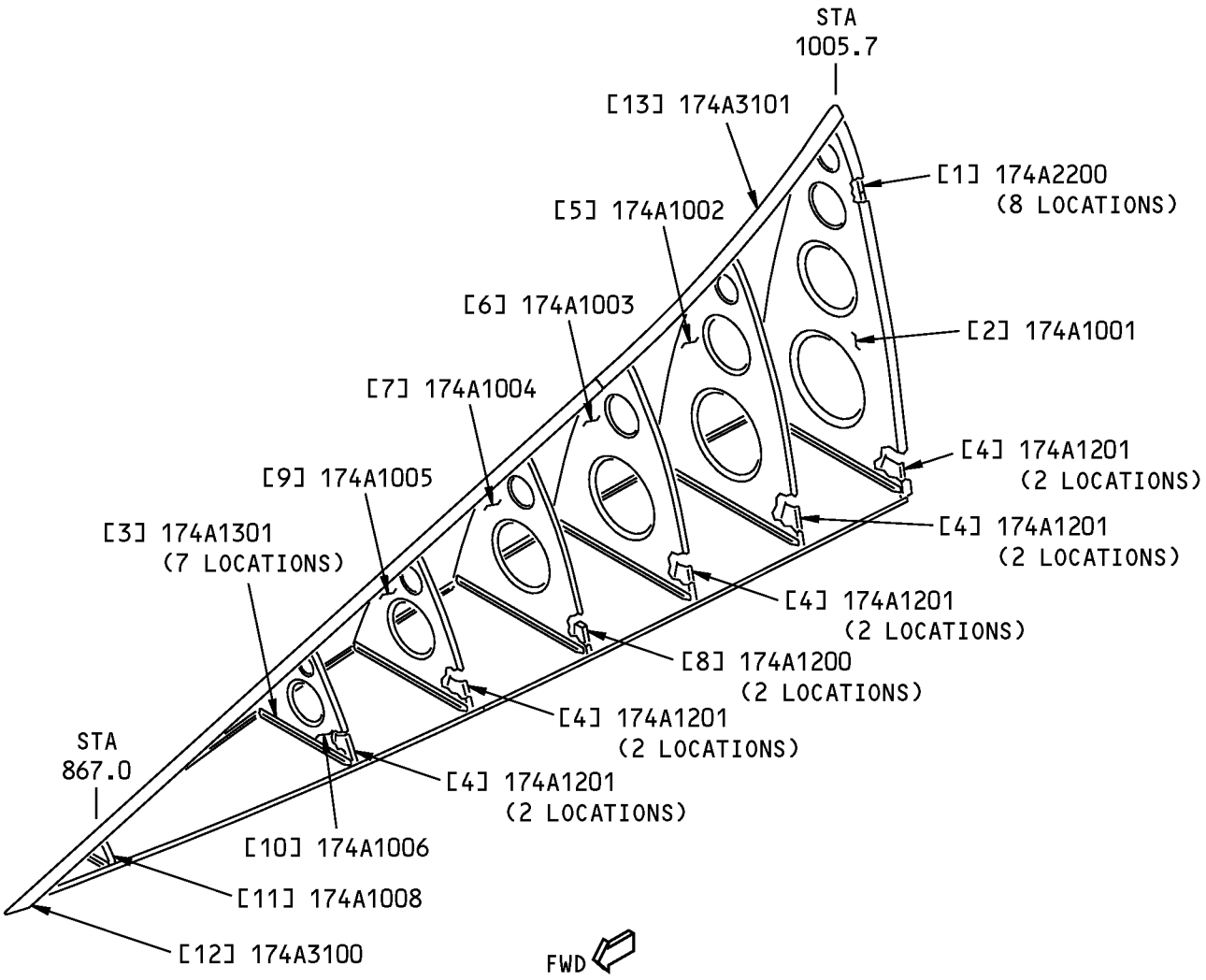


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Dorsal Fin Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
174A0101	Dorsal Fin Installation



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Dorsal Fin Structure Identification
Figure 2

Table 2:

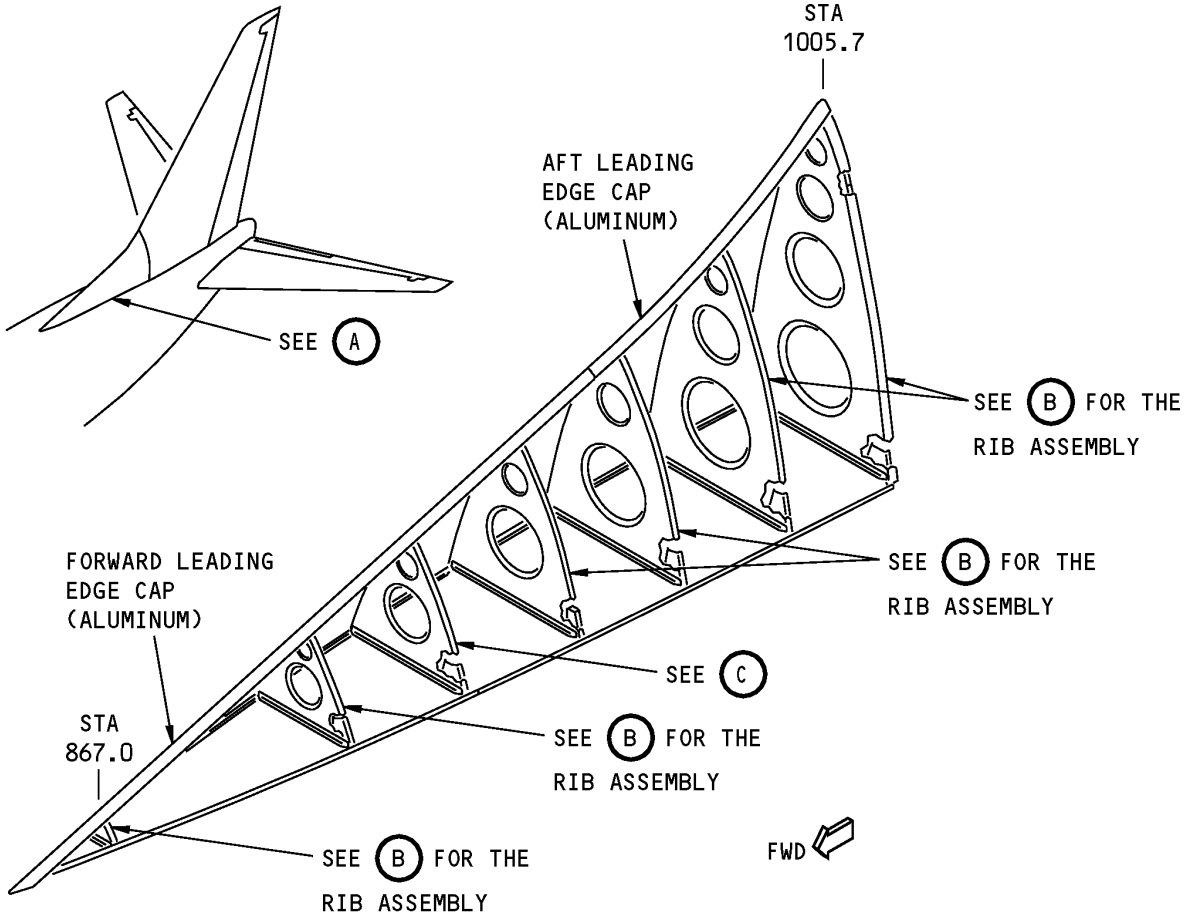
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Seal Retainer	0.025 (0.63)	2024-T42 clad sheet as given in QQ-A-250/5	
[2]	Rib - BS 1005.7	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
[3]	Stiffener		AND10134-0702 7075-T73511 extrusion	
[4]	Gusset	0.040 (1.02)	2024-T42 sheet as given in QQ-A-250/5	
[5]	Rib - BS 986.50	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
[6]	Rib - BS 966.70	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
[7]	Rib - BS 947.50	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[8]	Drag Load Fitting	1.40 (36.6)	7075-T7451 machined plate as given in AMS 4050	
[9]	Rib - BS 926.70	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[10]	Rib - BS 906.70	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[11]	Rib - BS 867	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[12]	Forward Leading Edge Cap		BAC1513-432 7075-T73511 extrusion	
[13]	Aft Leading Edge Cap		7050-T7451 plate as given in BMS 7-323, Type 1	
[14]	Attach Clip		BAC1503-100605 7075-T73511 extrusion as given in QQ-A-200/11	
[15]	Attach Clip		BAC1503-100698 7075-T73511 extrusion as given in QQ-A-200/11	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

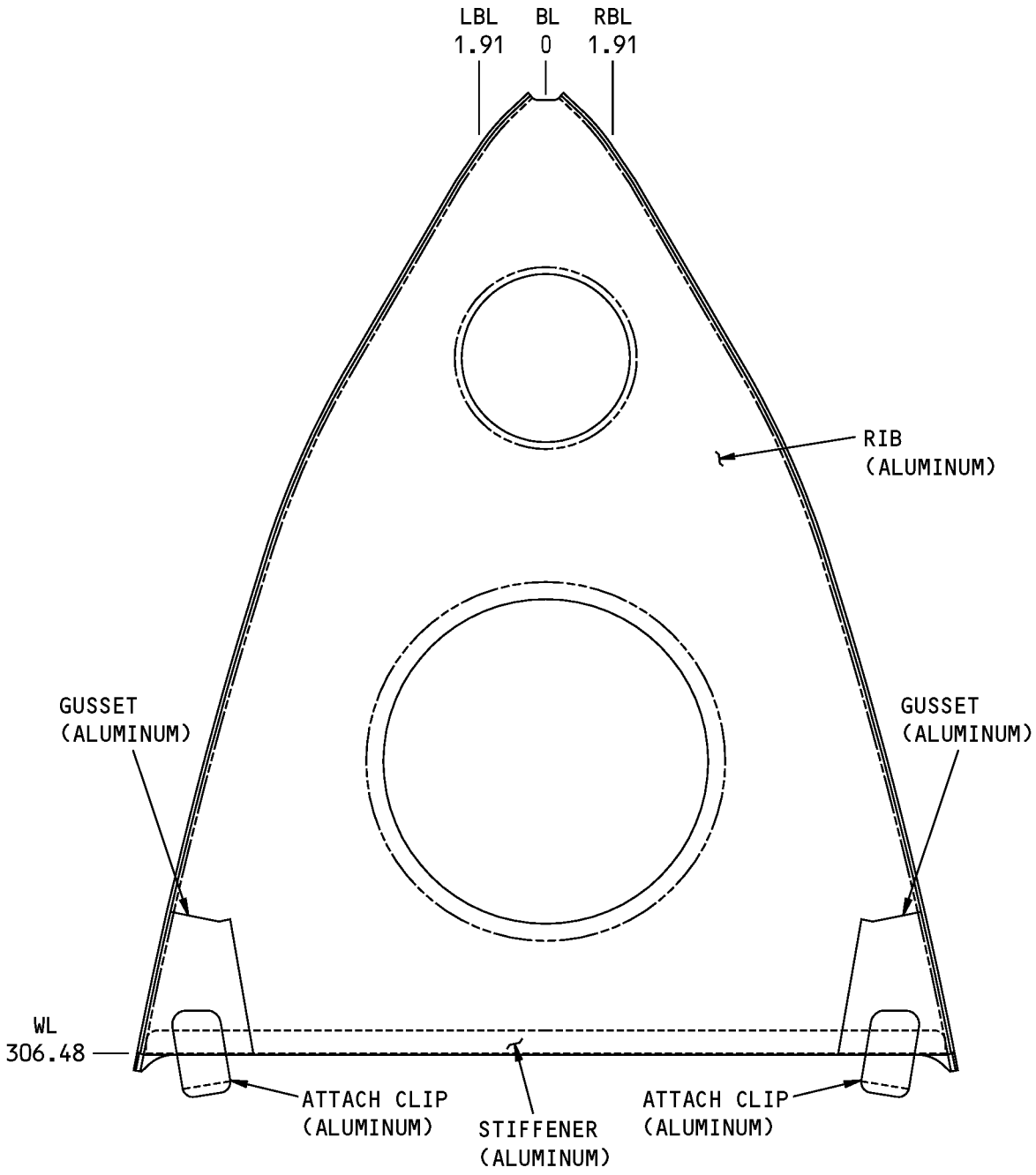
ALLOWABLE DAMAGE 2 - DORSAL FIN STRUCTURE

1. Applicability

A. This subject gives the allowable damage limits for the dorsal fin structure shown in Dorsal Fin Structure Location, Figure 101/ALLOWABLE DAMAGE 2.



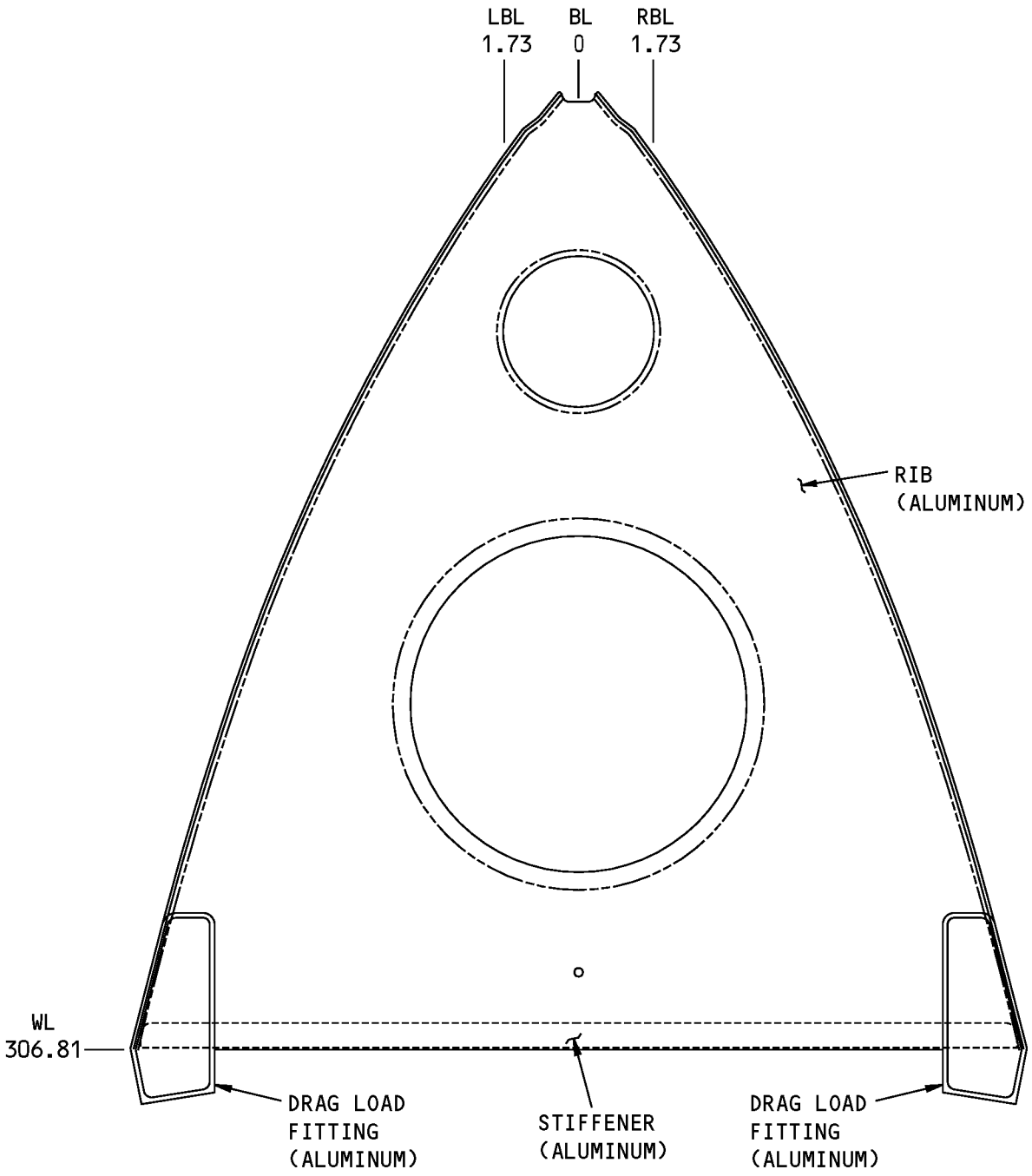
Dorsal Fin Structure Location
Figure 101 (Sheet 1 of 3)



VIEW WHEN YOU LOOK FORWARD
TYPICAL RIB ASSEMBLY AT SIX LOCATIONS

B

Dorsal Fin Structure Location
Figure 101 (Sheet 2 of 3)



Dorsal Fin Structure Location
Figure 101 (Sheet 3 of 3)

2. General

A. Remove the damaged material as necessary.

(1) Refer to 51-10-02 for the procedures.

(2) Refer to 51-30-03 for sources of non-metallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for sources of equipment and tools you can use to remove the damage.

B. After you remove the damage, do as follows:

(1) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(2) Apply two layers of BMS 10-79, Type III primer to the bare surfaces of the reworked areas. Refer to SOPM 20-44-04.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Ribs and Gussets

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, C, D, E, and F.

(3) Dents are permitted as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Detail G.

(4) Holes and Punctures:

(a) Damage is permitted in the free flange as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Detail I.

(b) Do the steps that follow to remove the damage in the web:

1) Drill out the damage to a maximum diameter of 0.25 inch (6.35 mm)

2) The damage must be a minimum of 1.0 inch (25.4 mm) away from a fastener hole, material edge, or other damage.

3) Install a 2117-T3 or 2117-T4 aluminum protruding head rivet. Install the rivet without sealant.

B. Stiffeners, Leading Edge Caps, and Drag Fittings

(1) Cracks:

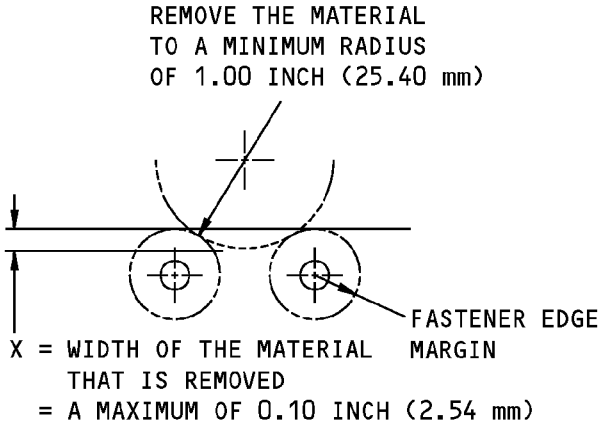
(a) Remove the damage as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, H, and J.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Details, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, D, E, H, and J.

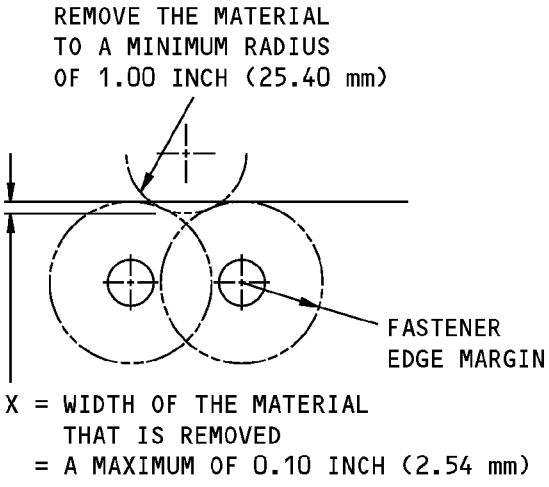
(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.



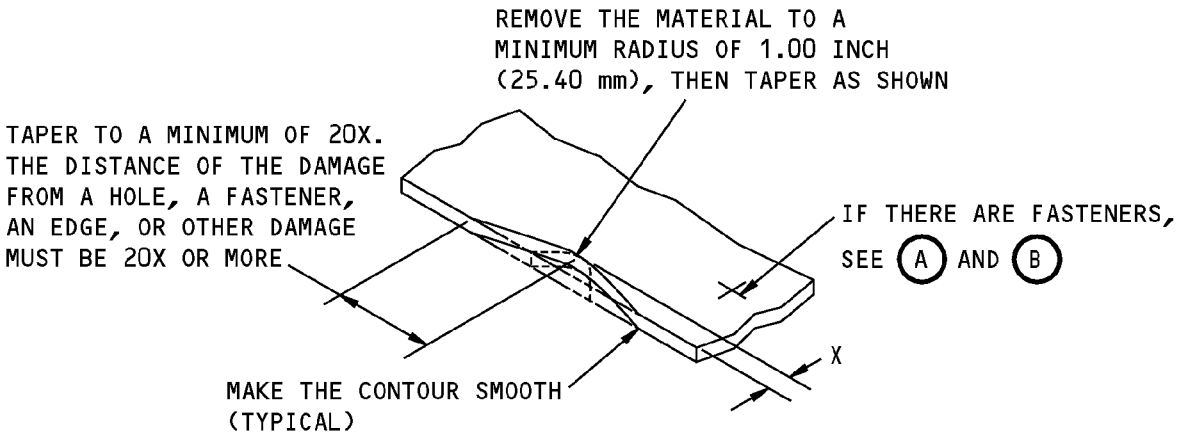
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

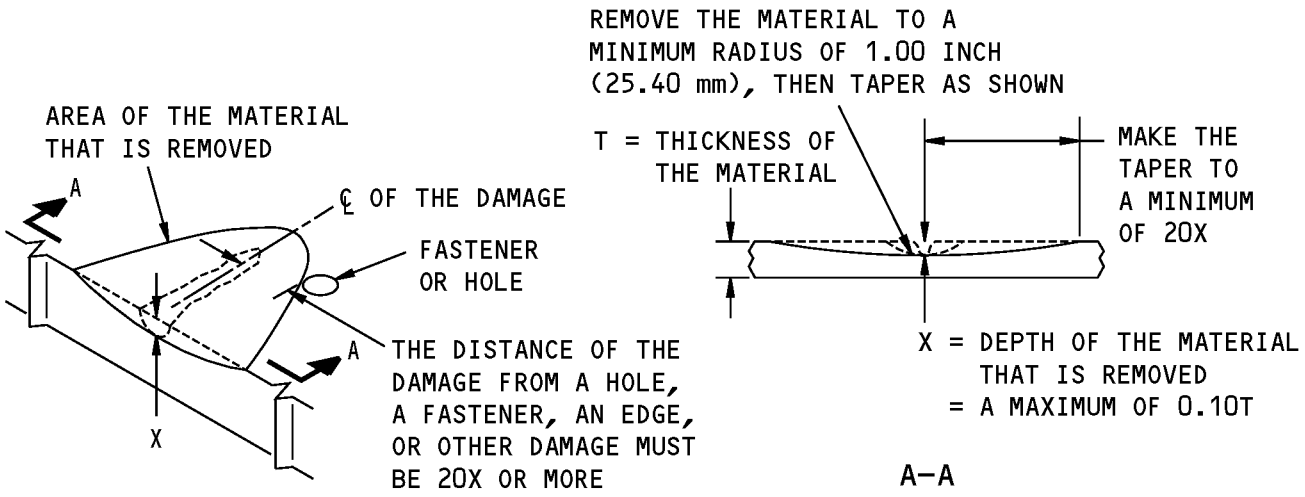


X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.20 INCH (5.08 mm)

REMOVAL OF DAMAGED MATERIAL AT AN EDGE OF A WEB

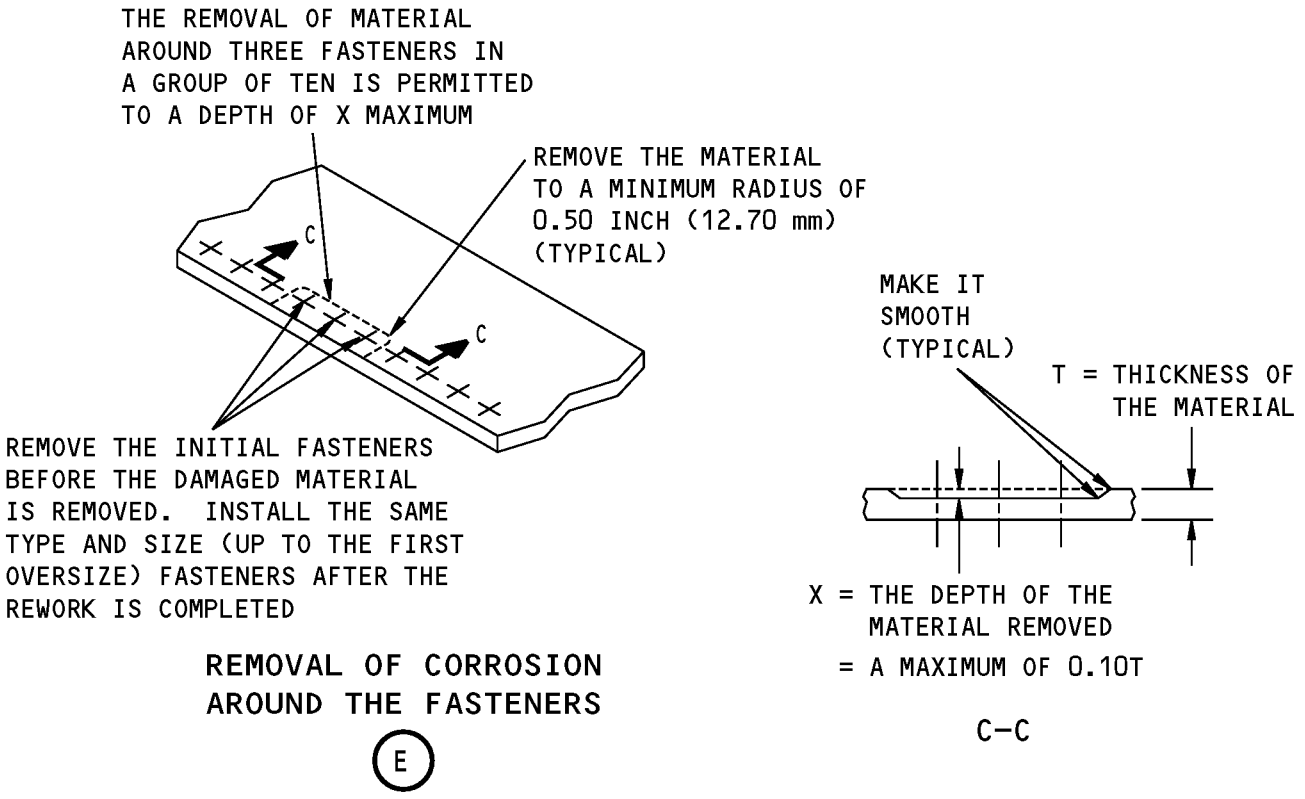
C

Allowable Damage Details
Figure 102 (Sheet 1 of 5)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

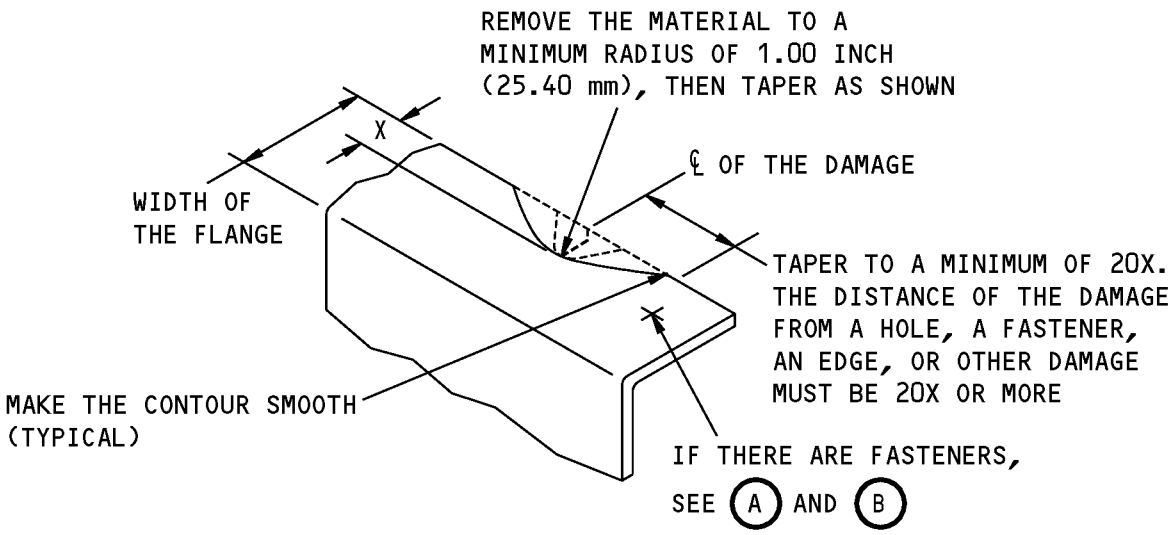
D



REMOVAL OF CORROSION AROUND THE FASTENERS

E

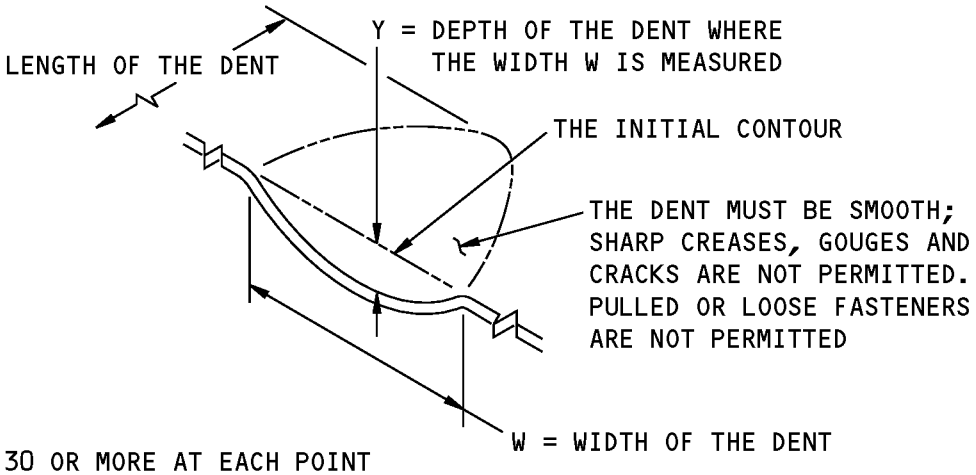
Allowable Damage Details
Figure 102 (Sheet 2 of 5)



X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE OF A FORMED PART

F



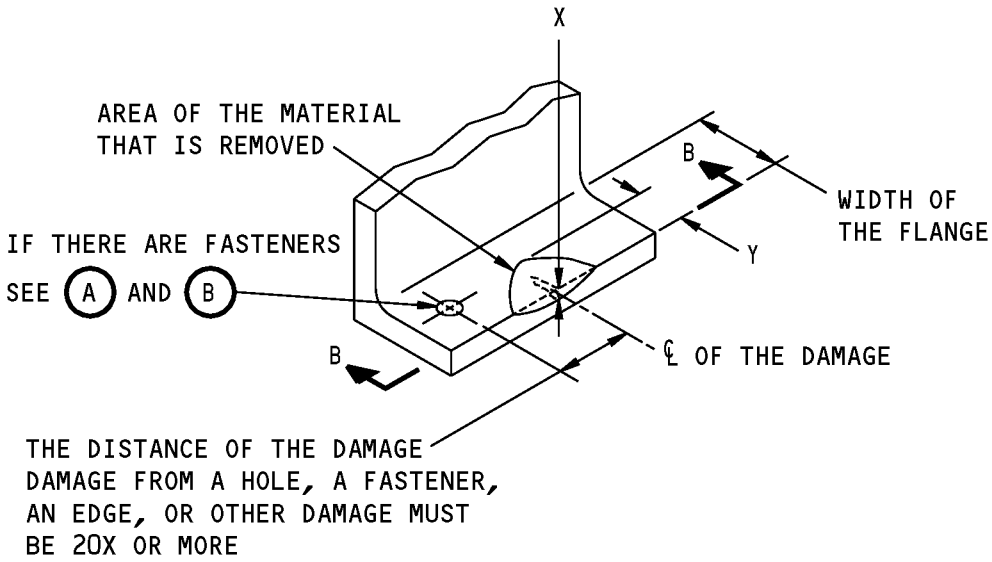
$\frac{W}{Y}$ MUST BE 30 OR MORE AT EACH POINT
ALONG THE LENGTH OF THE DENT

Y = A MAXIMUM OF 0.125 INCH (3.18 mm)

DENT THAT IS PERMITTED

G

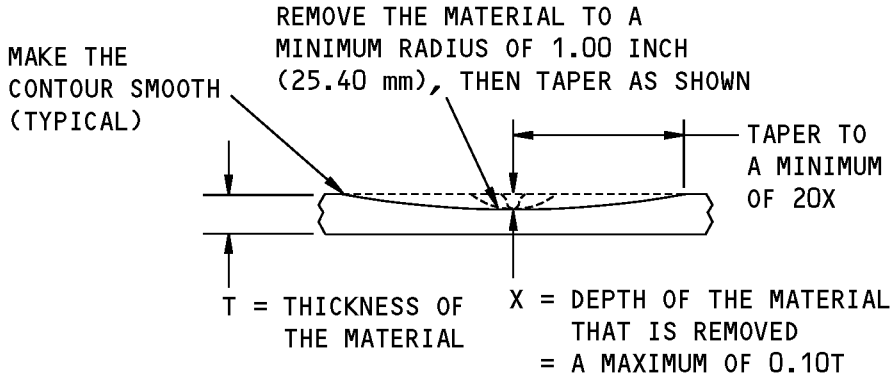
Allowable Damage Details
Figure 102 (Sheet 3 of 5)



Y = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

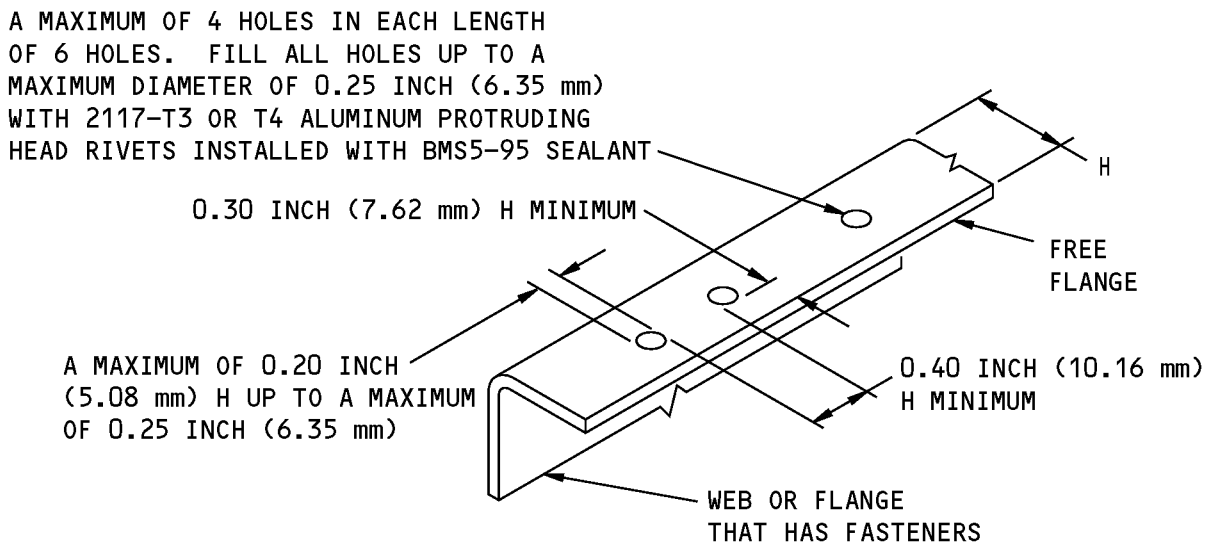
REMOVAL OF DAMAGED MATERIAL ON A SURFACE AT AN EDGE OF A MACHINED OR EXTRUDED PART

H



B–B

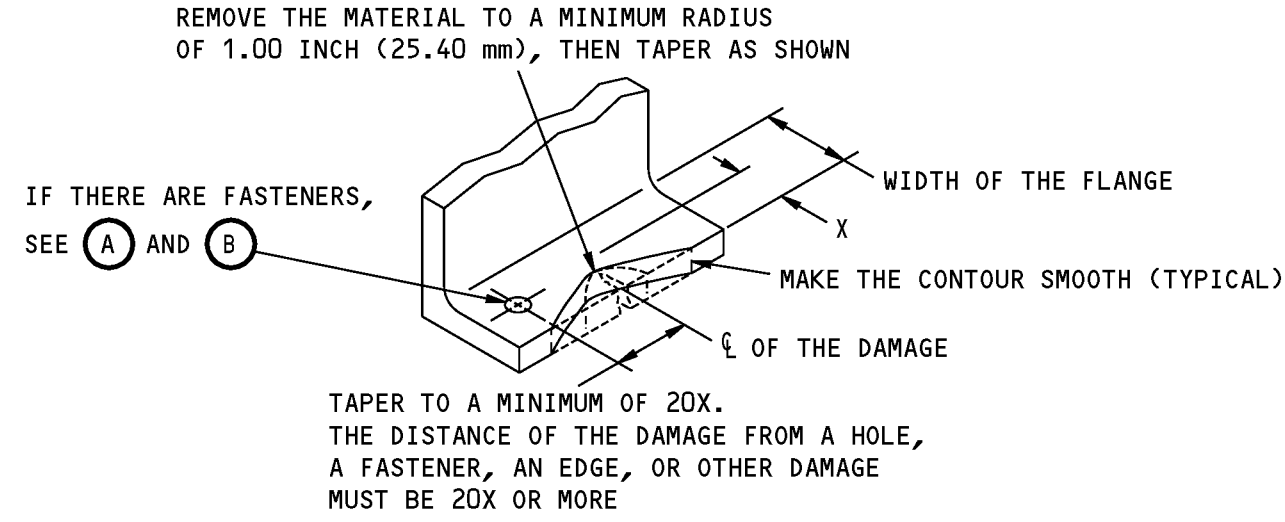
Allowable Damage Details
Figure 102 (Sheet 4 of 5)



NOTE: HOLE DAMAGE IS NOT PERMITTED IN FLANGES THAT HAVE FASTENERS.

ALLOWABLE DAMAGE LIMITS FOR HOLES IN FREE FLANGE

(I)



X = WIDTH OF THE MATERIAL REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

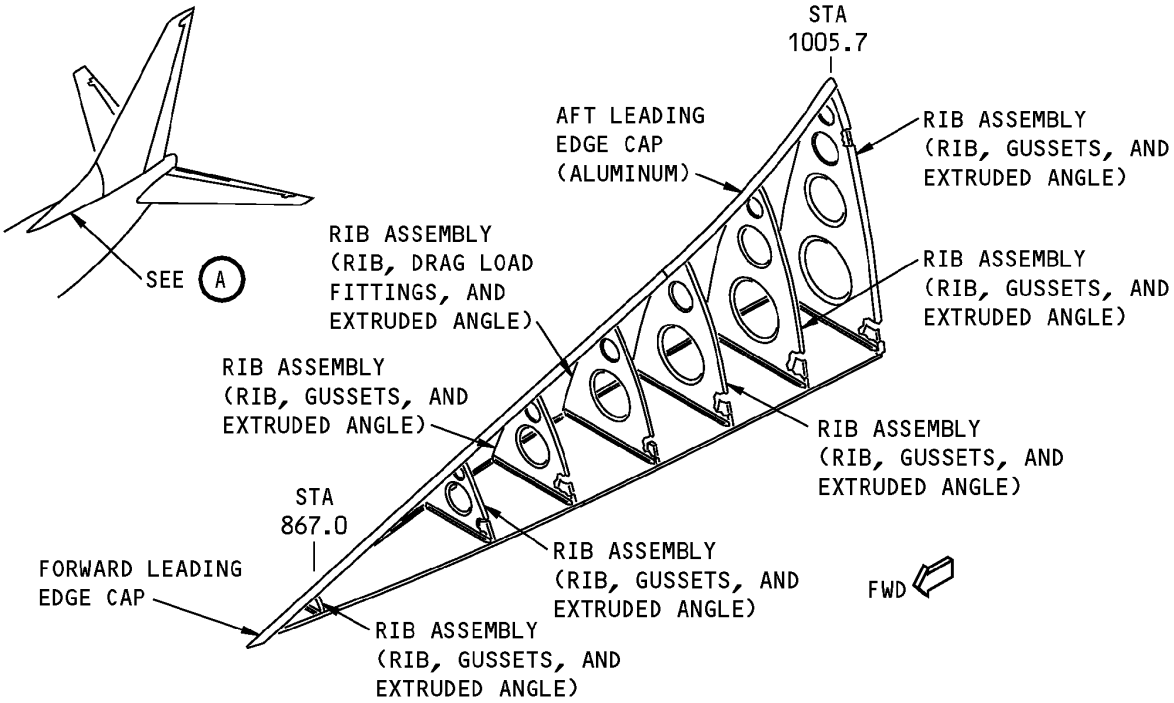
(J)

Allowable Damage Details
Figure 102 (Sheet 5 of 5)

REPAIR 2 - DORSAL FIN STRUCTURE

1. Applicability

A. Repair 2 is applicable to damage to the dorsal fin structure shown in 201.



NOTES

- REFER TO SRM 51-70-12 FOR THE TYPICAL EXTRUDED SECTION REPAIRS FOR THE ANGLES OF THE RIB ASSEMBLIES.
- YOU CAN USE THESE TYPICAL REPAIRS WHERE THEY ARE APPLICABLE IF:
  - SUFFICIENT SPACE IS AVAILABLE FOR THE INSTALLATION OF THE REPAIR PARTS, AND
  - THE REPAIR PARTS DO NOT TOUCH ADJACENT STRUCTURE.

Dorsal Fin Structure Repair
Figure 201

2. General

A. The typical repairs given in 51-70-12 can be used when applicable if:

(1) There is sufficient clearance with the adjacent structure for the installation of repair parts.

B. Refer to the limits of the typical repairs given in 51-70-12 before you start a repair.

3. References

Reference	Title
51-70-12	EXTRUDED SECTION REPAIRS
55-30-09	VERTICAL STABILIZER RIBS
55-30-09, ALLOWABLE DAMAGE 2	Dorsal Fin Structure
55-30-09, IDENTIFICATION 4	Dorsal Fin Structure

4. Repair Instructions

A. Dorsal Fin Structure

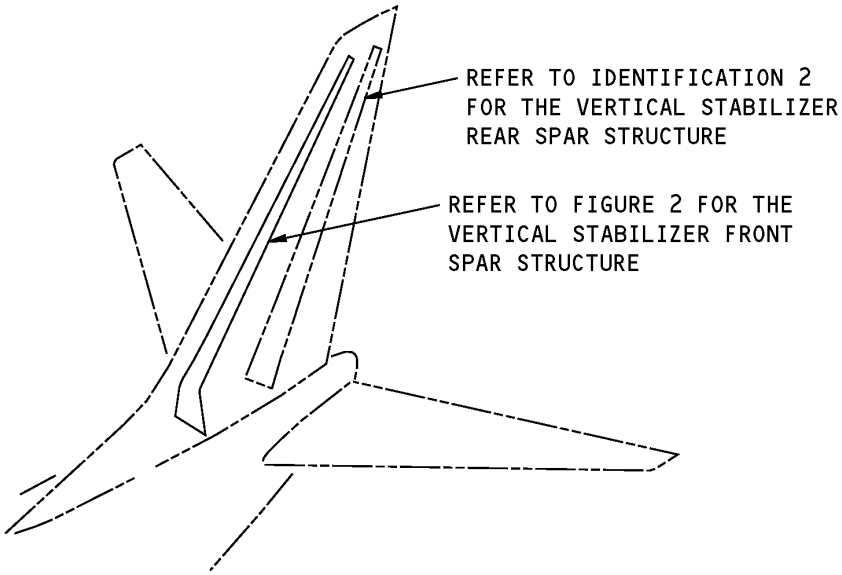
(1) Refer to Table 201/REPAIR 2 to find the applicable repairs of the dorsal fin structure.

NOTE: If necessary, refer to 55-30-09, Identification 4 to find the material and the process that was used to make the part which you want to repair.

Table 201:

REPAIR REFERENCES FOR THE DORSAL FIN STRUCTURE	
COMPONENT	**REPAIR**
Extruded Angles	Refer to SRM 51-70-12
Ribs and Gussets	There are no repairs for these components in the Structural Repair Manual at this time.
Leading Edge Caps	There are no repairs for these components in the Structural Repair Manual at this time. If the damage to the structure is more than the limits given in SRM 53-40-13, Allowable Damage 1, contact Boeing for a repair.

IDENTIFICATION 1 - VERTICAL STABILIZER FRONT SPAR STRUCTURE

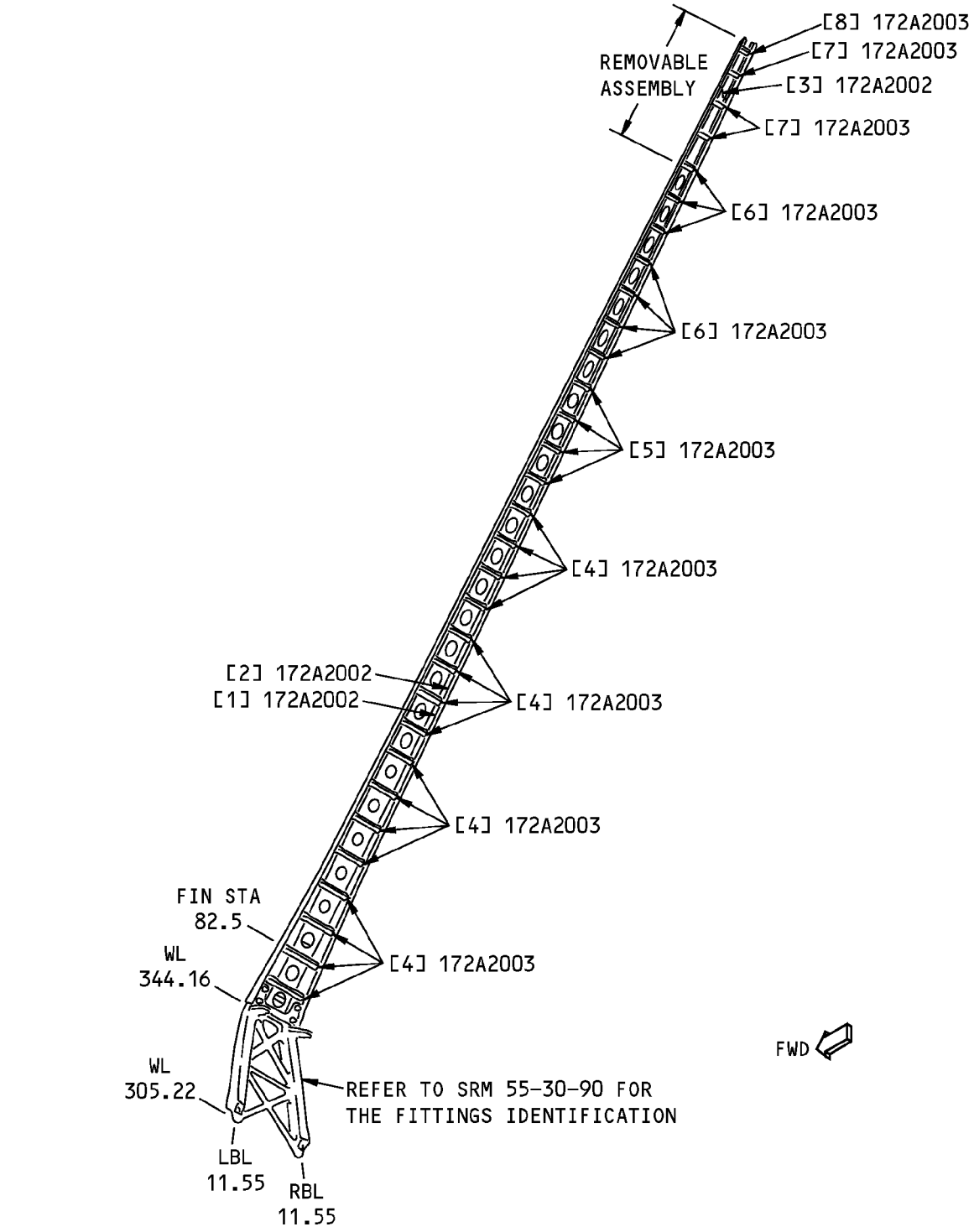


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Front Spar Structure Locations
Figure 1

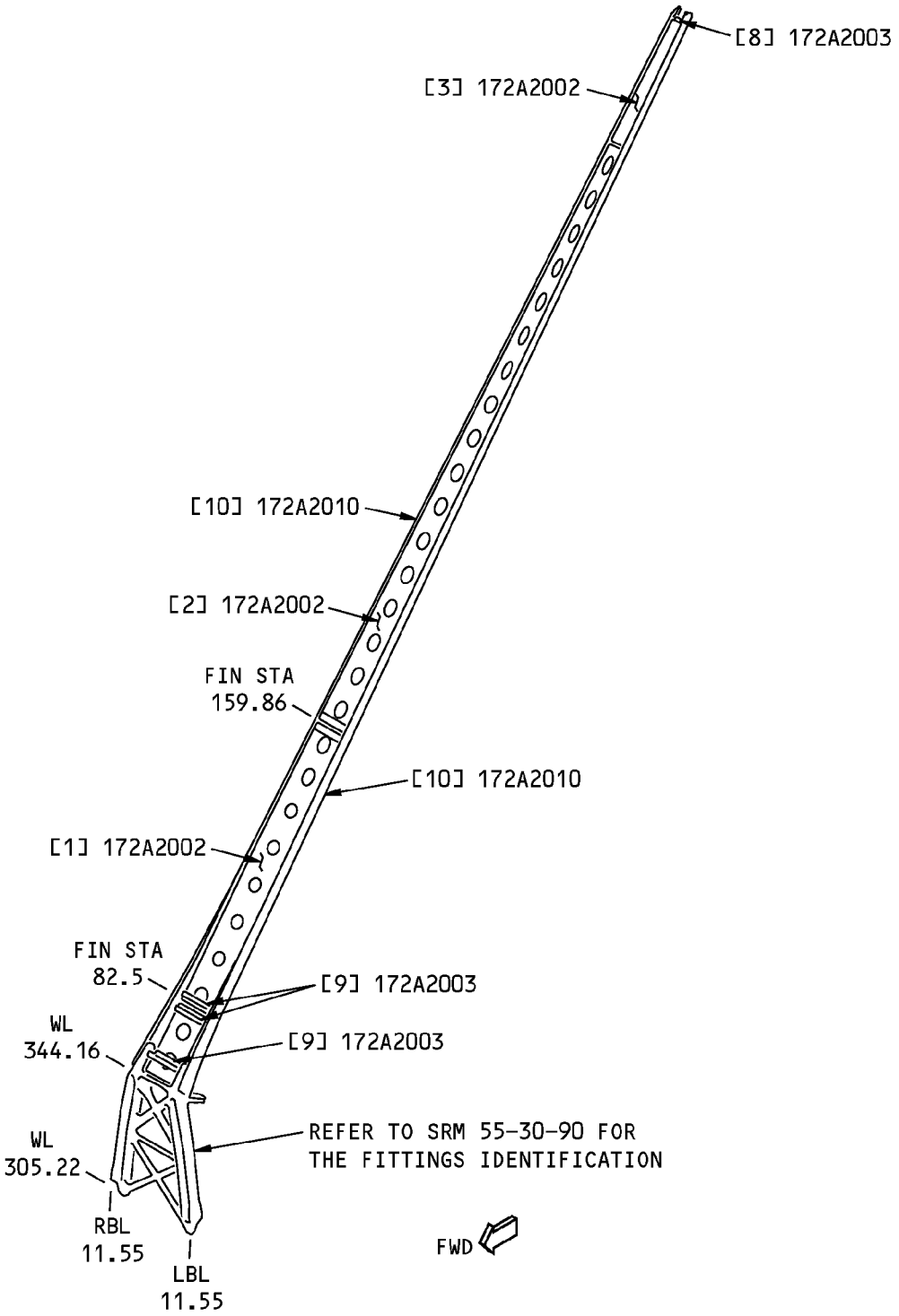
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
172A0001	Torque Box Functional Collector - Vertical Fin
172A2001	Front Spar Assembly/Installation - Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Front Spar Structure Identification
Figure 2 (Sheet 1 of 2)



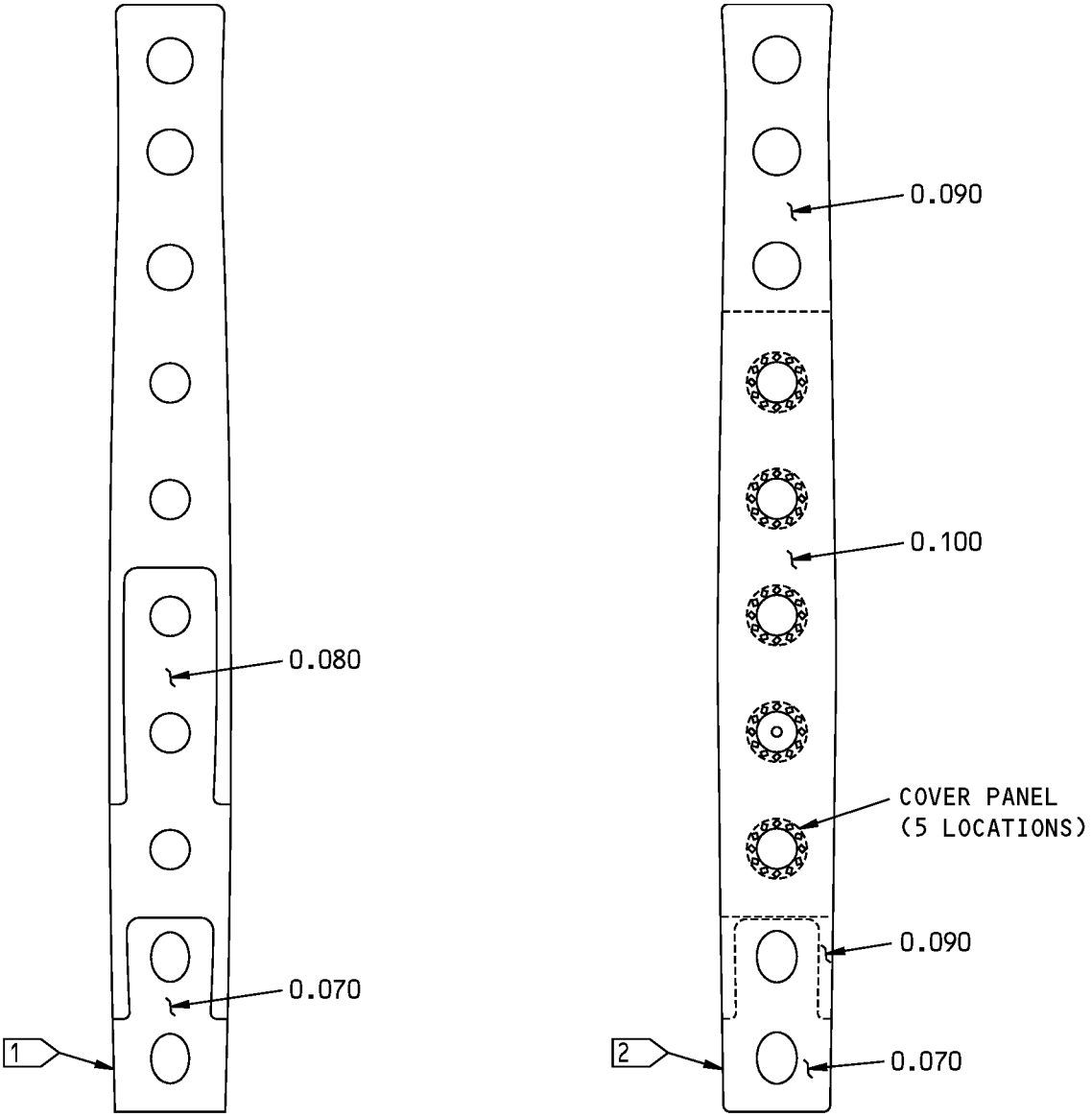
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Front Spar Structure Identification
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Web	0.090 (2.29)	7075-T6 aluminum sheet as given in QQ-A-250/12, chem-milled to different thick- nesses. Refer to Figure 3	Cum Line numbers 1 thru 4
	Web Assembly			Cum Line numbers 5 and on
	Web	0.100 (2.54)	7075-T6 aluminum sheet as given in QQ-A-250/12, chem-milled to different thick-nesses. Refer to Figure 3	
	Cover Panel (5)	0.100 (2.54)	7075-T6 aluminum sheet as given in QQ-A-250/12. Refer to Figure 3	
[2]	Web	0.063 (1.60)	7075-T6 aluminum sheet as given in QQ-A-250/12, chem-milled to different thick-nesses. Refer to Figure 4	
[3]	Web	0.040 (1.02)	7075-T6 aluminum sheet as given in QQ-A-250/12 milled to different thicknesses. Refer to Figure 5	
[4]	Stiffener		BAC1506-4406 7075-T73511 aluminum extrusion as given in QQ-A-200/11	
[5]	Stiffener		BAC1506-4407 7075-T73511 aluminum extrusion as given in QQ-A-200/11	
[6]	Stiffener		BAC1506-4408 7075-T73511 aluminum extrusion as given in QQ-A-200/11	
[7]	Stiffener		BAC1514-3266 7075-T73511 aluminum extrusion as given in QQ-A-200/11	
[8]	Stiffener		BAC1506-4410 7075-T73511 aluminum extrusion as given in QQ-A-200/11	
[9]	Stiffener		7075-T351 aluminum plate as given in QQ-A-250/12	
[10]	Chord		BAC1506-4319 7150-T77511 aluminum sheet as given in BMS 7-306	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



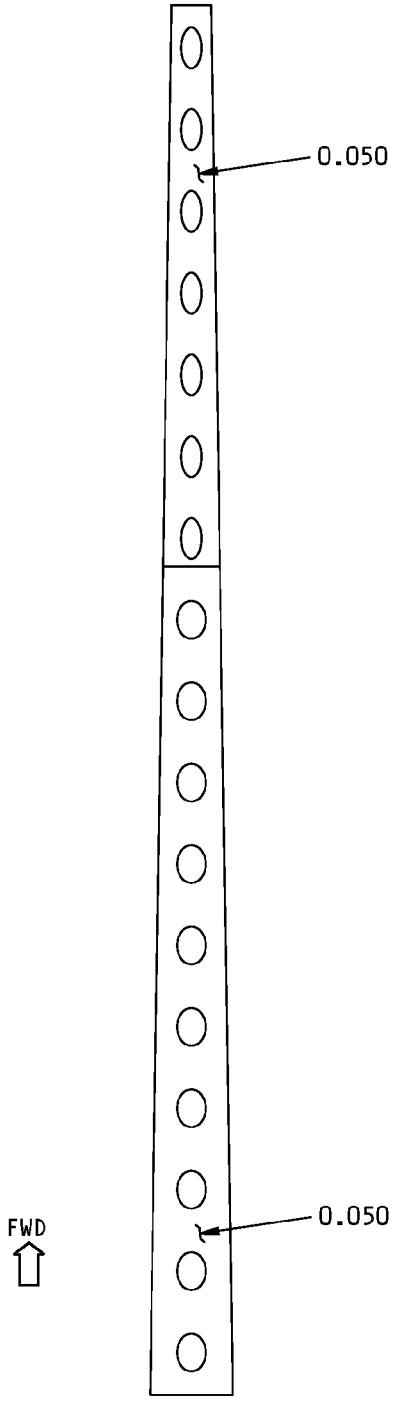
NOTES

- REFER TO TABLE 2 FOR THE LIST OF MATERIALS.
- ALL DIMENSIONS ARE IN INCHES.

1 FOR CUM LINE NUMBERS 1 THRU 4

2 FOR CUM LINE NUMBER 5 AND ON

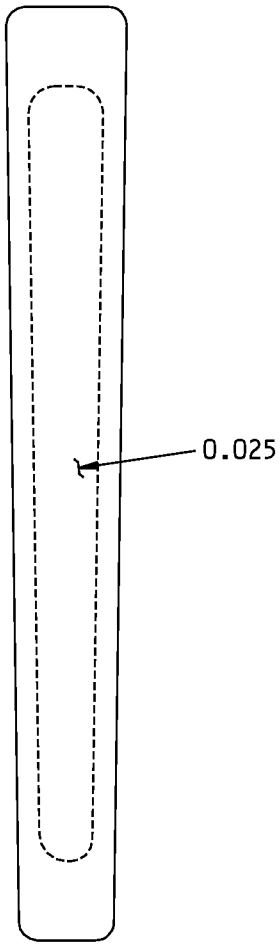
Chem-Milled Areas for Figure 2, Item [1]
Figure 3



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

ALL DIMENSIONS ARE IN INCHES.

Chem-Milled Areas for Figure 2, Item [2]
Figure 4

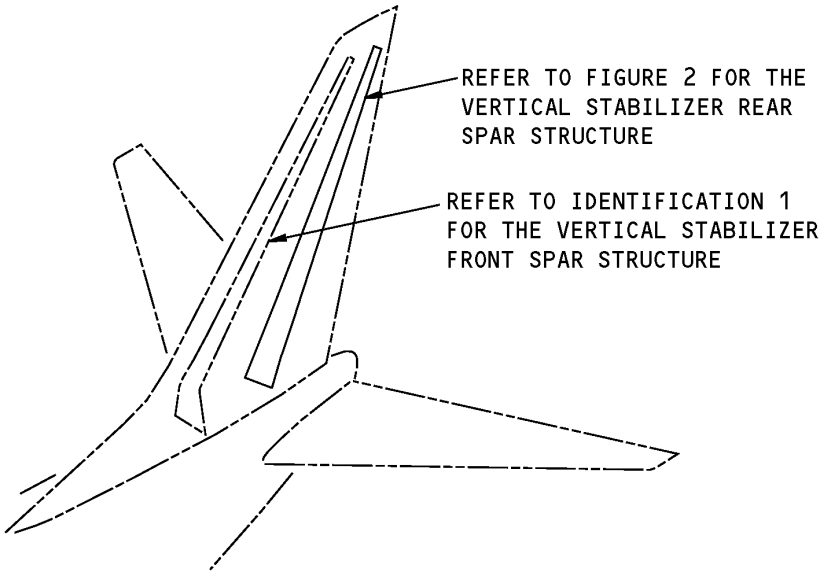


NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

ALL DIMENSIONS ARE IN INCHES.

Chem-Milled Areas for Figure 2, Item [3]
Figure 5

IDENTIFICATION 2 - VERTICAL STABILIZER REAR SPAR STRUCTURE

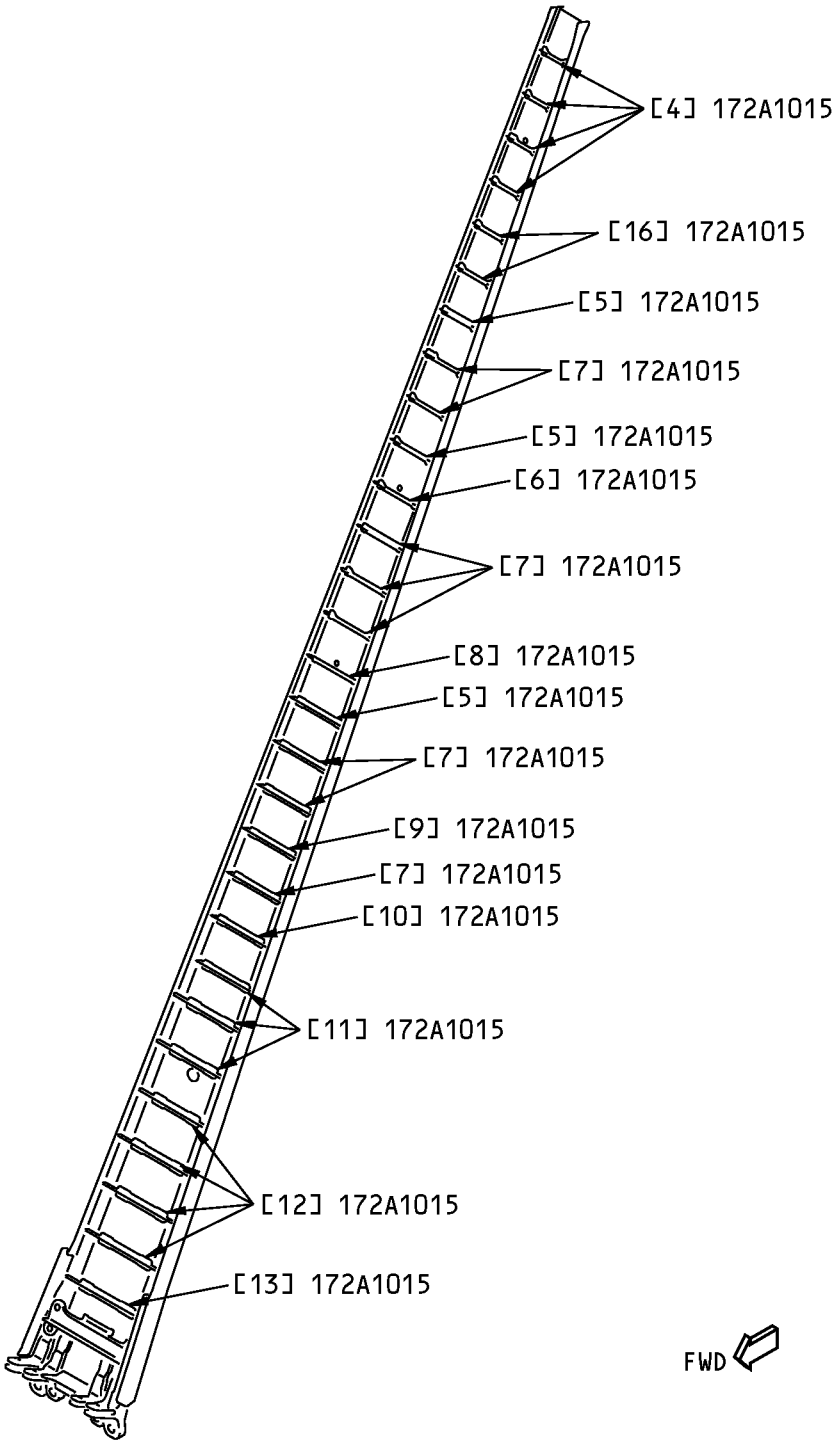


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Rear Spar Structure Locations
Figure 1

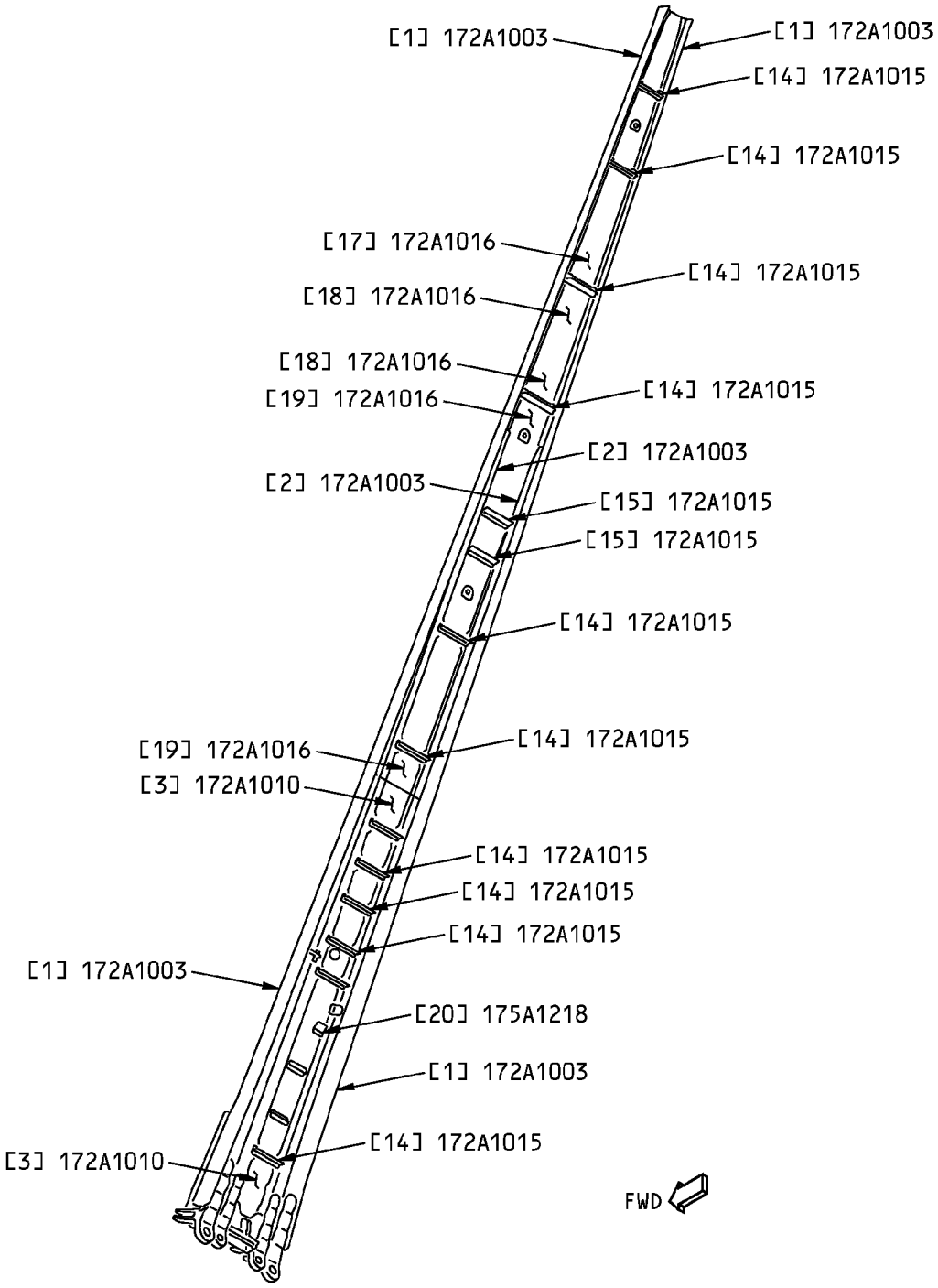
Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
172A1001	Rear Spar Assembly/Installation - Vertical Fin
175A0001	Trailing Edge Functional Collector - Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Rear Spar Structure Locations
Figure 2 (Sheet 1 of 2)



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

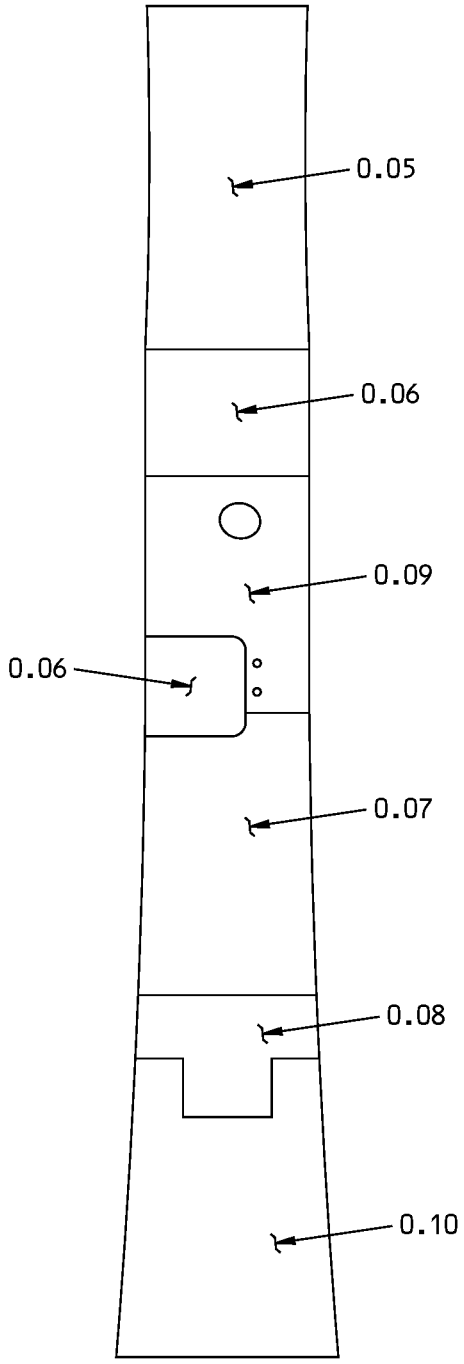
Vertical Stabilizer Rear Spar Structure Locations
Figure 2 (Sheet 2 of 2)

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Primary Chord		BAC1506-4440 2024-T3511 extrusion as given in QQ-A-200/3	
[2]	Failsafe Chord		BAC1520-2796 7075-T6511 extrusion as given in QQ-A-200/11	
[3]	Web Assembly			
	Failsafe Fitting	0.600 (15.2)	7075-T651 plate as given in QQ-A-250/12	
	Web	0.100 (2.54)	7075-T6 sheet as given in QQ-A-250/12. Refer to Figure 3 for the chem-milled thicknesses	
[4]	Stiffener		BAC1505-100575 7075-T6511 extrusion as given in QQ-A-200/11	
[5]	Stiffener		BAC1505-100574 7075-T6511 extrusion as given in QQ-A-200/11	
[6]	Stiffener		BAC1518-585 7075-T6511 extrusion as given in QQ-A-200/11	
[7]	Stiffener		BAC1505-100876 7075-T6511 extrusion as given in QQ-A-200/11	
[8]	Stiffener		BAC1503-100854 7075-T6511 extrusion as given in QQ-A-200/11	
[9]	Stiffener		BAC1505-100570 7075-T6511 extrusion as given in QQ-A-200/11	
[10]	Stiffener		BAC1506-4435 7075-T6511 extrusion as given in QQ-A-200/11	
[11]	Stiffener		BAC1506-4436 7075-T6511 extrusion as given in QQ-A-200/11	
[12]	Stiffener		BAC1506-4434 7075-T6511 extrusion as given in QQ-A-200/11	
[13]	Stiffener		7075-T73511 extruded bar as given in QQ-A-200/11	
[14]	Stiffener		BAC1506-2401 7075-T73511 extrusion as given in QQ-A-200/11 (Optional: Make the necessary cross-section from 7075-T73511 extruded bar as given in QQ-A-200/11)	
[15]	Stiffener		BAC1506-1826 7075-T6511 extrusion as given in QQ-A-200/11	
[16]	Stiffener		BAC1505-100573 7075-T6511 extrusion as given in QQ-A-200/11	
[17]	Web Assembly			
	Web	0.025 (0.64)	7075-T6 clad sheet as given in QQ-A-250/13	
	Doubler	0.025 (0.64)	7075-T6 clad sheet as given in QQ-A-250/13	
[18]	Web Assembly			
	Web	0.032 (0.81)	7075-T6 clad sheet as given in QQ-A-250/13	
	Doubler	0.050 (1.27)	7075-T6 clad sheet as given in QQ-A-250/13	
[19]	Web Assembly			
	Web	0.040 (1.02)	7075-T6 clad sheet as given in QQ-A-250/13	

LIST OF MATERIALS FOR FIGURE 2				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
	Doubler	0.050 (1.27)	7075-T6 clad sheet as given in QQ-A-250/13	
[20]	Angle	0.063 (1.60)	2024-T3 clad sheet as given in QQ-A-250/5	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

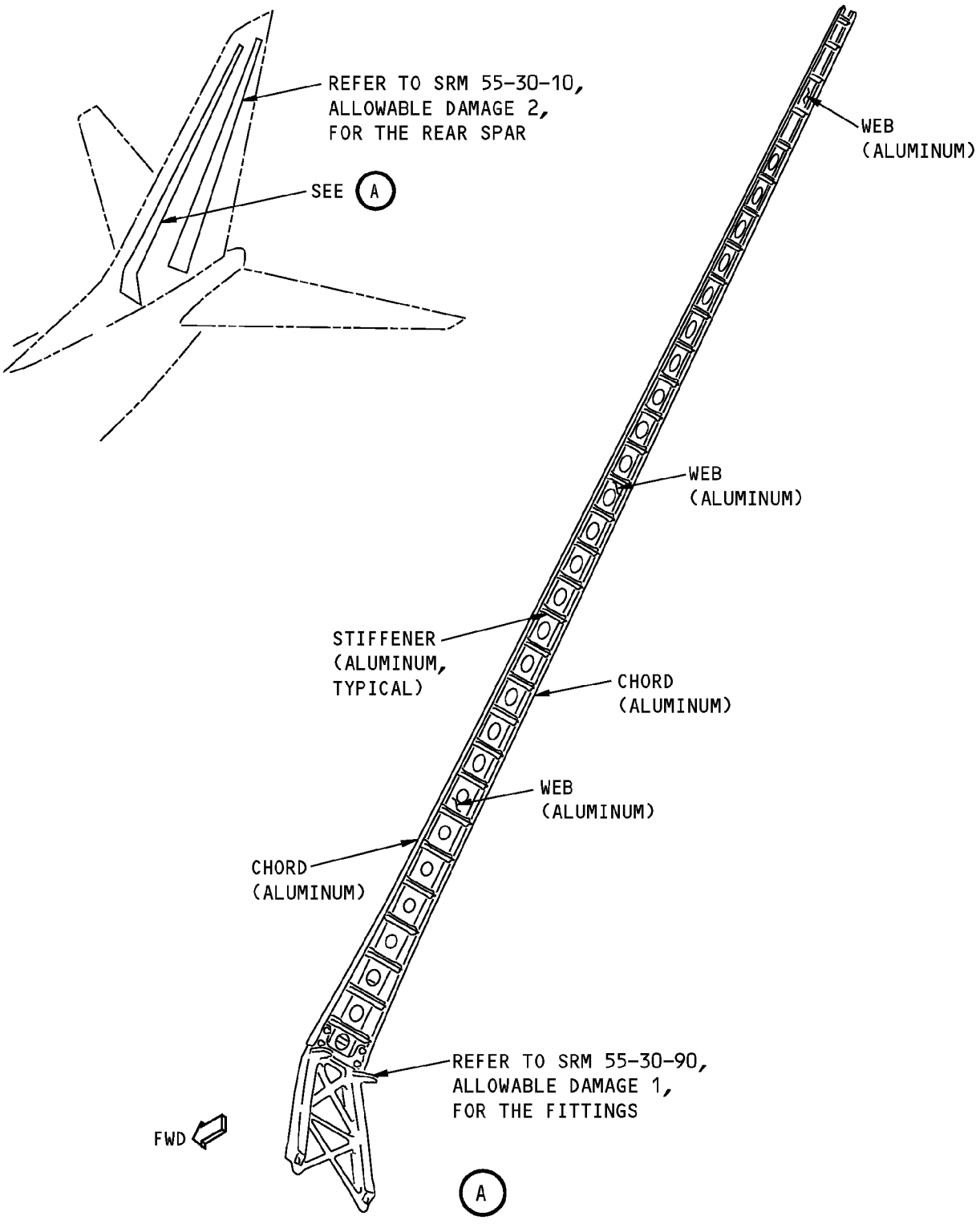
ALL DIMENSIONS ARE IN INCHES.

Chem-Milled Areas for Figure 2, Item [3]
Figure 3

ALLOWABLE DAMAGE 1 - VERTICAL STABILIZER FRONT SPAR

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer front spar shown in Vertical Stabilizer Front Spar Location, Figure 101/ALLOWABLE DAMAGE 1.



Vertical Stabilizer Front Spar Location
Figure 101

2. General

A. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

B. After you remove the damage, do the procedures that follow.

(1) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(2) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the stiffeners and the chords. Refer to SOPM 20-41-02.

(3) Apply two layers of BMS 10-11, Type I, primer to the reworked areas of the webs. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
55-30-90, ALLOWABLE DAMAGE 1	Vertical Stabilizer Fittings
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Allowable Damage Limits

A. Chords

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, INJURY TO PERSONS CAN OCCUR.

(5) Flap peen or shot peen the surfaces if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

B. Stiffeners

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and F.

(b) The total cross-sectional area removed must not be more than the limits given in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail H.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, E, and F.

(b) The total cross-sectional area removed must not be more than the limits given in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail H.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Webs

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B.

(b) Damage is permitted as shown in Vertical Stabilizer Front Spar - Bay Location, Figure 103/ALLOWABLE DAMAGE 1 and Table 101.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, E, and F.

(b) Damage is permitted as shown in Vertical Stabilizer Front Spar - Bay Location, Figure 103/ALLOWABLE DAMAGE 1 and Table 101.

Table 101:

PERCENT OF CROSS-SECTIONAL AREA REMOVED FROM A WEB OF THE FRONT SPAR	
BAY NUMBER	**MAXIMUM PERCENTAGE OF THE INITIAL CROSS-SECTIONAL AREA PERMITTED (AS MANUFACTURED BY BOEING)**
1, 2, AND 3	15
4	5
5	10
6	NO DAMAGE PERMITTED
7	10
8	NO DAMAGE PERMITTED
9	10
10 AND 11	5
12	10
13 THRU 31	15

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail D.

(4) Holes and Punctures are permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail G, and F igure 103 if:

(a) They are a maximum diameter D of 1.00 inch. (D = the maximum dimension of the largest damage)

(b) There are not more than two holes in each bay between two stiffeners

(c) The edge of the damage is a minimum of 4D away from the edge of:

1) An initial hole

2) A fastener hole

3) Other damage.

(d) The edge of the damage is a minimum of 3D away from the edge of the part

(e) They are filled with a 2117-T3 or 2117-T4 aluminum protruding head rivet installed without sealant

NOTE: Do not fill holes and punctures that are more than 0.25 inch in diameter.

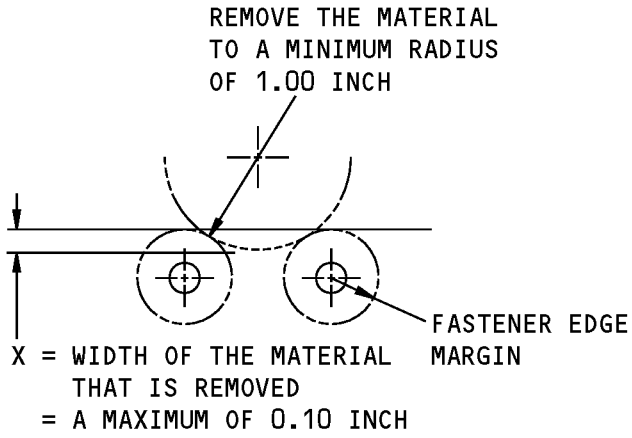
(f) The total cross-sectional area removed from the web:

1) Includes the cross-sectional area of all new fastener holes

2) Includes the cross-sectional area of all damaged material that was removed

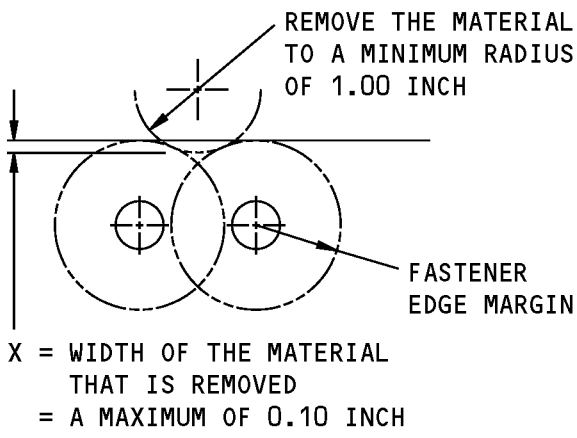
3) Is not more than the limits given in Table 101/ALLOWABLE DAMAGE 1 between Points A and B of Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail G

4) Is not more than the limits given in Table 101/ALLOWABLE DAMAGE 1 between Points M and N of Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Detail G.



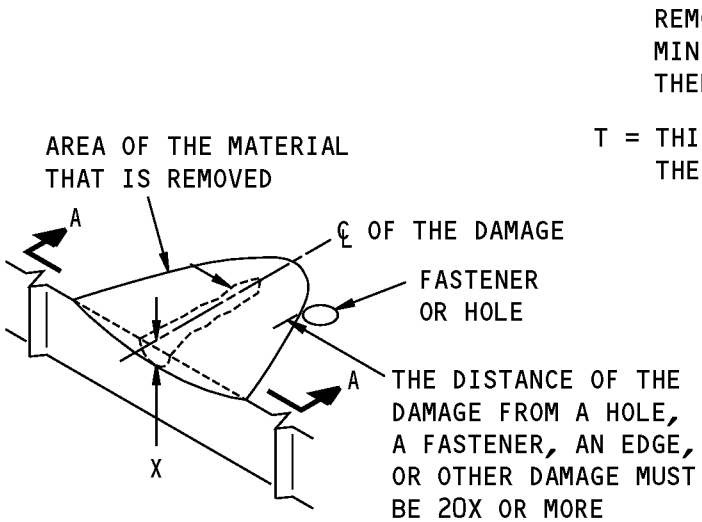
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

(A)



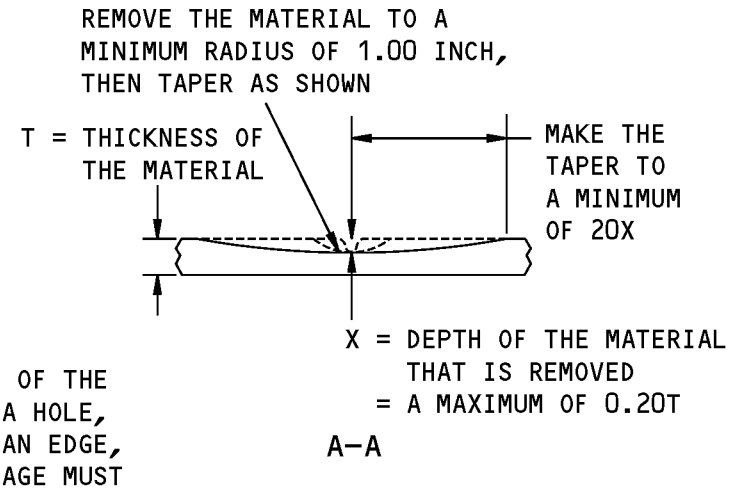
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

(B)

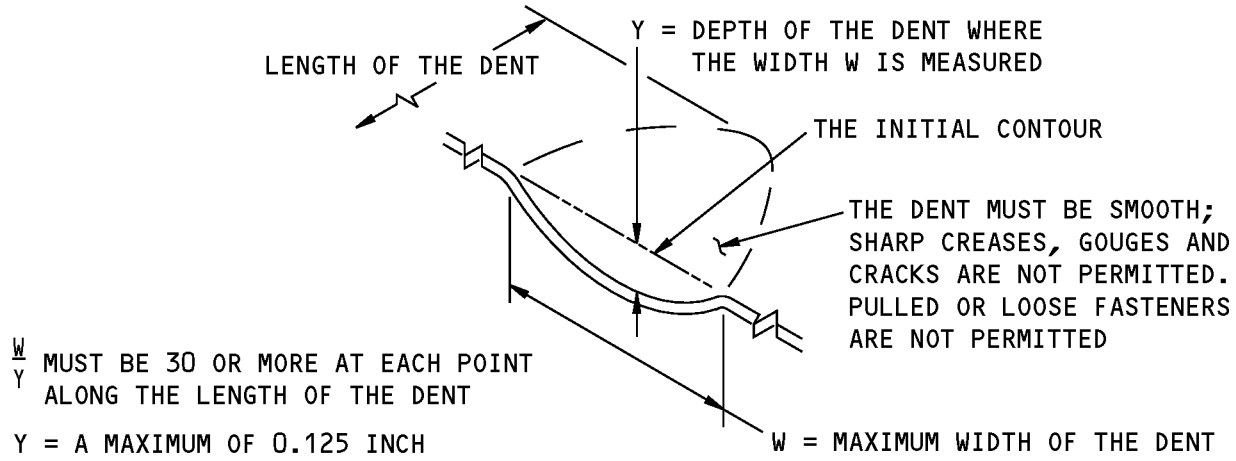


REMOVAL OF DAMAGED MATERIAL ON A SURFACE

(C)



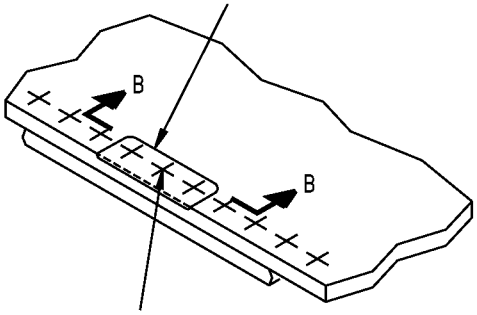
Allowable Damage Limits
Figure 102 (Sheet 1 of 5)



DENT THAT IS PERMITTED

D

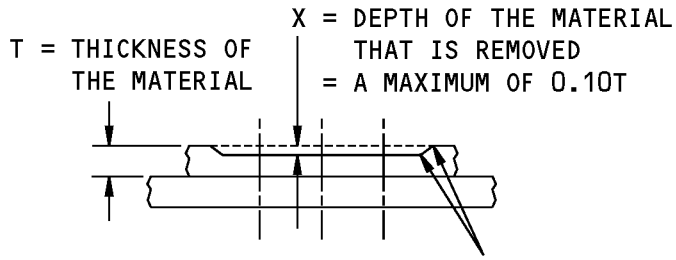
THE REMOVAL OF MATERIAL AROUND THREE FASTENERS IN ALL GROUPS OF TEN IS PERMITTED TO A MAXIMUM DEPTH OF X



REMOVE THE FASTENERS BEFORE THE DAMAGE IS REMOVED. INSTALL THE FASTENERS AFTER THE DAMAGE IS REMOVED

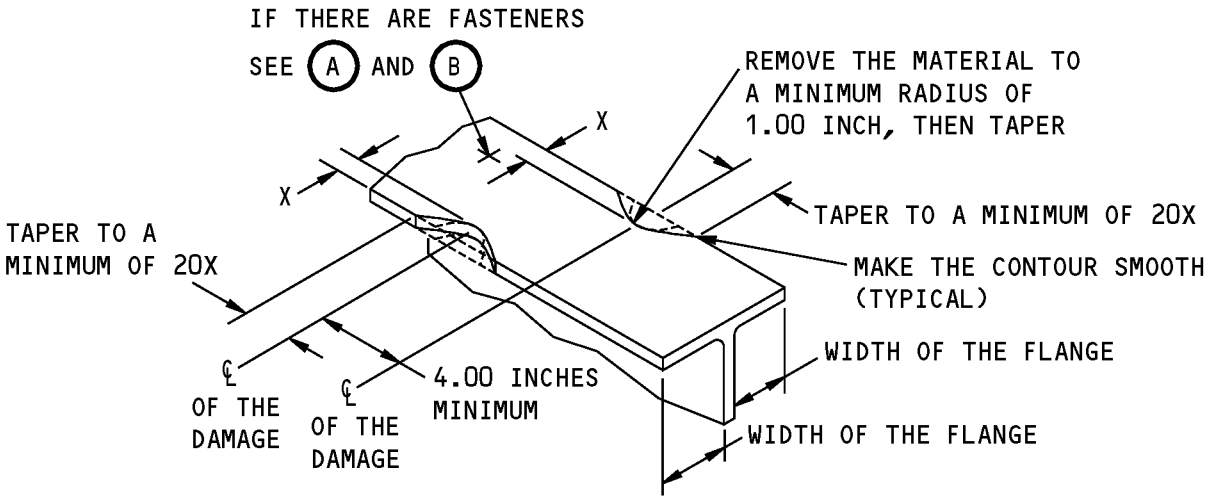
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E



B–B

Allowable Damage Limits
Figure 102 (Sheet 2 of 5)

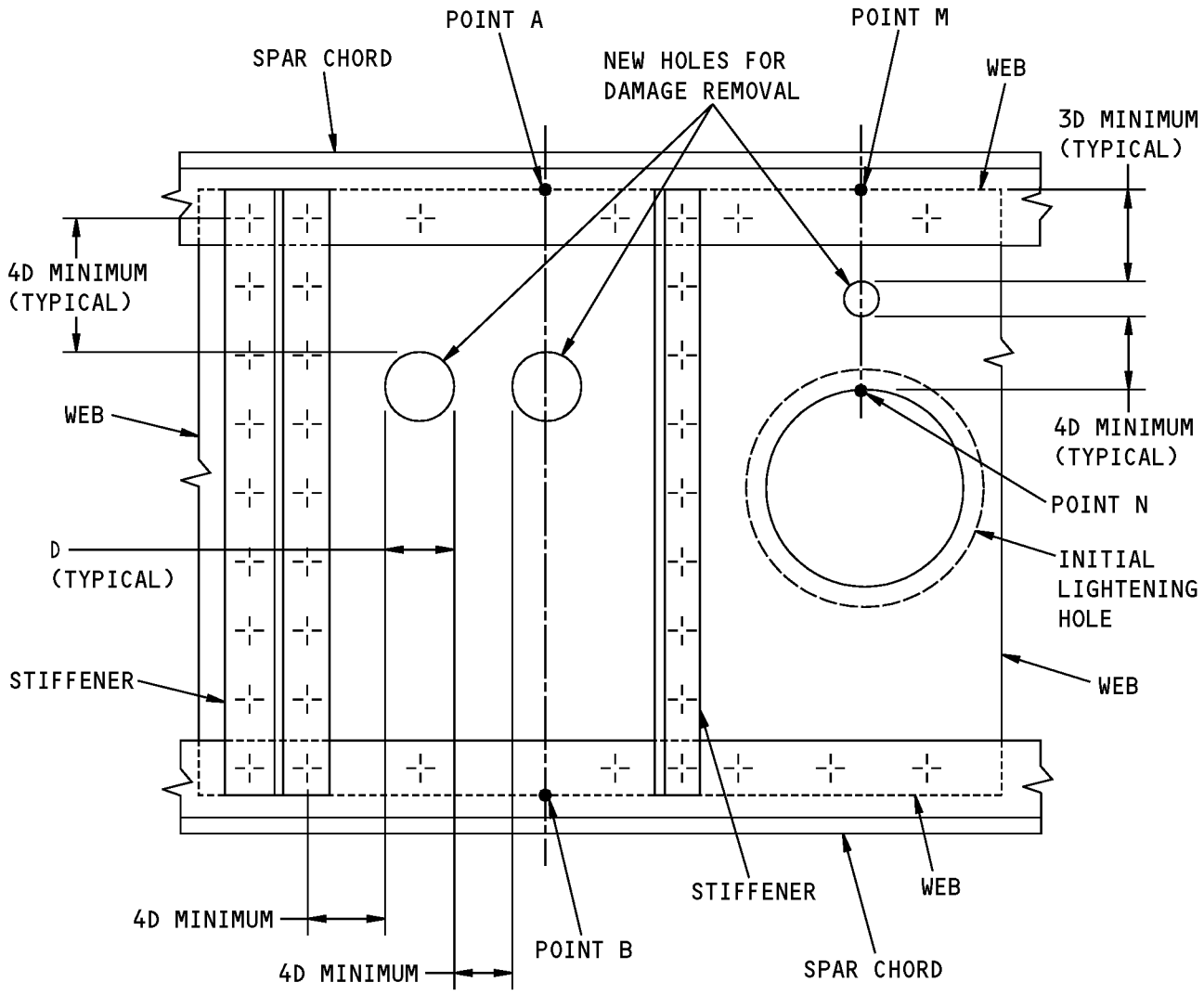


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

F

Allowable Damage Limits
Figure 102 (Sheet 3 of 5)

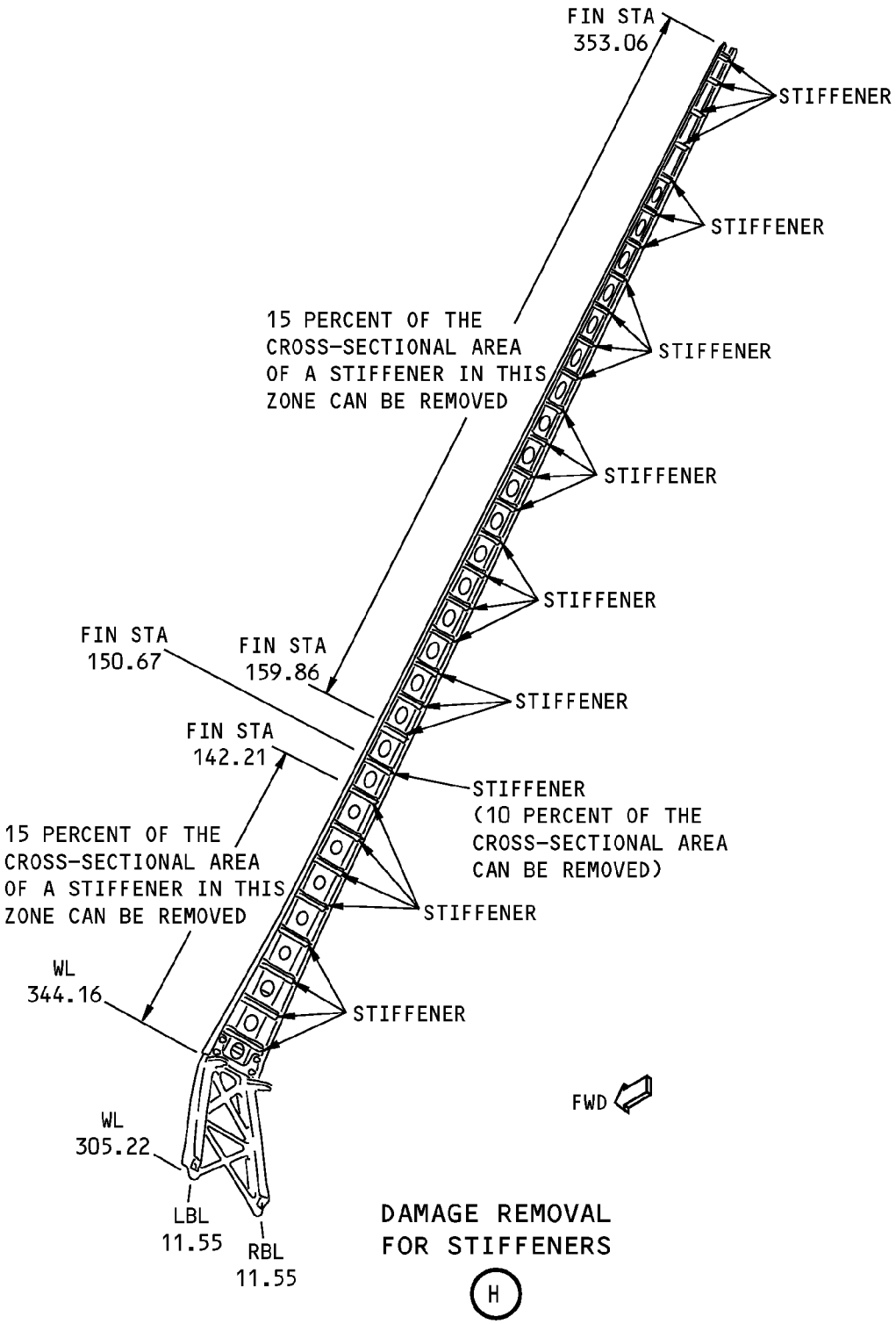


POINTS A, B, AND M ARE ON THE EDGES OF THE WEB
D = THE MAXIMUM DIMENSION OF THE DAMAGE REMOVAL
= 1.00 INCH MAXIMUM
-¦- FASTENER LOCATION

HOLES THAT ARE PERMITTED TO REMOVE
DAMAGED MATERIAL IN WEBS

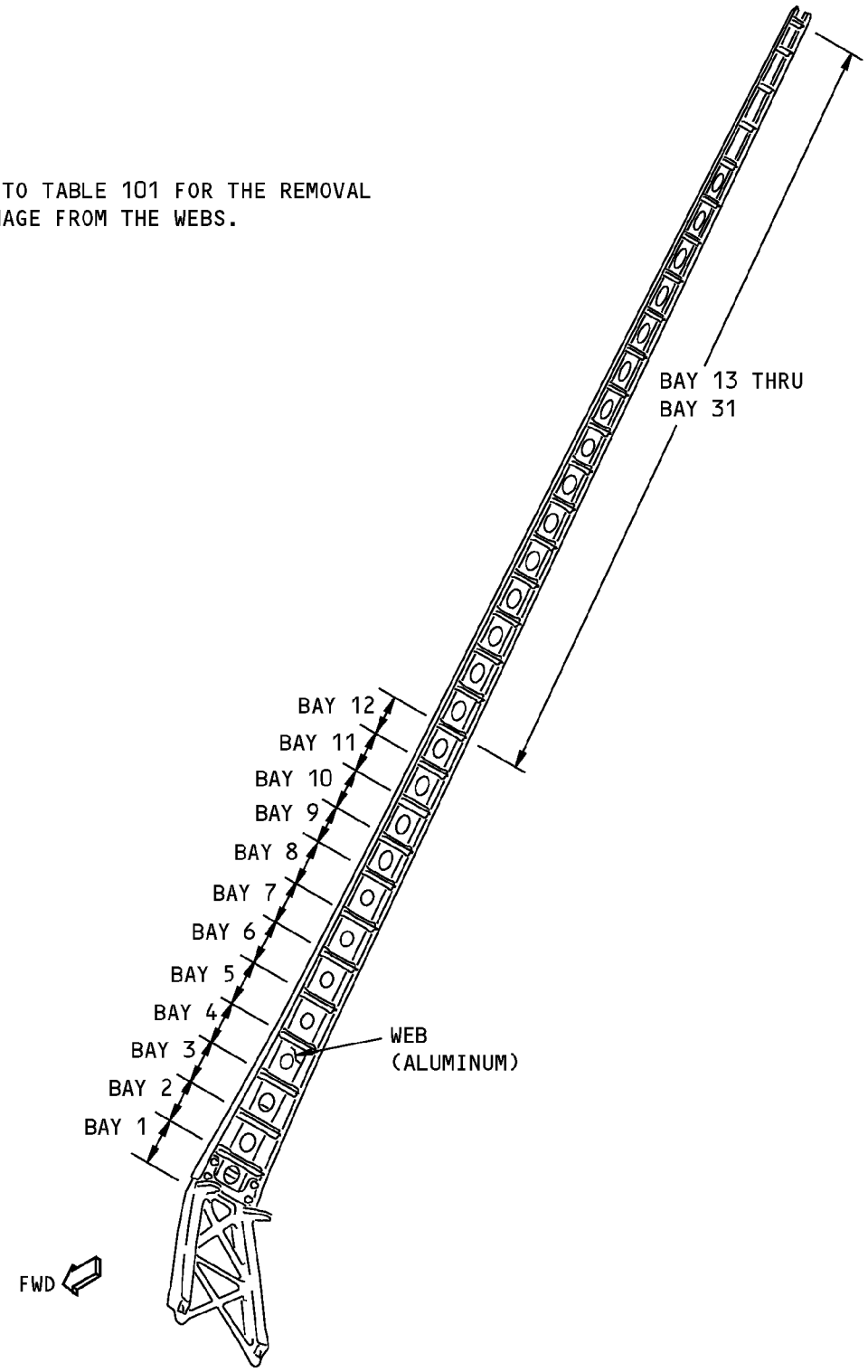
G

Allowable Damage Limits
Figure 102 (Sheet 4 of 5)



Allowable Damage Limits
Figure 102 (Sheet 5 of 5)

NOTE: REFER TO TABLE 101 FOR THE REMOVAL OF DAMAGE FROM THE WEBS.

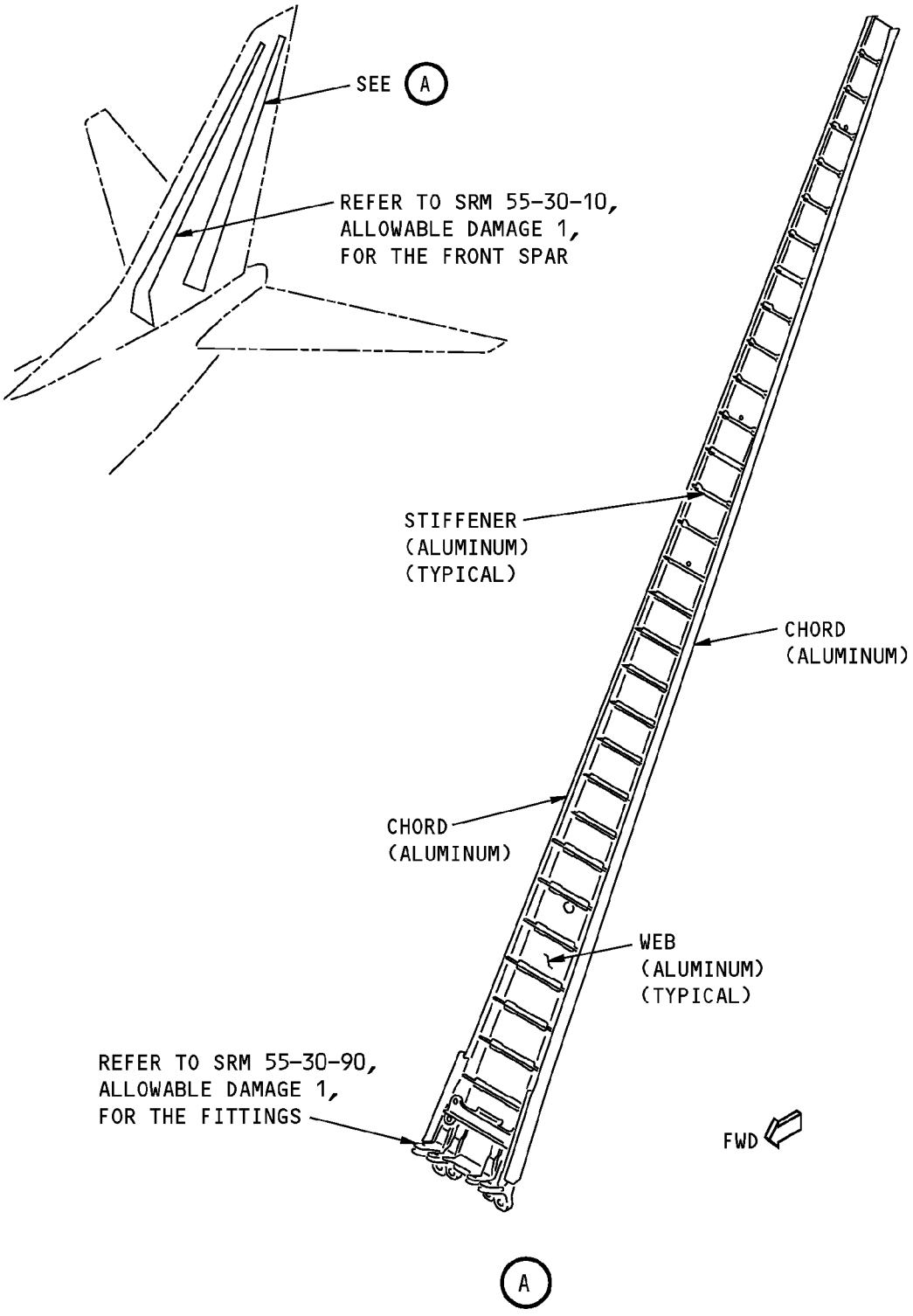


Vertical Stabilizer Front Spar - Bay Location
Figure 103

ALLOWABLE DAMAGE 2 - VERTICAL STABILIZER REAR SPAR

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer rear spar shown in Vertical Stabilizer Rear Spar Location, Figure 101/ALLOWABLE DAMAGE 2.



Vertical Stabilizer Rear Spar Location
Figure 101

2. General

A. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

B. After you remove the damage, do the procedures that follow.

(1) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(2) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the stiffeners and the chords. Refer to SOPM 20-41-02.

(3) Apply two layers of BMS 10-11, Type I, primer to the reworked areas of the webs. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
55-30-90, ALLOWABLE DAMAGE 1	Vertical Stabilizer Fittings
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Allowable Damage Limits

A. Chords

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, C, E, and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(5) Flap peen or shot peen the surfaces if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

B. Stiffeners

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and F.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, C, E, F, and H.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Webs

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, C, E, and F.

(3) Dents are permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Detail D.

(4) Holes and Punctures are permitted as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Detail G if:

(a) They are a maximum diameter (D) of 1.00 inch. D is the maximum dimension of the largest damage.

(b) There is not more than two holes in each bay between two stiffeners

(c) The edge of the damage is a minimum of 4D away from the edge of:

1) An initial hole

2) A fastener hole

3) Other damage

(d) The edge of the damage is a minimum of 3D away from the edge of the part

(e) They are filled with a 2117-T3 or 2117-T4 aluminum protruding head rivet:

1) Do not fill holes and punctures that are more than 0.25 inch in diameter.

2) Install the rivets without sealant.

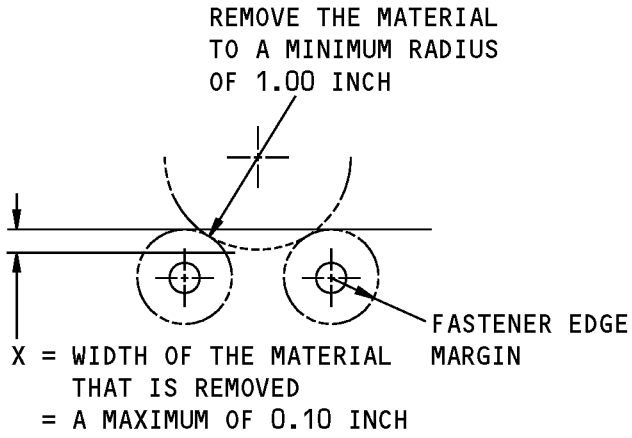
(f) The total cross-sectional area removed from the web:

1) Includes the cross-sectional area of all new fastener holes

2) Includes the cross-sectional area of all damaged material that was removed

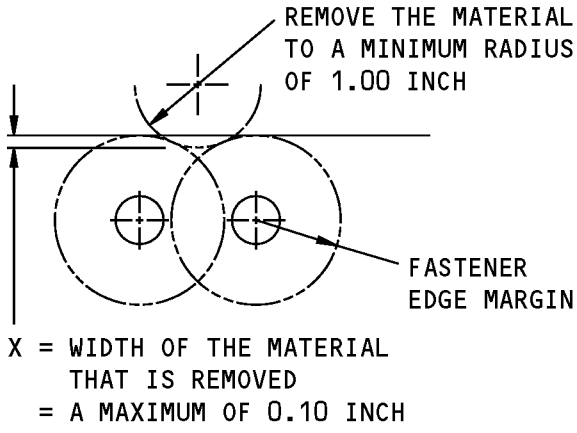
3) Is not more than 15 percent of the initial cross-sectional area (as given by the nominal thickness on the production drawing) between Points A and B of Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Detail G

4) Is not more than 15 percent of the initial cross-sectional area (as given by the nominal thickness on the production drawing) between Points M and N of Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Detail G.



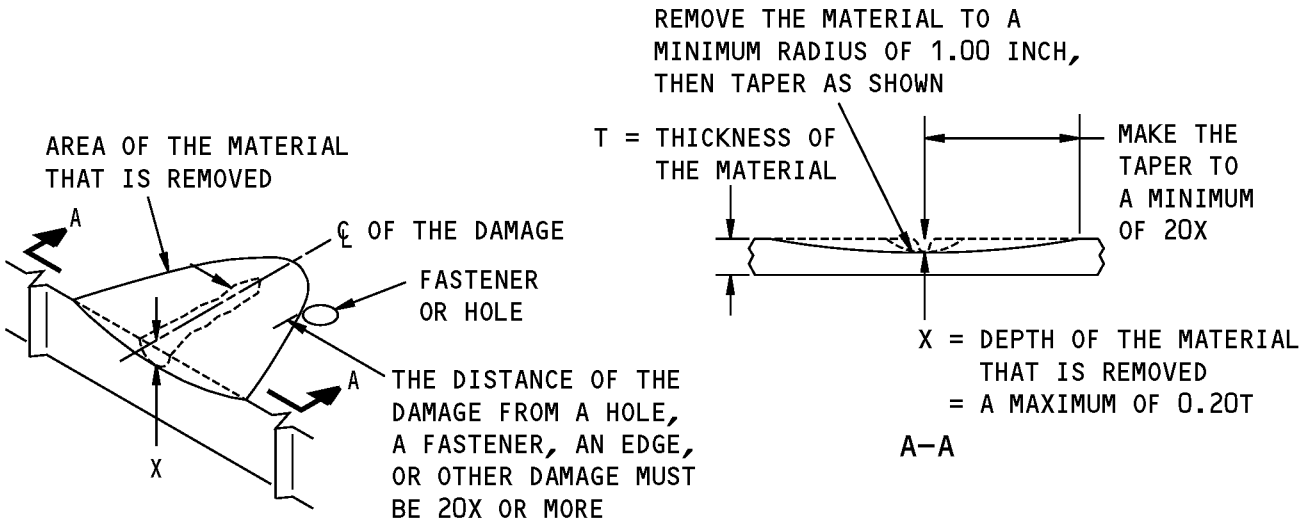
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

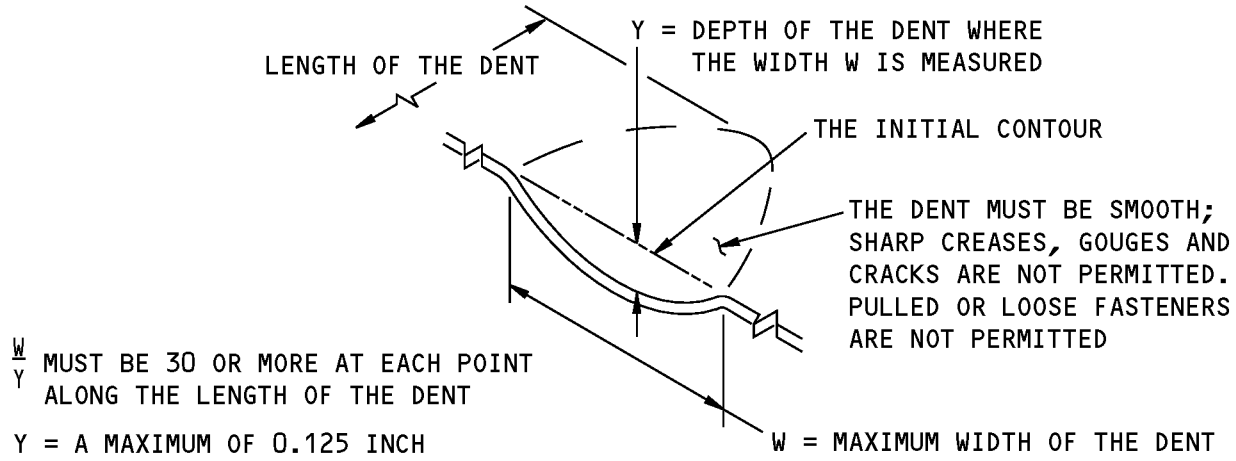
B



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

C

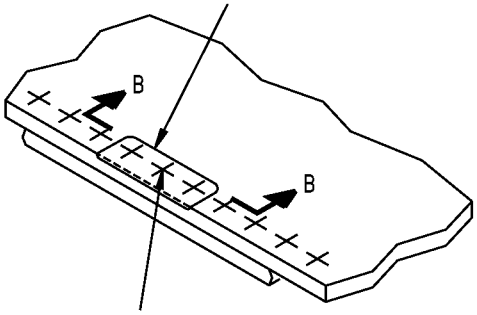
Allowable Damage Limits
Figure 102 (Sheet 1 of 5)



DENT THAT IS PERMITTED

D

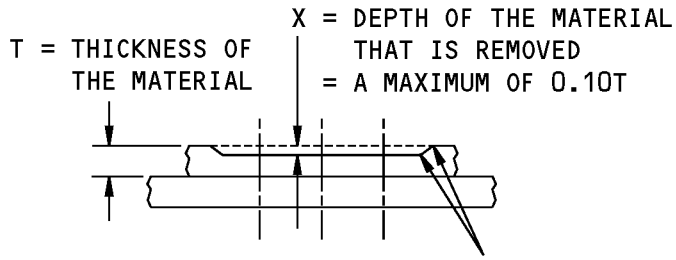
THE REMOVAL OF MATERIAL AROUND THREE FASTENERS IN ALL GROUPS OF TEN IS PERMITTED TO A MAXIMUM DEPTH OF X



REMOVE THE FASTENERS BEFORE THE DAMAGE IS REMOVED. INSTALL THE FASTENERS AFTER THE DAMAGE IS REMOVED

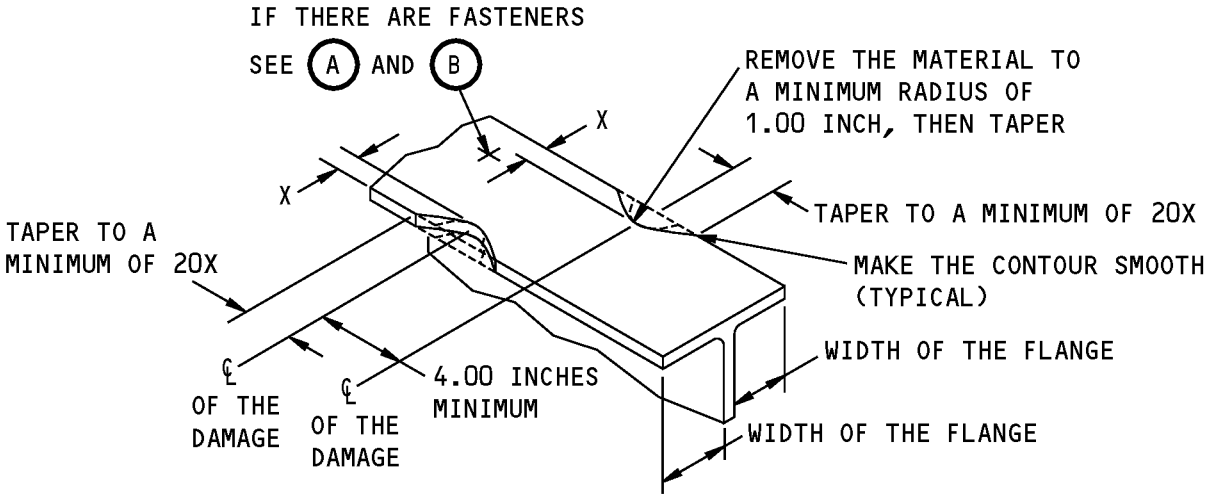
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E



B–B

Allowable Damage Limits
Figure 102 (Sheet 2 of 5)

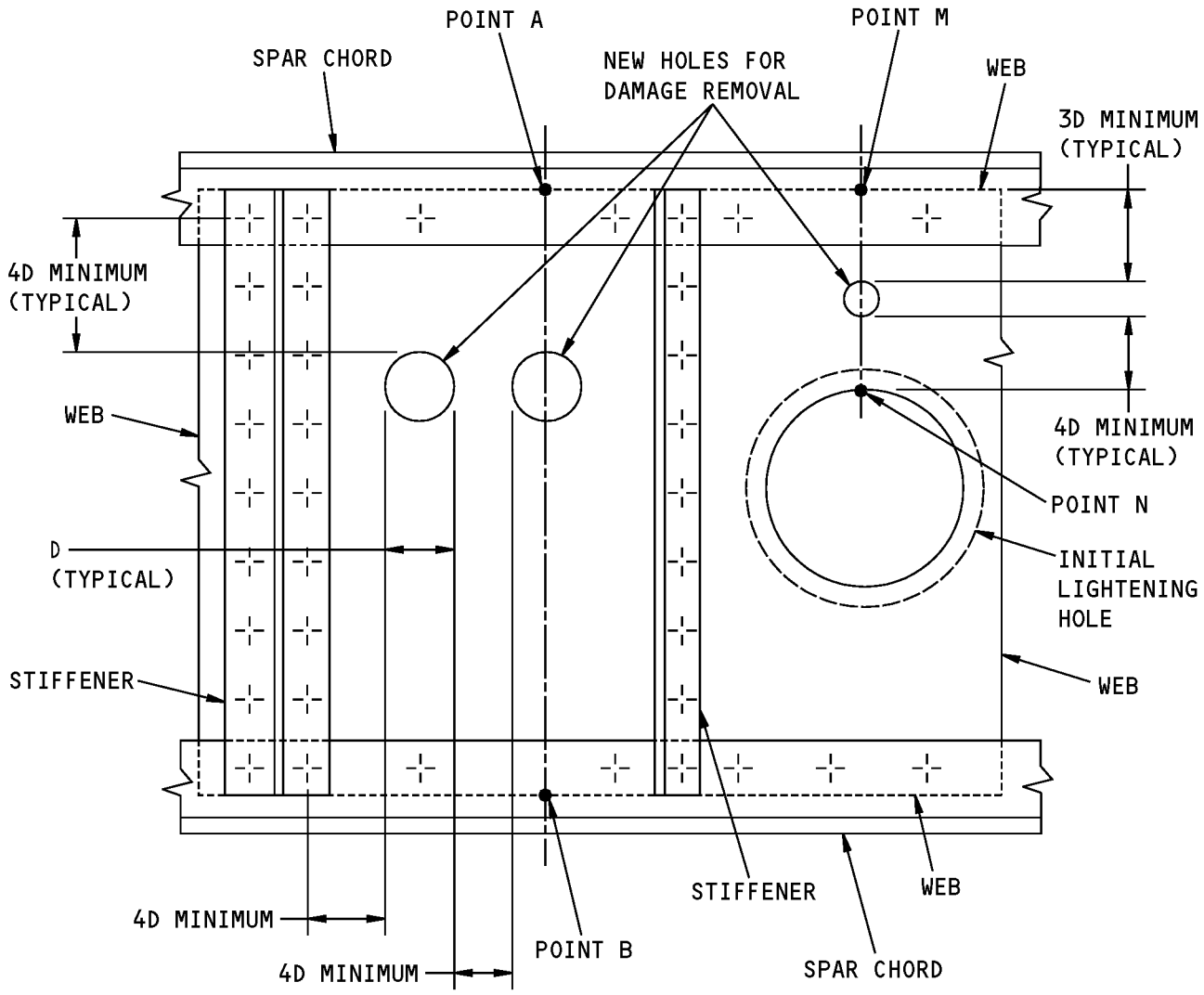


X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

F

Allowable Damage Limits
Figure 102 (Sheet 3 of 5)

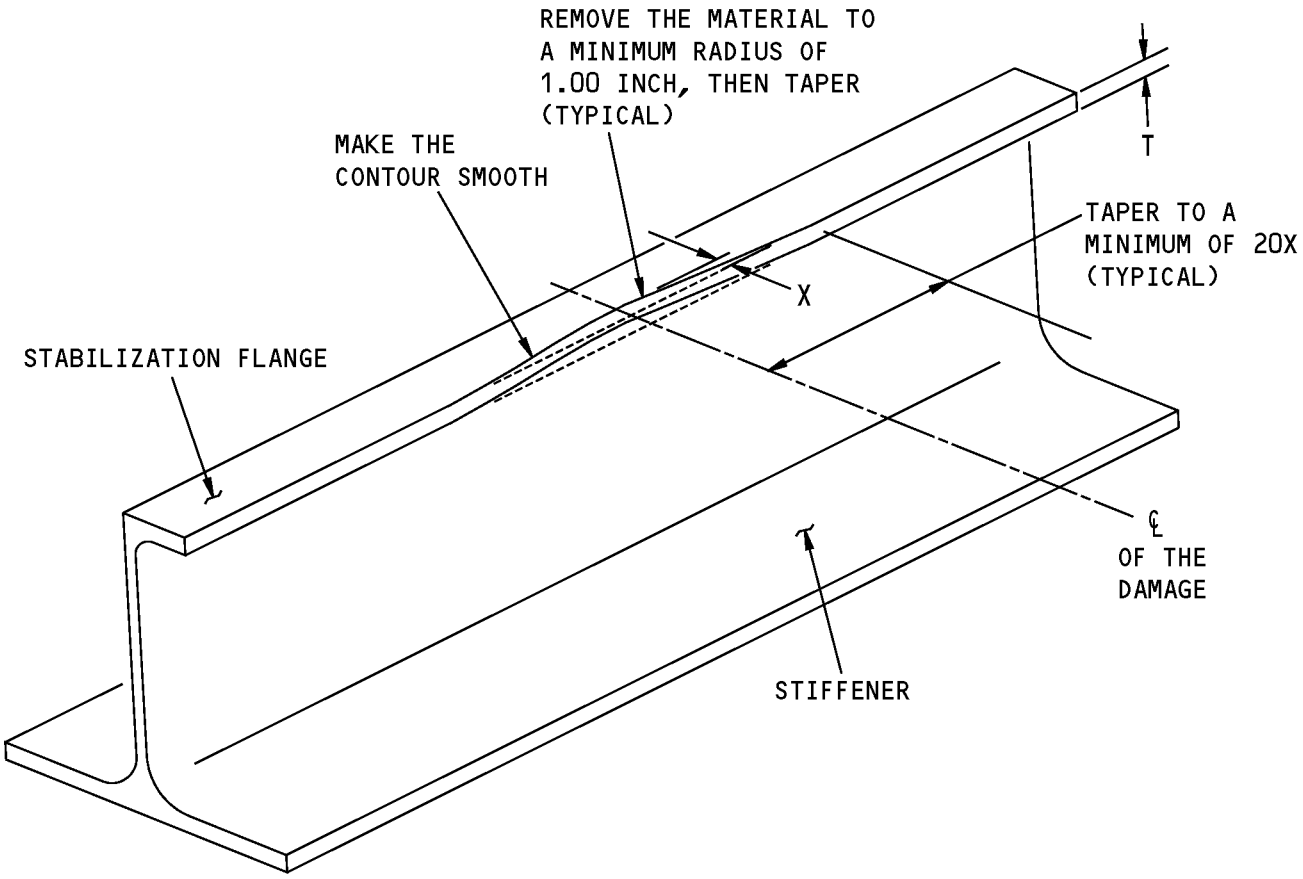


POINTS A, B, AND M ARE ON THE EDGES OF THE WEB
D = THE MAXIMUM DIMENSION OF THE DAMAGE REMOVAL
= 1.00 INCH MAXIMUM
-┼- FASTENER LOCATION

HOLES THAT ARE PERMITTED TO REMOVE
DAMAGED MATERIAL IN WEBS

G

Allowable Damage Limits
Figure 102 (Sheet 4 of 5)



T = THE THICKNESS OF THE FLANGE

X = THE DEPTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.05T

REMOVAL OF DAMAGED MATERIAL FROM THE
STABILIZATION FLANGE OF A STIFFENER

H

Allowable Damage Limits
Figure 102 (Sheet 5 of 5)

REPAIR 1 - VERTICAL STABILIZER SPAR

1. Applicability

A. Repair 1 is applicable to damage to:

(1) The front spar shown in Vertical Stabilizer Front Spar Repairs, Figure 201/REPAIR 1

(2) The rear spar shown in Vertical Stabilizer Rear Spar Repairs, Figure 202/REPAIR 1.

2. Repair Instructions

A. Refer to:

(1) Table 201 to find the applicable repair for a component of the front spar shown in Vertical Stabilizer Front Spar Repairs, Figure 201/REPAIR 1.

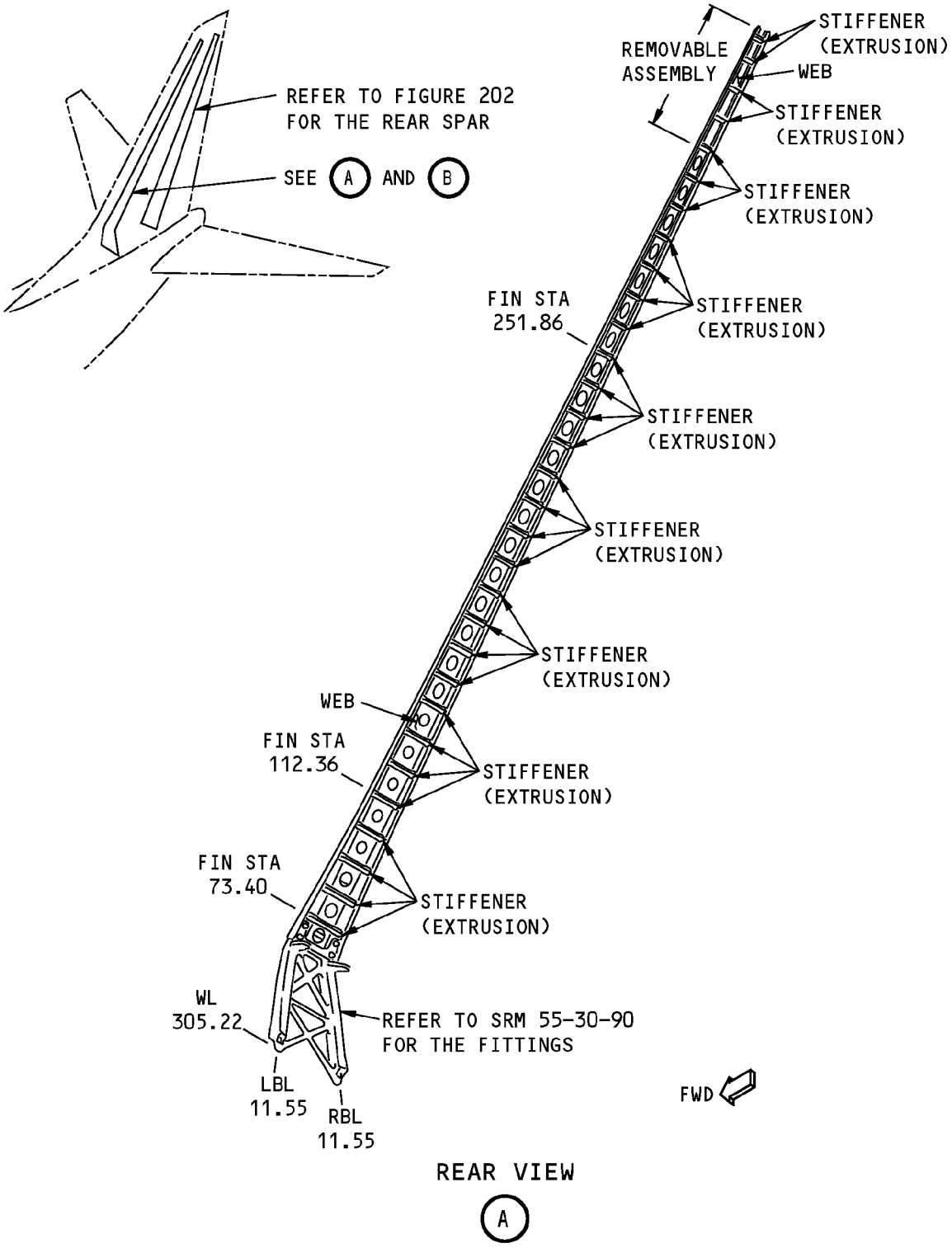
(2) Table 202 to find the applicable repair for a component of the rear spar shown in Vertical Stabilizer Rear Spar Repairs, Figure 202/REPAIR 1.

Table 201:

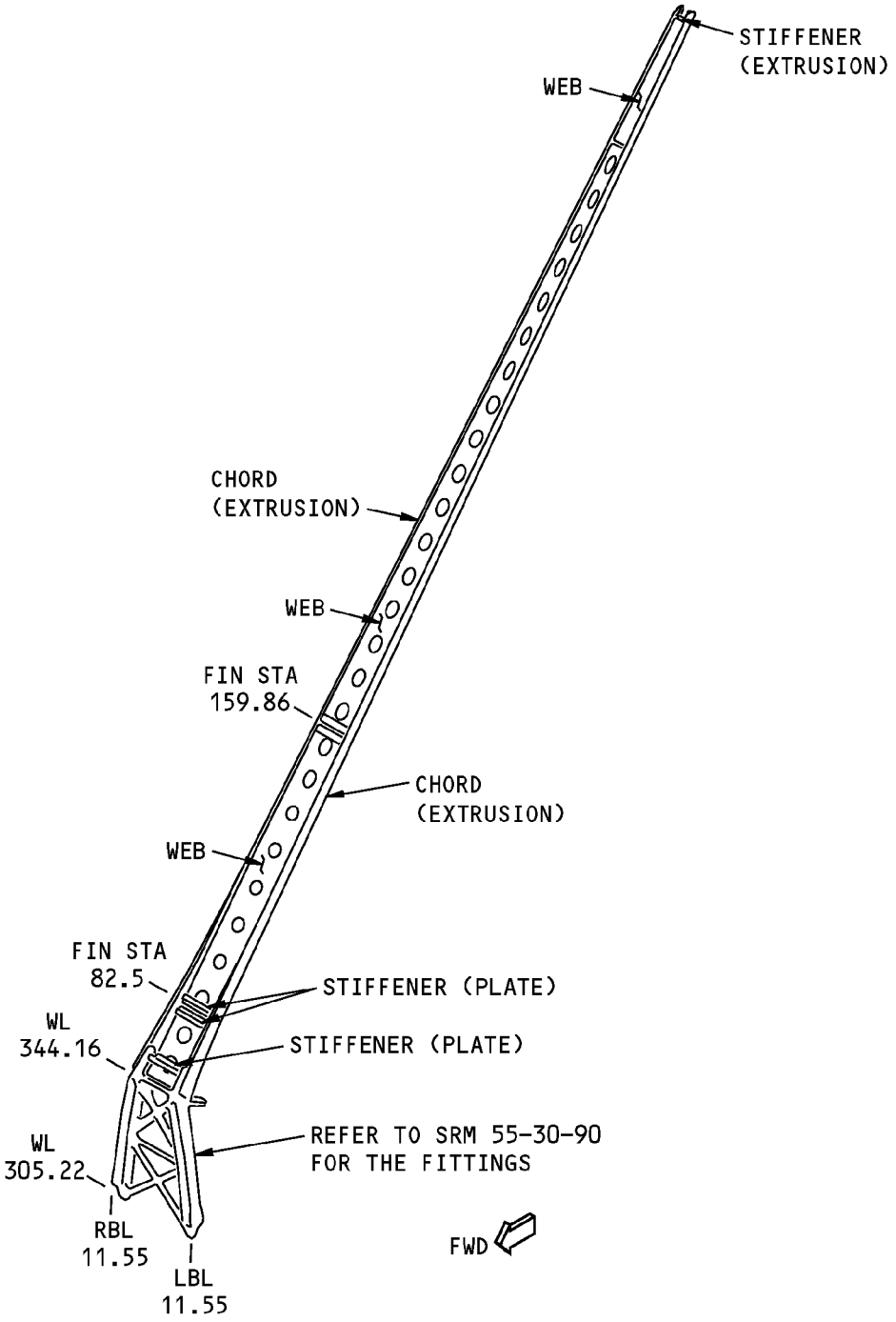
REPAIR REFERENCES FOR THE VERTICAL STABILIZER FRONT SPAR	
COMPONENT	**REPAIR**
Stiffeners (Extrusion)	Refer to SRM 51-70-12
Stiffeners (Plate)	There are no repairs for this component in the Structural Repair Manual at this time.
Chords (Extrusion)	Refer to SRM 51-70-12
Webs	Refer to SRM 55-30-10, Repair 2

Table 202:

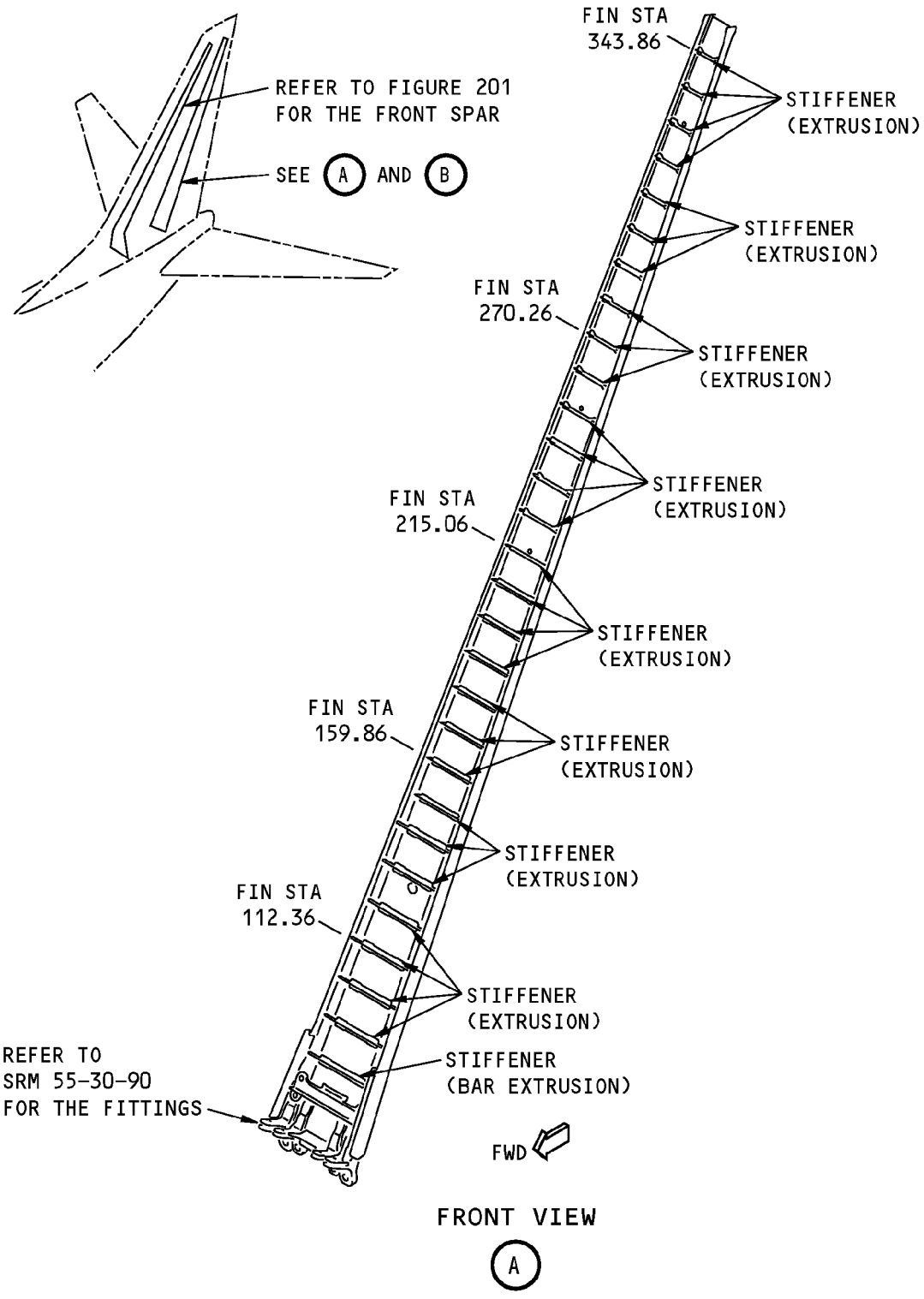
REPAIR REFERENCES FOR THE VERTICAL STABILIZER REAR SPAR	
COMPONENT	**REPAIR**
Stiffeners (Extrusion)	Refer to SRM 51-70-12
Stiffeners (Bar Extrusion)	Refer to SRM 51-70-12
Chords	There are no repairs for this component in the Structural Repair Manual at this time.
Webs	Refer to SRM 55-30-10, Repair 3



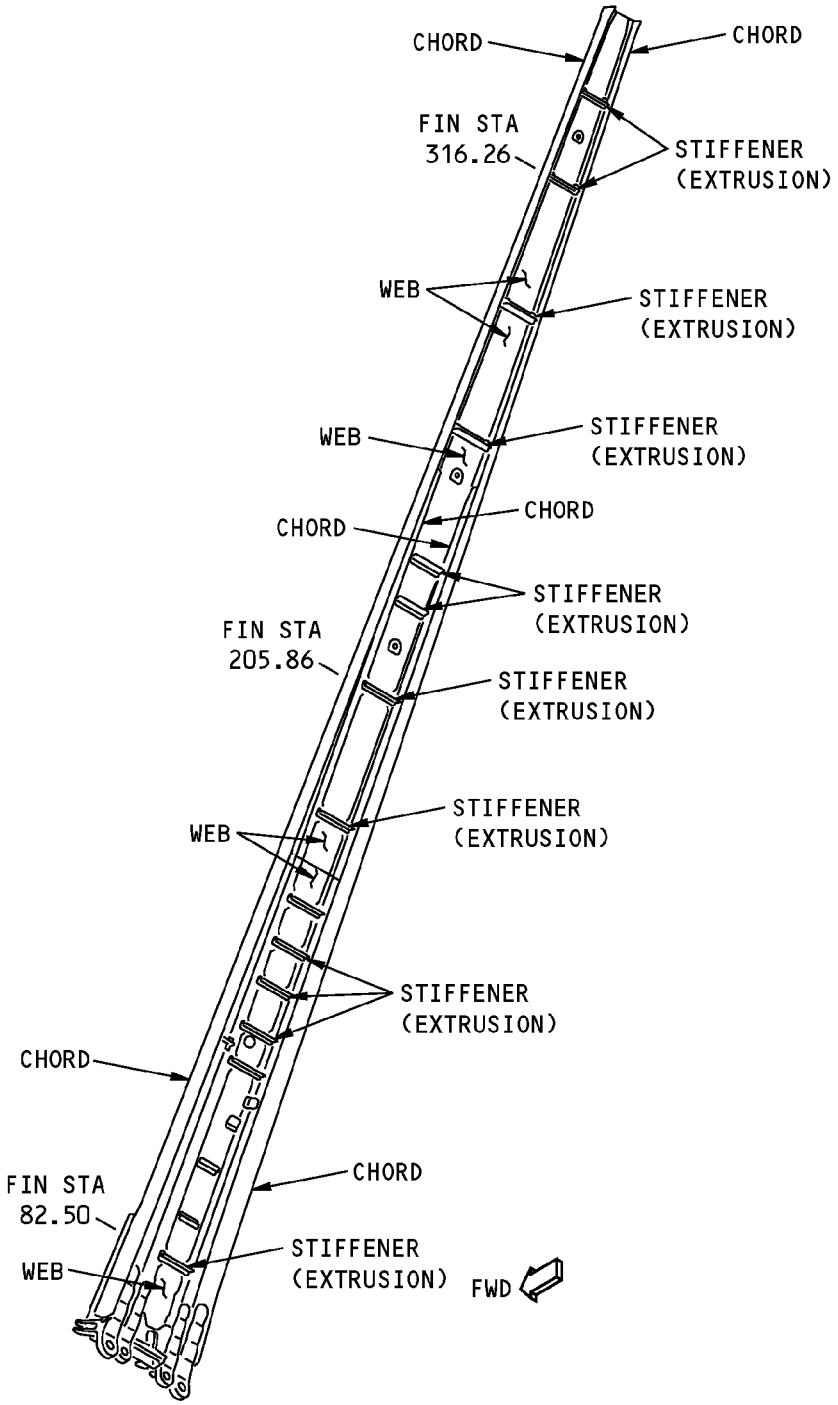
Vertical Stabilizer Front Spar Repairs
Figure 201 (Sheet 1 of 2)



Vertical Stabilizer Front Spar Repairs
Figure 201 (Sheet 2 of 2)



Vertical Stabilizer Rear Spar Repairs
Figure 202 (Sheet 1 of 2)

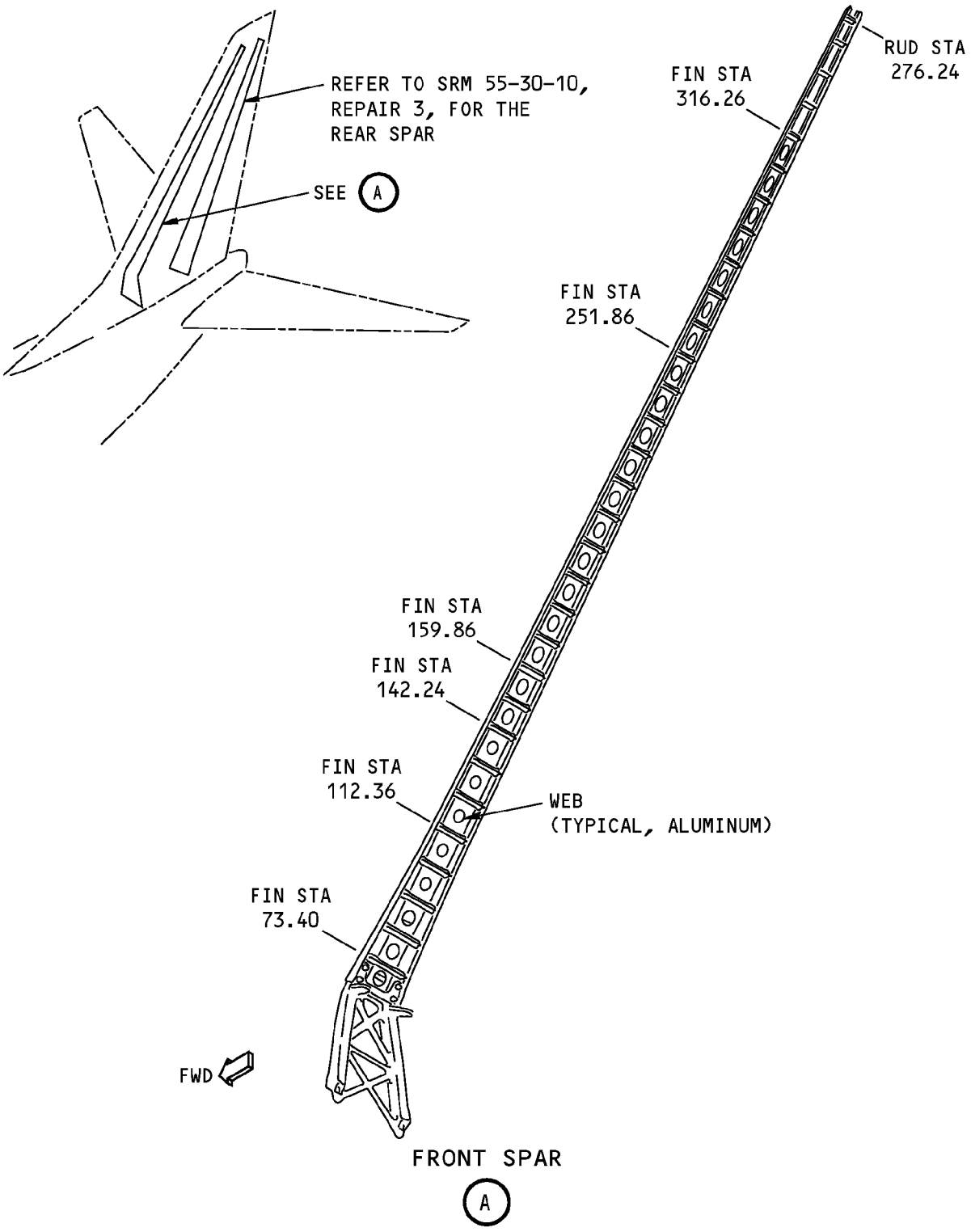


Vertical Stabilizer Rear Spar Repairs
Figure 202 (Sheet 2 of 2)

REPAIR 2 - VERTICAL STABILIZER FRONT SPAR WEB

1. Applicability

A. Repair 2 is applicable to damage to the web of the vertical stabilizer front spar if the damage is between Fin Station 73.40 and Rudder Station 276.24. Refer to Vertical Stabilizer Front Spar Location, Figure 201/REPAIR 2.



Vertical Stabilizer Front Spar Location
Figure 201

2. General

A. Repair 2 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Repair Instructions

A. Remove initial fasteners from skin assemblies as necessary to get access to the damaged area of the web. Refer to 51-40-02.

B. Drill a stop hole at the ends of all web cracks that do not end at fastener holes. Refer to Vertical Stabilizer Front Spar Web Repair, Figure 202/REPAIR 2 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the web as shown in Vertical Stabilizer Front Spar Web Repair, Figure 202/REPAIR 2. Refer to 51-10-02 for the procedures to remove the damage.

C. Assemble the repair part as shown in Vertical Stabilizer Front Spar Web Repair, Figure 202/REPAIR 2.

D. Drill the fastener holes. Refer to 51-40-05 for the fastener hole dimensions.

E. Remove the repair part.

F. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair part and the bare surfaces of the web.

G. Remove the initial web fasteners and stiffeners as necessary for the repair.

H. Make the repair part as shown in Vertical Stabilizer Front Spar Web Repair, Figure 202/REPAIR 2. Refer to Table 201/REPAIR 2 for the repair material.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 7075-T6 sheet. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended. You are permitted to make the repair part from 7075-T6 plate

Table 202:

REPAIR PART THICKNESSES FOR INITIAL WEB THICKNESS		
INITIAL WEB THICKNESS (INCH)	**LOCATION OF DAMAGE (FIN STATION, FS) (RUDDER STATION, RS)**	**ITEM [1] DOUBLER THICKNESS (INCH)**
0.090	FS 73.40 TO FS 91.55	0.100
0.100	FS 91.55 TO FS 143.15	0.100
0.070	FS 143.15 TO FS 159.86	0.080
0.063	FS 159.86 TO FS 251.86	0.071
0.050	FS 251.86 TO FS 316.26	0.063
0.025	FS 316.26 TO RS 276.24	0.040

I. Apply a chemical conversion coating to the repair part and bare surfaces of the web. Refer to 51-20-01 for the chemical conversion coating procedures.

J. Apply one layer of BMS 10-11, Type I, primer to the area of the repair. Refer to SOPM 20-41-02 for the procedures to apply the primer.

(1) Apply the primer to the repair part.

(2) Apply the primer to the bare surfaces of the web.

K. Install the repair part with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

(1) It is optional to bond the repair part to the initial web as given in 51-70-09. This option will increase the fatigue life of the repair.

L. Install the initial web stiffeners.

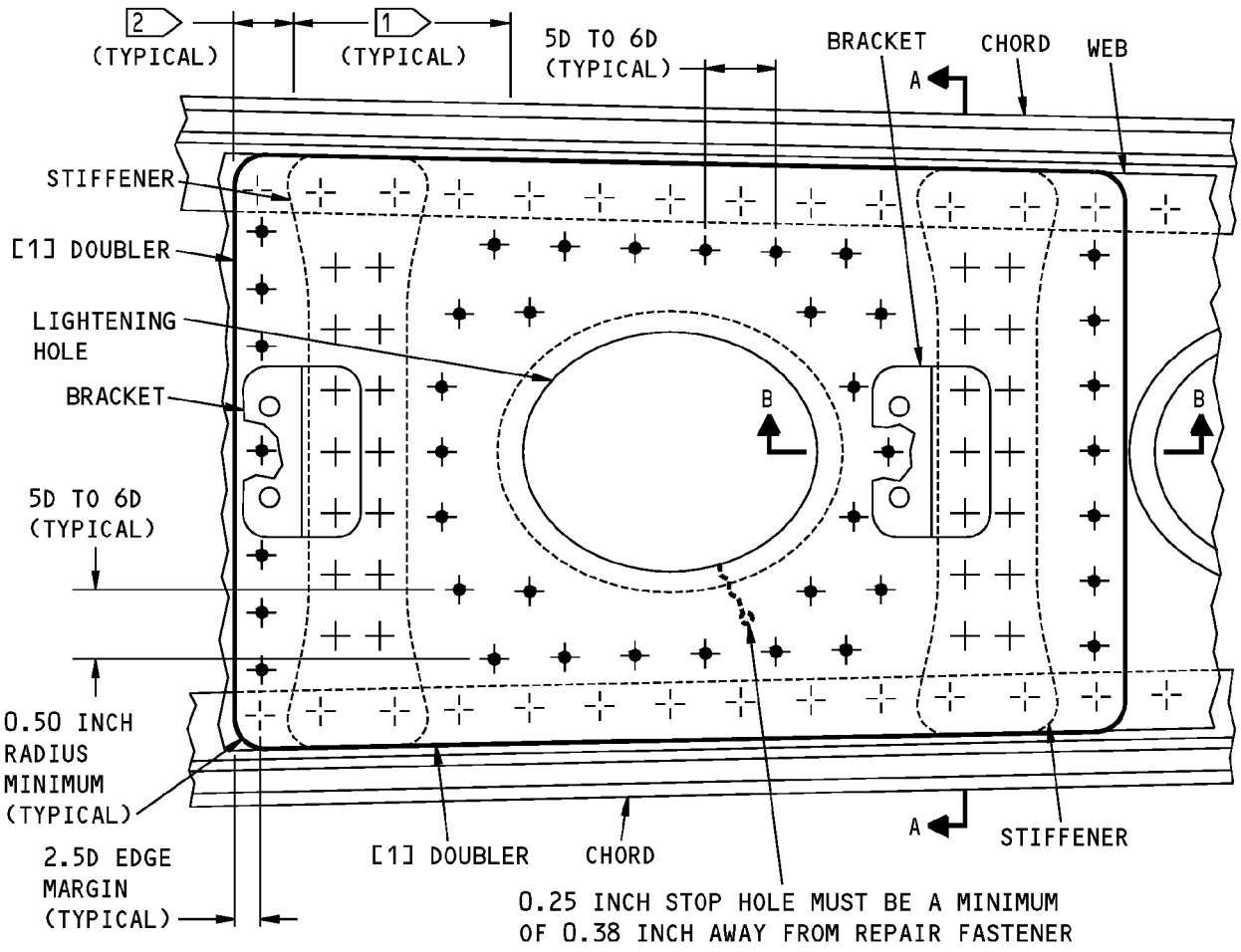
M. Install the fasteners.

(1) Install the hex drive fasteners wet with BMS 5-95 sealant in transition fit holes.

(2) Install the rivets at the initial locations without sealant.

N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.

O. Install the skin assemblies, if they were removed.



NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.

1 MAKE SURE THAT THERE IS A MINIMUM OF THREE HORIZONTAL ROWS OF FASTENERS ON EACH SIDE OF THE DAMAGED AREA.

2 PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.

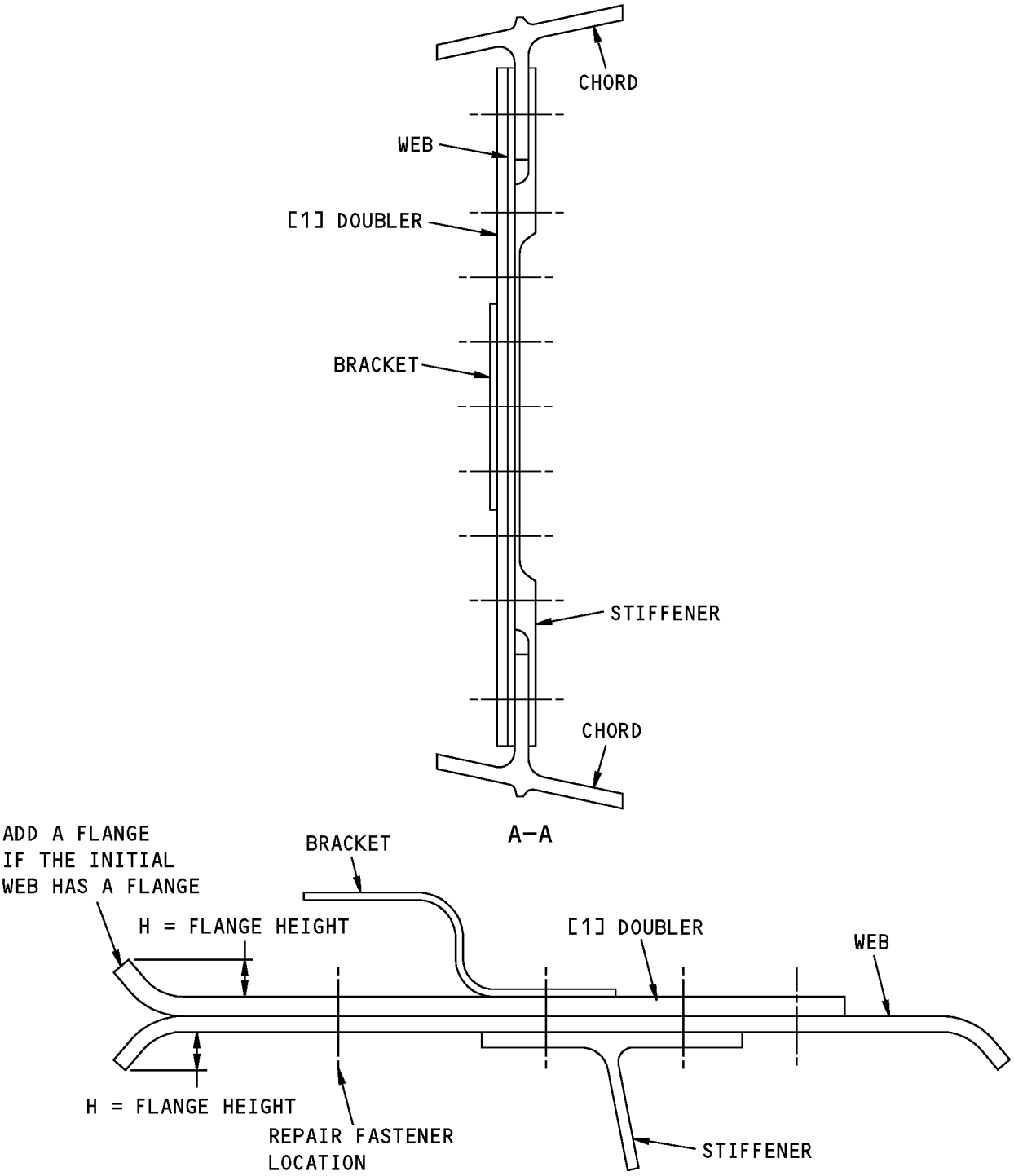
FASTENER SYMBOLS

INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE) AS THE INITIAL FASTENER.

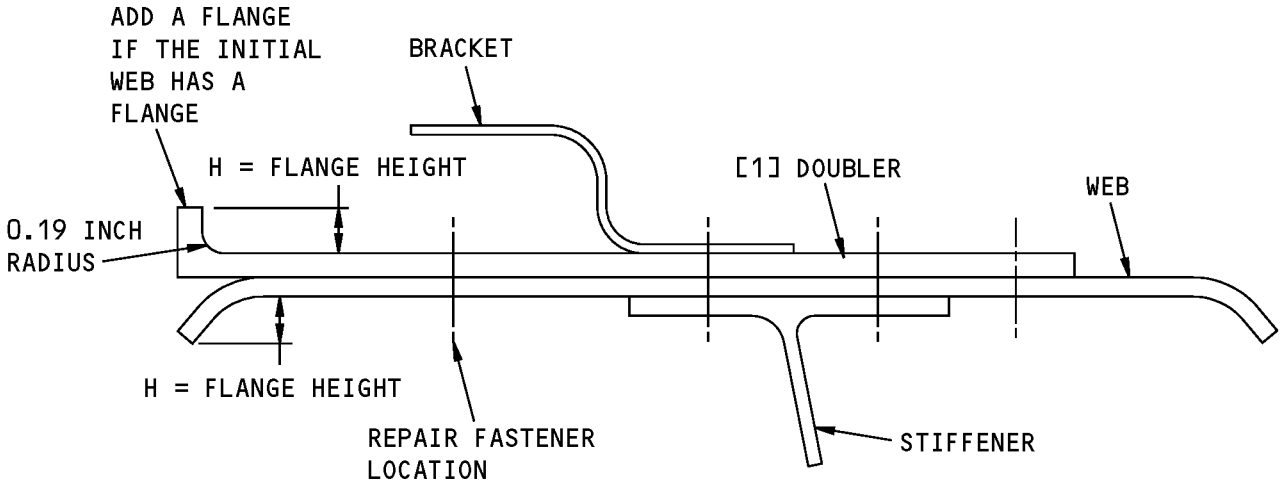
REPAIR FASTENER LOCATION. INSTALL A BACB30VT5K OR BACB30FM5A HEX DRIVE BOLT. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

INITIAL FASTENER LOCATION. INSTALL A BACB30MY()K()X HEX DRIVE BOLT THAT IS UP TO 1/64 INCH DIAMETER OVERSIZE. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Vertical Stabilizer Front Spar Web Repair
Figure 202 (Sheet 1 of 3)



Vertical Stabilizer Front Spar Web Repair
Figure 202 (Sheet 2 of 3)



B–B
REPAIR SHOWN WITH
OPTIONAL MACHINED DOUBLER

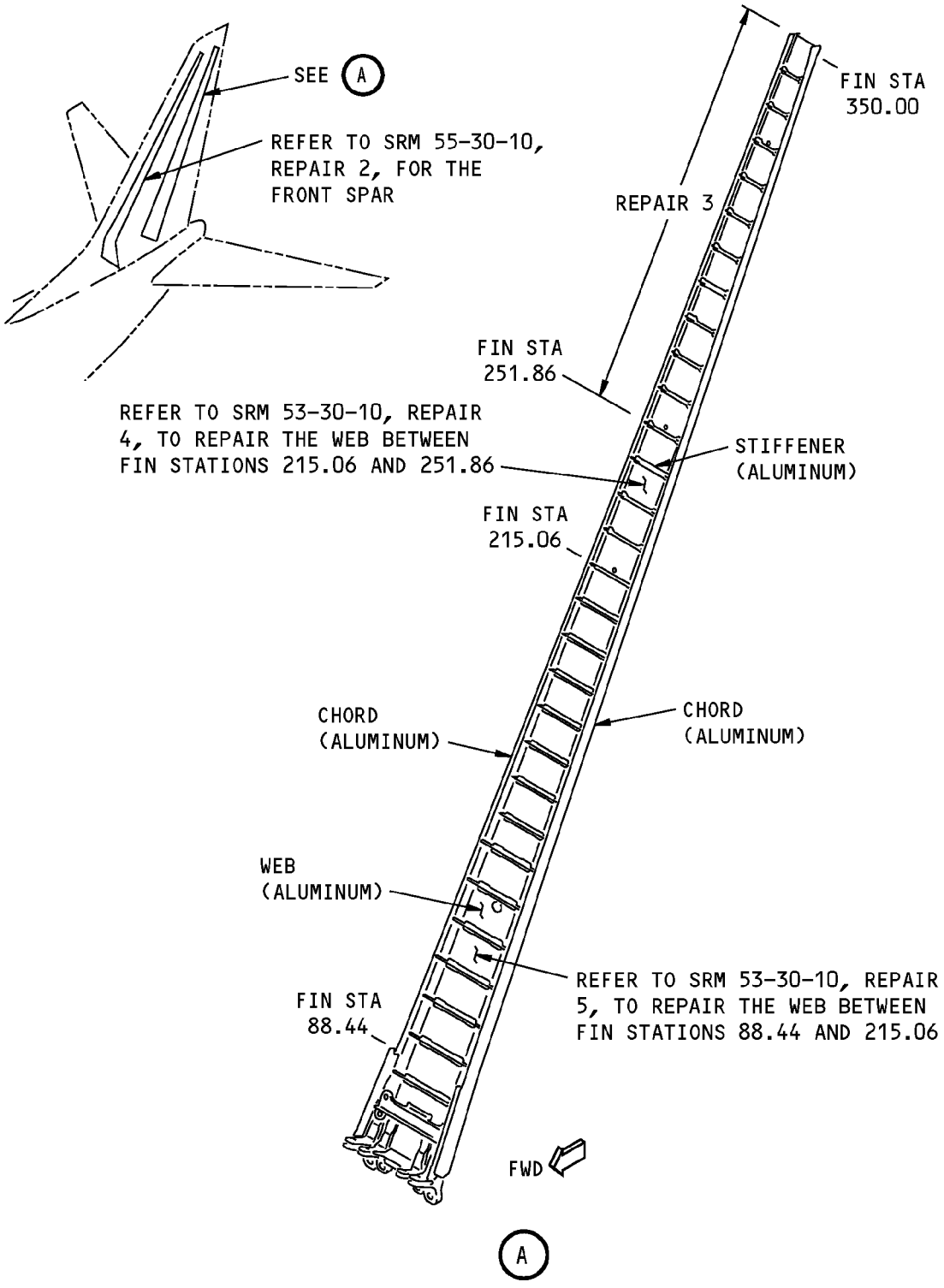
Vertical Stabilizer Front Spar Web Repair
Figure 202 (Sheet 3 of 3)

REPAIR 3 - VERTICAL STABILIZER REAR SPAR WEB - FIN STATIONS 251.86 TO 350.00

1. Applicability

A. Repair 3 is applicable to damage to the web of the vertical stabilizer rear spar shown in Vertical Stabilizer Rear Spar Location, Figure 201/REPAIR 3 if:

(1) The damage is between Fin Stations 251.86 and 350.00.



Vertical Stabilizer Rear Spar Location
Figure 201

2. General

A. Repair 3 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Repair Instructions

A. Remove initial fasteners from skin assemblies as necessary to get access to the damaged area of the web. Refer to 51-40-02.

B. Drill a stop hole at the ends of all web cracks that do not end at fastener holes. Refer to Vertical Stabilizer Rear Spar Web Repair, Figure 202/REPAIR 3 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the web as shown in Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed , Figure 203/REPAIR 3. Refer to 51-10-02 for the procedures to remove the damage.

C. Remove the initial web fasteners and stiffeners as necessary for the repair.

D. Make the repair parts as shown in Vertical Stabilizer Rear Spar Web Repair, Figure 202/REPAIR 3 or Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed , Figure 203/REPAIR 3, as applicable. Refer to Table 201/REPAIR 3 for the repair materials.

E. Assemble the repair parts as shown in Vertical Stabilizer Rear Spar Web Repair, Figure 202/REPAIR 3 or Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed , Figure 203/REPAIR 3, as applicable.

F. Drill the fastener holes. Refer to 51-40-05 for the fastener hole dimensions.

G. Remove the repair parts.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the web.

I. Apply a chemical conversion coating to the repair parts and bare surfaces of the web. Refer to 51-20-01 for the chemical conversion coating procedures.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 7075-T6 sheet. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended
[2]	Tapered Shim	4	Use clad or bare 7075-T6 sheet. The use of clad material is recommended
[3]	Web Filler	1	Use clad or bare 7075-T6 sheet. Make the thickness of the filler the same as the initial web. The use of clad material is recommended. This part is applicable only for the repair shown in Figure 203

Table 202:

REPAIR PART THICKNESSES FOR INITIAL WEB THICKNESSES		
INITIAL WEB THICKNESS (INCH)	**LOCATION OF DAMAGE (FIN STATION, FS)**	**ITEM [1] DOUBLER THICKNESS (INCH)**
0.032	FS 251.86 to FS 288.66	0.040
0.025	FS 288.66 to FS 350.00	0.032

J. Apply one layer of BMS 10-11, Type I, primer to the area of the repair. Refer to SOPM 20-41-02 for the procedures to apply the primer.
   (1) Apply the primer to the repair parts.
   (2) Apply the primer to the bare surfaces of the web.

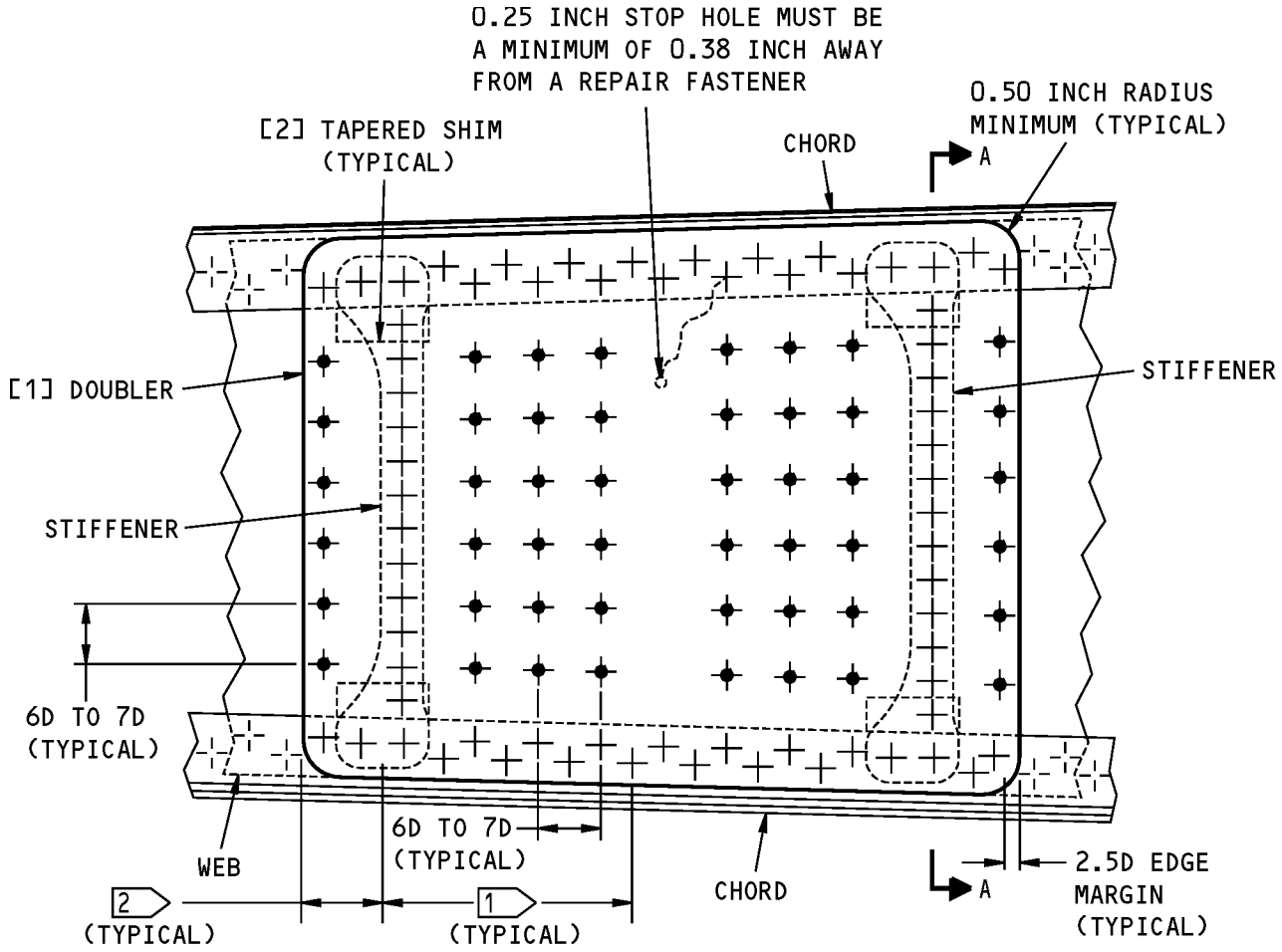
K. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.
   (1) It is optional to bond the part [1] doubler to the initial web as given in 51-70-09. This option will increase the fatigue life of the repair.

L. Install the initial web stiffeners.

M. Install the fasteners.
   (1) Install the rivets at the repair and initial locations without sealant.
   (2) Install the hex drive fasteners at the initial locations wet with BMS 5-95 sealant in transition fit holes.

N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.

O. Install the skin assemblies if they were removed.



NOTES

1. MAKE SURE THERE IS A MINIMUM OF FOUR HORIZONTAL ROWS OF FASTENERS ON EACH SIDE OF THE DAMAGE.
2. PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.
   - (D) IS THE DIAMETER OF THE REPAIR FASTENER.
   - MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

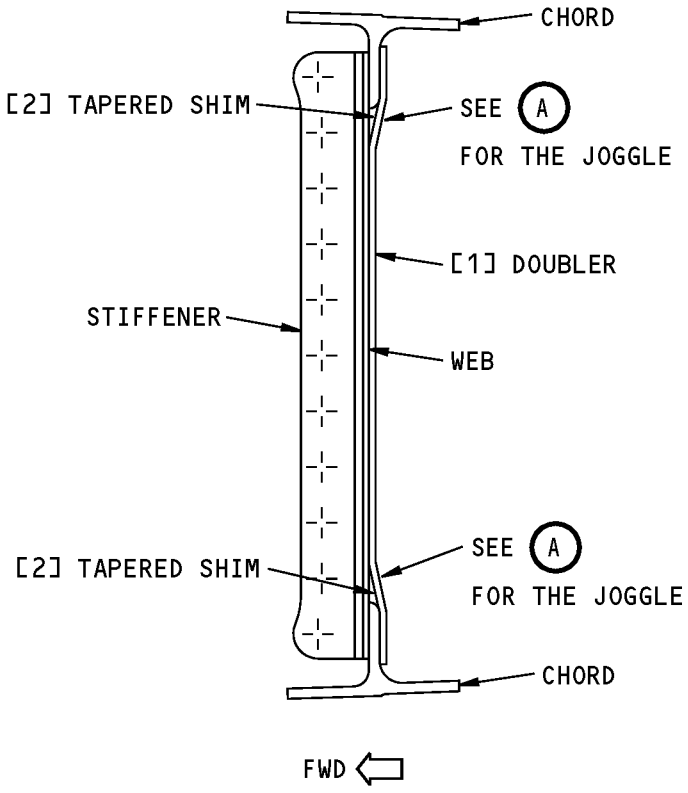
FASTENER SYMBOLS

-¦- REFERENCE FASTENER LOCATION

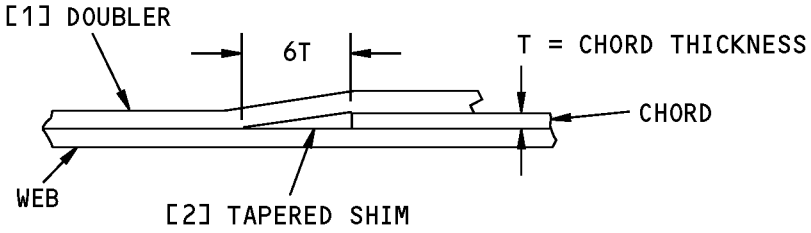
┼ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE FOR RIVETS AND 1/64 INCH DIAMETER OVERSIZE FOR HEX DRIVE BOLTS) AS THE INITIAL FASTENER.

✦ REPAIR FASTENER LOCATION. INSTALL A BACR15BB5D() RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Vertical Stabilizer Rear Spar Web Repair
Figure 202 (Sheet 1 of 2)

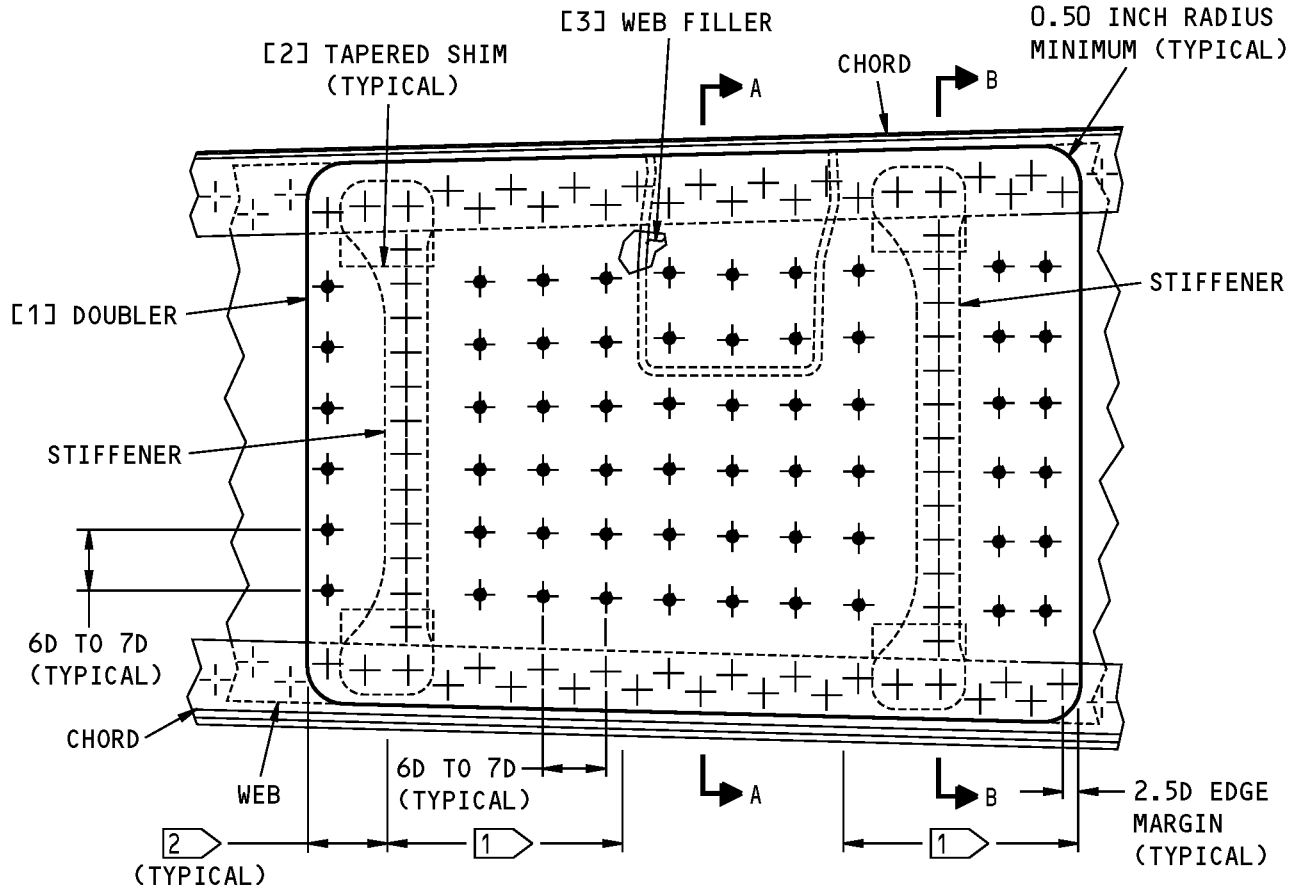


A–A



JOGGLE
(TYPICAL)
A

Vertical Stabilizer Rear Spar Web Repair
Figure 202 (Sheet 2 of 2)



NOTES

1. MAKE SURE THERE IS A MINIMUM OF FOUR HORIZONTAL ROWS OF FASTENERS ON EACH SIDE OF THE DAMAGE.
2. PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.
- MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

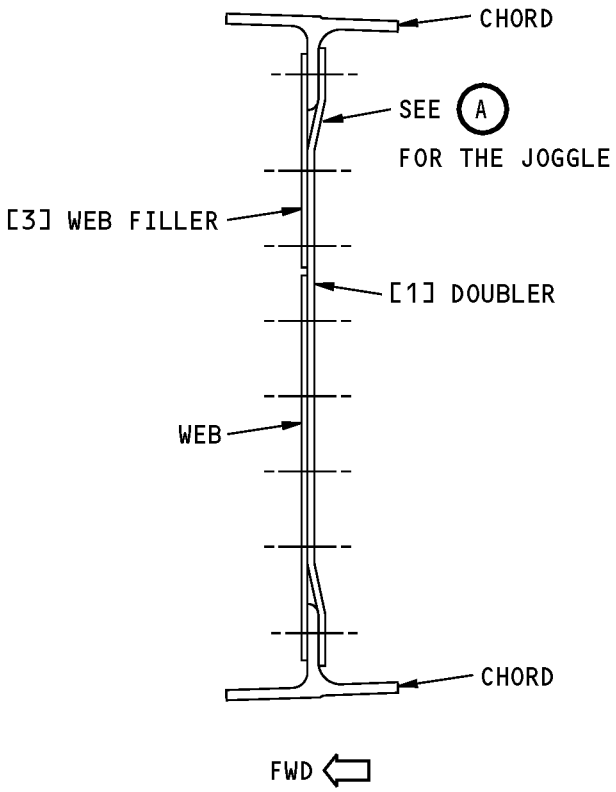
FASTENER SYMBOLS

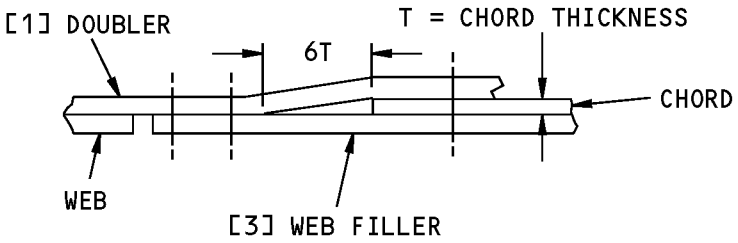
-⊹- REFERENCE FASTENER LOCATION

┼ INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE FOR RIVETS AND 1/64 INCH DIAMETER OVERSIZE FOR HEX DRIVE BOLTS) AS THE INITIAL FASTENER.

✦ REPAIR FASTENER LOCATION. INSTALL A BACR15BB5D() RIVET. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

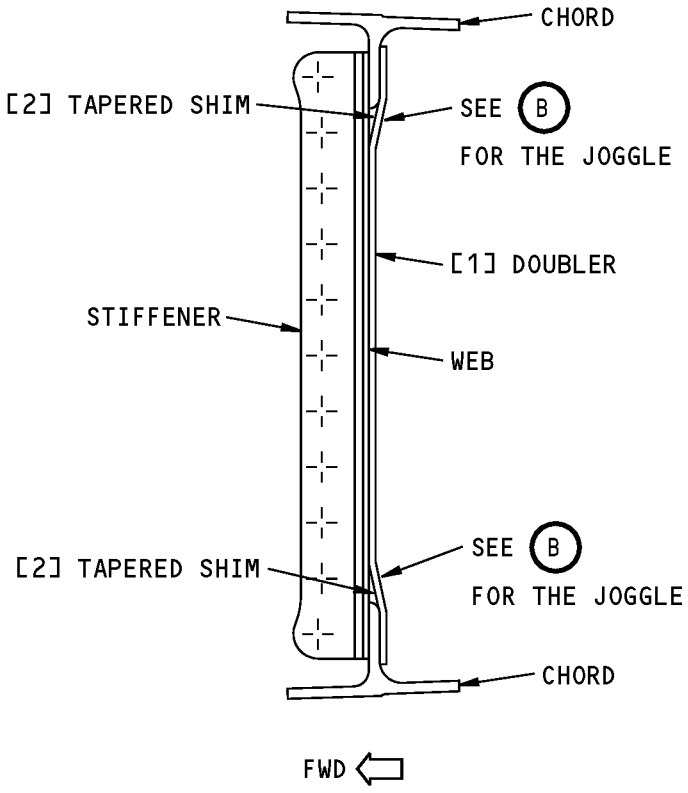
Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed
Figure 203 (Sheet 1 of 3)



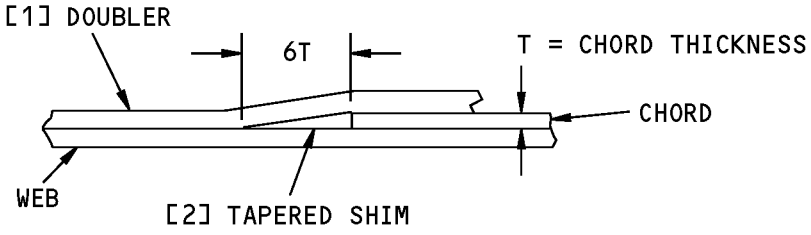


JOGGLE
(TYPICAL)
A

Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed
Figure 203 (Sheet 2 of 3)



B–B



JOGGLE
(TYPICAL)
B

Vertical Stabilizer Rear Spar Web Repair With the Area of Damage Removed
Figure 203 (Sheet 3 of 3)

REPAIR 4 - VERTICAL STABILIZER REAR SPAR WEB REPAIR - FIN STATIONS 215.06 THRU 251.86

1. Applicability

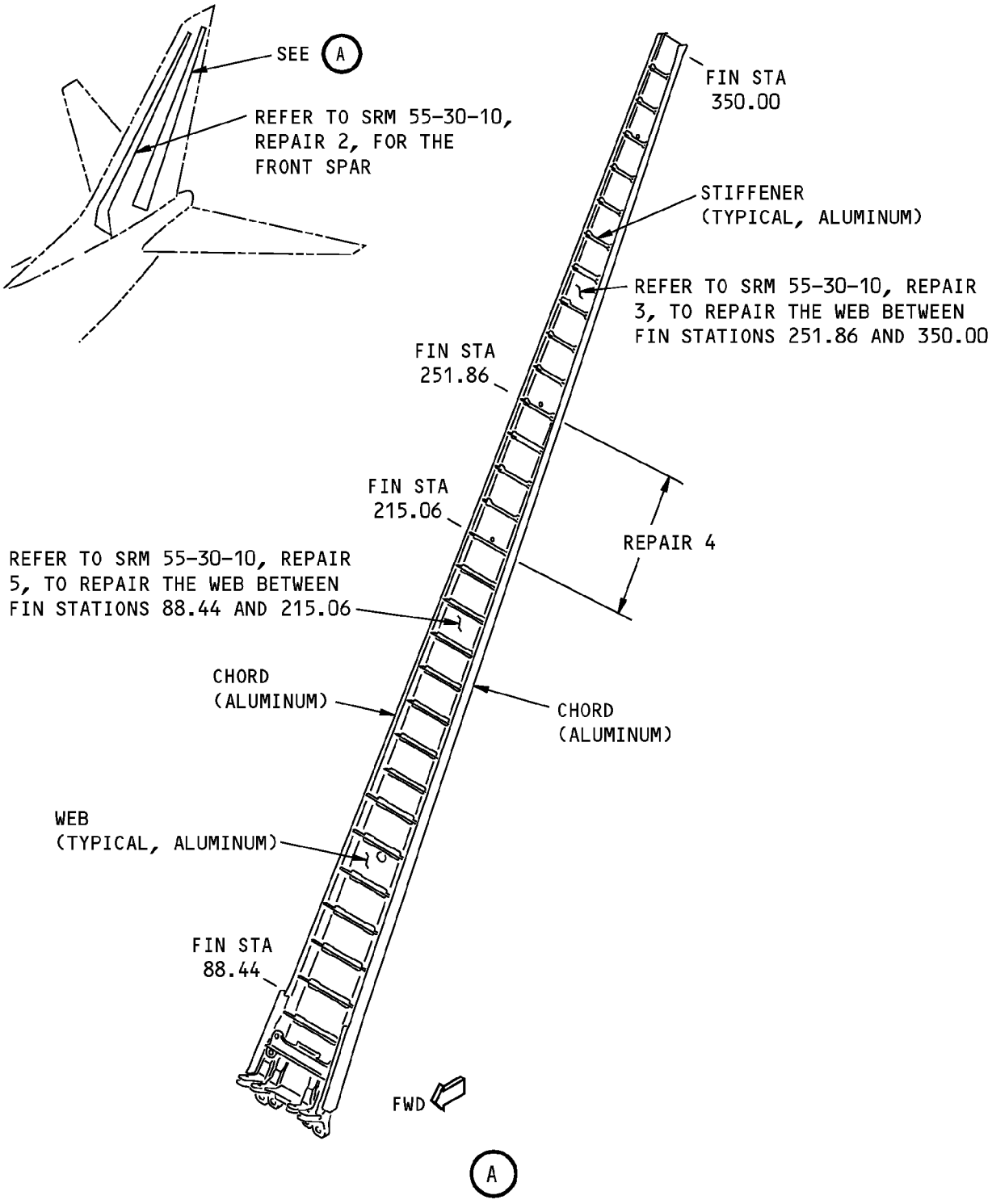
A. Repair 4 is applicable to damage to the web of the vertical stabilizer rear spar shown in Figure 201/REPAIR 4 if:

(1) The damage is between Fin Stations 215.06 and 251.86.

2. General

A. Repair 4 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to 51-30-05 for possible sources of the equipment and tools you need to remove the damage.



Vertical Stabilizer Rear Spar Location
Figure 201

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
737 NDT Part 4, 55-30-01	Vertical Stabilizer Rear Spar Primary Chords

4. Repair Instructions

A. Remove initial fasteners from skin assemblies as necessary to get access to the damaged area of the web. Refer to 51-40-02.

B. Drill a stop hole at the ends of all web cracks that do not end at fastener holes. Refer to Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86, Figure 202/REPAIR 4, Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86, Figure 203/REPAIR 4, and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the web as shown in Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86, Figure 202/REPAIR 4 or Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86, Figure 203/REPAIR 4. Refer to 51-10-02 for the procedures to remove the damage.

C. Remove the initial web fasteners and stiffeners as necessary for the repair.

D. Make the repair part as shown in Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86, Figure 202/REPAIR 4 or Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86, Figure 203/REPAIR 4. Refer to Table 201/REPAIR 4 for the repair material.

E. Assemble the repair part as shown in Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86, Figure 202/REPAIR 4 or Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86, Figure 203/REPAIR 4.

F. Drill the fastener holes. Refer to 51-40-05 for the fastener hole dimensions.

G. Remove the repair part.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair part and the bare surfaces of the web.

I. Apply a chemical conversion coating to the repair part and bare surfaces of the web. Refer to 51-20-01 for the chemical conversion coating procedures.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 7075-T6 that is 0.050 inch thick. Make the thickness 0.090 inch thick if you make the Part [2] Splice shown in Figure 203. The use of clad material is recommended
[2]	Splice	1	Use clad or bare 7075-T6 that is 0.090 inch thick. The use of clad material is recommended. This part is needed for the repair shown in Figure 203
[3]	Filler	1	Use clad or bare 7075-T6. The use of clad material is recommended. Use this filler when you do the repair shown in Figure 203
[4]	Filler	2	Use clad or bare 7075-T6 that is 0.090 inch thick. The use of clad material is recommended. Use these fillers when you do the repair shown in Figure 203
[5]	Stiffener	2	Make the stiffeners from a 7075-T6511 extrusion. Make the stiffeners the same shape as the initial stiffeners on the production drawing except for a shorter flange height. Use these stiffeners when you do the repair shown in Figure 203

J. Apply one layer of BMS 10-11, Type I, primer to the area of the repair. Refer to SOPM 20-41-02 for the procedures to apply the primer.

(1) Apply the primer to the repair part.

(2) Apply the primer to the bare surfaces of the web.

K. Install the repair part with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

(1) It is optional to bond the part [1] doubler to the initial web as given in 51-70-09. This option will increase the fatigue life of the repair.

L. Install the initial web stiffeners, as necessary.

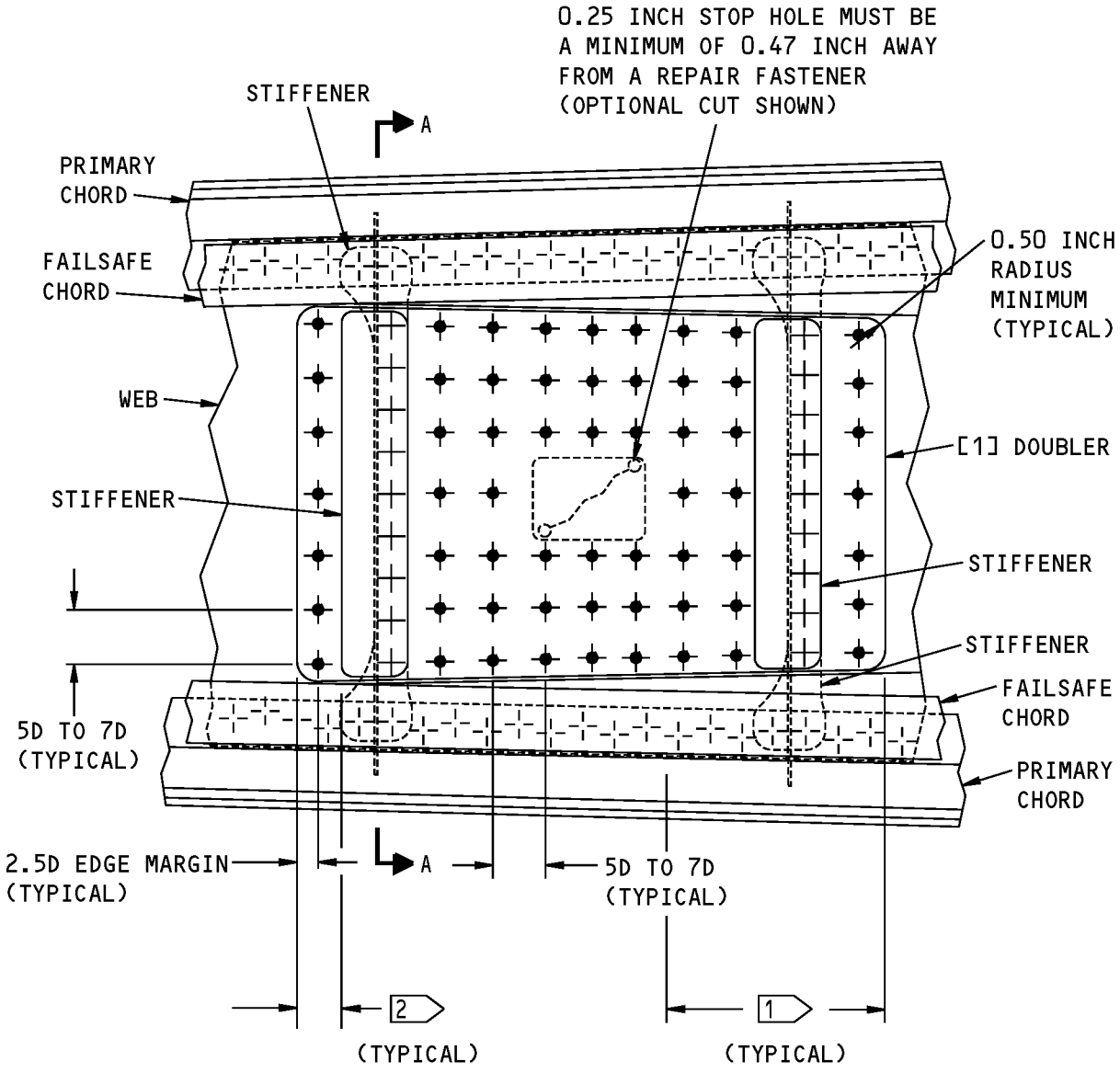
M. Install the fasteners.

(1) Install the hex drive fasteners at the repair and initial locations wet with BMS 5-95 sealant in transition fit holes.

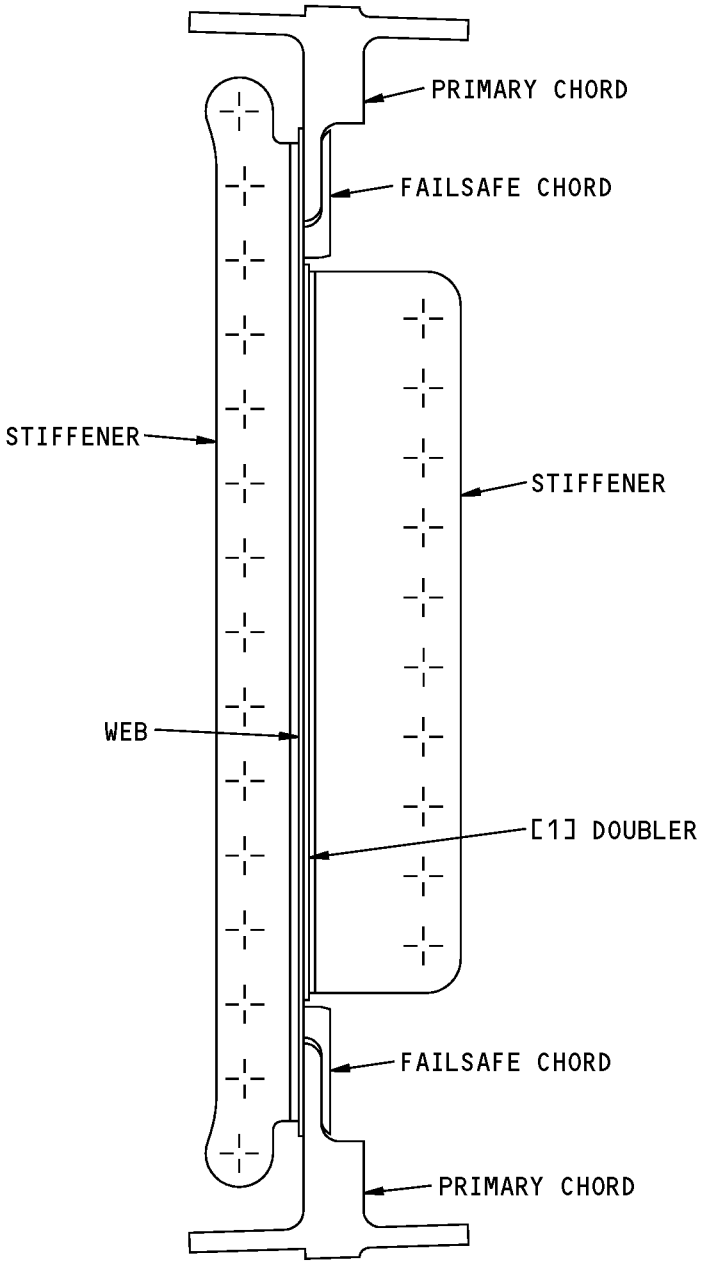
(2) Install the rivets at the initial locations without sealant.

N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.

O. Install the skin assemblies, if they were removed.



Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86
Figure 202 (Sheet 1 of 3)



A–A

Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86
Figure 202 (Sheet 2 of 3)

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.
- MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

1 MAKE SURE THERE IS A MINIMUM OF THREE ROWS OF REPAIR FASTENERS ALL AROUND THE DAMAGE.

2 PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.

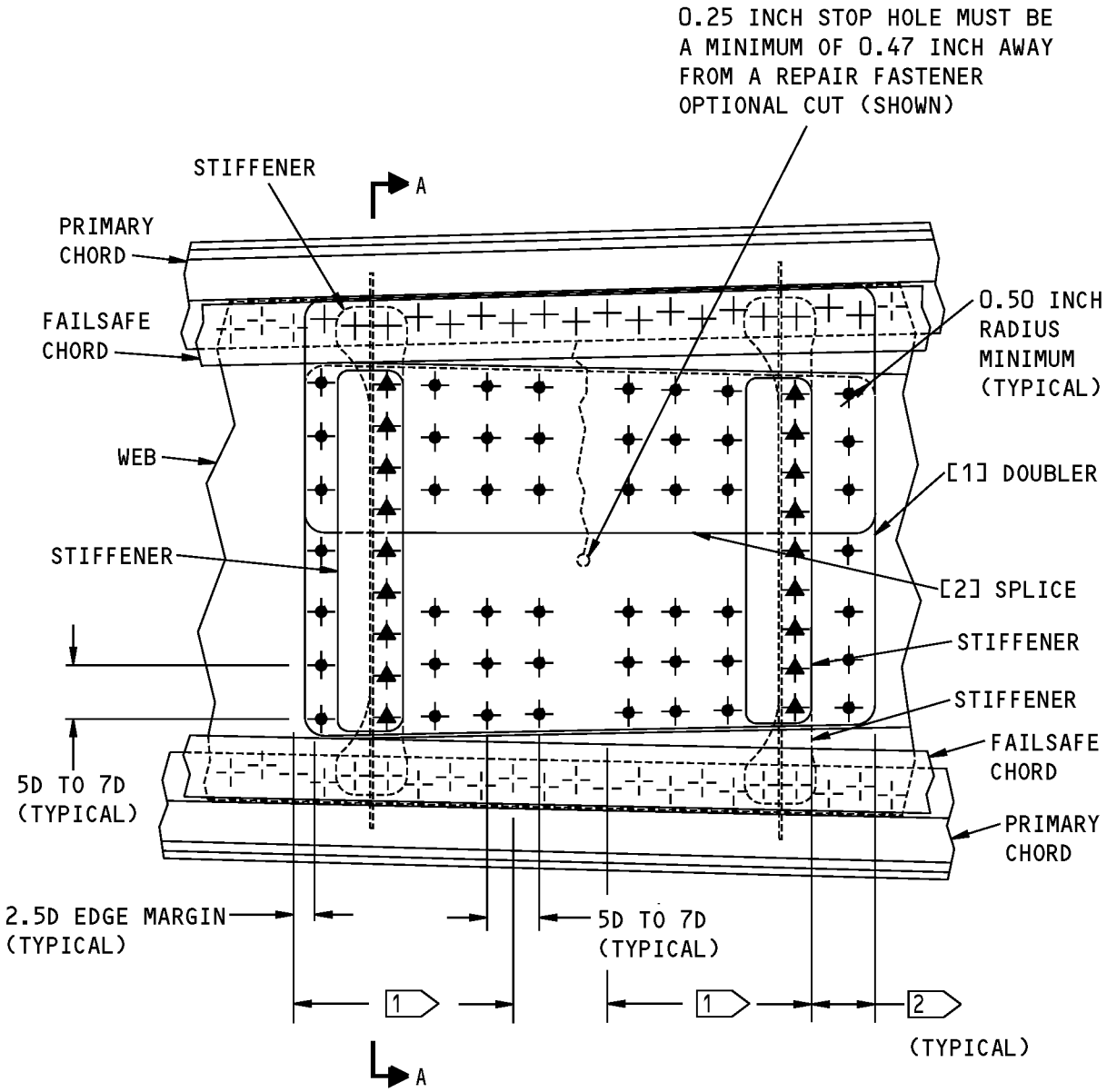
FASTENER SYMBOLS

REFERENCE FASTENER LOCATION.

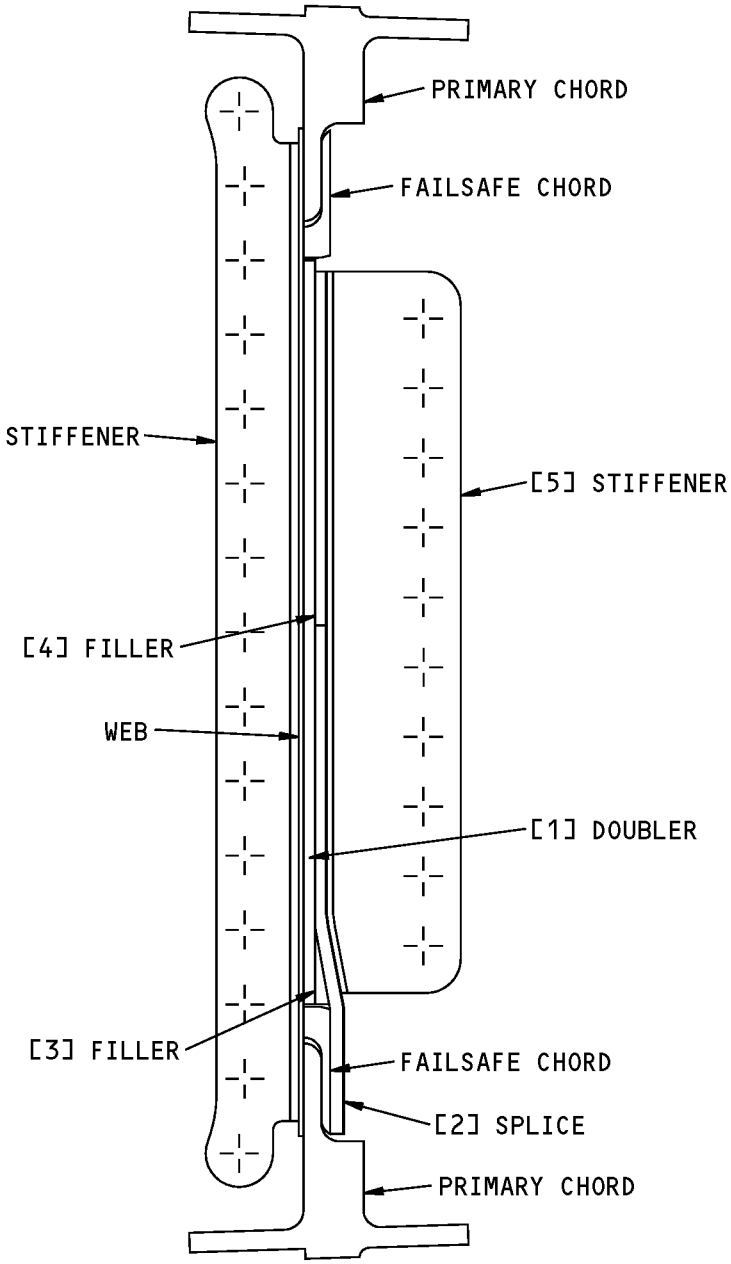
INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE FOR RIVETS AND 1/64 INCH DIAMETER OVERSIZE FOR HEX DRIVE BOLTS) AS THE INITIAL FASTENER.

REPAIR FASTENER LOCATION. INSTALL A BACB30NX6K() HEX DRIVE BOLT. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

Vertical Stabilizer Rear Spar Web Repair - Damage Near Center of Web, Fin Stations 215.06 thru 251.86
Figure 202 (Sheet 3 of 3)



Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86
Figure 203 (Sheet 1 of 3)



Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86
Figure 203 (Sheet 2 of 3)

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.
- MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

1 MAKE SURE THERE IS A MINIMUM OF FOUR HORIZONTAL ROWS OF FASTENERS ON EACH SIDE OF THE DAMAGE.

2 PUT THE LAST ROW OF FASTENERS AWAY FROM A STIFFENER.

FASTENER SYMBOLS

REFERENCE FASTENER LOCATION

INITIAL FASTENER LOCATION. INSTALL A FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE FOR RIVETS AND 1/64 INCH DIAMETER OVERSIZE FOR HEX DRIVE BOLTS) AS THE INITIAL FASTENER.

REPAIR FASTENER LOCATION. INSTALL A BACB30NX6K() HEX DRIVE BOLT. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA.

INITIAL FASTENER LOCATION. INSTALL A BACB30NX6K() HEX DRIVE BOLT.

Vertical Stabilizer Rear Spar Web Repair with Web Splice, Damage Near Edge of Web - Fin Stations 215.06 thru 251.86
Figure 203 (Sheet 3 of 3)

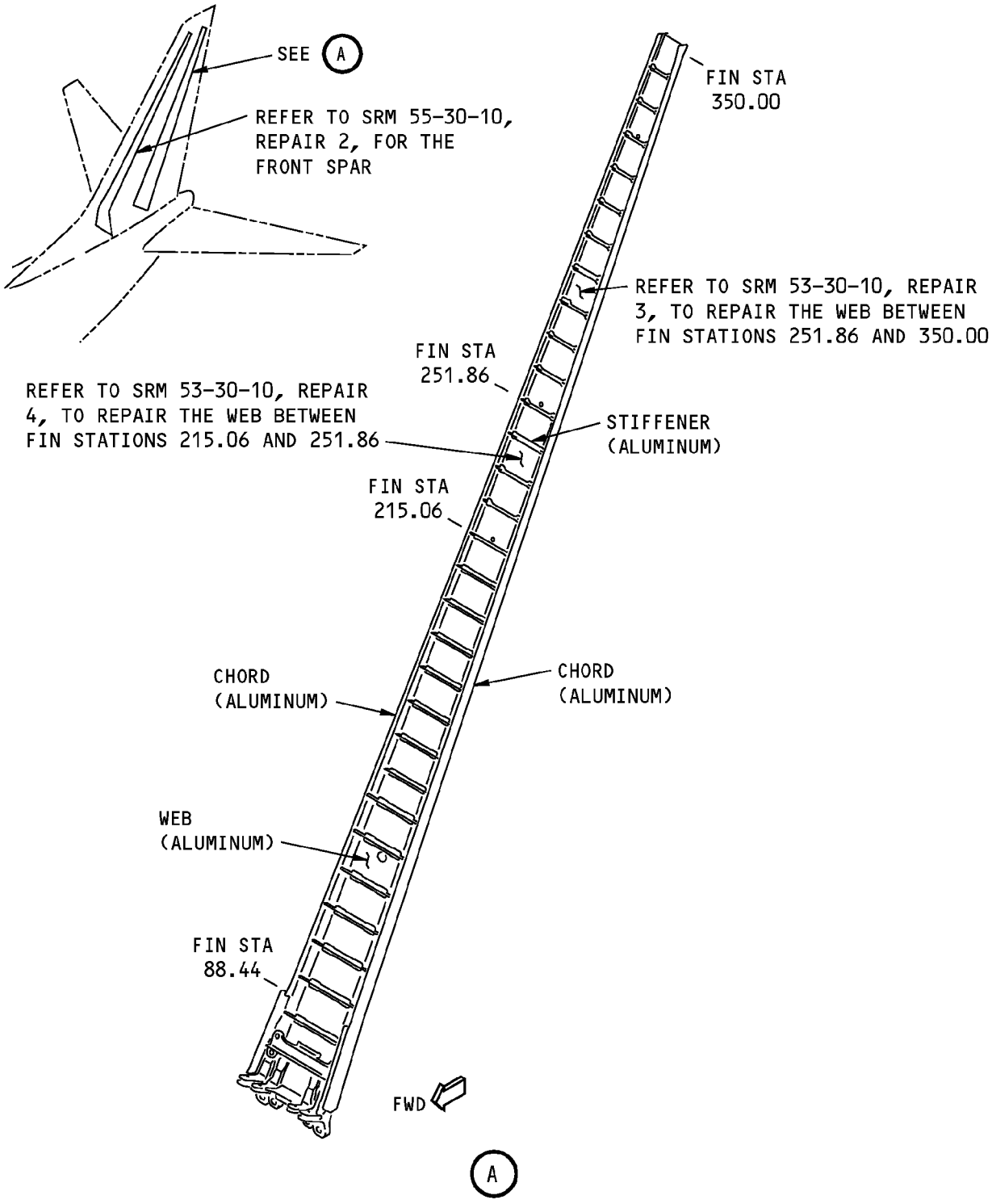
REPAIR 5 - VERTICAL STABILIZER REAR SPAR WEB REPAIR - FIN STATIONS 88.44 THRU 215.06

1. Applicability

A. Repair 5 is applicable to damage to the web of the vertical stabilizer rear spar shown in Vertical Stabilizer Rear Spar Location, Figure 201/REPAIR 5 if:

(1) The damage is between Fin Stations 88.44 and 215.06

(2) There is no damage to the failsafe chords.



Vertical Stabilizer Rear Spar Location
Figure 201

2. General

A. Repair 5 gives instructions for a Category A repair. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05	REPAIR SEALING
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-00, GENERAL	Fasteners
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-40-05	FASTENER HOLE SIZES
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
51-70-09	BONDED METAL STRUCTURE REPAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-31-00 P/B 201	SEALS AND SEALING - MAINTENANCE PRACTICES
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Repair Instructions

A. Remove initial fasteners from skin assemblies as necessary to get access to the damaged area of the web. Refer to 51-40-02.

B. Drill a stop hole at the ends of all web cracks that do not end at fastener holes. Refer to Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06, Figure 202/REPAIR 5 and SRM 51-10-02 for the procedures to drill a stop hole. For other damage, do what follows:

(1) Cut and remove the damaged part of the web as shown in Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06, Figure 202/REPAIR 5. Refer to 51-10-02 for the procedures to remove the damage.

C. Remove the initial web fasteners and stiffeners as necessary for the repair.

D. Make the repair parts as shown in Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06, Figure 202/REPAIR 5. Refer to Table 201/REPAIR 5 for the repair material.

Table 201:

REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use clad or bare 7075-T6. Refer to Table 202 for the necessary thickness of the material. The use of clad material is recommended
[2]	Tapered Shim	4	Use clad or bare 7075-T6. The use of clad material is recommended

Table 202:

REPAIR PART THICKNESSES FOR INITIAL WEB THICKNESSES		
INITIAL WEB THICKNESS (INCH)	**LOCATION OF DAMAGE (FIN STATION, FS)**	**ITEM [1] DOUBLER THICKNESS (INCH)**
0.080	FS 88.44 TO FS 93.47	0.100
0.070	FS 93.47 TO FS 115.24	0.090
0.090	FS 115.24 TO FS 133.27	0.125
0.060	FS 133.27 TO FS 143.26	0.080
0.050	FS 143.26 TO FS 169.06	0.063
0.040	FS 169.06 TO FS 215.06	0.050

E. Assemble the repair parts as shown in Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06, Figure 202/REPAIR 5.

F. Drill the fastener holes. Refer to 51-40-05 for the fastener hole dimensions.

G. Remove the repair parts.

H. Remove the nicks, scratches, gouges, burrs, and sharp edges from the repair parts and the bare surfaces of the web.

I. Apply a chemical conversion coating to the repair parts and bare surfaces of the web. Refer to 51-20-01 for the chemical conversion coating procedures.

J. Apply one layer of BMS 10-11, Type I, primer to the area of the repair. Refer to SOPM 20-41-02 for the procedures to apply the primer.

(1) Apply the primer to the repair parts.

(2) Apply the primer to the bare surfaces of the web.

K. Install the repair parts with BMS 5-95 sealant between the mating surfaces. Refer to 51-20-05 for the procedures to apply the sealant.

(1) It is optional to bond the part [1] doubler to the initial web as given in 51-70-09. This option will increase the fatigue life of the repair.

L. Install the initial web stiffeners.

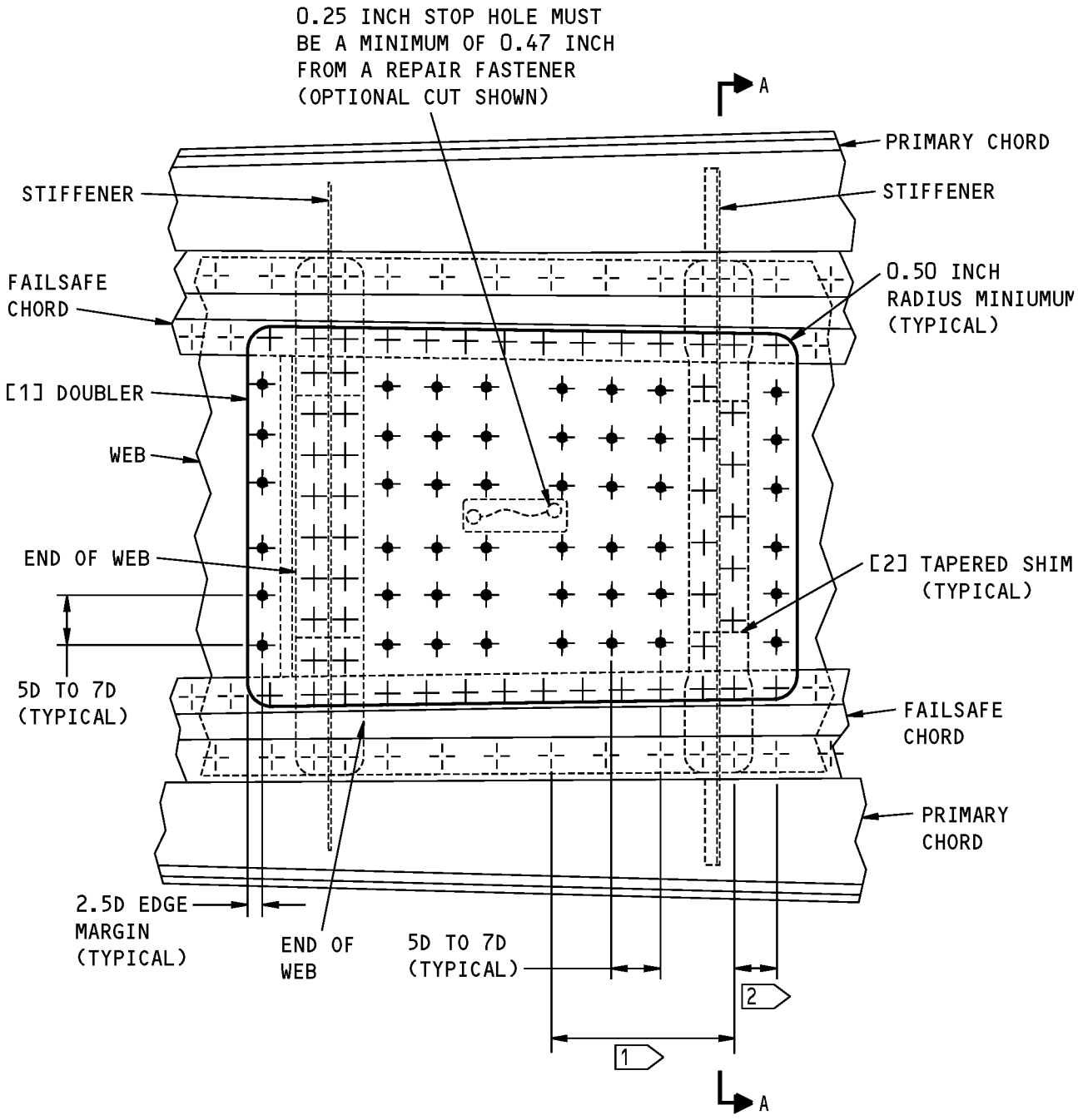
M. Install the fasteners.

(1) Install the hex drive fasteners at the repair and initial locations wet with BMS 5-95 sealant in transition fit holes.

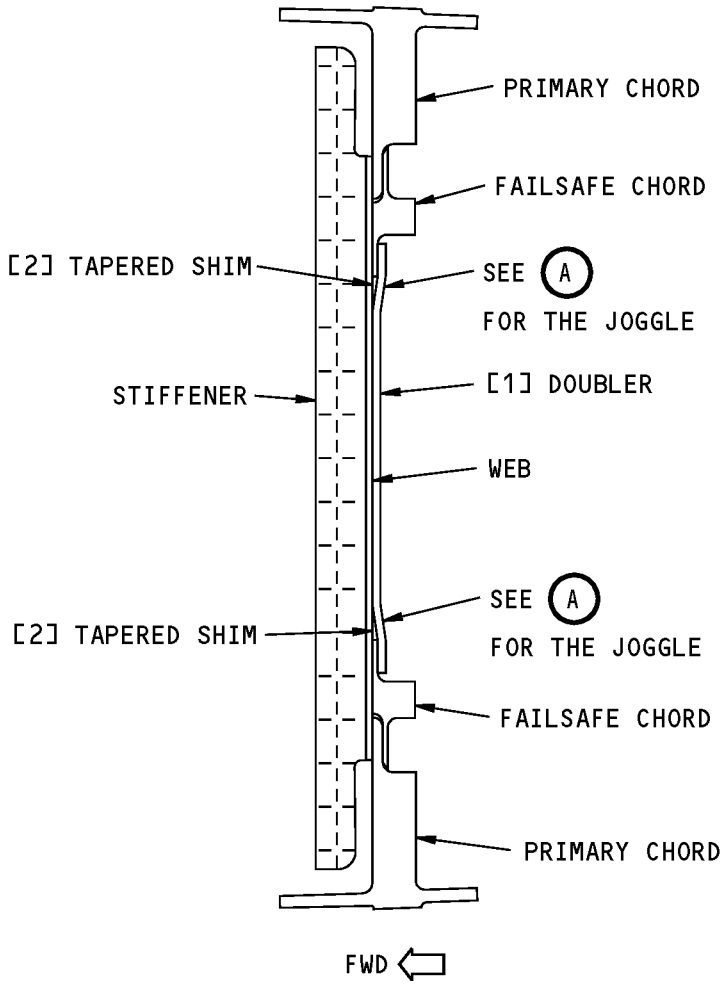
(2) Install the rivets at the initial locations without sealant.

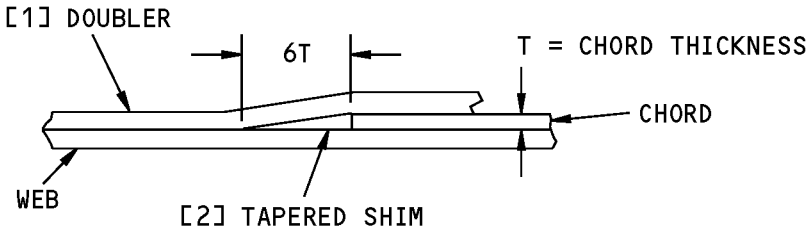
N. Apply the decorative finish to the repair area as given in AMM PAGEBLOCK 51-21-99/701.

O. Install the skin assemblies, if they were removed.



Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06
Figure 202 (Sheet 1 of 3)





JOGGLE
(TYPICAL)
A

Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06
Figure 202 (Sheet 2 of 3)

NOTES

- (D) IS THE DIAMETER OF THE REPAIR FASTENER.
- MAKE SURE THE REPAIR IS SYMMETRICAL AROUND THE DAMAGE.

1 MAKE SURE THERE IS A MINIMUM OF THREE ROWS OF REPAIR FASTENERS ALL AROUND THE DAMAGE.

2 PUT THE LAST ROW OF FASTENERS AWAY FROM THE STIFFENER.

FASTENER SYMBOLS

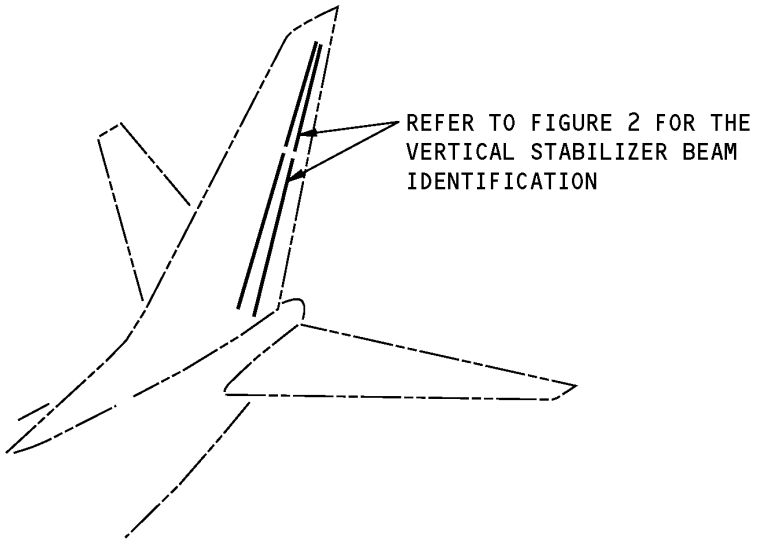
REFERENCE FASTENER LOCATION

INITIAL FASTENER LOCATION. INSTALL FASTENER THAT IS THE SAME TYPE AND DIAMETER (UP TO 1/32 INCH DIAMETER OVERSIZE FOR RIVETS AND 1/64 INCH DIAMETER OVERSIZE FOR HEX DRIVE BOLTS) AS THE INITIAL FASTENER.

REPAIR FASTENER LOCATION. INSTALL A BACB30NX()K() HEX DRIVE BOLT OR A BACR15BB()D() RIVET THAT IS SAME DIAMETER AS THE INITIAL FASTENERS IN THE WEB AND CHORDS. REFER TO SRM 51-40-00 THROUGH 51-40-08 FOR THE FASTENER DATA. THE FASTENER DIAMETER IS 3/16 INCH BETWEEN FIN STATIONS 143.25 AND 215.06 AND 1/4 INCH BELOW FIN STATION 143.26.

Vertical Stabilizer Rear Spar Web Repair - Fin Stations 88.44 thru 215.06
Figure 202 (Sheet 3 of 3)

IDENTIFICATION 1 - VERTICAL STABILIZER BEAM

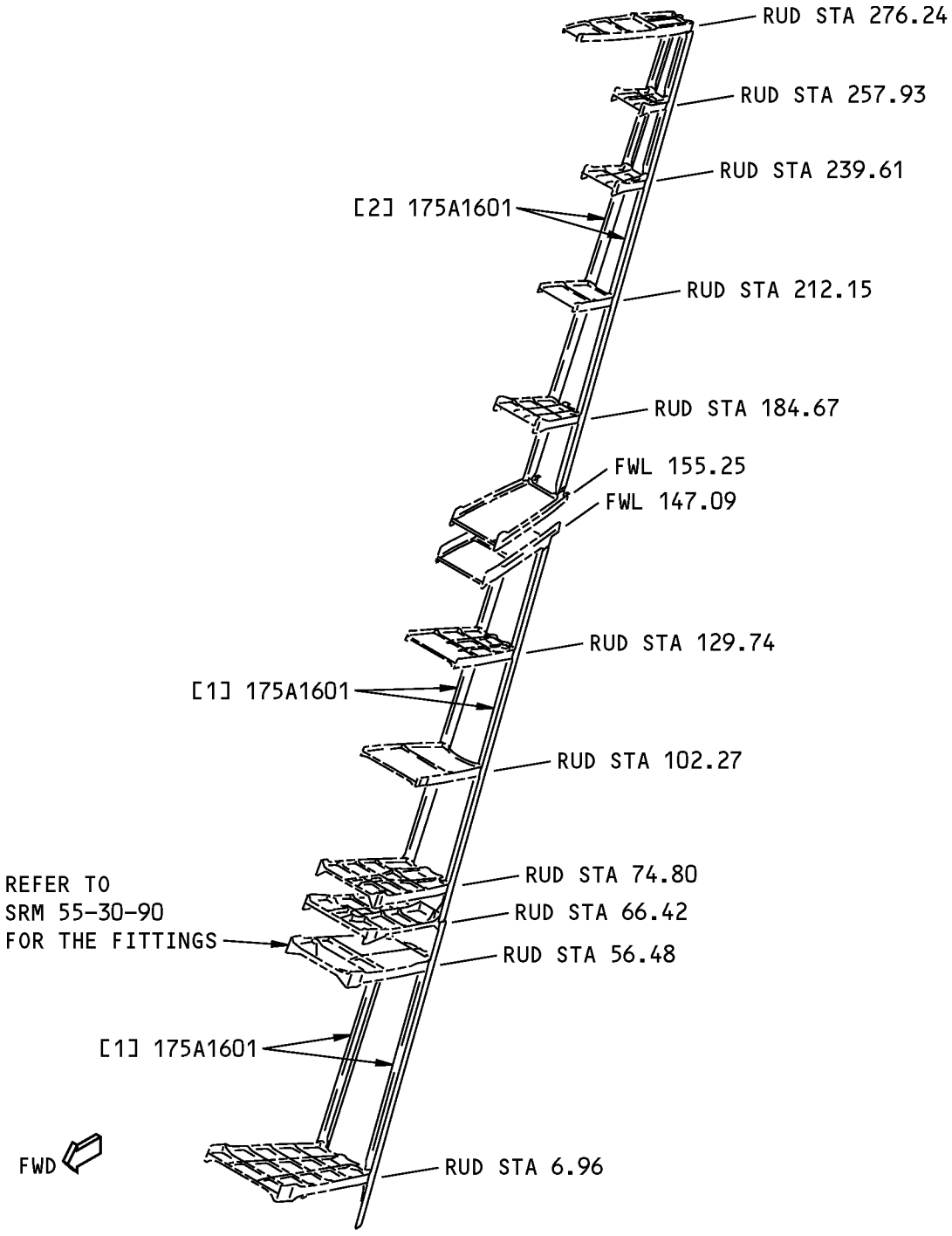


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Beam Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
001A7001	Section 70 Vertical Fin - Product Collector
175A0001	Trailing Edge Functional Collector - Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

VERTICAL STABILIZER BEAM UPPER AND LOWER SECTIONS

Vertical Stabilizer Beam Identification
Figure 2

Table 2:

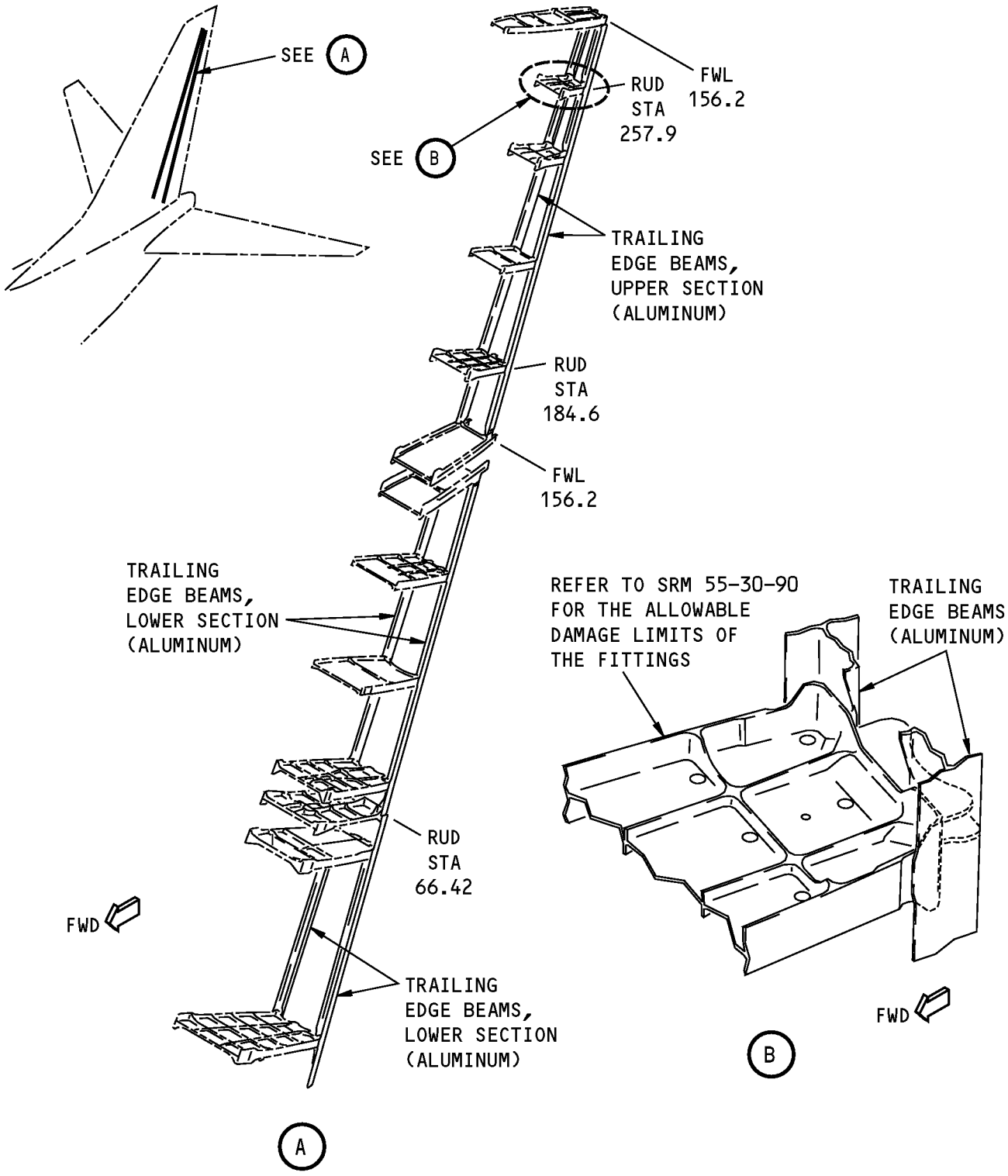
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Beam Assembly (2)			
	Beam		BAC1518-1188 7075-T6511 extrusion as given in QQ-A-200/11	
	Strap	0.080 (2.03)	7075-T6 clad sheet as given in QQ-A-250/13	
(2)	Beam		BAC1518-1188 7075-T6511 extrusion as given in QQ-A-200/11	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

ALLOWABLE DAMAGE 1 - VERTICAL STABILIZER TRAILING EDGE BEAMS

1. Applicability

A. This subject gives the allowable damage limits for the vertical stabilizer trailing edge beams shown in Vertical Stabilizer Upper and Lower Beam Locations, Figure 101/ALLOWABLE DAMAGE 1.



Vertical Stabilizer Upper and Lower Beam Locations
Figure 101

2. General

A. Remove the damage as necessary.

(1) Refer to 51-10-02 for the inspection and removal of damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

B. After you remove the damage, do the procedures that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(1) Flap peen or shot peen the surfaces of the beams if you remove the damage.

(a) Refer to 51-20-06 for shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for flap peen and shot peen procedures.

(2) Apply a chemical conversion coating to the bare surfaces of the reworked areas of the beams. Refer to 51-20-01.

(3) Apply one layer of BMS 10-11, Type I, primer to the reworked areas of the beams. Refer to SOPM 20-41-02.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes

4. Allowable Damage Limits

A. Cracks:

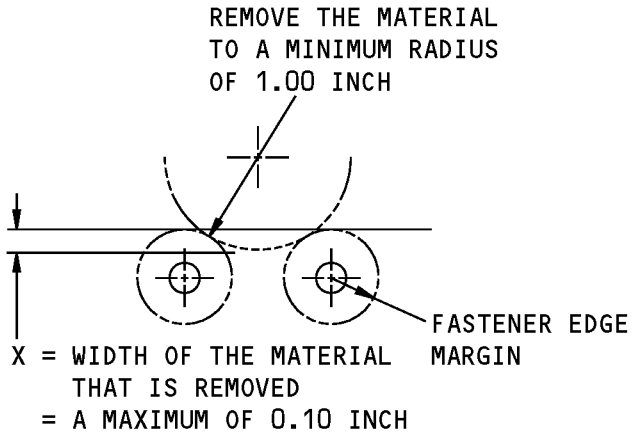
(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, D, and E

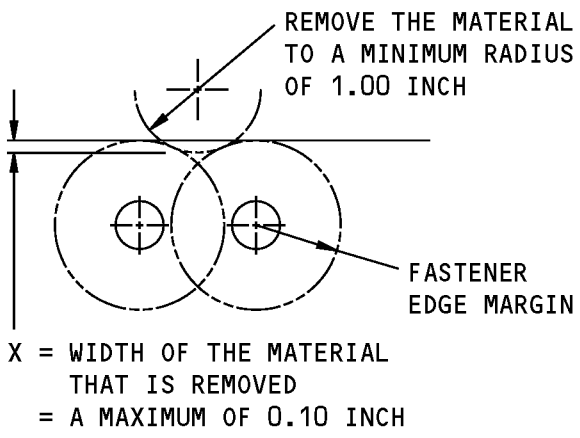
C. Dents are not permitted.

D. Holes and Punctures are not permitted.



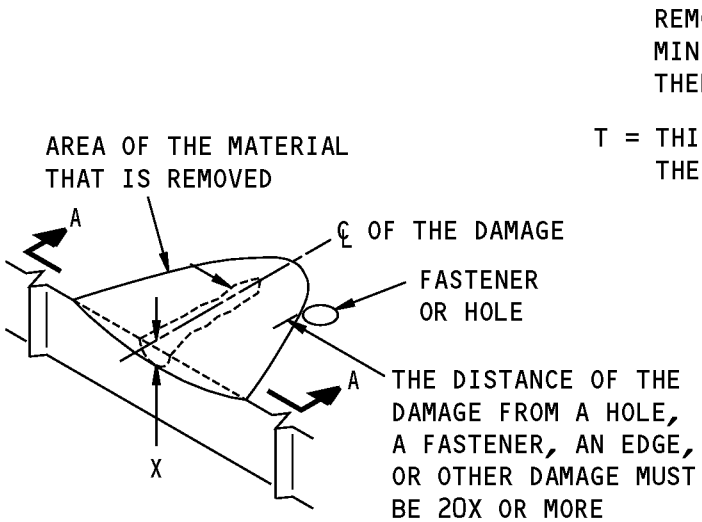
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

(A)



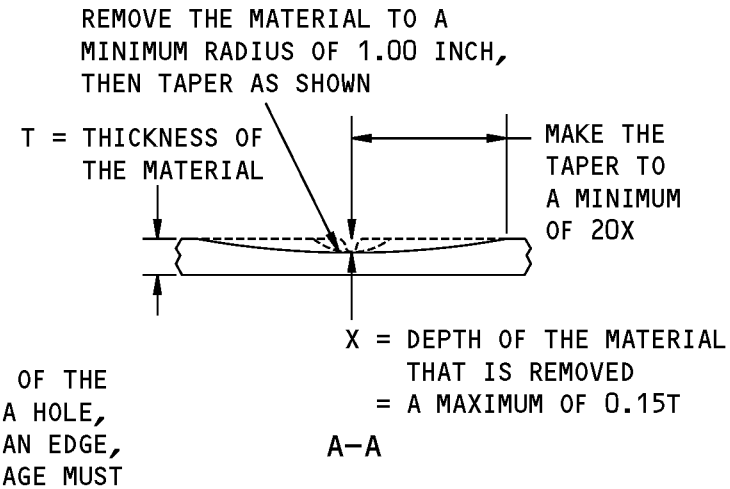
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

(B)

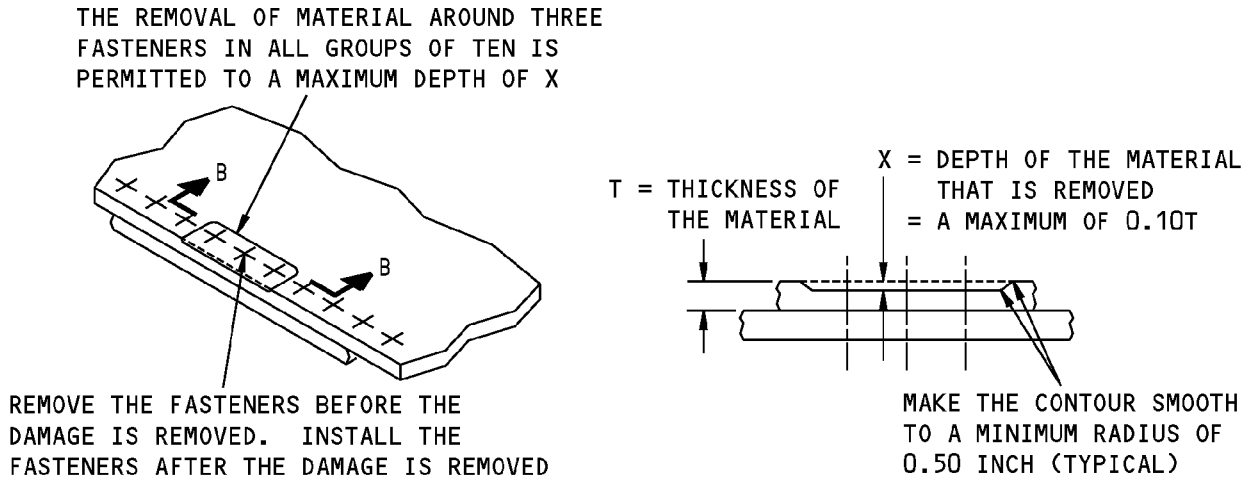


REMOVAL OF DAMAGED MATERIAL ON A SURFACE

(C)

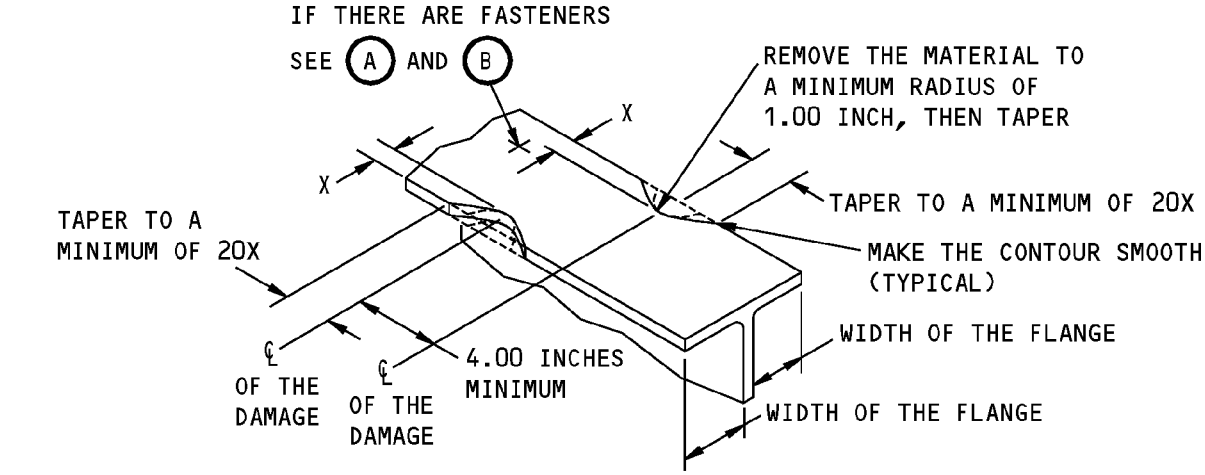


Allowable Damage Limits
Figure 102 (Sheet 1 of 2)



REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

(D)



X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

(E)

Allowable Damage Limits
Figure 102 (Sheet 2 of 2)

REPAIR 1 - VERTICAL STABILIZER TRAILING EDGE BEAM

1. Applicability

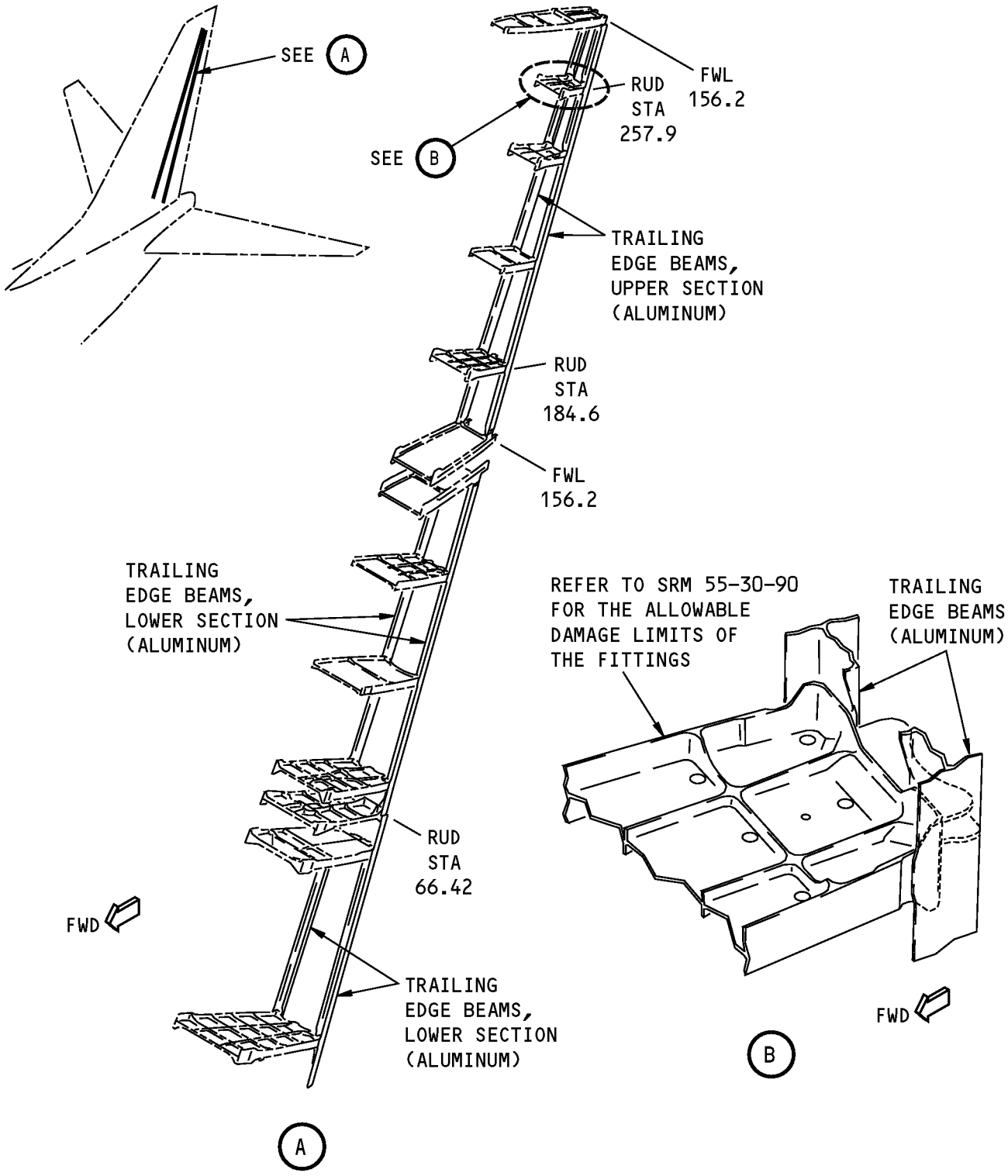
A. Repair 1 is applicable to damage to the trailing edge beams shown in Vertical Stabilizer Upper and Lower Beam Locations, Figure 201/REPAIR 1.

2. References

Reference	Title
51-70-12	EXTRUDED SECTION REPAIRS

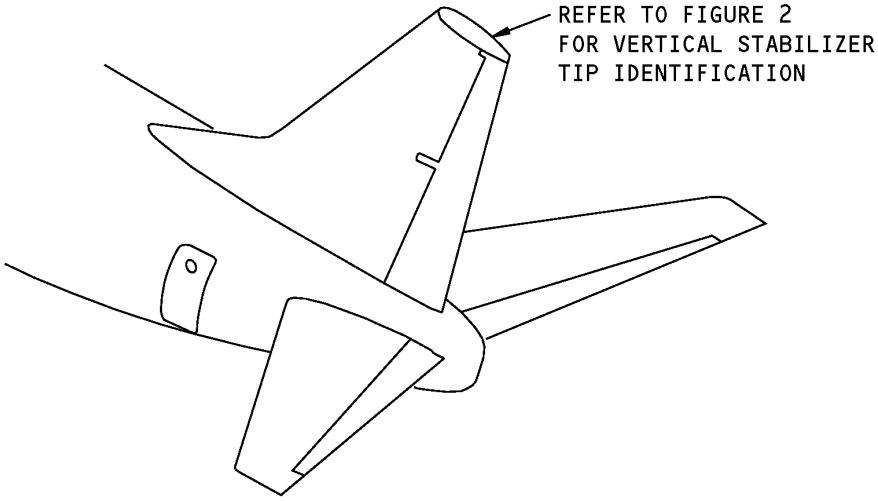
3. Repair Instructions

A. Refer to 51-70-12 to repair the trailing edge beams.



Vertical Stabilizer Upper and Lower Beam Locations
Figure 201

IDENTIFICATION 1 - VERTICAL STABILIZER TIP

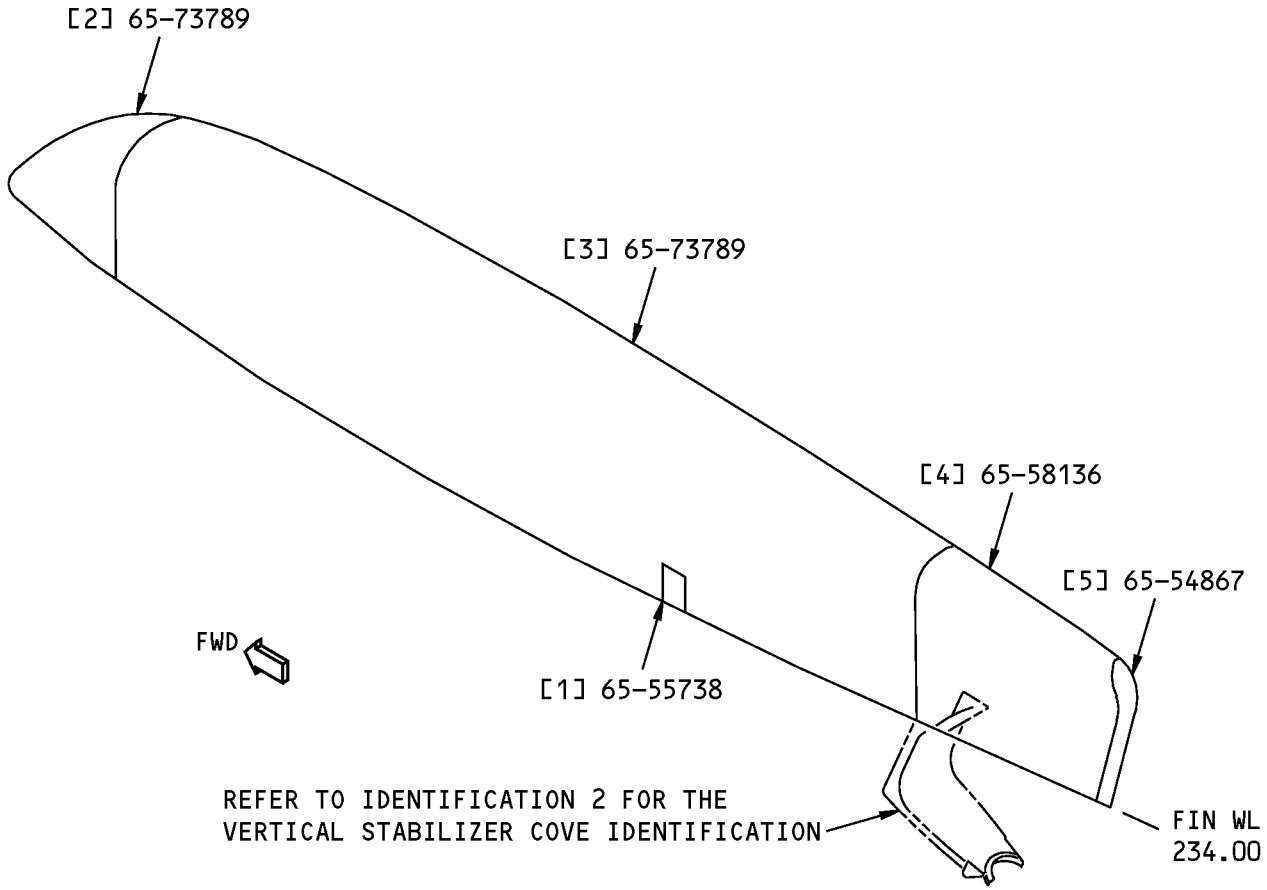


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Tip Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A0001	Torque Box Functional Collector - Vertical Fin
172A3701	Nutplate Installation - FWL 274.570, Vertical Fin
284A0510	Antenna Installation - VOR



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

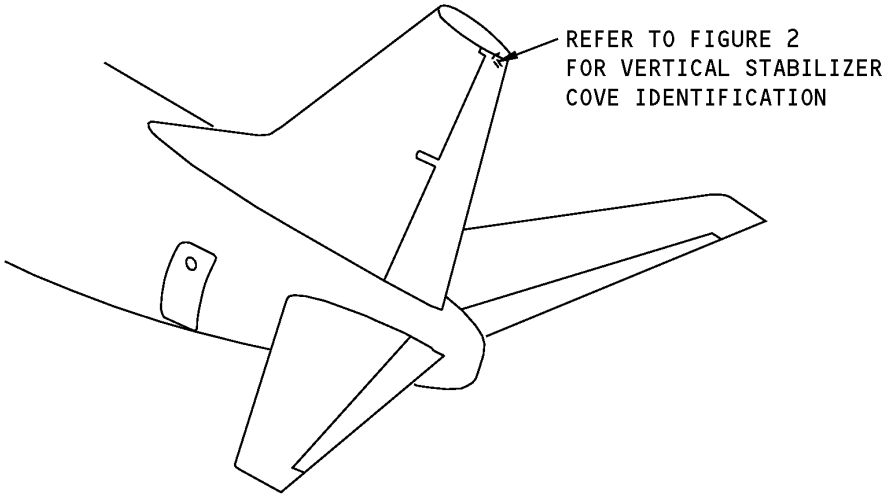
Vertical Stabilizer Tip Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Ground Strap	0.016 (0.41)	6061-0 sheet as given in QQ-A-250/11	
[2]	Leading Edge Access Assembly			
	Nose	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
	Doubler	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
[3]	Canopy Assembly			
	Lightning Strip		BAC1511-3787 6061-0 extrusion as given in QQ-A-200/8 (Optional: 6061-T6)	
	Canopy		Glass Fabric Reinforced Plastic (GFRP) as given in BAC 5449. Glass fabric number 181, warp direction optional	
	Splice (2)	0.050 (1.27)	2024-T42 clad sheet as given in QQ-A-250/5	
	Splice (2)		GFRP as given in BAC 5449. Glass fabric number 181, warp direction optional	
[4]	Trailing Edge Assembly			
	Skin	0.040 (1.02)	6061-T6 clad sheet as given in QQ-A-321	
	Former	0.063 (1.60)	2024-T42 clad sheet as given in QQ-A-250/5	
	Doubler	0.063 (1.60)	2024-T3 clad sheet as given in QQ-A-250/5	
	Splice Plate	0.050 (1.27)	2024-T3 clad sheet as given in QQ-A-250/5	
[5]	Fitting-Trailing Edge, Fin Tip		A360 aluminum die casting, Class II B, as given in QQ-A-591 (Optional: Machine from 2024-T351 rolled bar as given in AMS QQ-A-225/6. Grain direction is parallel to the length of the rolled bar)	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

IDENTIFICATION 2 - VERTICAL STABILIZER COVE

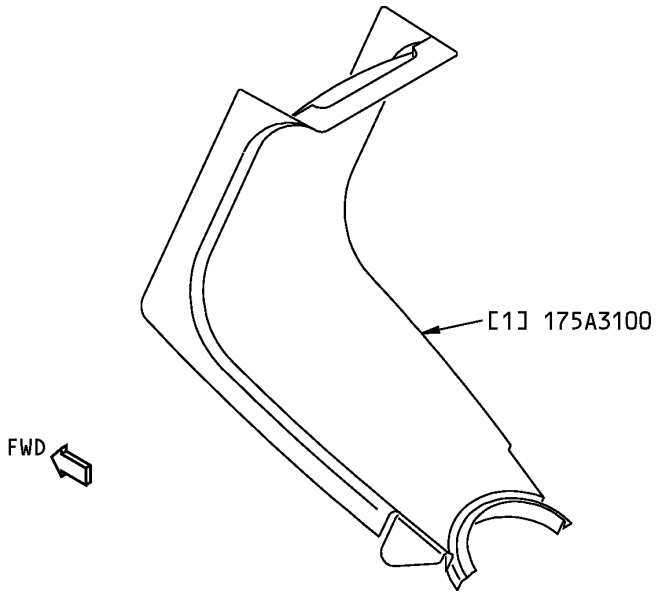


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Cove Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
176A0001	Leading Edge and Miscellaneous Functional Collector - Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Cove Identification
Figure 2

Table 2:

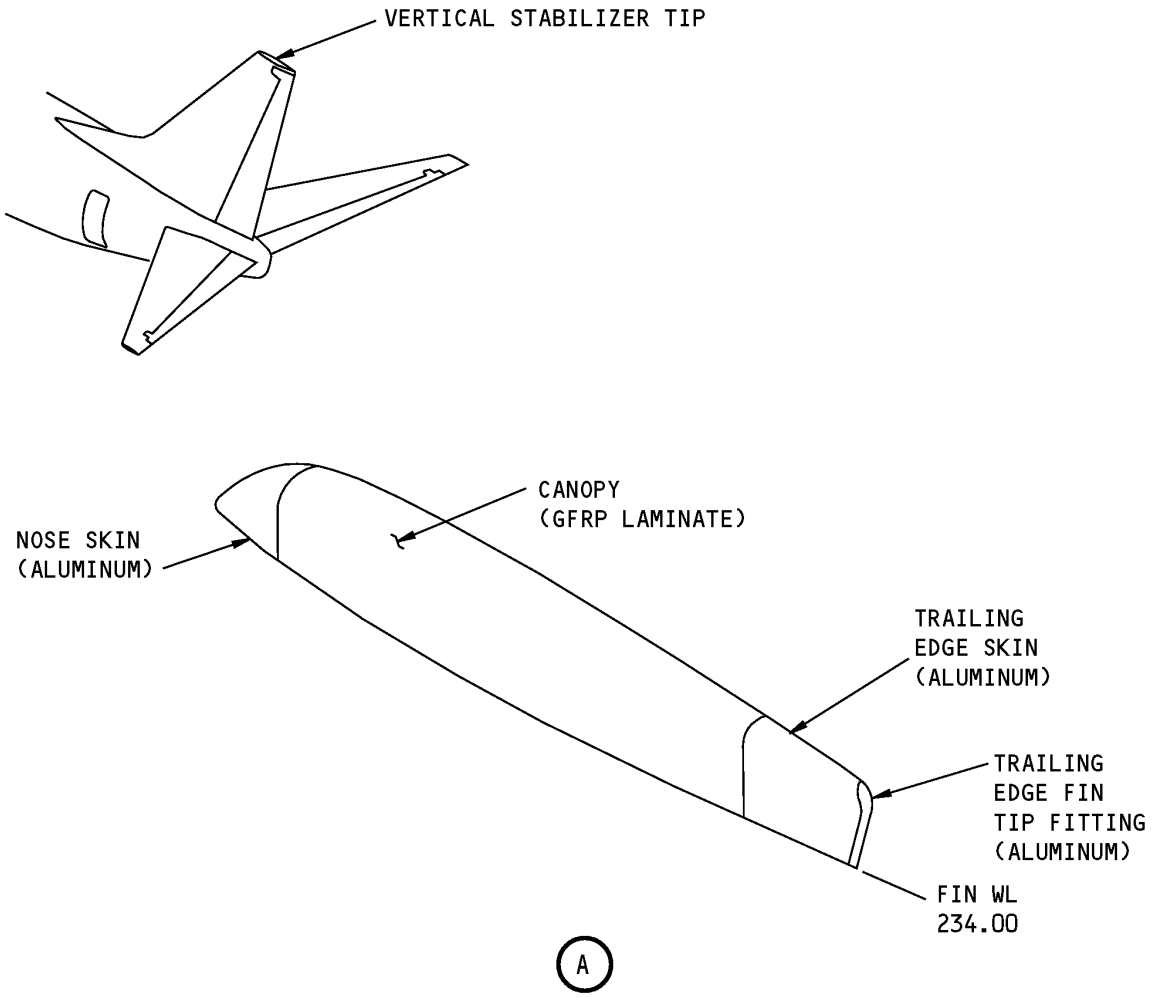
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Cove Assembly		Glass Fiber Reinforced Plastic (GFRP) laminate as given in BMS 8-79, Class III, Grade B, Type 1581 or 7781. Warp direction is optional	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

ALLOWABLE DAMAGE 1 - VERTICAL STABILIZER TIP

1. Applicability

A. Allowable Damage 1 is applicable to damage on the vertical stabilizer tip skin and fitting as shown in Vertical Stabilizer Tip, Figure 101/ALLOWABLE DAMAGE 1.



Vertical Stabilizer Tip
Figure 101

2. General

A. Do the steps that follow for the canopy made of Glass Fabric Reinforced Plastic (GFRP).

(1) Refer to Vertical Stabilizer Tip, Figure 101/ALLOWABLE DAMAGE 1 for the location of the canopy.

(2) Remove all the contamination and water from the structure. Refer to 51-30-05 and 51-70-04 for the tools and the cleanup procedures.

(3) Refer to Definitions of the Damage Size, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

(4) Seal the damaged areas with the steps that follow:

(a) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 1

1) Make a temporary seal.

a) Apply aluminum foil tape (speed tape).

b) Keep a record of the location.

c) Make sure the tape is in satisfactory condition at each 400 flight hour interval or more frequently.

d) Seal the damage permanently no later than 5000 flight hours from the time the seal was made.

2) Make a permanent seal.

a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

b) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

(b) Seal the damaged areas that are more than one ply deep and that agree with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 1

1) Use a vacuum and heat to remove moisture from the solid laminate or the honeycomb cells. Refer to 51-70-04.

2) Make a temporary seal with aluminum foil tape (speed tape).

3) Keep a record of the location.

4) Repair the damage no later than 400 flight hours from the time the seal was made.

B. Do the steps that follow for the parts made of aluminum.

(1) Refer to Vertical Stabilizer Tip, Figure 101/ALLOWABLE DAMAGE 1 for the location of the parts made of aluminum.

(2) Refer to Paragraph 4 for the allowable damage limits

(3) Remove the damage.

(a) Refer to 51-10-02 for the investigation and cleanup procedures.

(b) Refer to 51-30-03 for possible sources of the abrasive and other materials you need to remove the damage.

(c) Refer to 51-30-05 for possible sources of the equipment and tools you need to remove the damage.

(d) Make the surface texture roughness for all cut surfaces 125 microinches Ra or smoother.

(4) After you remove the damage, do the steps that follow:

(a) For lightning strike damage to the trailing edge fin tip fitting or the trailing edge skin remove all finishes and do as follows:

1) Do a High Frequency Eddy Current (HFEC) inspection to the damaged area as given in NDT Part 6 51-00-00, Figures 3 and 4.

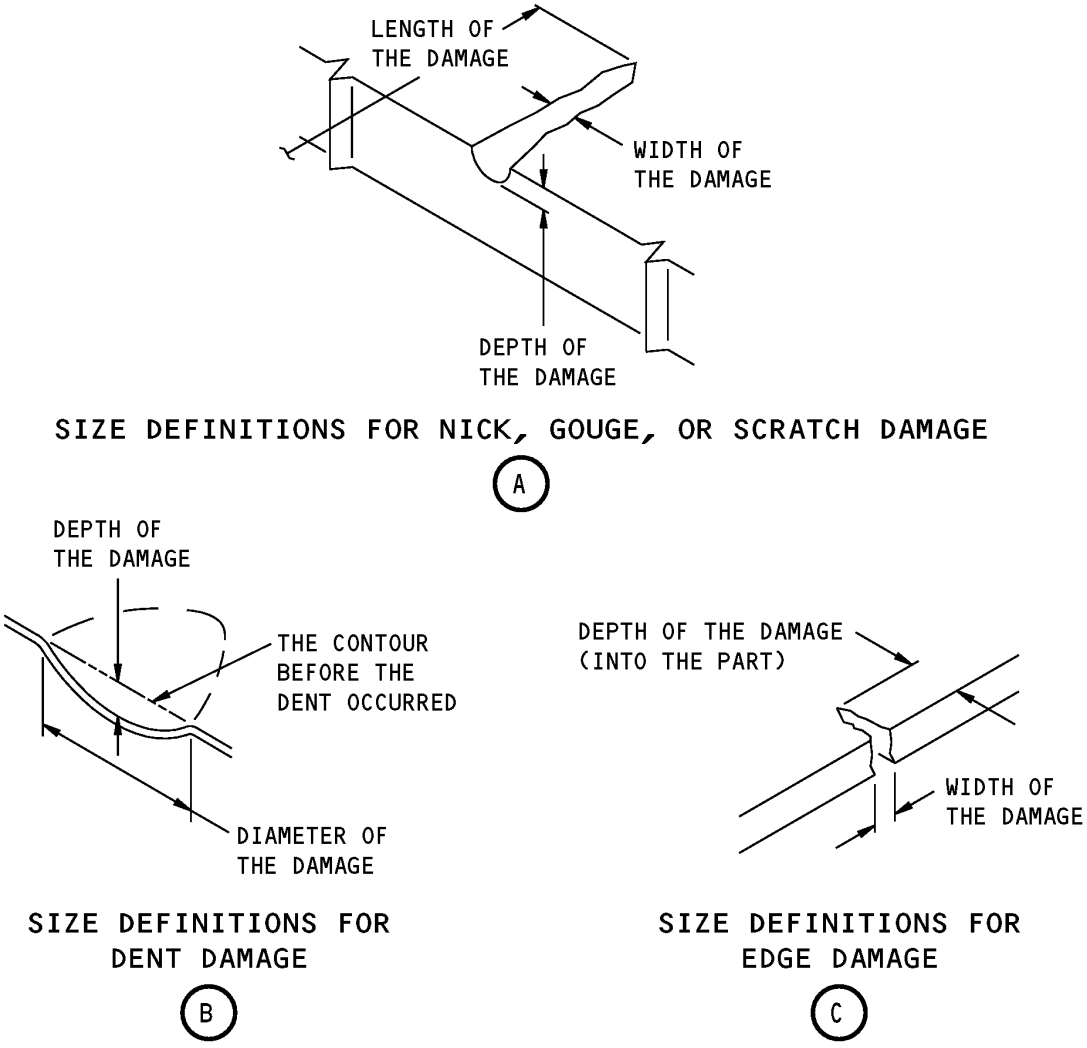
2) Do a resistance check between the fastener head and the initial structure as given in BAC 5117-6. The maximum resistance that is permitted is 0.010 ohms.

(b) Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

(c) Apply one layer of BMS 10-11, Type I primer to all the conversion coated, reworked areas other than the trailing edge fin tip fitting. Apply two layers of BMS 10-11, Type I primer to the conversion coated, reworked areas of the trailing edge fin tip fitting. Refer to SOPM 20-41-02.

(d) Apply a decorative finish if necessary. Refer to AMM PAGEBLOCK 51-21-99/701.

C. Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the economic performance of the airplane. Refer to 51-10-01.



Definitions of the Damage Size
Figure 102

3. References

Reference	Title
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-01, REPAIR GENERAL	Procedures to Rework or Fill Allowable Dents on the External Aerodynamic Surfaces of Metallic Parts
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
51-70-14, ALLOWABLE DAMAGE GENERAL	Damage Limits and Sealing Instructions for Aluminum Coatings and Foils
55-30-30, REPAIR 1	Vertical Stabilizer Tip
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Canopy (GFRP)

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A maximum of 0.25 inch in width

(d) A minimum of 0.50 inch away from the edge of a fastener hole

(e) A minimum of 0.50 inch away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(3) Dents are permitted if:

(a) They are a maximum of 2.0 inch in diameter

(b) The edge of the damage is a minimum of 4D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 1.50 inch in diameter

(b) A minimum of 4D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(5) Delaminations are permitted if they are:

(a) A maximum of 1.5 inch in diameter

(b) A minimum of 4D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(6) Edge damage is permitted if it is:

(a) A maximum of 0.10 in depth

(b) A maximum of 0.50 inch in width

(c) The edge of the damage is a minimum of 2.5D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(7) Edge Erosion is permitted as shown in Cleanup and Sealing of Edge Erosion, Figure 103/ALLOWABLE DAMAGE 1.

B. Leading Edge Cap and Trailing Edge Skin (Aluminum)

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Details A, B, C, D, and E.

(b) Damage that does not go through the clad surface is permitted.

(3) Dents:

(a) Dents are permitted if they agree with the conditions shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 1, Detail F.

(4) Holes and Punctures are permitted if:

(a) They are 0.25 inch in diameter or less

(b) The edge of the damage is a minimum of 1.0 inch away from another hole, an edge, or other damage

(c) They are filled with a 2017-T3 or 2117-T4 aluminum protruding head rivet. Install the rivet without sealant.

1) Install the rivet without sealant.

(5) Trailing Edge Skin and Trailing Edge Fin Tip Fitting Lightning Strike damage is permitted if:

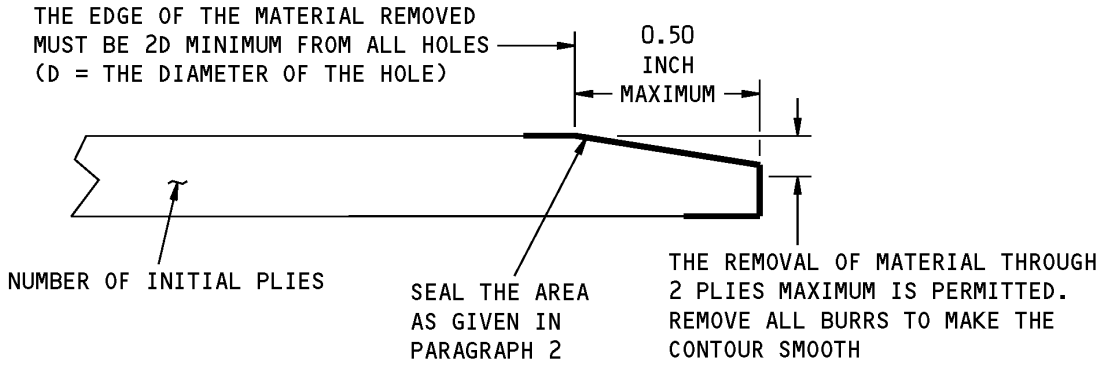
(a) You remove the damage as shown in Figure 104, Details D and G.

NOTE: If the damage is more than the limits shown in Figure 104, Details D and G then refer to 55-30-30, REPAIR 1.

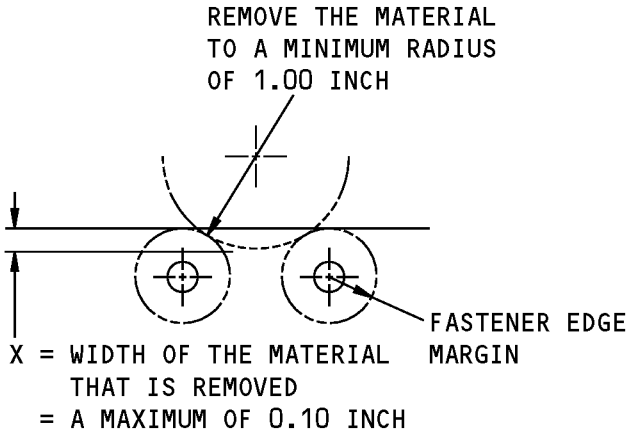
(b) Make sure there is a minimum 1.0 inch (25.4 mm) blend radius at a 20:1 blend ratio at all locations.

(c) Make sure there is a minimum distance of 2.0 inches (50.8 mm) between any two adjacent damage locations.

(d) No fasteners are damaged.

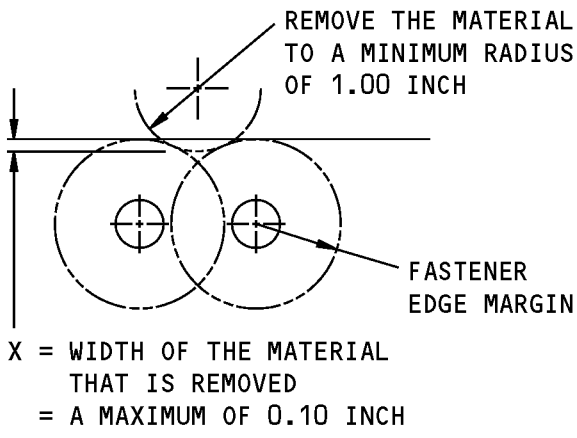


Cleanup and Sealing of Edge Erosion
Figure 103



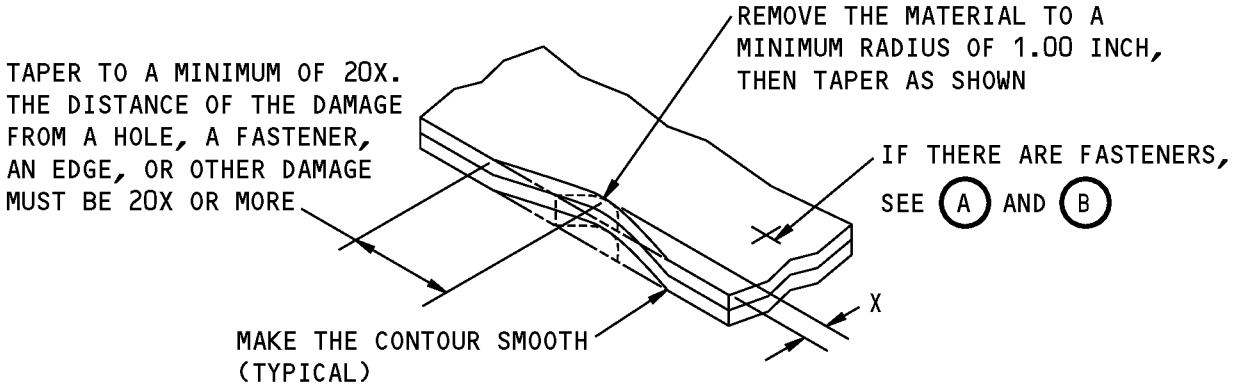
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

(A)



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

(B)

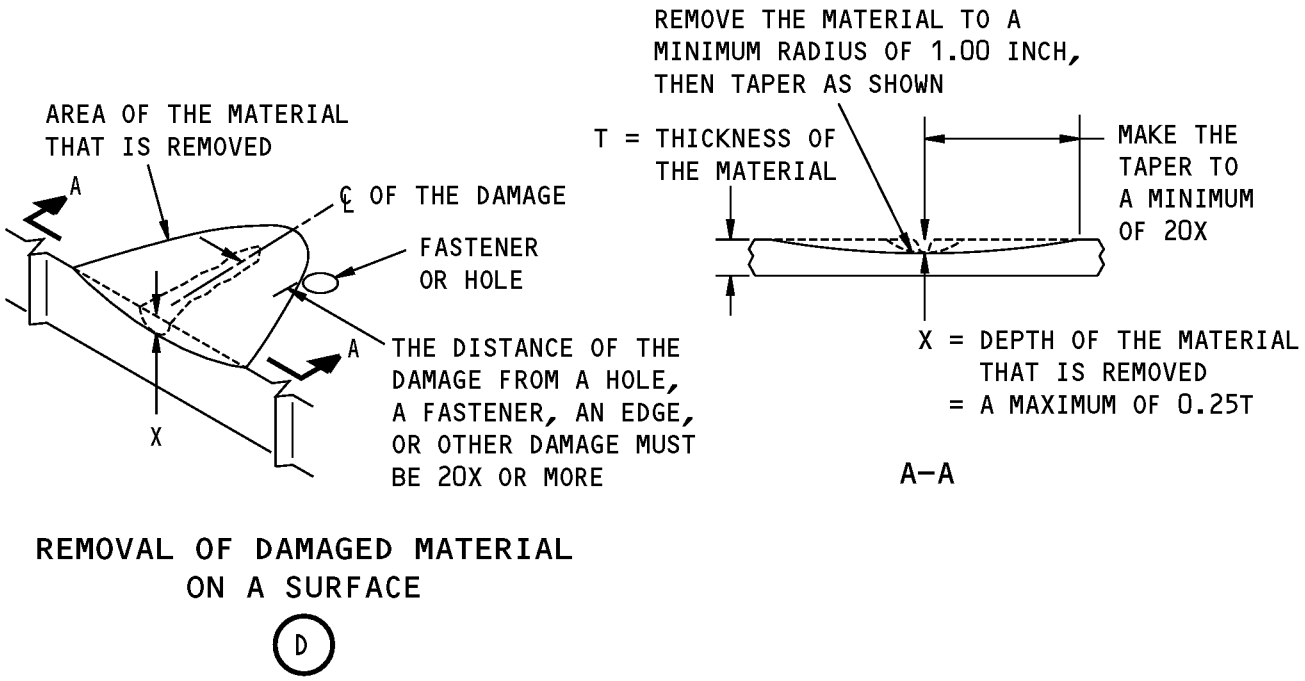


X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.10 INCH

REMOVAL OF DAMAGED MATERIAL ON AN EDGE OF BONDED METAL SKINS AND WEBS

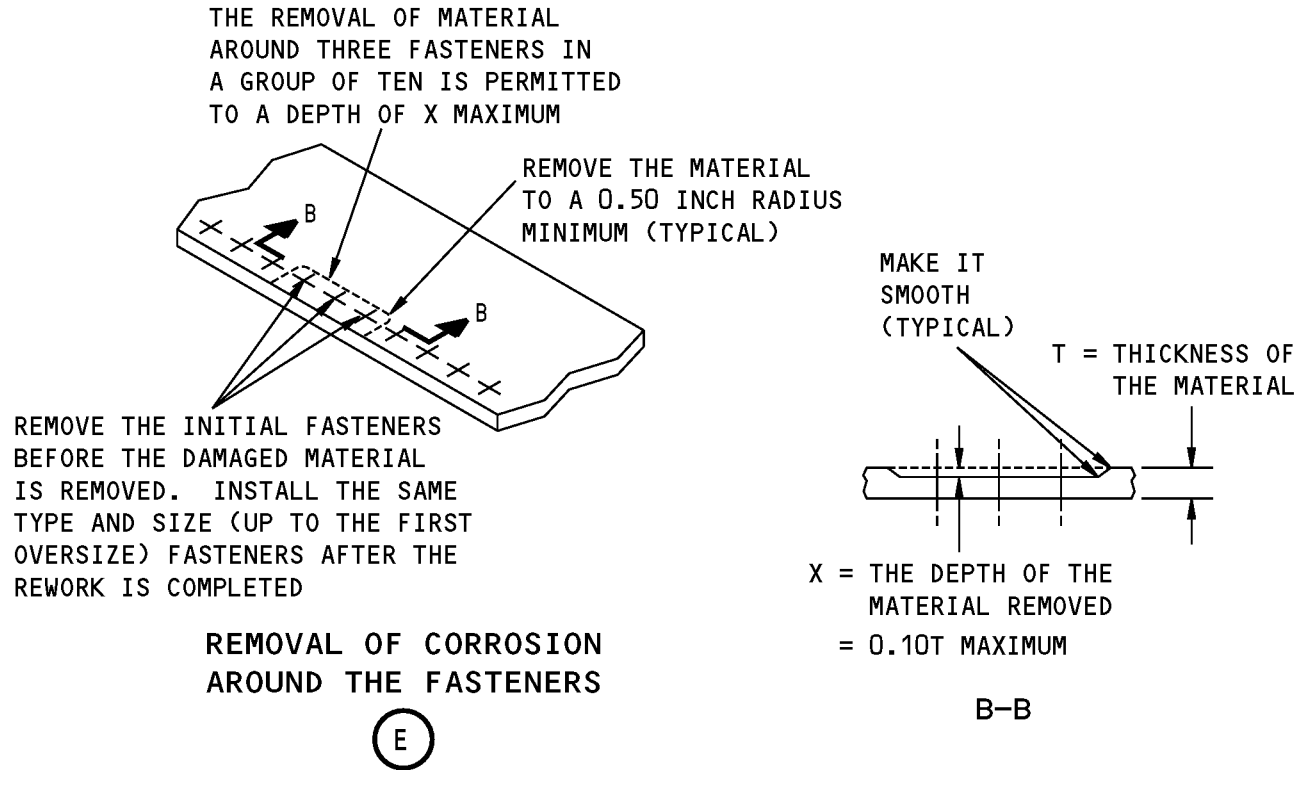
(C)

Allowable Damage Limits
Figure 104 (Sheet 1 of 4)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

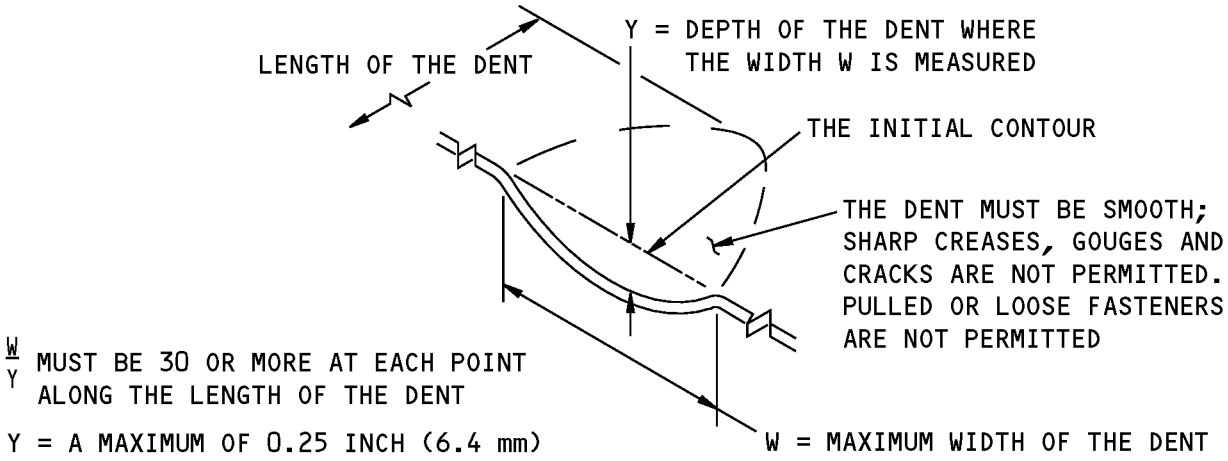
D



REMOVAL OF CORROSION AROUND THE FASTENERS

E

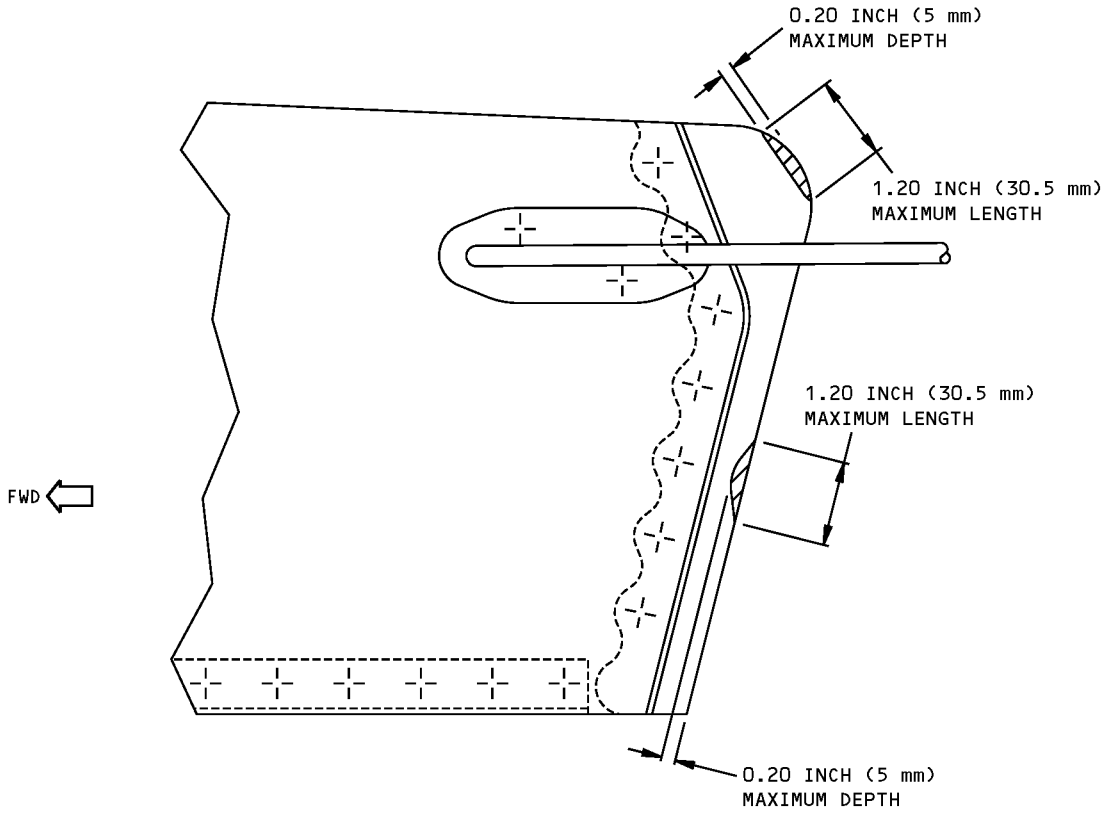
Allowable Damage Limits
Figure 104 (Sheet 2 of 4)



DENT THAT IS PERMITTED

F

Allowable Damage Limits
Figure 104 (Sheet 3 of 4)



TRAILING EDGE FIN TIP FITTING
(LIGHTNING STRIKE LIMITS)

G

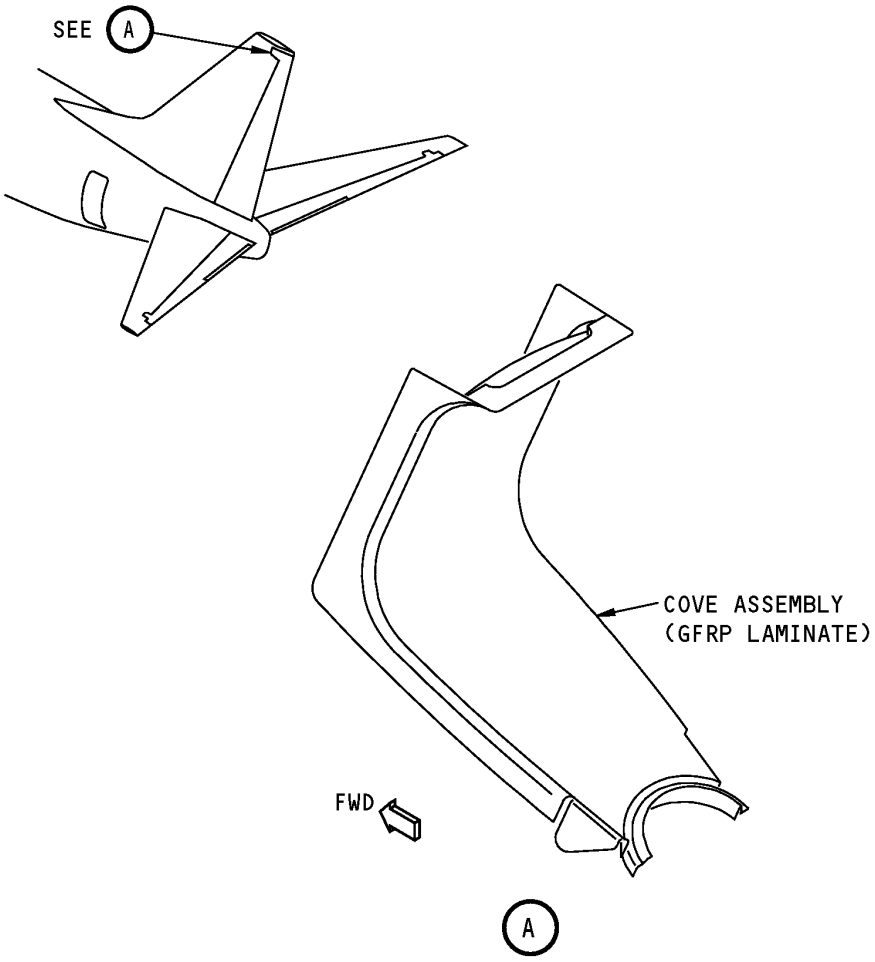
MATERIAL REMOVED

Allowable Damage Limits
Figure 104 (Sheet 4 of 4)

ALLOWABLE DAMAGE 2 - VERTICAL STABILIZER COVE

1. Applicability

A. Allowable Damage 2 is applicable to damage on the vertical stabilizer cove panel shown in Vertical Stabilizer Cove, Figure 101/ALLOWABLE DAMAGE 2.



Vertical Stabilizer Cove
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use and instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Definitions of the Damage Size, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and C for the definitions of the length, width, and length of damage.

B. Do the steps that follow for the cove panel made of Glass Fabric Reinforced Plastic (GFRP).

(1) Remove all the contamination and water from the structure.

(a) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(b) Refer to 51-70-04 for the damage removal procedures.

(2) Refer to Definitions of the Damage Size, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and C for the definitions of the length, width, and depth of damage.

(3) Seal the damaged areas with the steps that follow.

(a) Seal the damage that is not more than one ply deep and that agrees with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2

1) Make a temporary seal.

a) Apply aluminum foil tape (speed tape).

b) Keep a record of the location.

c) Make sure the tape is in satisfactory condition every 400 flight hours.

d) Seal the damage permanently at or before 5000 flight hours.

2) Make a permanent seal.

a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

b) Apply one layer of BMS 10-79, Type 3 or BMS 10-103, Type 1 primer. Refer to SOPM 20-44-04.

c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM PAGEBLOCK 51-21-99/701.

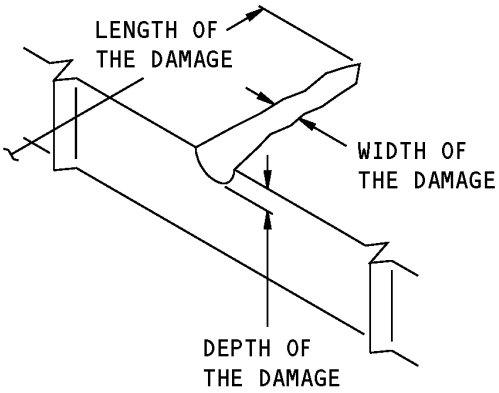
(b) Seal the damaged areas that are more than one ply deep and that agree with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2

1) Use a vacuum and heat to remove moisture from the solid laminate or the honeycomb cells. Refer to 51-70-04.

2) Make a temporary seal with aluminum foil tape (speed tape).

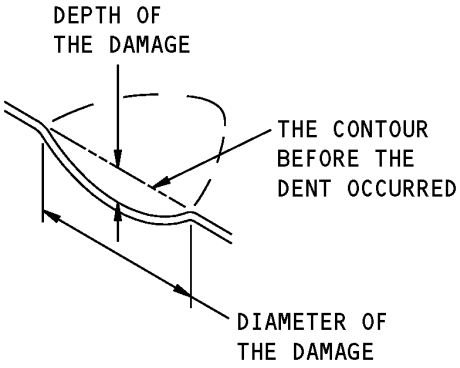
3) Keep a record of the location.

4) Repair the damage at or before 400 flight hours.



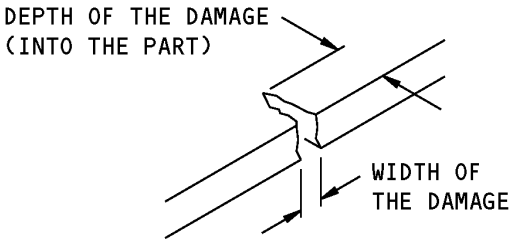
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 102

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-99 P/B 701	DECORATIVE EXTERIOR PAINT SYSTEM - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Inboard and Outboard Panels (GFRP Laminate)

(1) Nicks, Gouges and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges and Scratches that cause damage to the glass fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A maximum of 0.25 inch in width

(d) A minimum of 0.50 inch away from the edge of a fastener hole

(e) A minimum of 0.50 inch away from the edge of other damage. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies, and

2) Are sealed as given in Paragraph 2.

(3) Dents are permitted if:

(a) They are a maximum of 2.0 inch in diameter.

(b) The edge of the damage is a minimum of 2.5D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies, and

2) Are sealed as given in Paragraph 2.

(4) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inch in diameter

(b) A minimum of 2.5D (D = the diameter of the damage) from other damage, fastener holes or material edges. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies, and

2) Are sealed as given in Paragraph 2.

(5) Delaminations are permitted if they are:

(a) A maximum of 2.0 inch in diameter

(b) A minimum of 2.5D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(6) Edge damage is permitted if it is:

(a) A maximum of 0.25 in depth

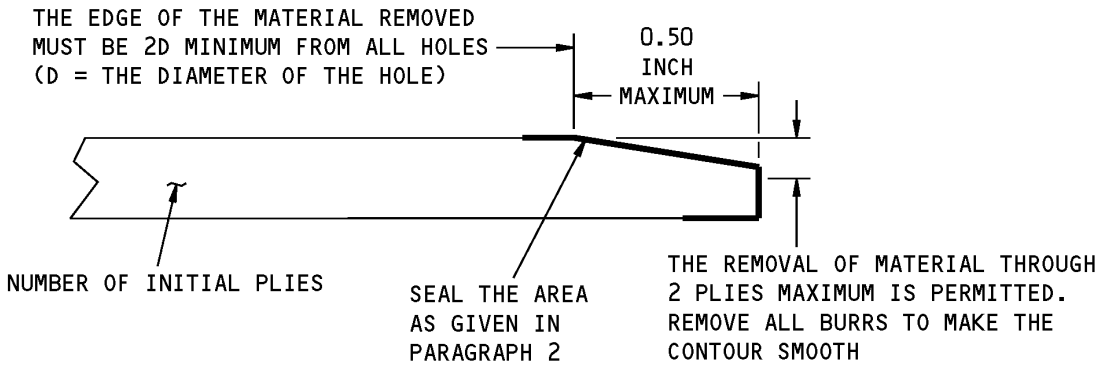
(b) A maximum of 1.00 inch in width

(c) A minimum of 2.5D (D = the diameter of the damage) from the edge of other damage, the edge of a hole, or the edge of the material. Other damage does not include nicks, gouges, and scratches that:

1) Do not cause damage to the glass fiber plies

2) Are sealed as given in Paragraph 2.

(7) Edge Erosion is permitted as shown in Cleanup and Sealing of Edge Erosion, Figure 103/ALLOWABLE DAMAGE 2.



Cleanup and Sealing of Edge Erosion
Figure 103

REPAIR 1 - VERTICAL STABILIZER TIP

1. Applicability

A. Repair 1 is applicable to the vertical stabilizer canopy made of Glass Fiber Reinforced Plastic (GFRP) and the vertical stabilizer trailing edge skin (Aluminum) shown in Vertical Stabilizer Tip Canopy Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.

2. General

A. Repair 1 gives instructions for Category A and B repairs for the vertical stabilizer canopy and a Category A repair for the vertical stabilizer trailing edge skin. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Refer to Paragraphs 2.C through 2G for damage to the vertical stabilizer canopy. Refer to Paragraph 2.H for lightning strike damage to the vertical stabilizer trailing edge skin.

C. Get access to the damaged area.

(1) If necessary, remove the tip cap. Refer to AMM 55-33-21/401.

(2) Refer to 51-40-02 for information on fastener removal.

D. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

E. Refer to Definitions of the Damage Size, Figure 202/REPAIR 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

F. Do the repair as given in Paragraph 4./REPAIR 1

G. Put the tip cap back to the initial condition, as applicable.

(1) Install the tip cap, if it was removed. Refer to AMM 55-33-21/401.

(a) Refer to 51-40-02 for information on fastener installation.

(2) Make sure the aerodynamic smoothness is satisfactory or there will be a decrease in the performance of the airplane. Refer to 51-10-01.

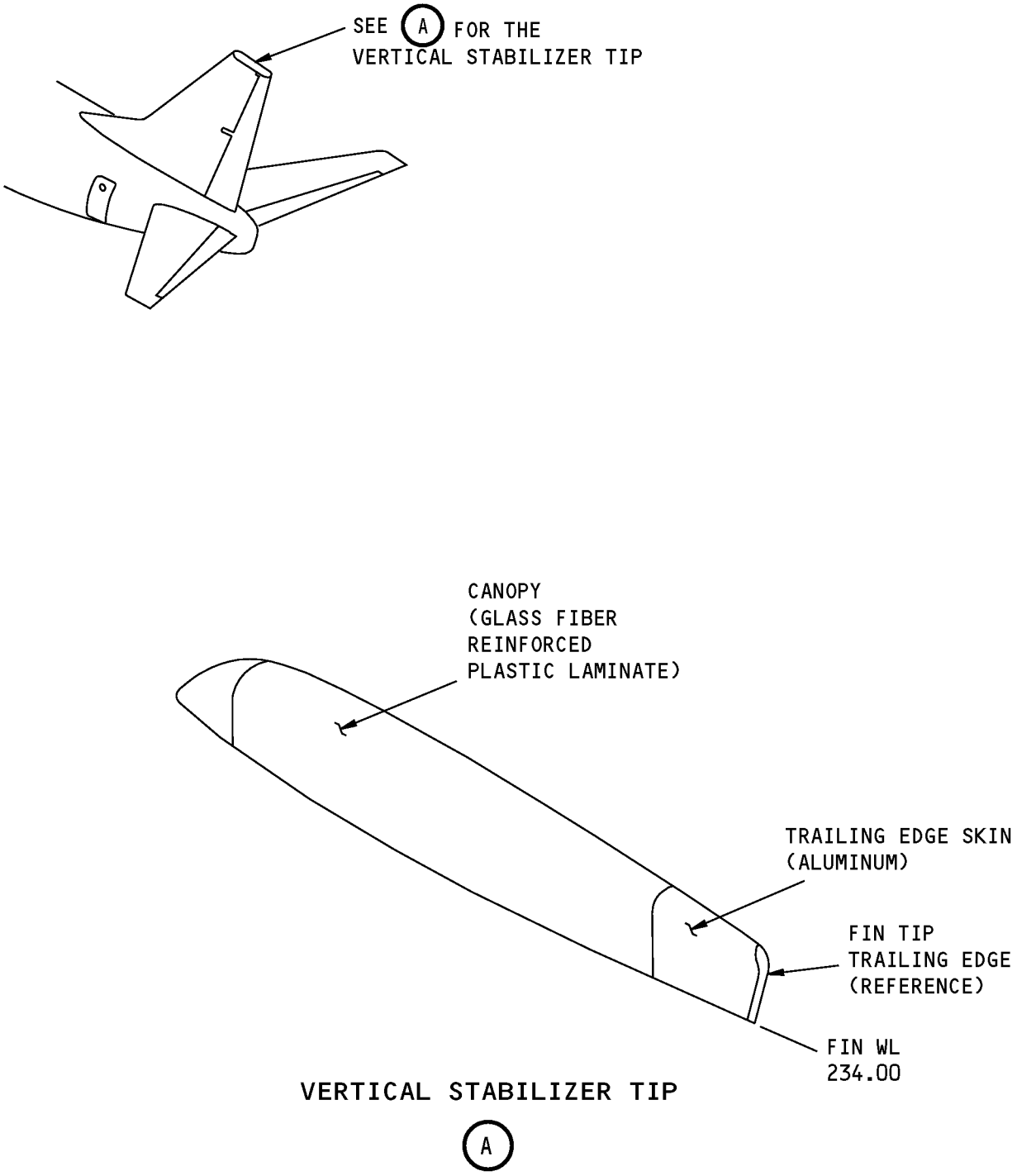
H. For damage to the aluminum vertical stabilizer trailing edge skin do as follows:

(1) Remove the damage.

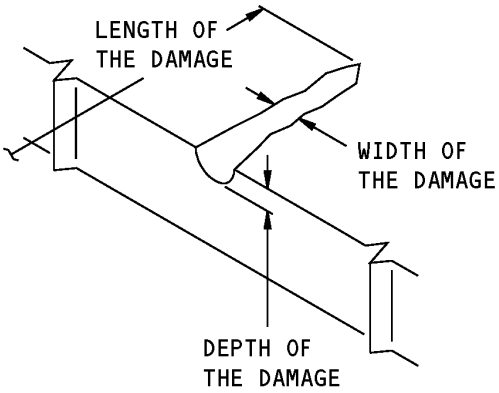
(2) Do a High Frequency Eddy Current (HFEC) inspection to the edge of the damage locations to make sure that all of the damage has been removed. Refer to NDT Part 6, 51-00-00, Figure 3.

(3) Make a 0.08 inch (2.03 mm) insurance cut around the damage perimeter.

(4) Do the repair instructions as given in Paragraph 4.

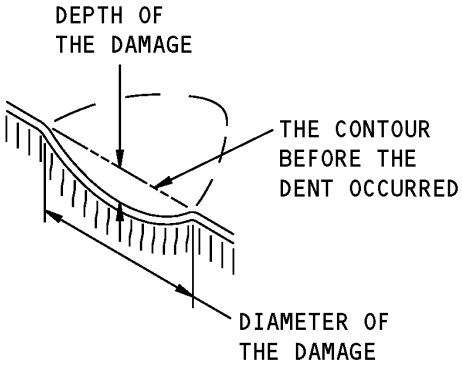


Vertical Stabilizer Tip Canopy Location
Figure 201



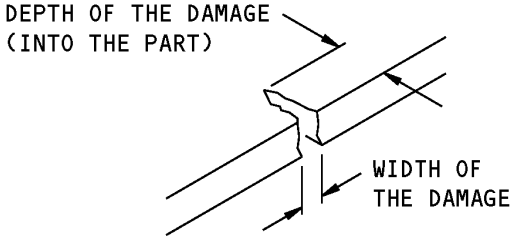
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01	AERODYNAMIC SMOOTHNESS
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-05, GENERAL	Fastener Hole Sizes
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS

(Continued)

Reference	Title
55-30-30, ALLOWABLE DAMAGE 1	Vertical Stabilizer Tip
AMM 55-33-21/401	Vertical Stabilizer (FIN) Tip Removal/Installation
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. Refer to paragraph 4.B through 4.G for damage to the vertical stabilizer canopy. Refer to Paragraph 4.H for damage to the vertical stabilizer trailing edge skins.

B. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound.

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

C. For dents that are not permitted by Paragraph 4.B./REPAIR 1 and for other damage that is not permitted by Allowable Damage 1, refer to Table 201.

D. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) The edges of the repair must be 3 inches or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 1.

(2) Repair the damage as given in 51-70-06.

(3) Use the same number of repair plies as the number of initial plies that were removed.

Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE CANOPY				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 1.5 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location	Damage that is a maximum of: - 3.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location	There are no limits on the dimension of the repair	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	SRM 51-70-06 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

(4) Do an inspection of the repair every 800 flight hours.

(a) If deterioration is found, replace the repair with a Category A repair.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.
   (1) The edges of the repair must be 3 inches or more away from:
      (a) The edge of other repairs
      (b) The edge of the part
      (c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 1.
   (2) Repair the damage as given in 51-70-04.
      (a) Use the same number of repair plies as the number of initial plies that were removed.
      (b) Add one structural ply of BMS 9-3, Type H-2, or Type H-3 glass fabric that is ±45 degrees.
      (c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

F. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.
   (1) Repair the damage as given in 51-70-04.
      (a) Use the same number of repair plies as the number of initial plies that were removed.
      (b) Add one structural ply of BMS 9-3, Type H-2, or Type H-3 glass fabric that is ±45 degrees.
      (c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

G. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.
   (1) Use the same number of repair plies as the number of initial plies that were removed.

H. For the Category A repair to the vertical stabilizer trailing edge skins do as follows:
   (1) Remove the damage and initial finishes to a maximum 1.0 inch (25.4 mm) diameter hole as shown in Figure 203.
   (2) Make sure the surface texture roughness for all cut surfaces is 63 microinches Ra, or smoother at all locations.
   (3) Make the part [1] Doubler as given in Table 201. Make sure the part [1] Doubler has the same contour as the initial skin.
   (4) Remove the finish from the trailing edge skin that is common to the part [1] Doubler.
   (5) Assemble the part [1] Doubler as shown in Figure 203.
   (6) Drill the necessary fastener holes as shown in Figure 203. Refer to 51-40-05, GENERAL for the fastener hole dimensions.
      (a) Make sure that the maximum countersink depth is not more than 80 percent of the part [1] Doubler thickness. This will prevent a knife edge condition of the part [1] Doubler.
   (7) Disassemble the part [1] Doubler.
   (8) Remove all the nicks, scratches, gouges, burrs from the initial and repair parts.
   (9) Chamfer the edge of the part [1] Doubler to a 20:1 ratio at all locations.
   (10) Install the part [1] Doubler and fasteners without sealant.
   (11) Apply a chemical conversion coating to the part [1] Doubler and to the bare surfaces of the initial skin. Refer to 51-20-01, GENERAL.

Table 202:

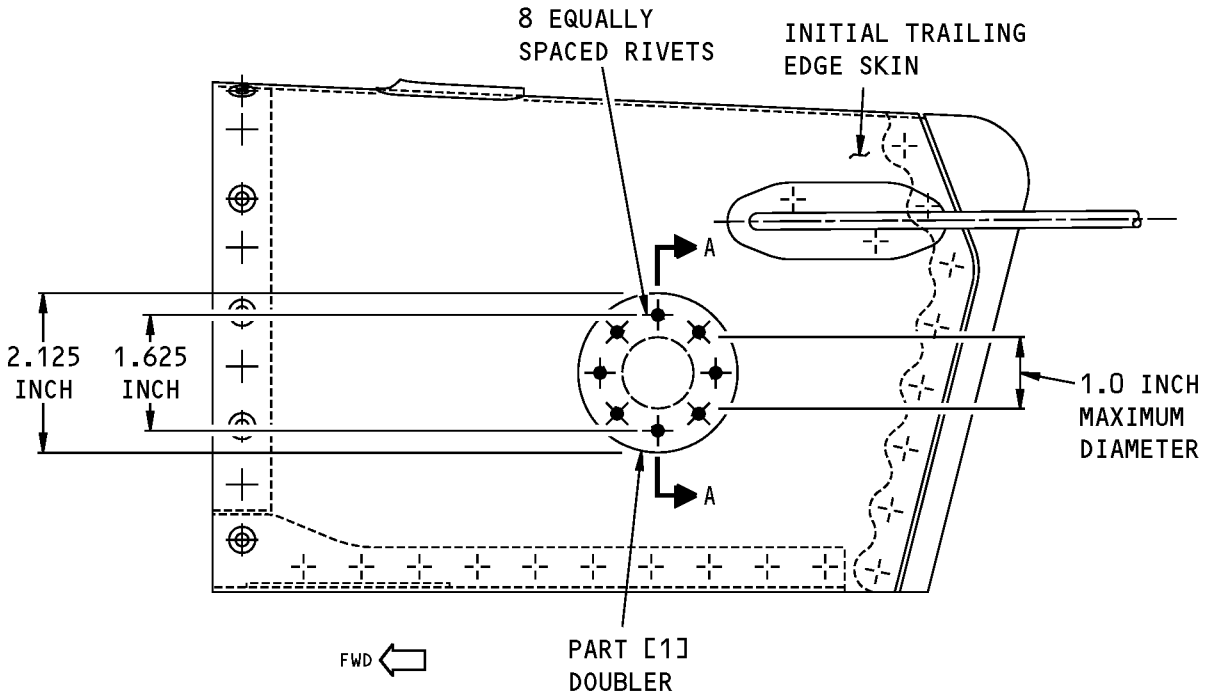
REPAIR MATERIAL			
ITEM	**PART**	**QUANTITY**	**MATERIAL**
[1]	Doubler	1	Use 2024-T3 sheet with a thickness of 0.050 inch (12.70 mm).

(12) Apply (2) layers of BMS 10-11, Type I primer to the part [1] Doubler and to the bare surfaces of the initial skin. Refer to SOPM 20-41-02.

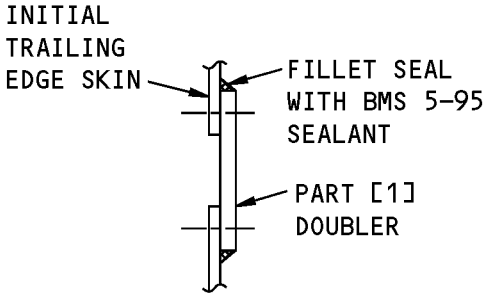
(13) Fillet seal the edges of the part [1] doubler and all gaps with BMS 5-95 sealant. Refer to 51-20-05, GENERAL.

(14) Do a resistance check between the part [1] Doubler and the initial trailing edge skin. Refer to BAC 5117-6 for the test procedures. The maximum resistance that is permitted is 0.010 ohms.

(15) Apply all initial production drawing finishes as necessary.



LEFT SIDE IS SHOWN
(RIGHT SIDE IS OPPOSITE)



A–A

NOTES

- MAKE SURE THERE IS A MINIMUM OF 2D EDGE MARGIN AT ALL LOCATIONS.
- MAKE SURE THE FASTENER SPACING IS 4D–6D.

FASTENER SYMBOLS

✦ REPAIR FASTENER LOCATION. INSTALL A BACR15CE4D() RIVET.

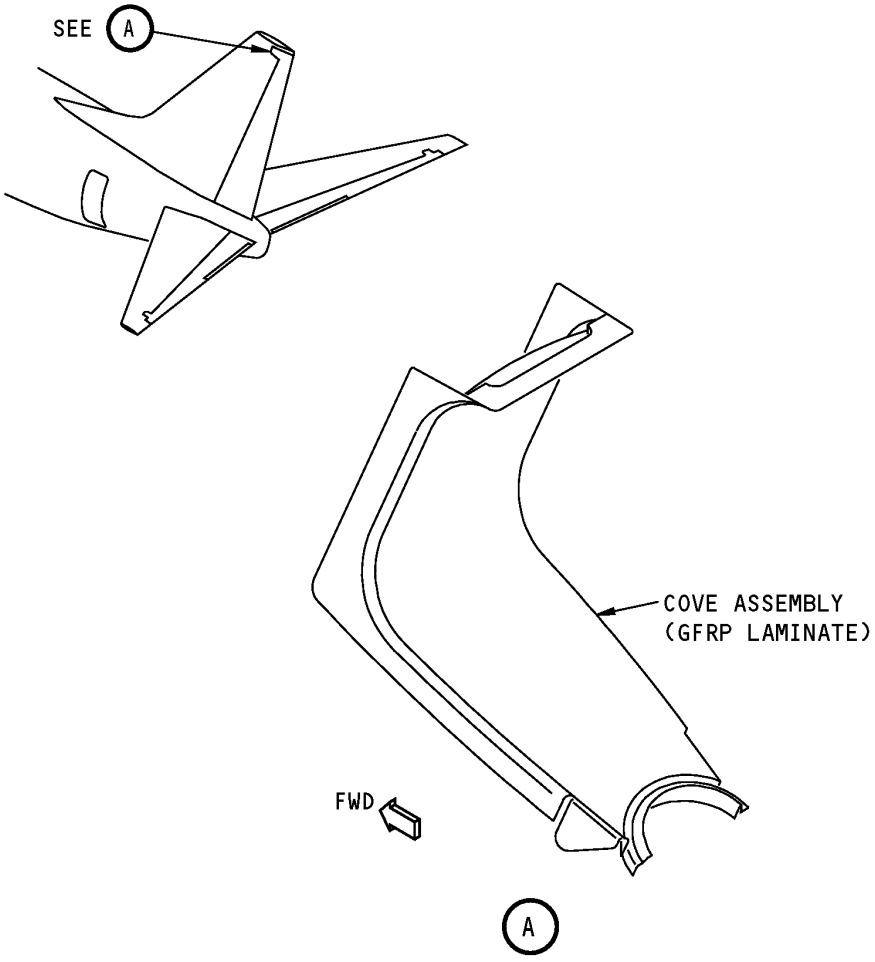
Trailing Edge Skin Lightning Strike Repair
Figure 203

REPAIR 2 - VERTICAL STABILIZER COVE

1. Applicability

A. Repair 2 is applicable to the vertical stabilizer cove panel made of Glass Fiber Reinforced Plastic (GFRP) shown in Vertical Stabilizer Cove, Figure 201/REPAIR 2.

B. Repair 2 is applicable to damage that is more than the limits permitted in Allowable Damage 2. Refer to Allowable Damage 2 for the type and size of damage that is permitted.



Vertical Stabilizer Cove
Figure 201

2. General

A. Repair 2 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the cove panel.

(2) Refer to 51-40-02 for information on fastener removal.

C. Do an inspection of the damaged area to find the dimensions of the damage.

(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

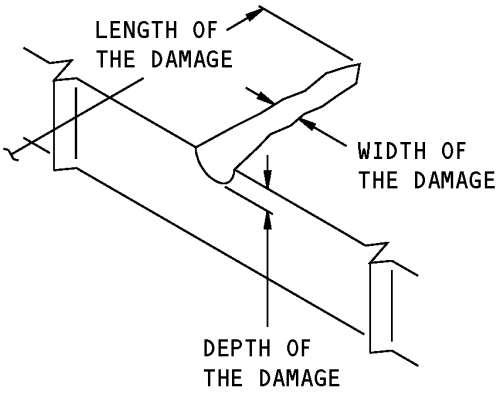
D. Refer to Definitions of the Damage Size, Figure 202/REPAIR 2, Details A, B, and C for the definitions of the length, width, and depth of damage.

E. Do the repair as given in Paragraph 4./REPAIR 2

F. Put the cove panel back to the initial condition, as applicable.

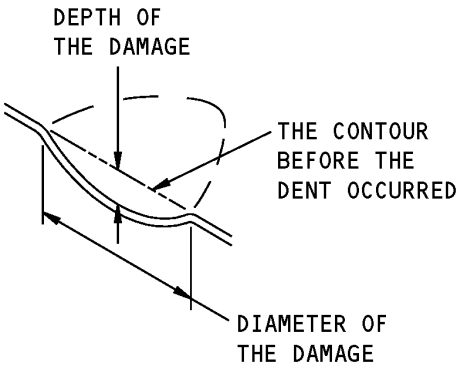
(1) Install the cove panel, if it was removed.

(a) Refer to 51-40-02 for information on fastener installation.



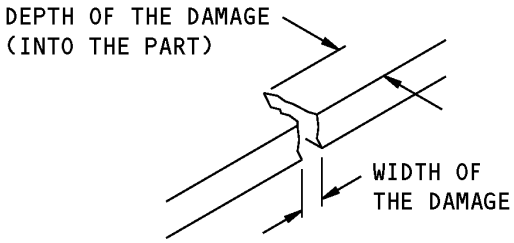
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

B



SIZE DEFINITIONS FOR
EDGE DAMAGE

C

Definitions of the Damage Size
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-02, GENERAL	Inspection and Removal of Damage
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06	ROOM TEMPERATURE CURE REPAIRS
55-10-30, ALLOWABLE DAMAGE 2	Horizontal Stabilizer Cove

4. Repair Instructions

A. For dents that are a maximum of 2 inches in diameter and have no fiber damage and delamination, do the steps that follow:

(1) Fill the dent with BMS 5-28, Type 7 potting compound

(2) Apply a fiberglass patch over the potted area as given in 51-70-04.

B. For dents that are not permitted by Paragraph 4.A./REPAIR 2 and for other damage that is not permitted by Allowable Damage 1, refer to Table 201/REPAIR 2.

C. Use the instructions that follow to do a Category B repair with wet layup materials at room temperature cure.

(1) The edges of the repair must be 3.0 inch or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 2.

(2) Repair the damage as given in 51-70-06.

(3) Use the same number of repair plies as the number of initial plies that were removed.

(4) Do an inspection of the repair each 800 flight hour interval or more frequently.

(a) If deterioration is found, replace the repair with a Category A repair.

Table 201:

REPAIR DATA FOR THE 250°F (121°C) CURE COVE PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE	Damage that is a maximum of: - 1.5 inches in diameter - 30 percent of the smallest dimension across the panel at the damage location One repair is permitted for each 144 square inches of panel area	Damage that is a maximum of: - 3.0 inches in diameter - 50 percent of the smallest dimension across the panel at the damage location One repair is permitted for each 144 square inches of panel area	There are no limits on the dimension of the repair	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	SRM 51-70-06 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.D	SRM 51-70-04 and Paragraph 4.E	SRM 51-70-05 and Paragraph 4.F

D. Use the instructions that follow to do a Category A repair with wet layup materials at 150°F (66°C) cure.

(1) The edges of the repair must be 3.0 inch or more away from:

(a) The edge of other repairs

(b) The edge of the part

(c) The edge of other damage. This does not include damage that is permitted and sealed as given in Allowable Damage 2.

(2) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

(b) Add one structural ply of BMS 9-3, Type H-2, or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

E. Use the instructions that follow to do a Category A repair with wet layup materials at 200°F (93°C) cure.

(1) Repair the damage as given in 51-70-04.

(a) Use the same number of repair plies as the number of initial plies that were removed.

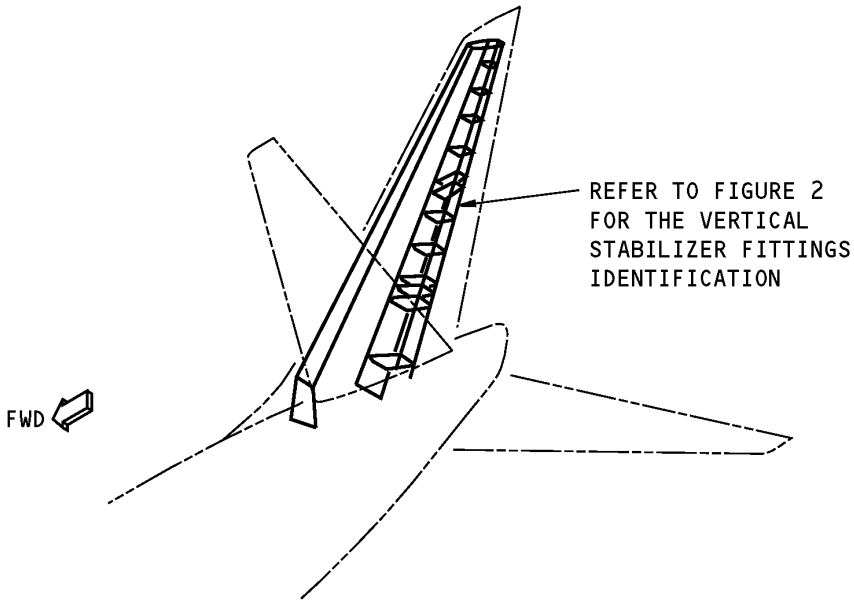
(b) Add one structural ply of BMS 9-3, Type H-2, or Type H-3 glass fabric that is ±45 degrees.

(c) Add a second structural ply of BMS 9-3, Type H-2 or Type H-3 glass fabric that is 0 or 90 degrees.

F. Use the instruction that follows to do a Category A repair with preimpregnated layup materials at 250°F (121°C) cure.

(1) Use the same number of repair plies as the number of initial plies that were removed.

IDENTIFICATION 1 - VERTICAL STABILIZER FITTINGS

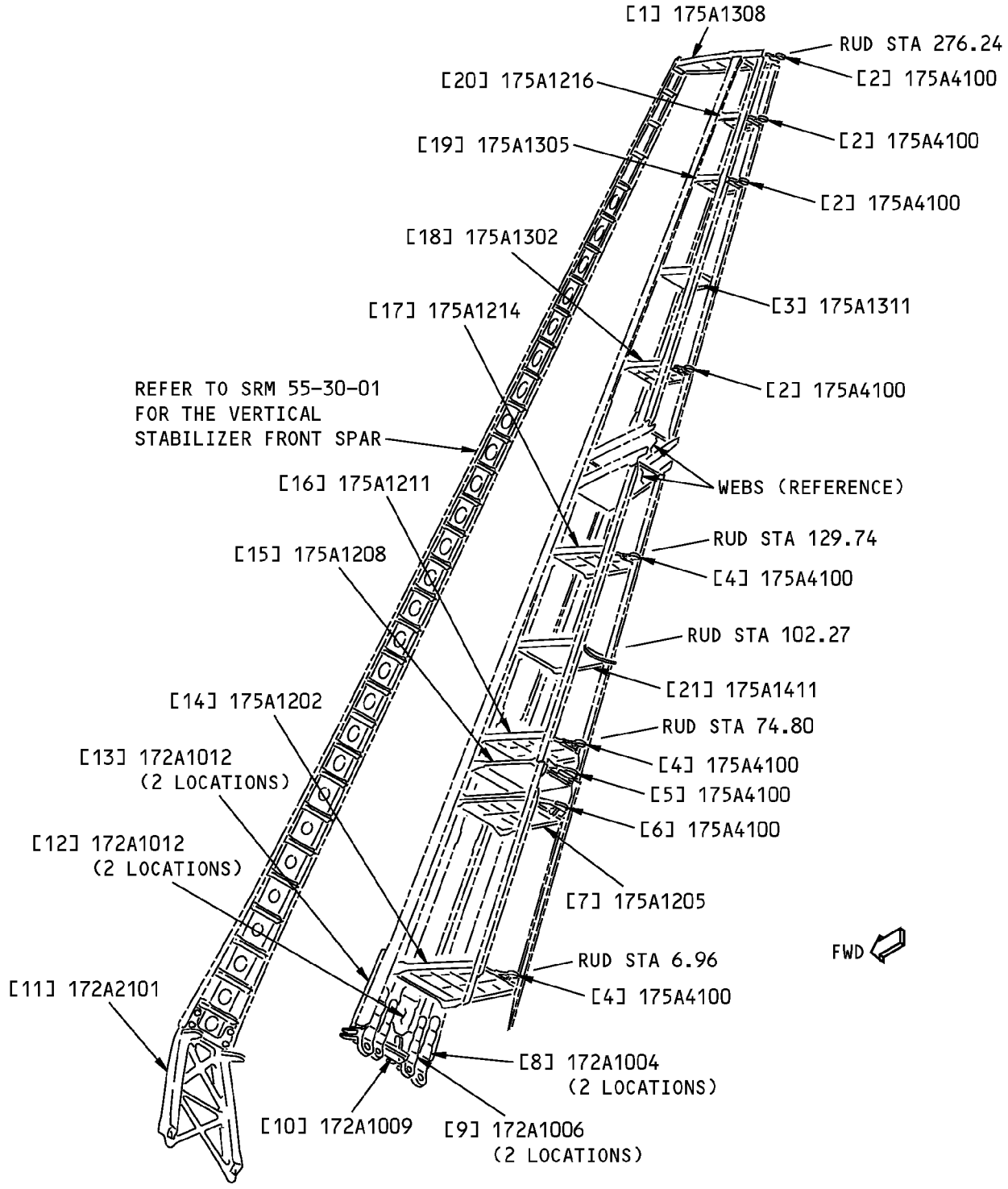


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Vertical Stabilizer Fittings Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
172A1001	Rear Spar Assembly / Installation - Vertical Fin
172A2001	Front Spar Assembly / Installation - Vertical Fin
175A0001	Trailing Edge Functional Collector - Vertical Fin



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Vertical Stabilizer Fittings Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Hinge Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[2]	Rudder Attach Hinge Plate (4)		7075-T7351 rolled plate as given in QQ-A-250/12, Class A. Refer to the production drawing for the machined thicknesses. (Grain direction controlled part)	
[3]	Beam, Support Fitting		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[4]	Rudder Attach Hinge Plate (3)		7075-T7351 plate as given in QQ-A-250/12, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[5]	Rudder Attach Hinge Plate Assembly			
	Hinge Plate		7075-T7351 plate as given in QQ-A-250/12, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
	Retainer		15-5PH CRES as given in BMS 7-240 Type I, heat treated to 180-200 KSI. Refer to the production drawing for the machined thicknesses	
	Retainer		7075-T7351 plate as given in QQ-A-250/12, Class A. Refer to the production drawing for the machined thicknesses	
[6]	Rudder Attach Hinge Plate Assembly			
	Hinge Plate		7075-T7351 plate as given in QQ-A-250/12, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
	Bearing Retainer		15-5PH CRES as given in BMS 7-240 Type I, heat treated to 180-200 KSI. Refer to the production drawing for the machined thicknesses	
[7]	Hinge Fitting Assembly			
	Fitting, Upper		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses	
	Fitting, Lower		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses	
[8]	Rear Spar Primary Fitting (2)		Ti-6Al-4V titanium machined forged block as given in MIL-T-9047, annealed. Refer to the production drawing for the machined thicknesses	
[9]	Rear Spar Failsafe Fitting (2)		Ti-6Al-4V titanium machined forged block as given in MIL-T-9047, annealed. Refer to the production drawing for the machined thicknesses	
[10]	Rear Spar Tension Tie Fitting		7075-T73 forged block as given in BMS 7-186, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	

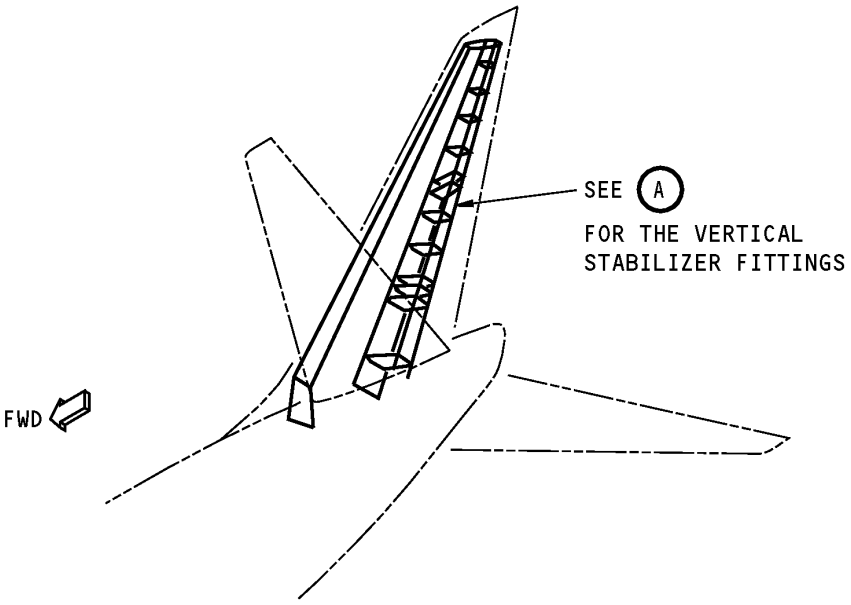
LIST OF MATERIALS FOR FIGURE 2				
ITEM	DESCRIPTION	T*[1]	MATERIAL	EFFECTIVITY
[11]	Front Spar Termination Fitting		7075-T73 forging as given in BMS 7-186, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[12]	Rear Spar Failsafe Fitting		7075-T651 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[13]	Rear Spar Fitting Strap (2)		7075-T7351 plate as given in QQ-A-250/12. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[14]	Hinge Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[15]	Hinge Fitting Assembly Fitting Failsafe Doubler		 7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part) 7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Optional: 7050-T7451 plate as given in AMS 4050 (Grain direction controlled part)	
[16]	Hinge Fitting (2)		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[17]	Hinge Fitting		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[18]	Hinge Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[19]	Hinge Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[20]	Hinge Fitting		7050-T7451 plate as given in BMS 7-323, Type I. Refer to the production drawing for the machined thicknesses (Grain direction controlled part)	
[21]	Beam Support Fitting		7050-T7451 plate as given in AMS 4050, Class A. Refer to the production drawing for the machined thicknesses	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

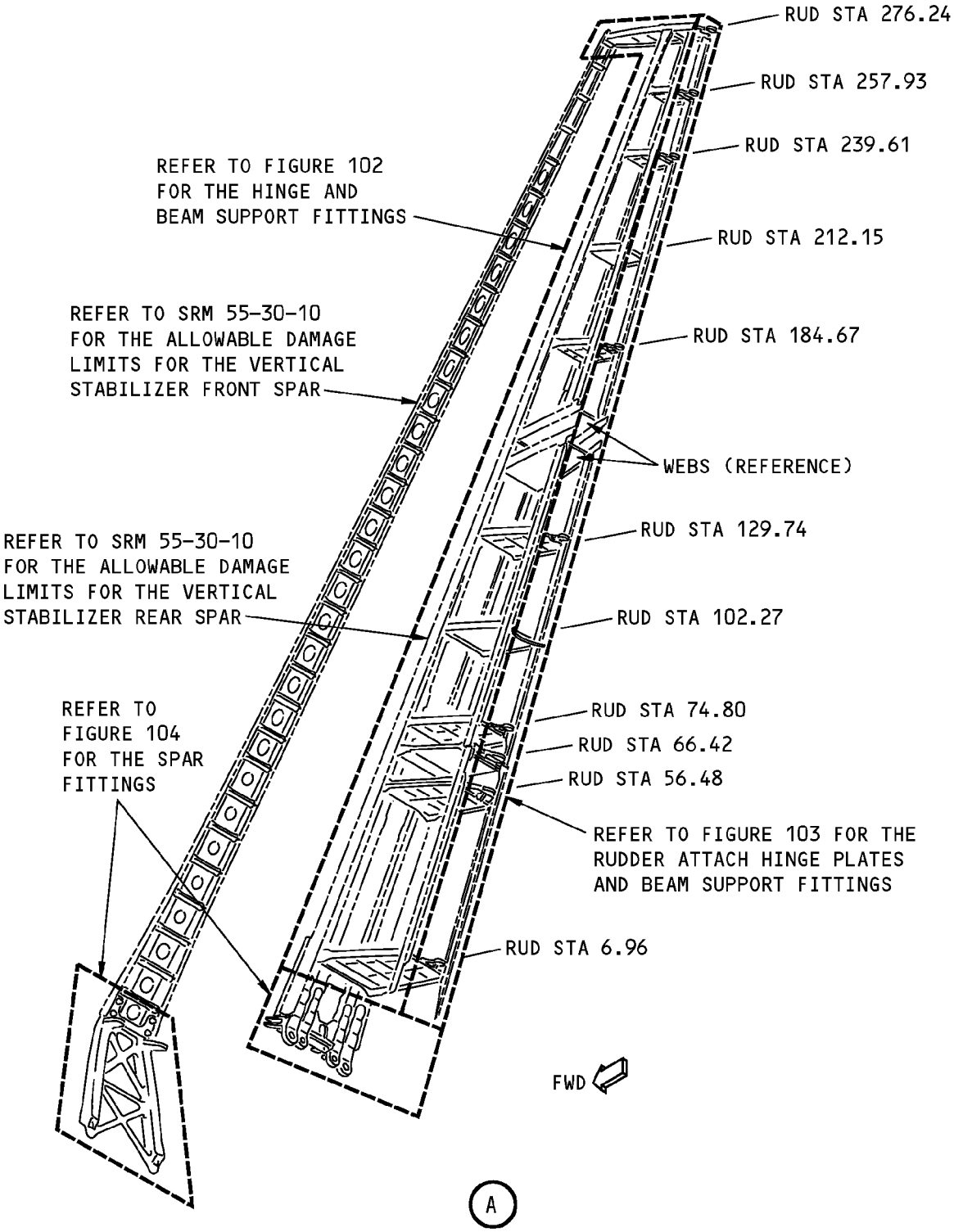
ALLOWABLE DAMAGE 1 - VERTICAL STABILIZER FITTINGS

1. Applicability

A. This subject gives the allowable damage limits for the fittings that attach to the vertical stabilizer shown in Vertical Stabilizer Fitting Locations, Figure 101/ALLOWABLE DAMAGE 1.



Vertical Stabilizer Fitting Locations
Figure 101 (Sheet 1 of 2)



Vertical Stabilizer Fitting Locations
Figure 101 (Sheet 2 of 2)

2. General

A. Remove the parts as necessary to get access to the vertical stabilizer fittings.

B. Refer to Table 101/ALLOWABLE DAMAGE 1 for a list of the references for the allowable damage limits.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS	
STRUCTURAL PART	PARAGRAPH
End Pads	4.A
Gussets	4.A
Webs	4.A
Attach Flanges	4.A
Rear Spar Strap	4.A
Hinge Plates	4.B
Bearing Retainers	4.C
Lugs	4.C
Rear Spar Terminal Fittings	4.D

WARNING: SMALL PARTICLES AND THIN CUTS OF TITANIUM ARE FLAMMABLE. IN A SUFFICIENT CONCENTRATION, AN EXPLOSION CAN OCCUR. EXTINGUISH FIRES OF TITANIUM WITH FULLY DRY TALC, CALCIUM CARBONATE, SAND OR GRAPHITE. APPLY THE POWDER TO A DEPTH OF 1/2 INCH OR MORE ON THE AREA THAT IS ON FIRE. DO NOT USE FOAM, WATER, CARBON TETRACHLORIDE, HALON OR CARBON DIOXIDE. WATER IN CONTACT WITH MOLTEN TITANIUM CAN CAUSE A STREAM EXPLOSION. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

C. Do the steps that follow if you have damage to the aluminum, Corrosion Resistant Steel (CRES), or titanium parts:

D. Remove the damage as necessary.

(1) Refer to 51-10-02 for the investigation and removal of damage.

(2) Refer to 51-30-03 for possible sources of nonmetallic materials you need to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

E. After you remove the damage, do the procedures that follow:

(1) Do a penetrant inspection to all parts except the rear spar strap and the bearing retainers to make sure that all the damage is removed. Refer to SOPM 20-20-02.

(2) Apply a chemical conversion coating to the bare surfaces of the aluminum parts. Refer to 51-20-01.

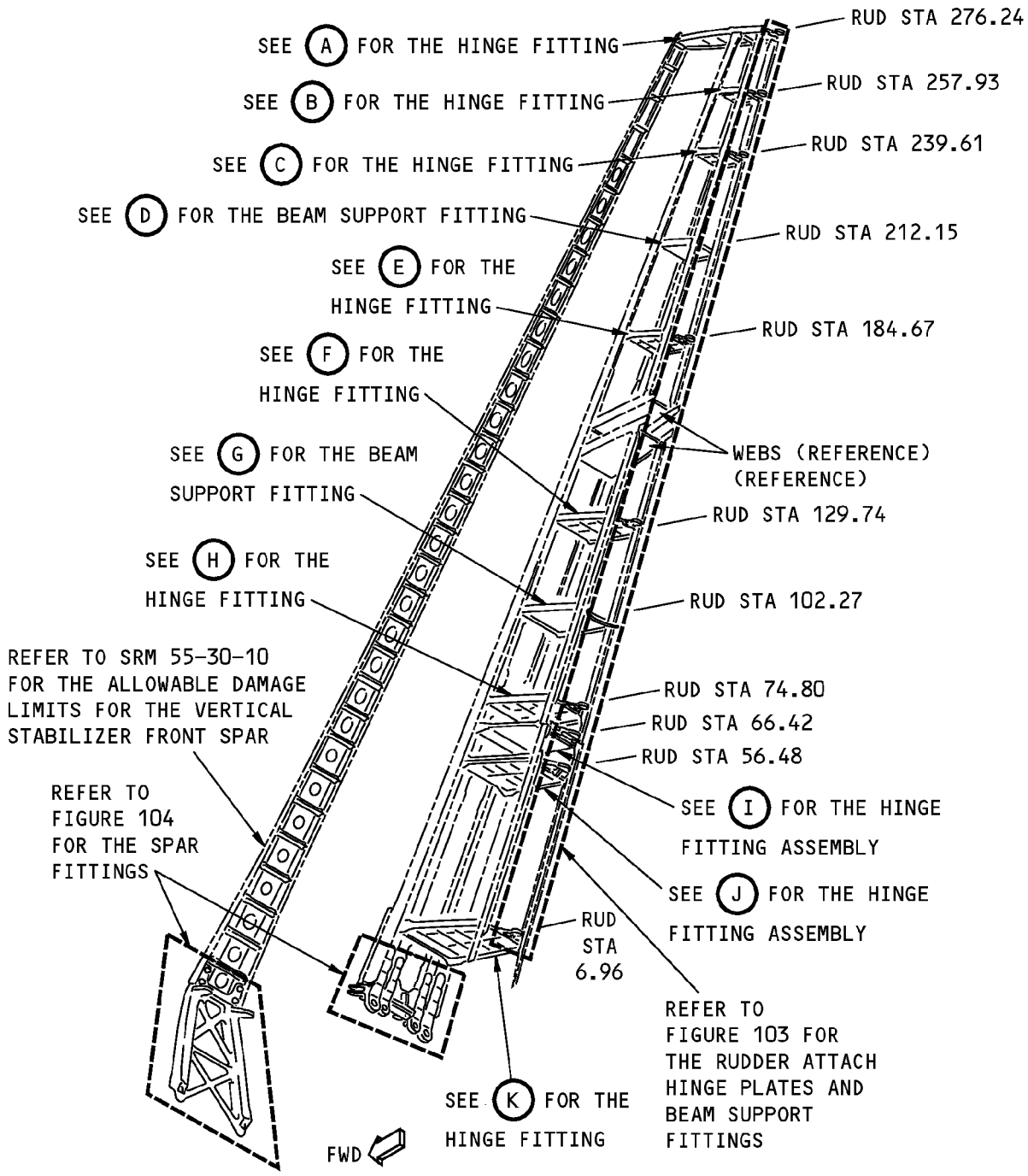
(3) Apply cadmium plating to the bare surfaces of the CRES parts. Refer to SOPM 20-42-05.

(4) Apply 2 layers of BMS 10-11, Type I primer to the surfaces of all reworked areas except the fitting straps, primary fittings, and failsafe fittings of the rear spar. Refer to SOPM 20-41-02.

NOTE: Do not apply the BMS 10-11, Type I primer to the holes of the fittings.

(5) Apply a layer of BMS 10-11, Type I primer to the surfaces of the fitting straps, primary fittings, and failsafe fittings of the rear spar. Refer to SOPM 20-41-02.

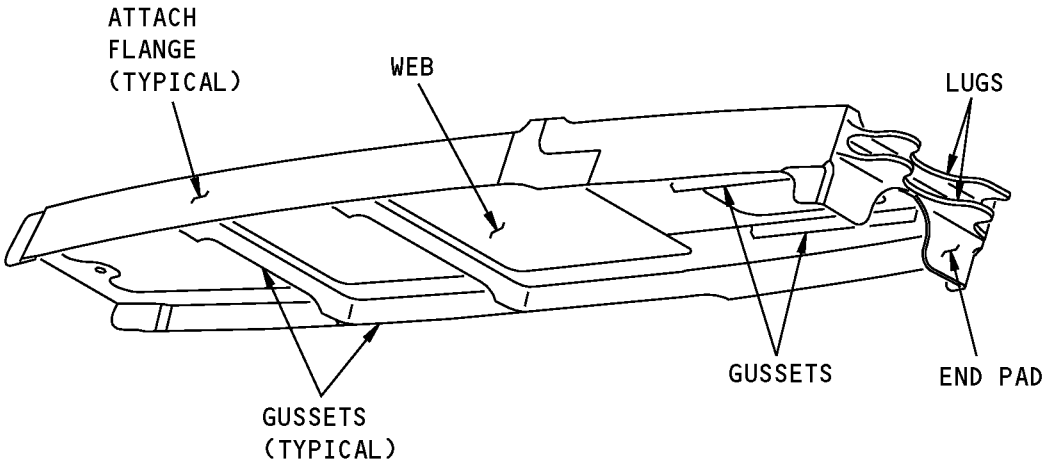
NOTE: Do not apply the BMS 10-11, Type I primer to the holes of the fittings.



NOTES

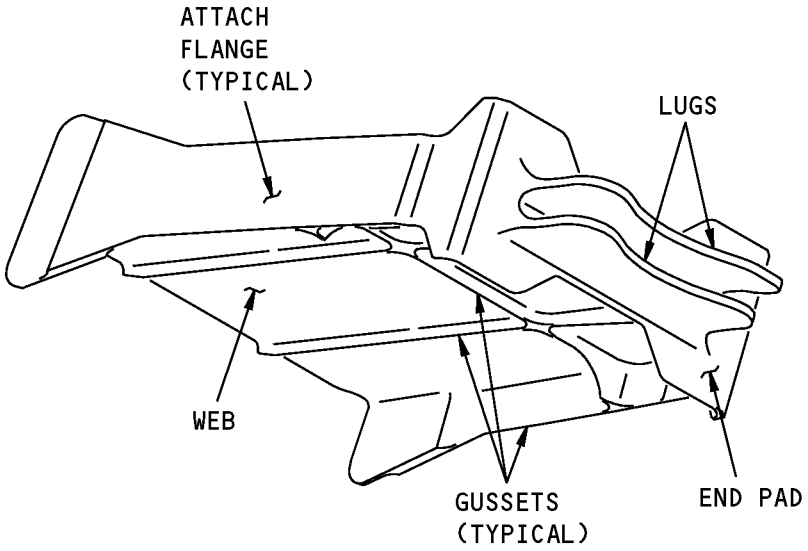
- ALL THE PARTS IDENTIFIED ARE MACHINED ALUMINUM.

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 1 of 7)



HINGE FITTING AT RUDDER STATION 276.24

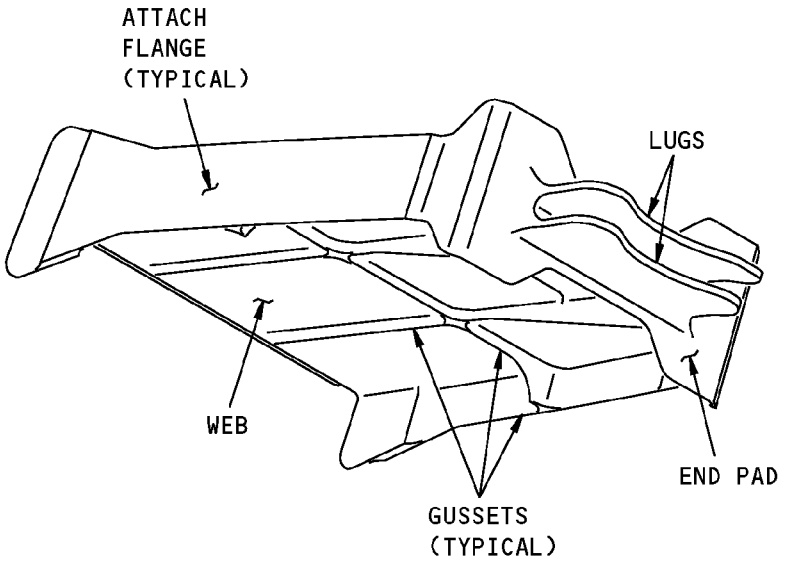
A



HINGE FITTING AT RUDDER STATION 257.93

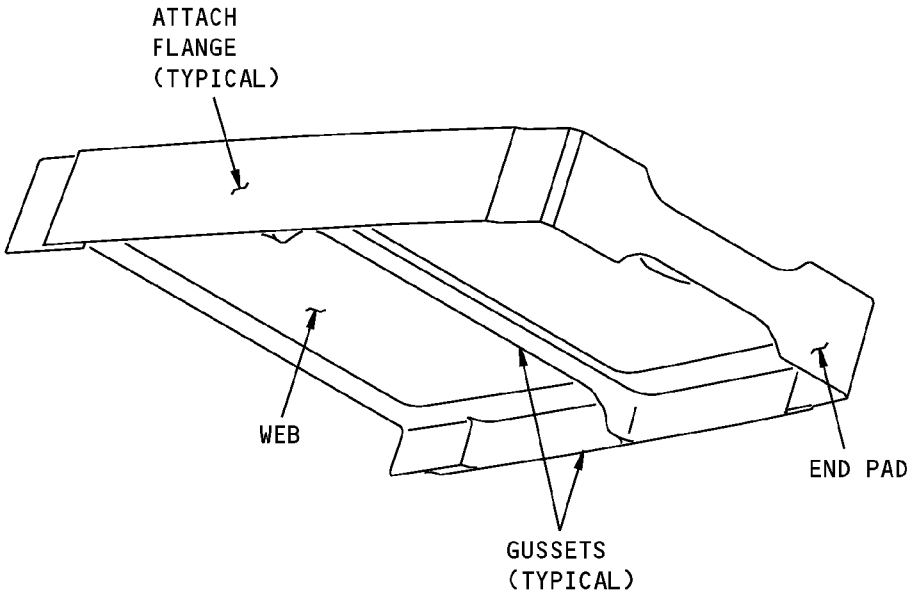
B

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 2 of 7)



HINGE FITTING AT RUDDER STATION 239.61

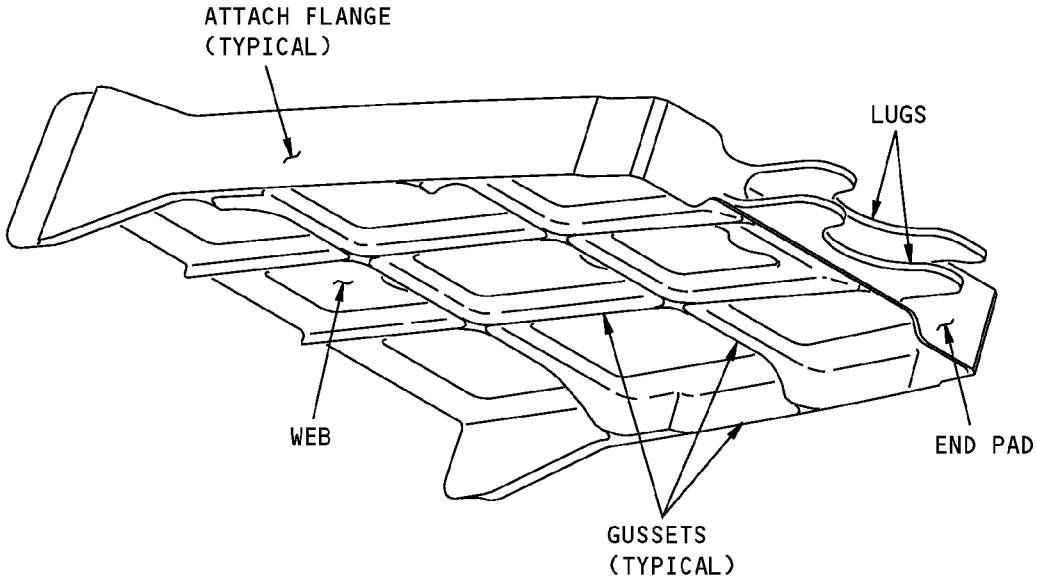
C



BEAM SUPPORT FITTING AT RUDDER STATION 212.15

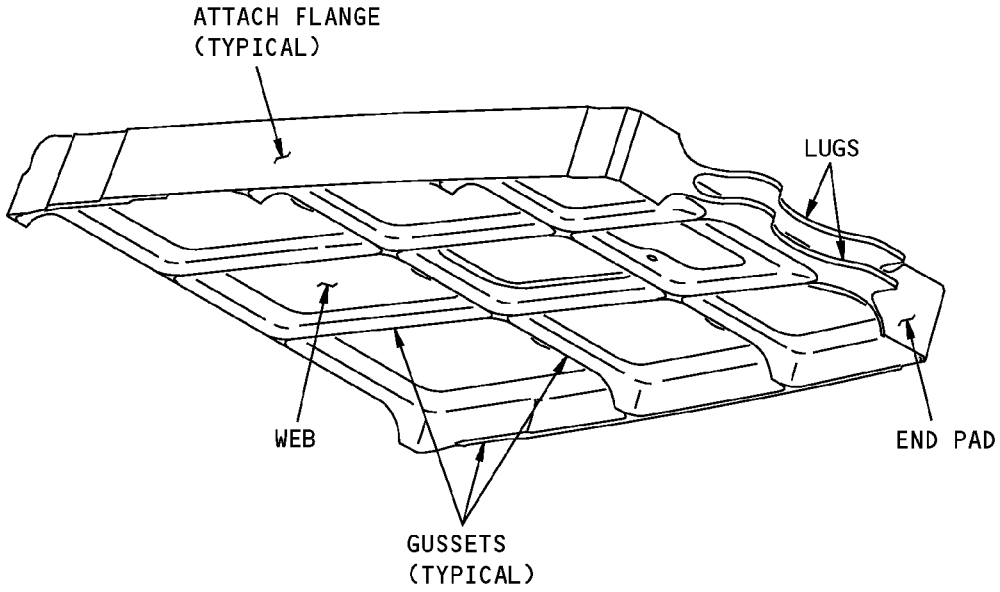
D

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 3 of 7)



HINGE FITTING AT RUDDER STATION 184.67

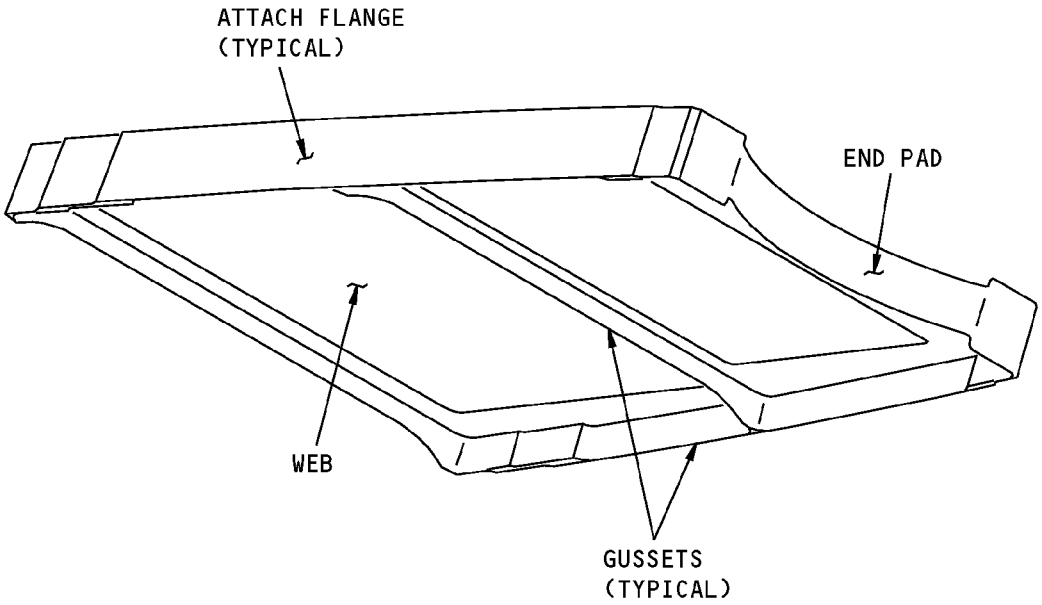
E



HINGE FITTING AT RUDDER STATION 129.74

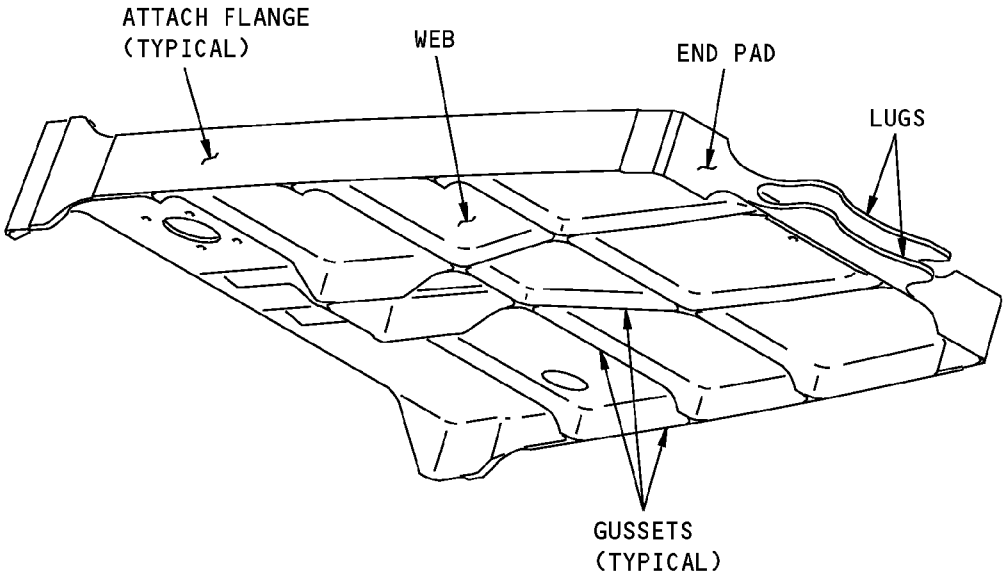
F

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 4 of 7)



BEAM SUPPORT FITTING AT RUDDER STATION 102.27

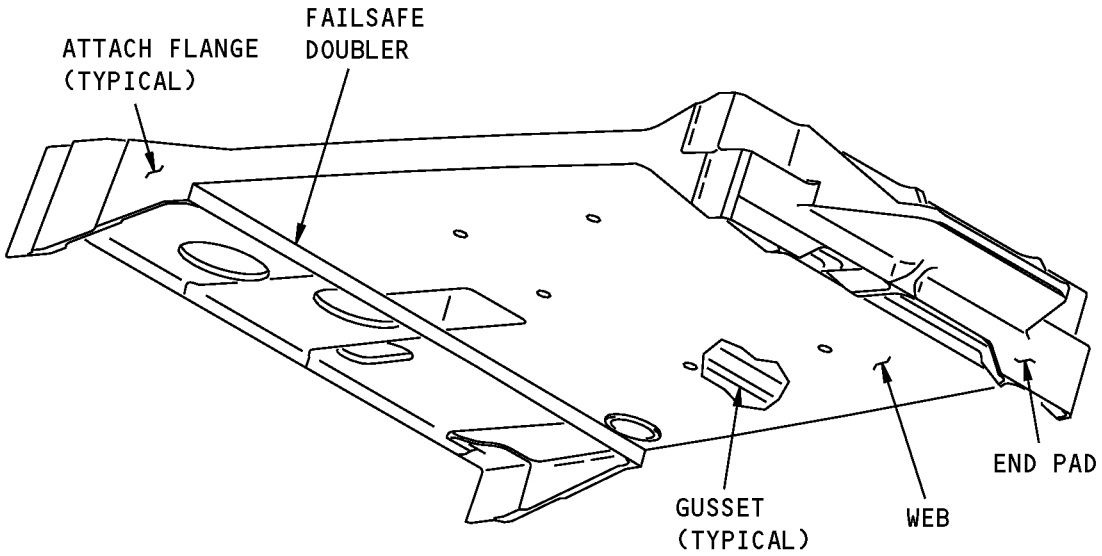
G



HINGE FITTING AT RUDDER STATION 74.80

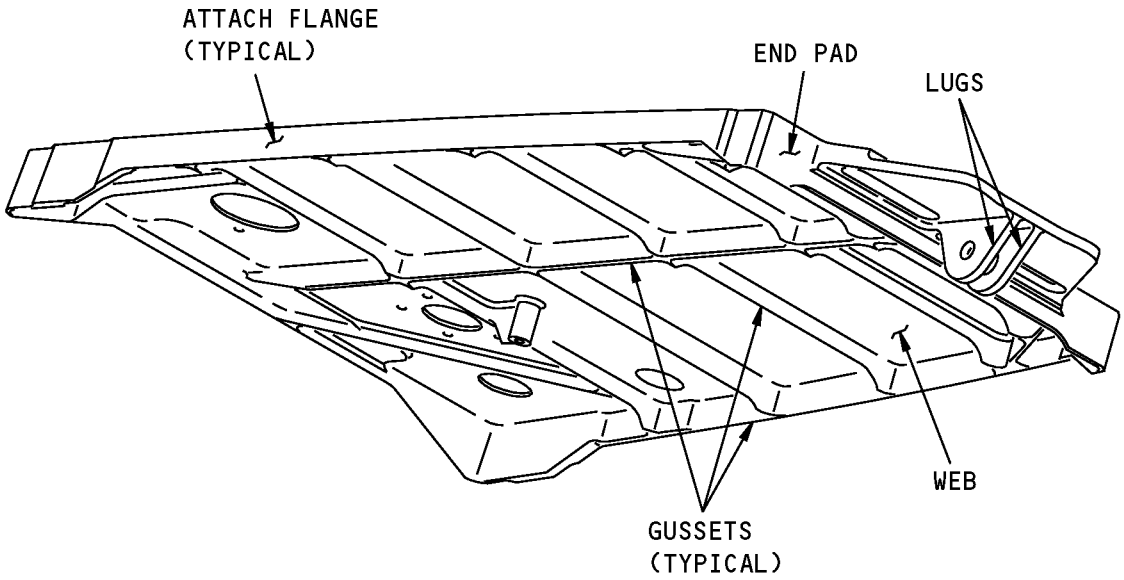
H

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 5 of 7)



HINGE FITTING ASSEMBLY AT RUDDER STATION 66.42

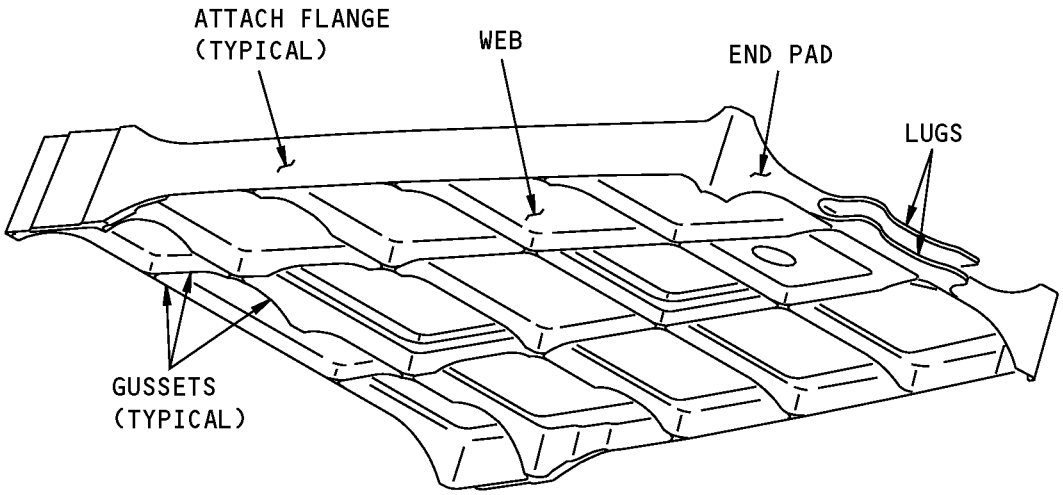
I



HINGE FITTING ASSEMBLY AT RUDDER STATION 56.48

J

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 6 of 7)



HINGE FITTING AT RUDDER STATION 6.96

K

Vertical Stabilizer Hinge and Beam Support Fittings
Figure 102 (Sheet 7 of 7)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-40-05, GENERAL	Fastener Hole Sizes
51-40-06, GENERAL	Fastener Edge Margins
51-40-08, GENERAL	Countersink Data and Procedures for Metal Structures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-41-02	Application of Chemical and Solvent Resistant Finishes
SOPM 20-42-05	Bright Cadmium Plating
SOPM 20-50-03	Bearing and Bushing Replacement

4. Allowable Damage Limits

A. End Pads, Gussets, Webs, Attach Flanges, and Rear Spar Strap

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Detail A, B, C, D, E, F, and G.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Hinge Plates

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Detail A, B, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Lugs and Bearing Retainers

NOTE: No damage is permitted in the surface of the lug bore. You are permitted to drill the bore to a maximum oversize diameter of 0.06 inch more than the initial bore diameter if:

- There is no damage on the edge of the lug initial bore

- You follow the bushing removal procedures as given in SOPM 20-50-03.

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details H and I.

(2) Nicks, Gouges, Scratches, and Corrosion:

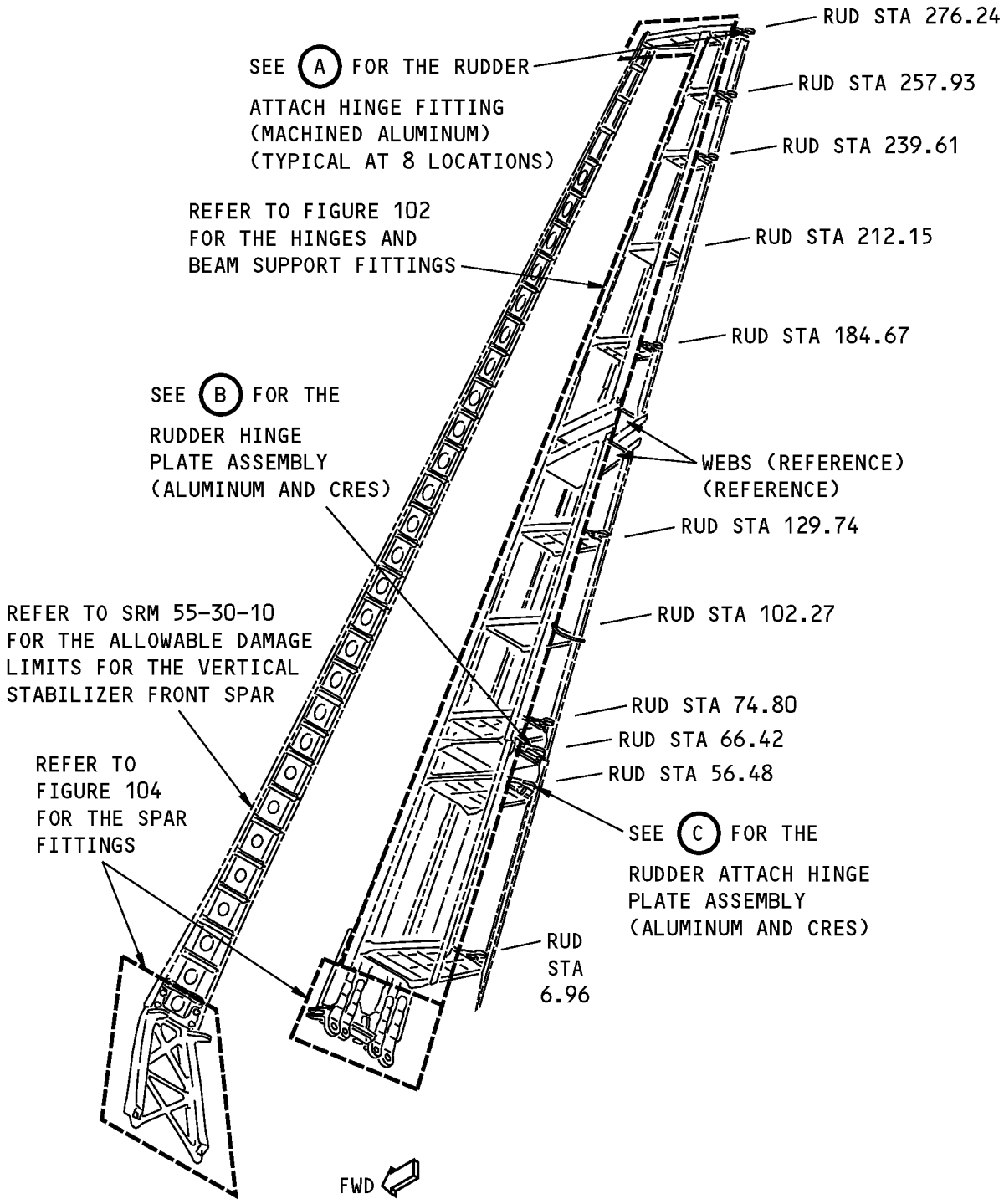
(a) Remove the damage as shown in Allowable Damage Limits, Figure 105/ALLOWABLE DAMAGE 1, Details H and I.

(3) Dents are not permitted.

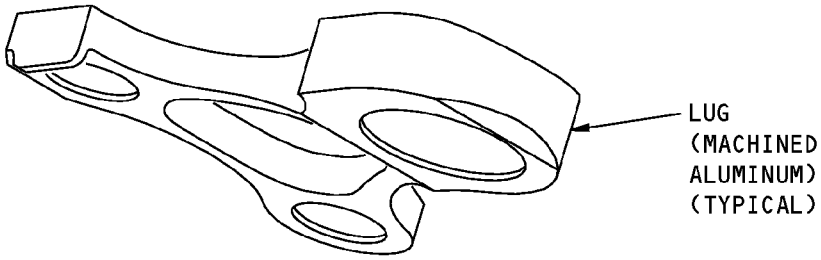
(4) Holes and Punctures are not permitted.

D. Rear Spar Terminal Fittings

(1) Damage is not permitted.

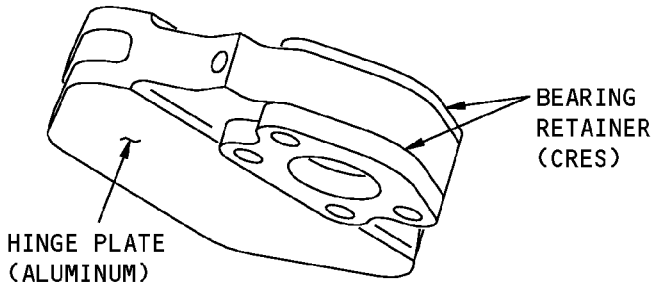


Vertical Stabilizer Rudder Attach Hinge Plates and Beam Support
Figure 103 (Sheet 1 of 2)



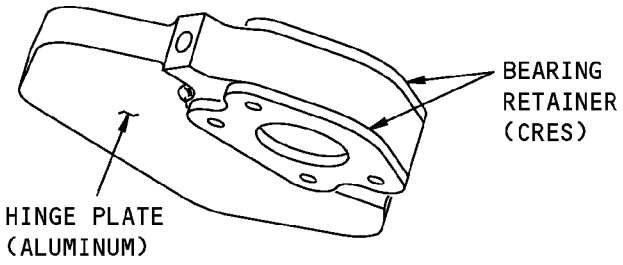
TYPICAL ATTACH HINGE FITTING
(LOCATED AT RUDDER STATIONS 276.24, 257.93,
239.61, 212.15, 184.67, 129.74, 74.80, AND 6.96)

A



RUDDER ATTACH HINGE PLATE AT RUDDER STATION 66.42

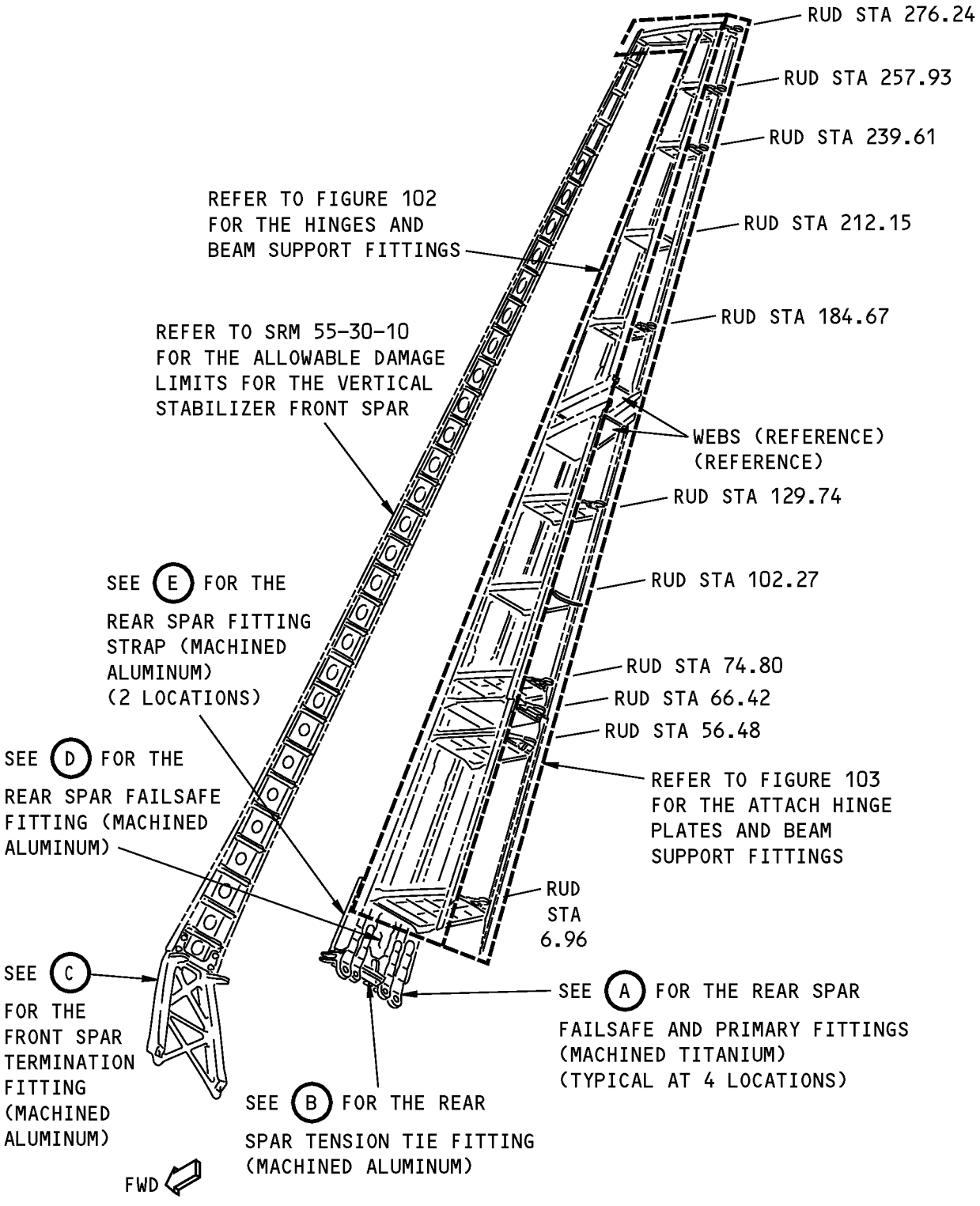
B



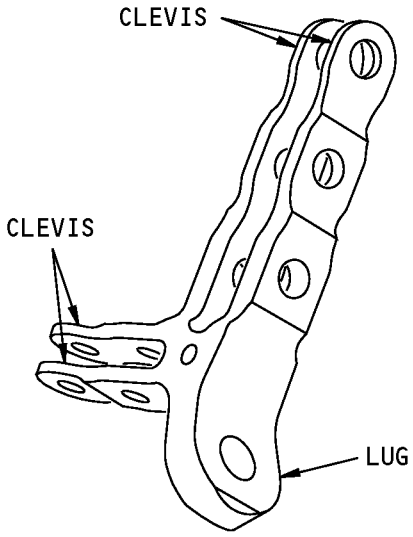
RUDDER ATTACH HINGE PLATE AT RUDDER STATION 56.48

C

Vertical Stabilizer Rudder Attach Hinge Plates and Beam Support
Figure 103 (Sheet 2 of 2)

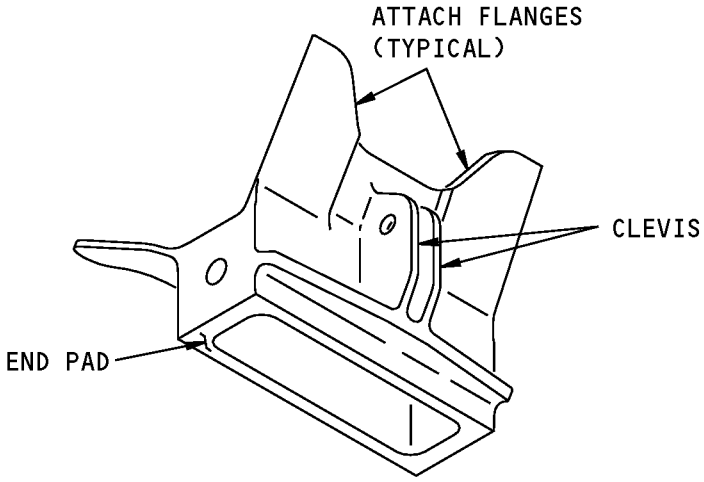


Vertical Stabilizer Spar Fittings
Figure 104 (Sheet 1 of 4)



TYPICAL REAR SPAR TERMINAL, PRIMARY, AND FAILSAFE FITTING

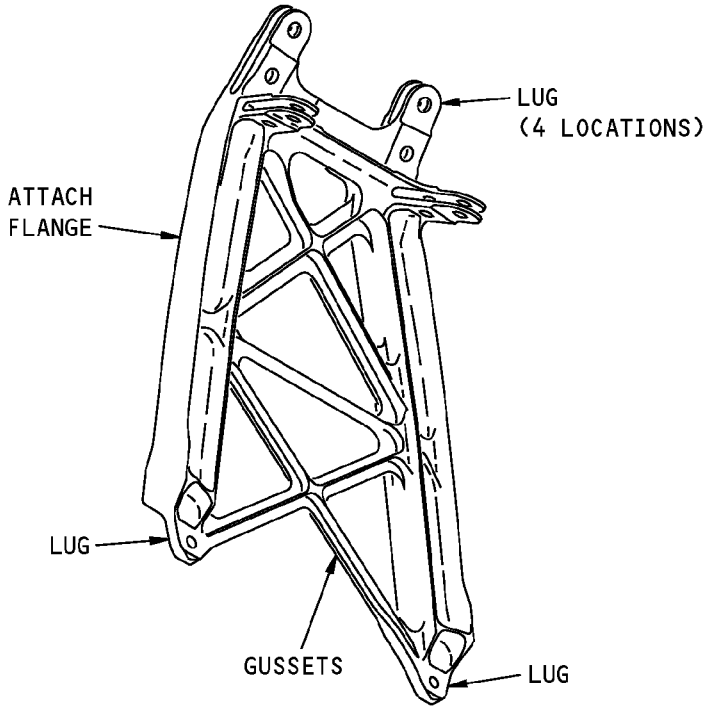
A



REAR SPAR TENSION TIE FITTING

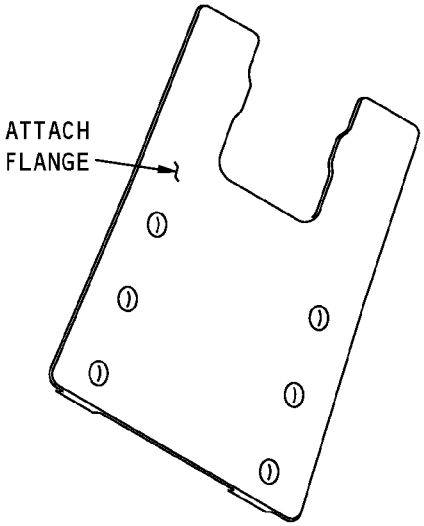
B

Vertical Stabilizer Spar Fittings
Figure 104 (Sheet 2 of 4)



FRONT SPAR TERMINATION FITTING

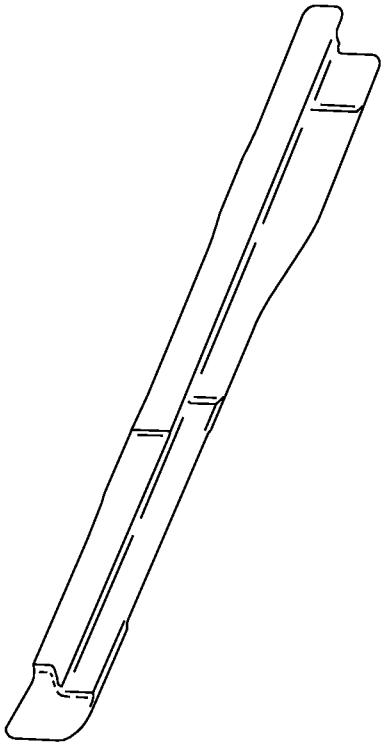
C



REAR SPAR FAILSAFE FITTING

D

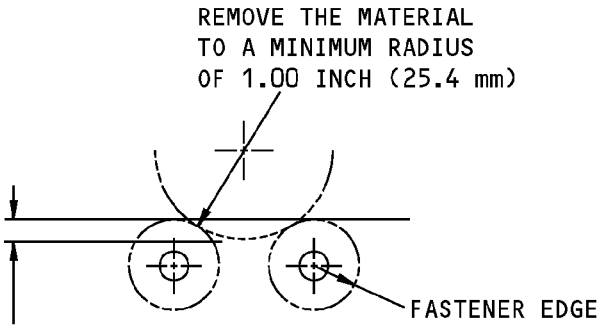
Vertical Stabilizer Spar Fittings
Figure 104 (Sheet 3 of 4)



REAR SPAR FITTING STRAP

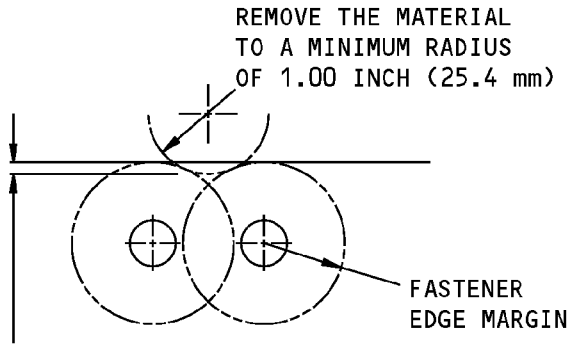
E

Vertical Stabilizer Spar Fittings
Figure 104 (Sheet 4 of 4)



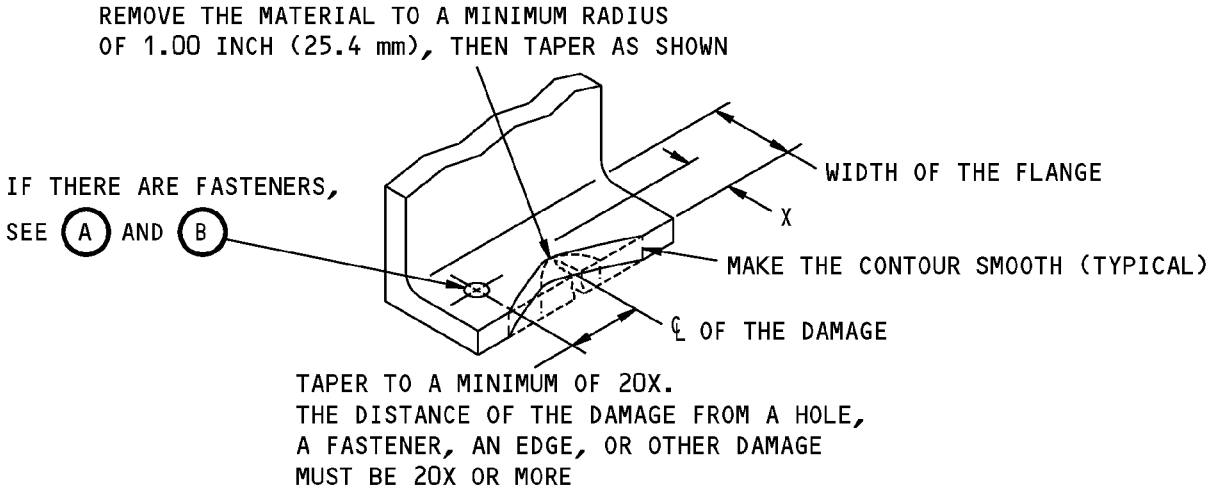
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

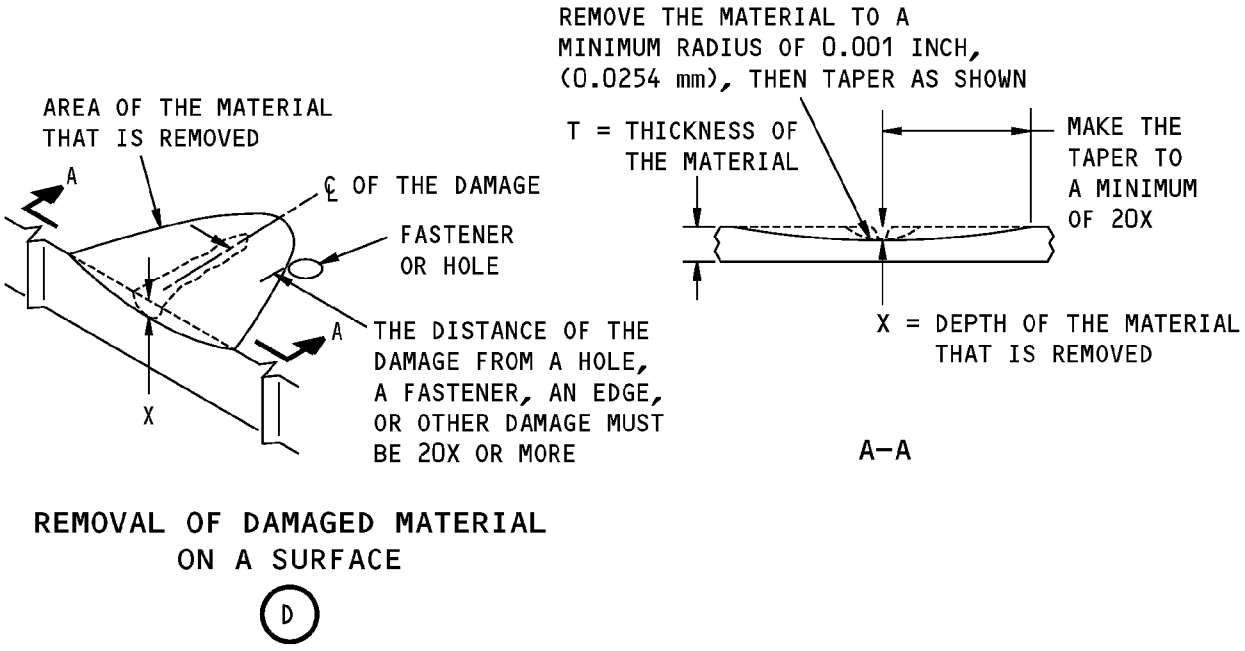


X = WIDTH OF THE MATERIAL REMOVED
= A MAXIMUM OF 0.001 INCH (0.0254mm) THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

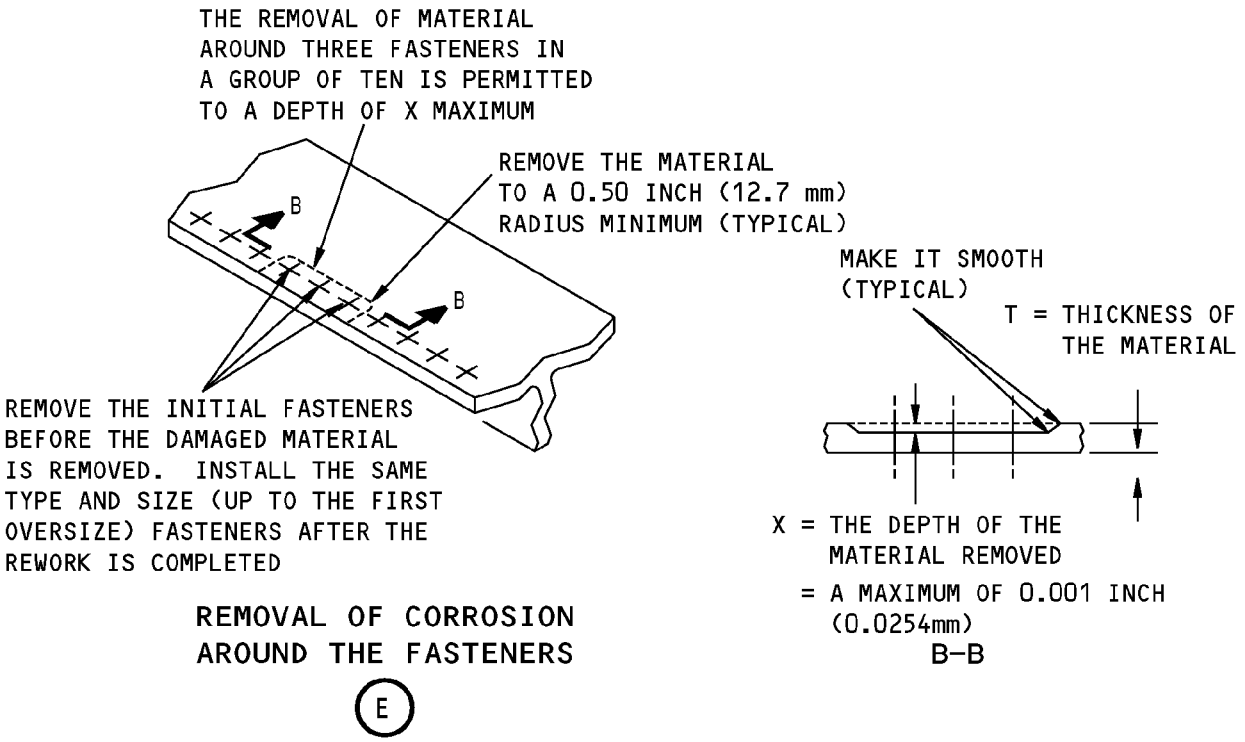
C

Allowable Damage Limits
Figure 105 (Sheet 1 of 5)



REMOVAL OF DAMAGED MATERIAL ON A SURFACE

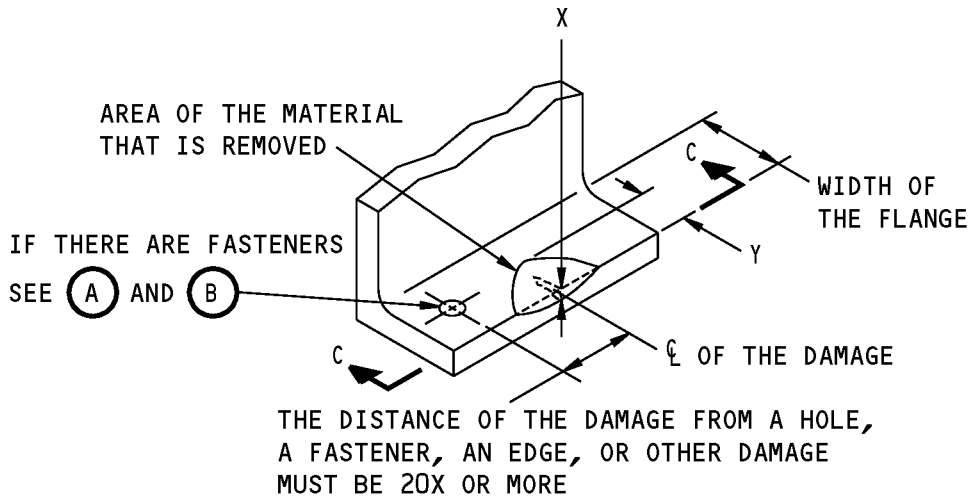
(D)



REMOVAL OF CORROSION AROUND THE FASTENERS

(E)

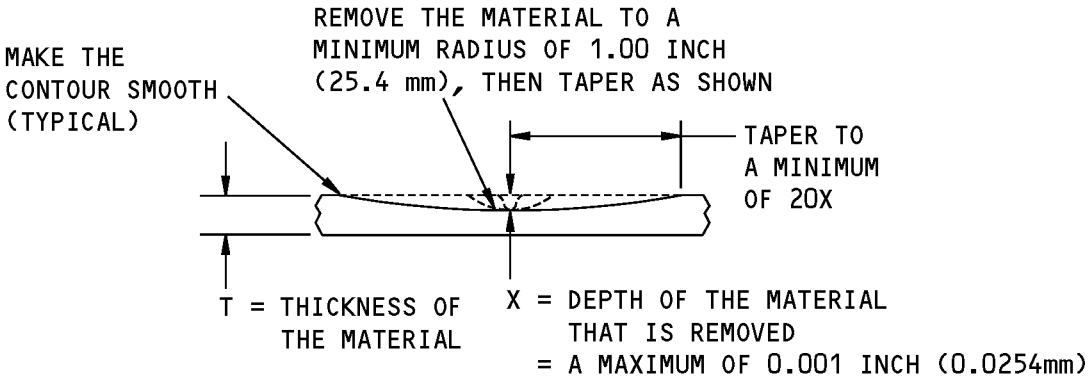
Allowable Damage Limits
Figure 105 (Sheet 2 of 5)



Y = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.001 INCH (0.0254 mm) OF THE WIDTH OF THE FLANGE

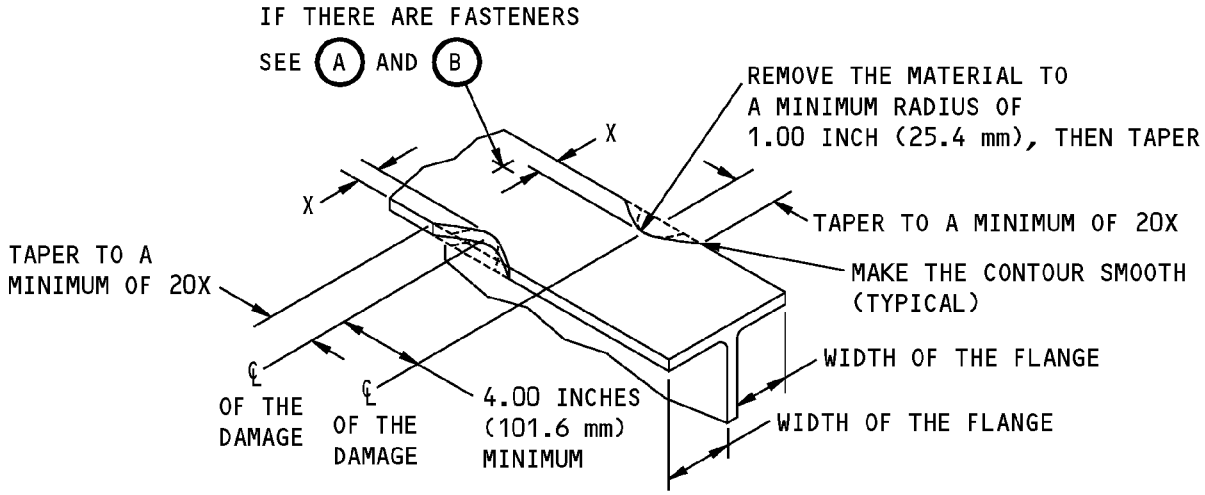
NOTE: AN ANGLE IS SHOWN. THIS DETAIL ALSO APPLIES TO PLATES.

REMOVAL OF DAMAGED MATERIAL
ON A SURFACE AT AN EDGE
F



C–C

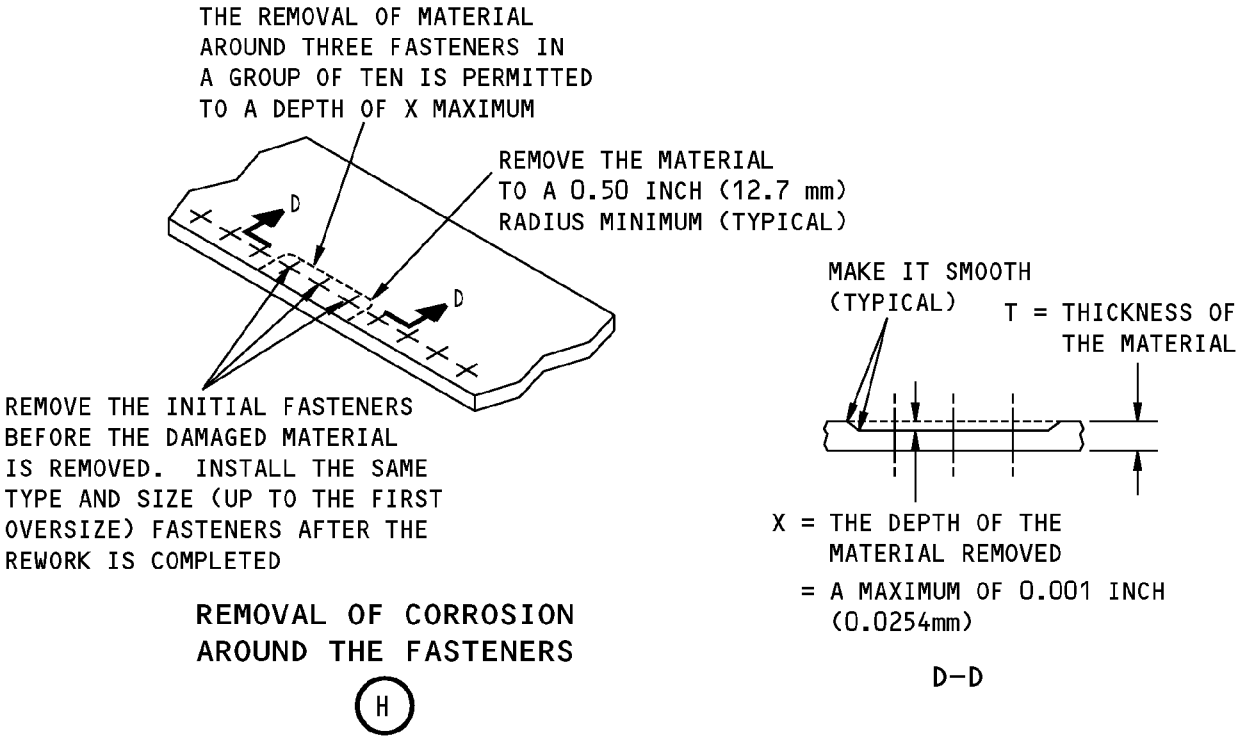
Allowable Damage Limits
Figure 105 (Sheet 3 of 5)



X = THE WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 0.001 INCH (0.0254mm) OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

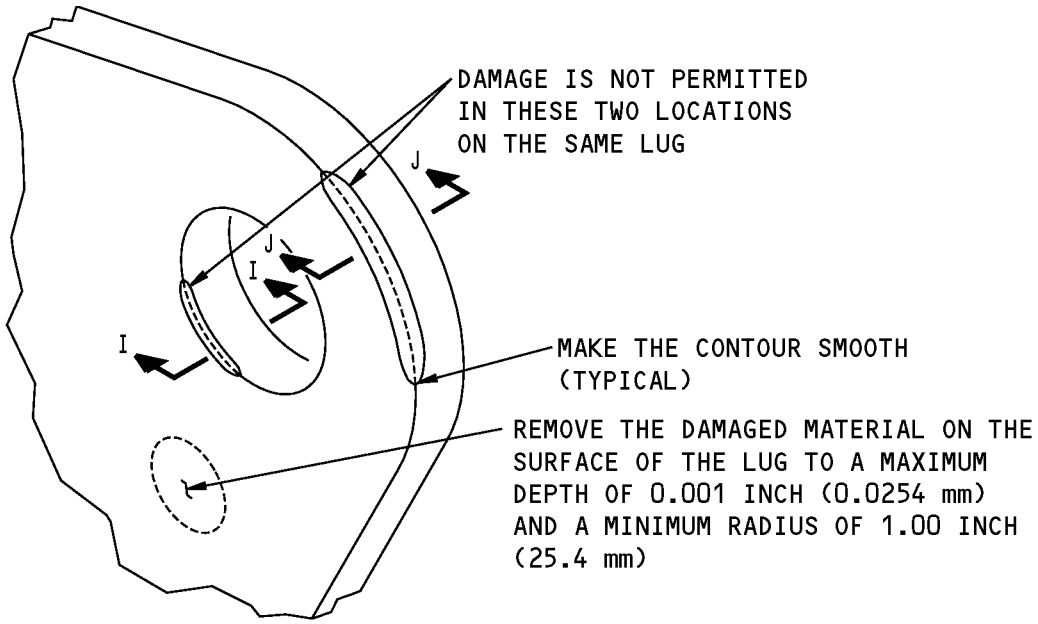
G



REMOVAL OF CORROSION
AROUND THE FASTENERS

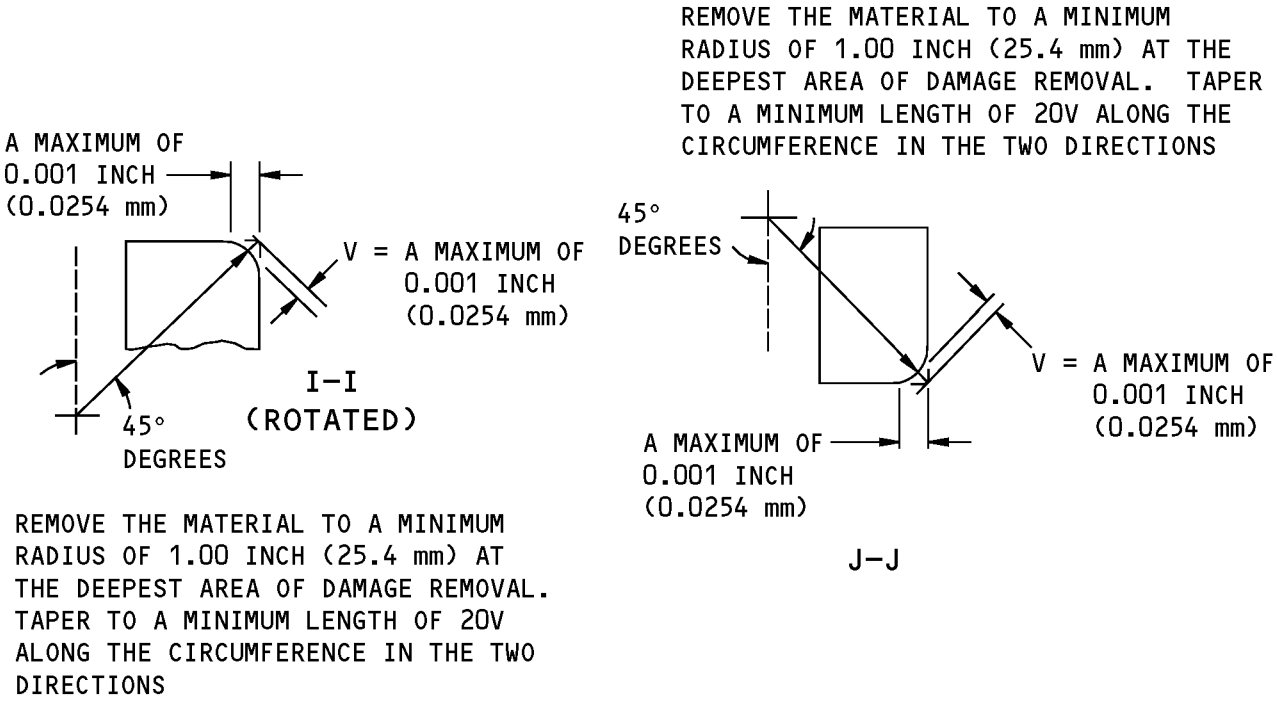
H

Allowable Damage Limits
Figure 105 (Sheet 4 of 5)



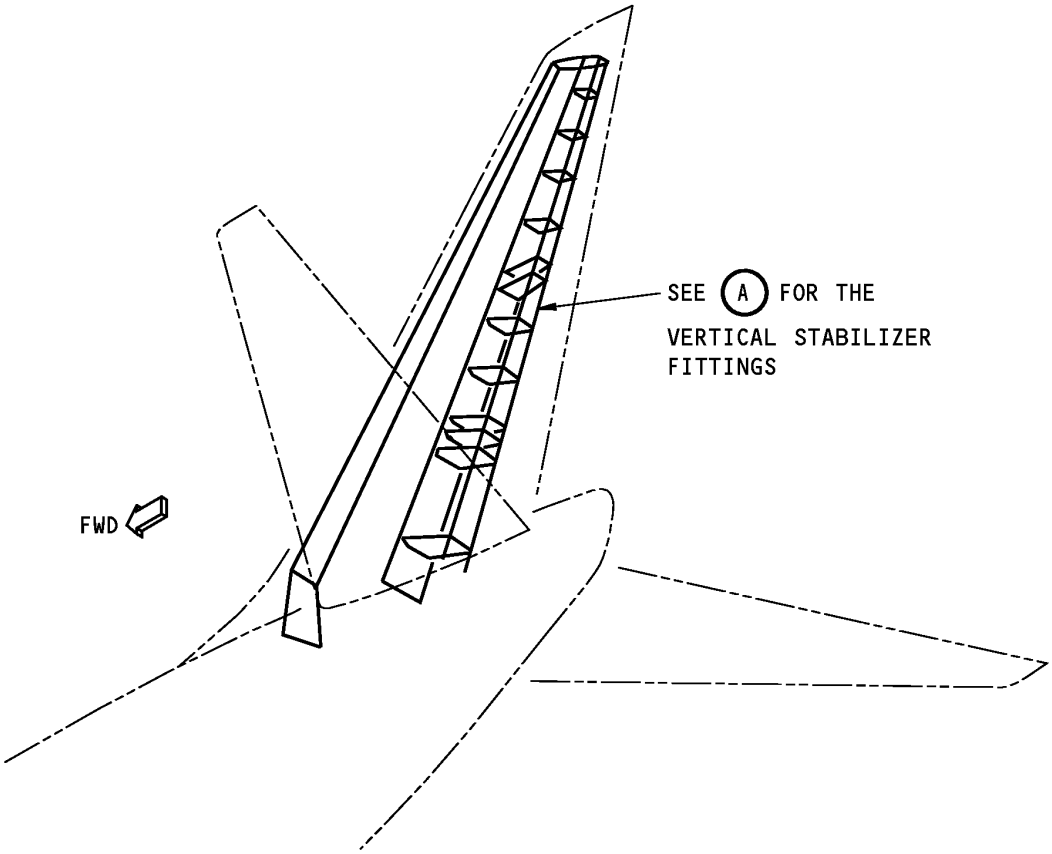
REMOVAL OF DAMAGED MATERIAL ON A LUG WITHOUT BUSHINGS

(I)



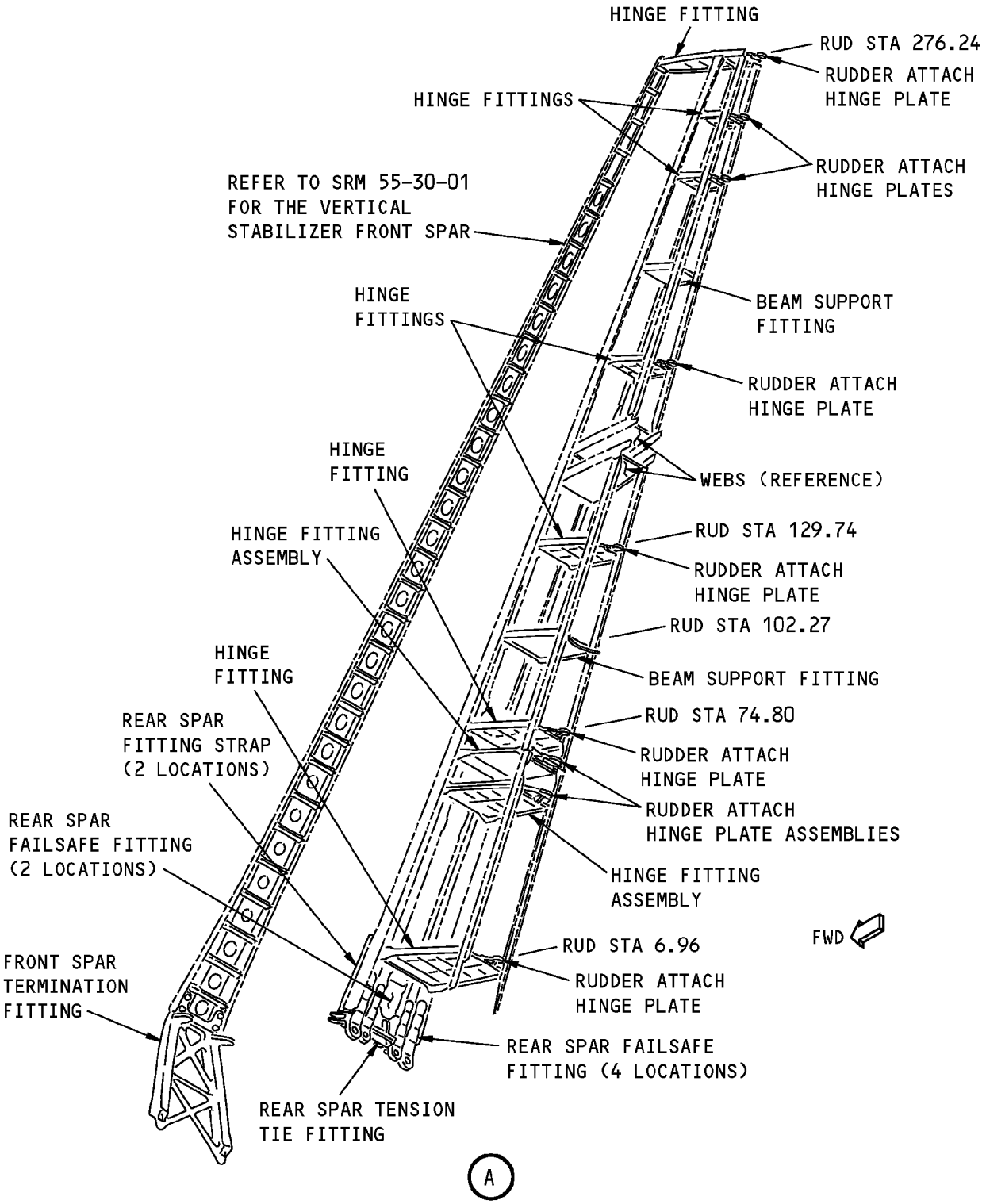
Allowable Damage Limits
Figure 105 (Sheet 5 of 5)

REPAIR GENERAL - VERTICAL STABILIZER HINGE FITTINGS



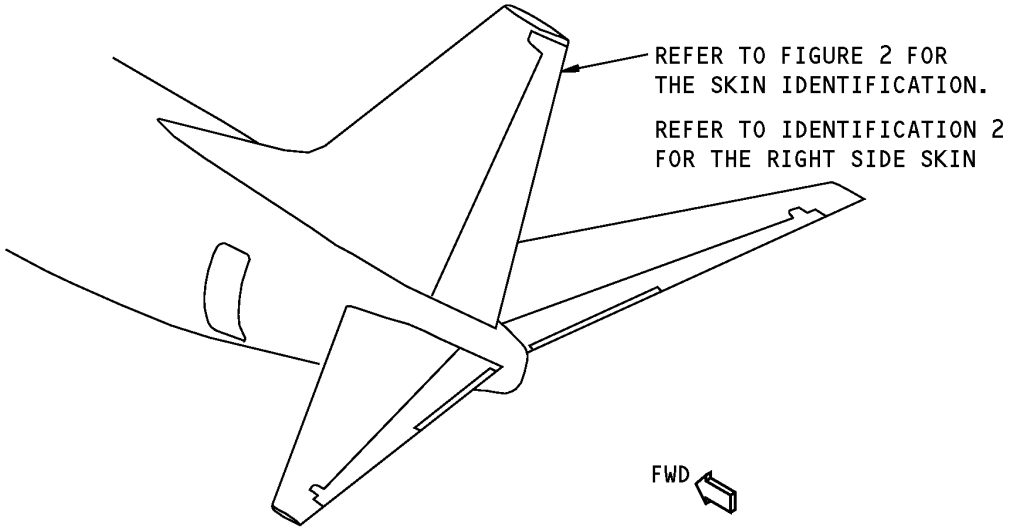
NOTE: THERE ARE NO REPAIRS FOR THESE PARTS IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

Vertical Stabilizer Fitting Repair
Figure 201 (Sheet 1 of 2)



Vertical Stabilizer Fitting Repair
Figure 201 (Sheet 2 of 2)

IDENTIFICATION 1 - RUDDER SKIN



NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

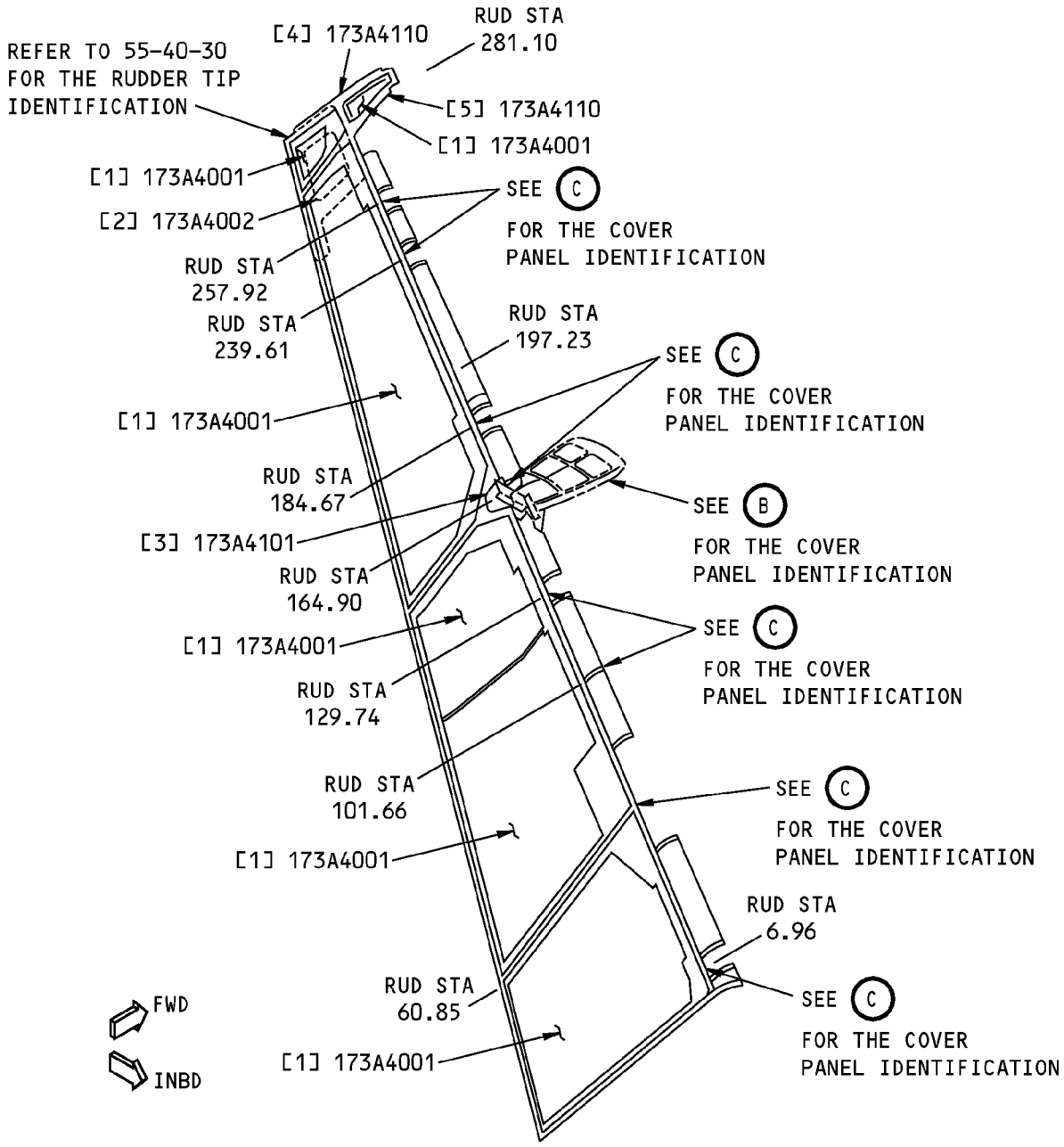
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

Rudder Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0000	Rudder Integration Functional Product Collector
173A0001	Installation- Rudder
173A0100	Rudder Functional Product Collector
173A0150	Centerline Diagram - Rudder
173A4000	Skin Panel Installation-Rudder
173A4001	Skin Panel Assembly - Rudder

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A4300	Cover Panel Assembly - Rudder
173A4301	Gap Cover Assembly - Balance Arm, Rudder
173A5000	Balance Arm Installation - Rudder
173A5001	Balance Arm Assembly - Rudder

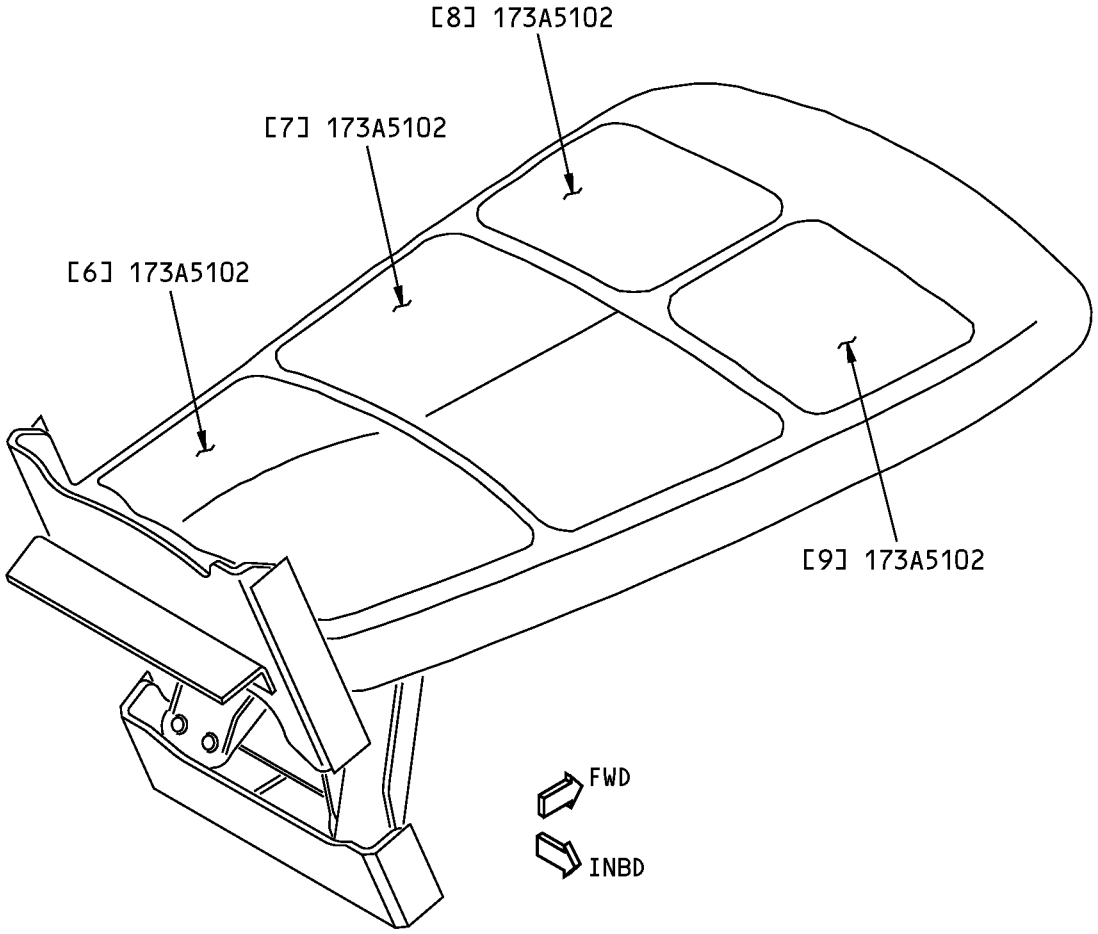


NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
(EXCEPT AS NOTED)

A

Rudder Skin Identification
Figure 2 (Sheet 1 of 3)

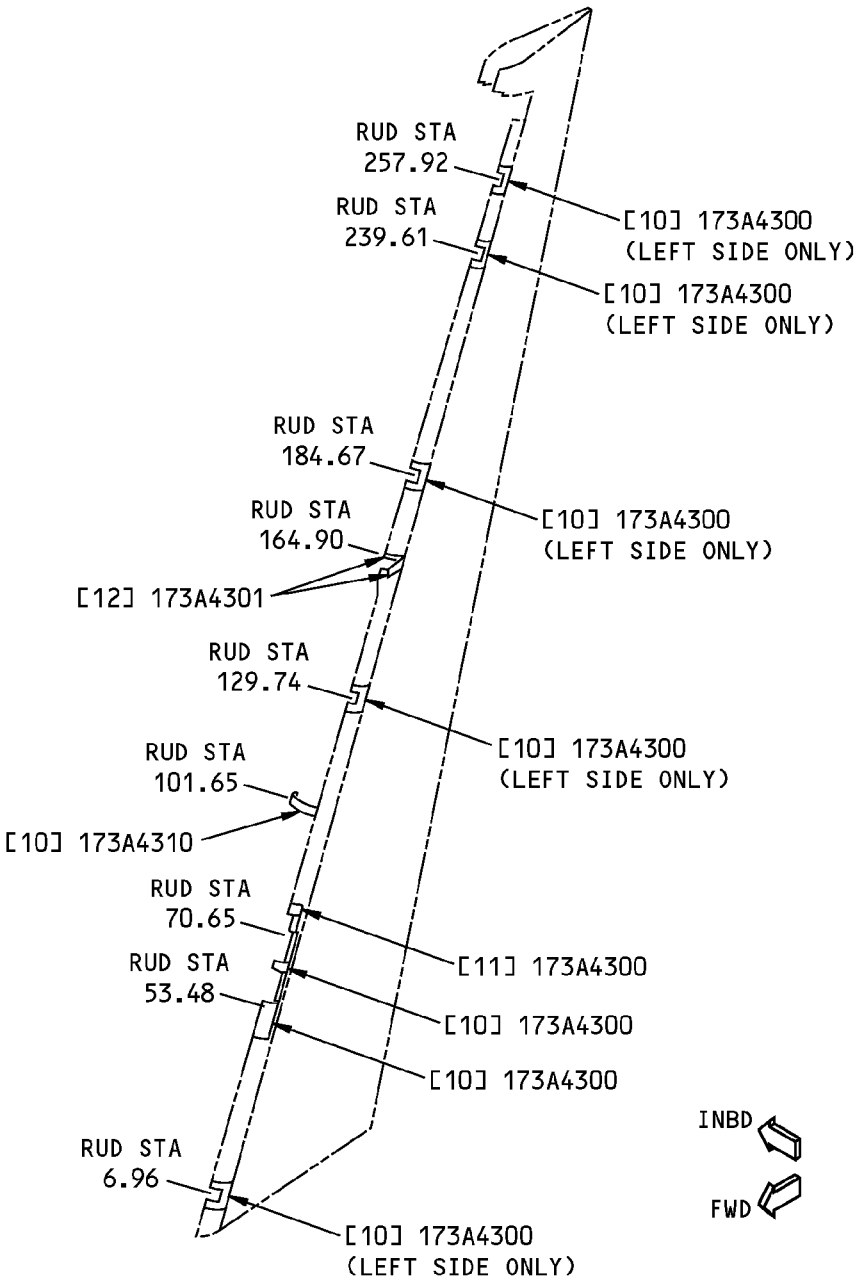


NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

LEFT SIDE BALANCE ARM IS SHOWN, RIGHT SIDE IS OPPOSITE
(EXCEPT AS NOTED)

B

Rudder Skin Identification
Figure 2 (Sheet 2 of 3)



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

GAP COVER LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE
(EXCEPT AS NOTED)

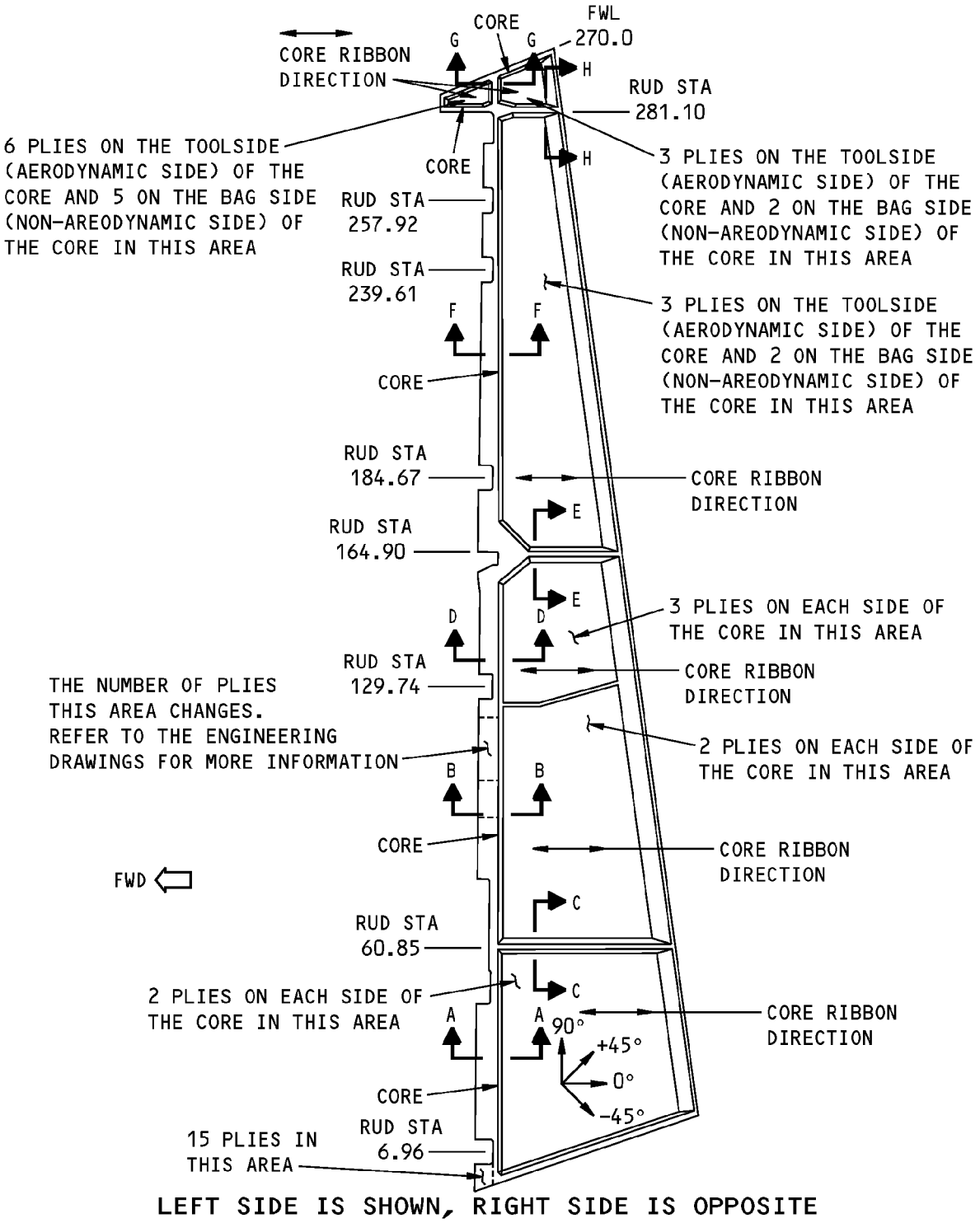
C

Rudder Skin Identification
Figure 2 (Sheet 3 of 3)

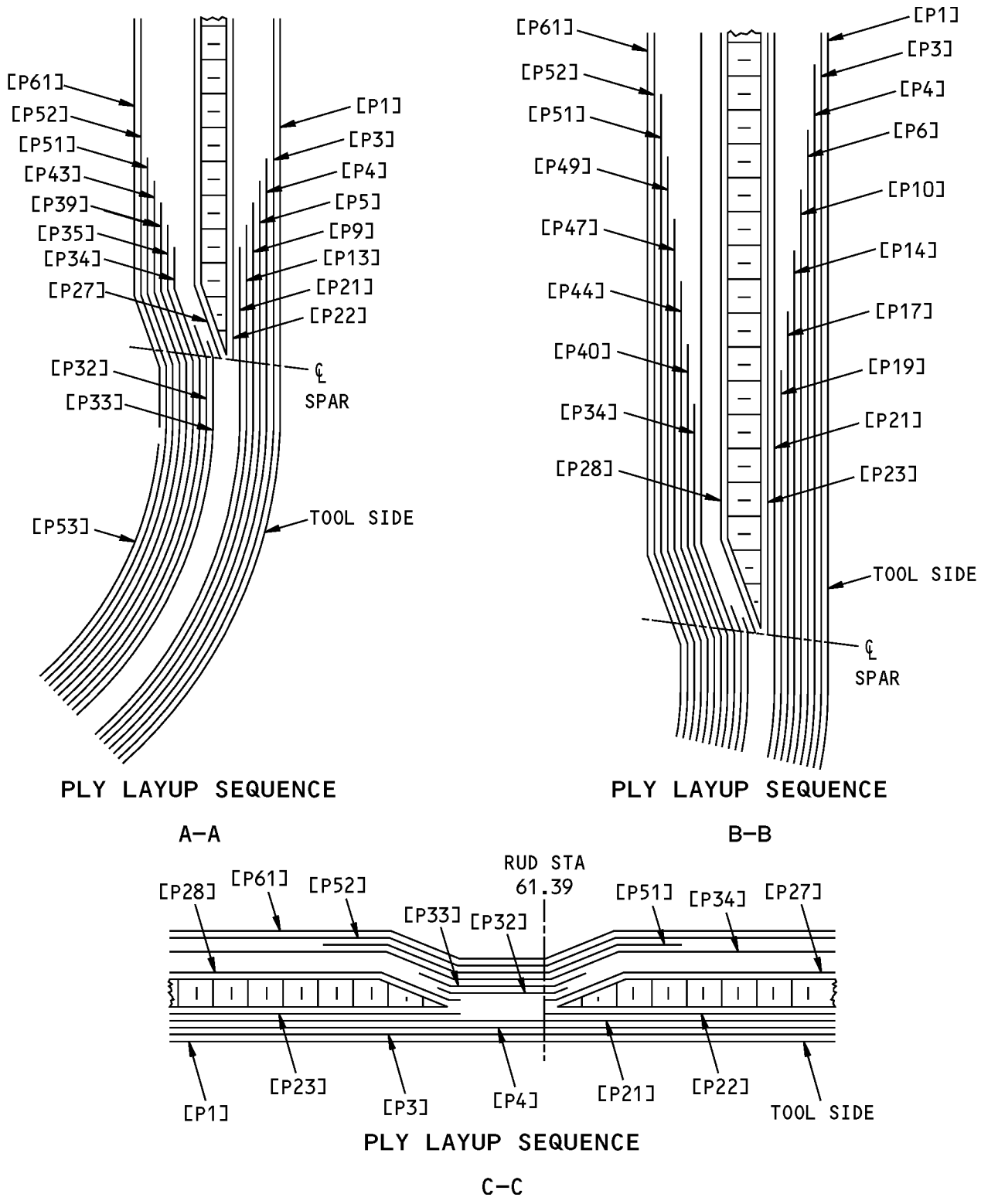
Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rudder Skin - Bonded Part		Non-metallic honeycomb sandwich	
	Skin		Refer to Figure 3	
	Core - Lower Closure Rib to RUD STA 61.39		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - RUD STA 61.39 to RUD STA 164.90		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - RUD STA 164.90 to RUD STA 282.17		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - Aft of Rudder Front Spar RUD STA 282.17 to FIN WATERLINE 270		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - Forward of Rudder Front Spar RUD STA 282.17 to FIN WATERLINE 270		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Conductive Frame	0.020 (0.51)	6061-T4 sheet	
[3]	Doubler, Balance Arm - Rudder	0.025 (0.64)	Ti-6Al-4V titanium plate as given in MIL-T-9046, AB-1, Condition A	
[4]	Strap - Bonded		Epoxy impregnated graphite woven fabric. Refer to Figure 4	
[5]	Strap - Bonded		Epoxy impregnated graphite woven fabric. Refer to Figure 5	
[6]	Skin Panel		Fiberglass prepreg fabric. Refer to Figure 6	
[7]	Skin Panel		Fiberglass prepreg fabric. Refer to Figure 7	
[8]	Skin Panel		Fiberglass prepreg fabric. Refer to Figure 8	
[9]	Skin Panel		Fiberglass prepreg fabric. Refer to Figure 9	
[10]	Cover Panel	0.063 (1.60)	2024-T3 clad sheet	
[11]	Cover Panels (2)	0.063 (1.60)	2024-T3 clad sheet	
[12]	Gap Cover Assembly			
	Cover	0.063 (1.60)	2024-T3 clad sheet	
	Splice Plate	0.080 (2.03)	2024-T3 clad sheet (Optional: 2024-T42)	

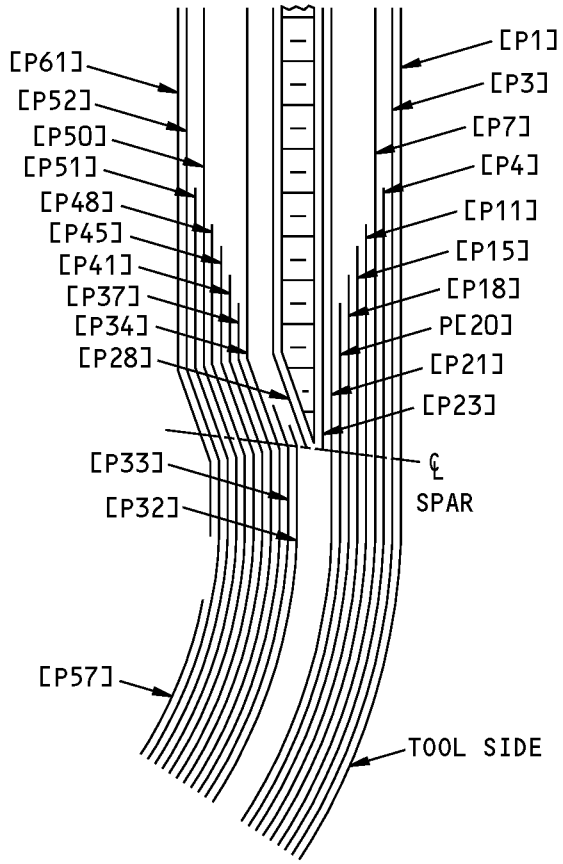
*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 1 of 4)

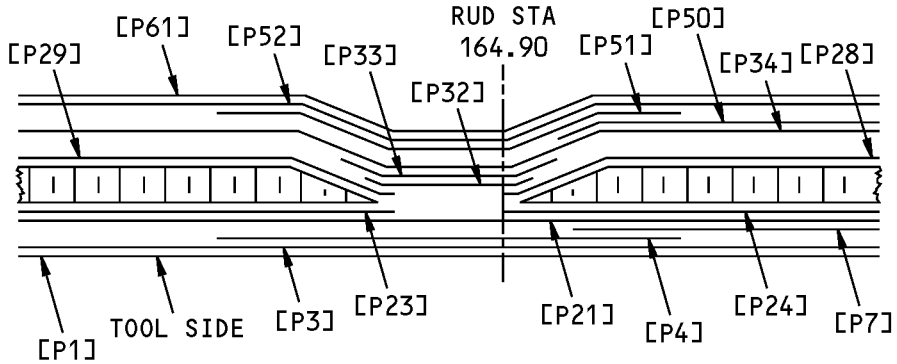


Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 2 of 4)



PLY LAYUP SEQUENCE

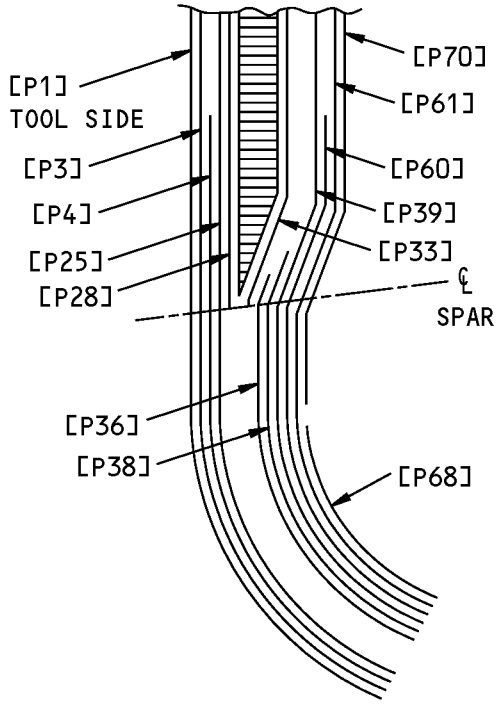
D–D



PLY LAYUP SEQUENCE

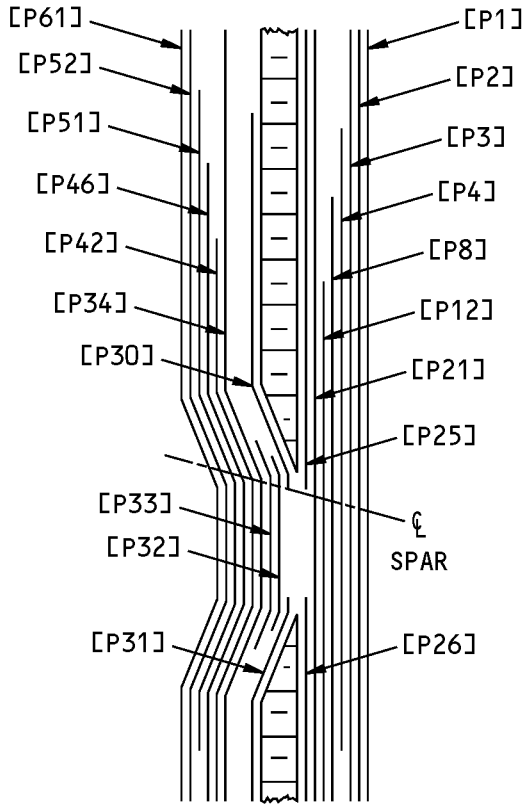
E–E

Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 3 of 4)



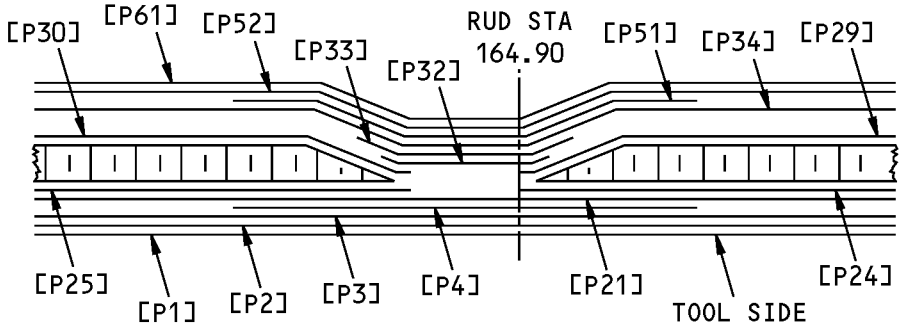
PLY LAYUP SEQUENCE

F–F



PLY LAYUP SEQUENCE

G–G



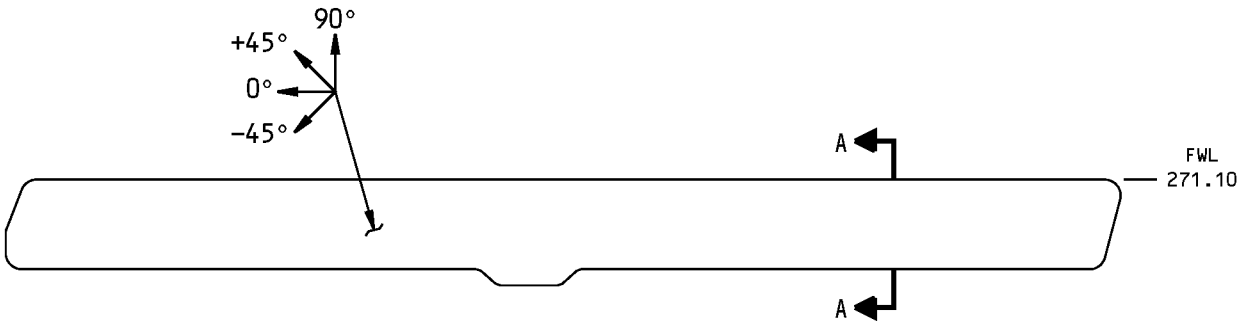
PLY LAYUP SEQUENCE

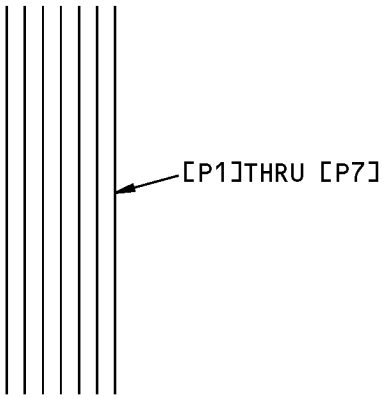
H–H

Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 4 of 4)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1	———	Co-cure surfacer as given in BMS 8-341, Type II
P2, P53, P54, P55, P56, P57, P58, P59, P60	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Class III, Style 108
P3, P5, P6, P7, P8, P13, P14, P15, P16, P19, P20, P32, P33, P35, P36, P37, P38, P43, P44, P45, P46, P49, P50, P52	+ or - 45 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P4, P9, P10, P11, P12, P17, P18, P21, P34, P39, P40, P41, P42, P47, P48, P51	0 or 90 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P22, P23, P24, P25, P26, P27, P28, P29, P30, P31	———	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A
P61	———	1 mil white bondable tedlar film as given in BAC 5315-4





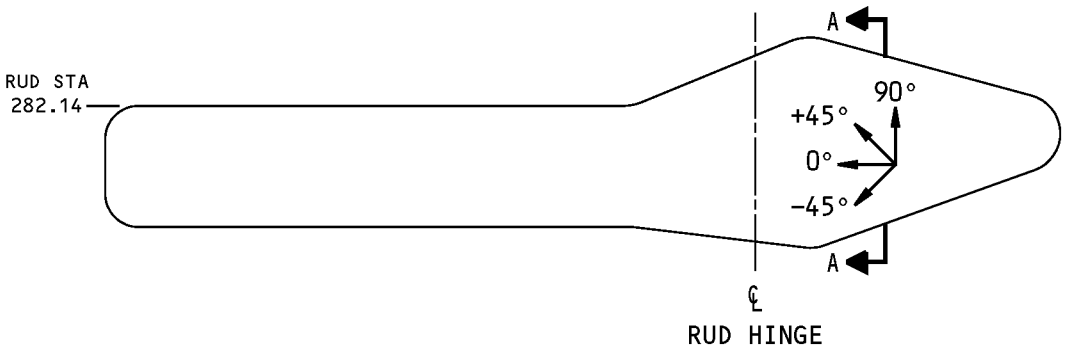
PLY LAYUP SEQUENCE

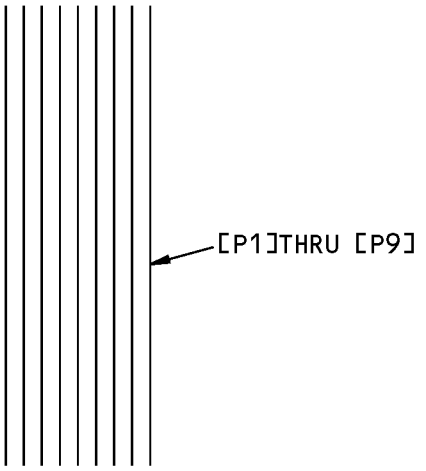
A-A

Ply Direction and Ply Sequence for Figure 2, Item [4]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7	0 or 90 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6	+ or - 45 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW





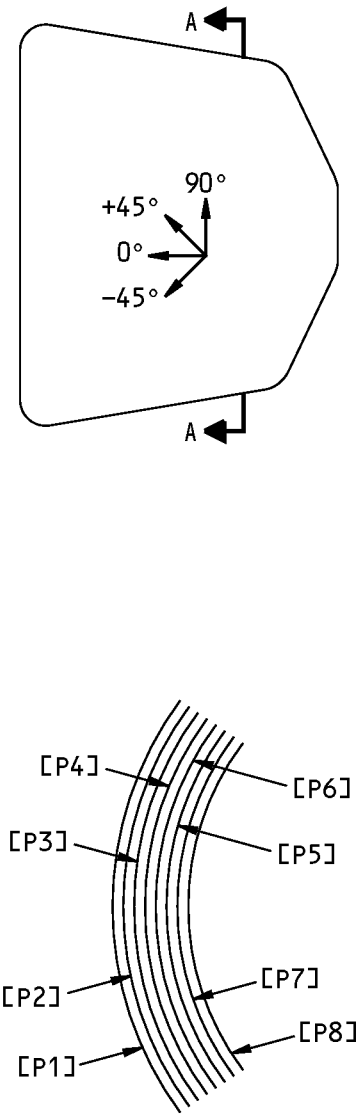
PLY LAYUP SEQUENCE

A–A

Ply Direction and Ply Sequence for Figure 2, Item [5]
Figure 5

Table 5:

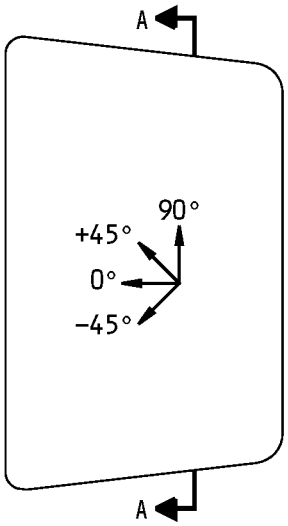
PLY MATERIAL AND DIRECTION FOR FIGURE 5		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7, P9	0 or 90 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P8	+ or - 45 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

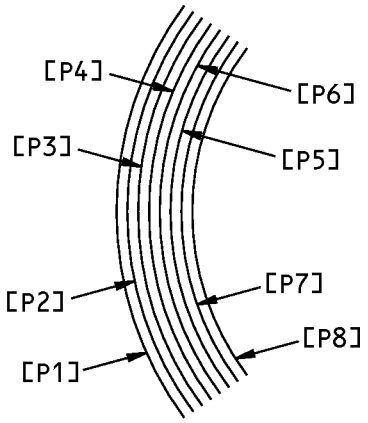


Ply Direction and Ply Sequence for Figure 2, Item [6]
Figure 6

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)
P2, P4, P5, P7	0 or 90 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)

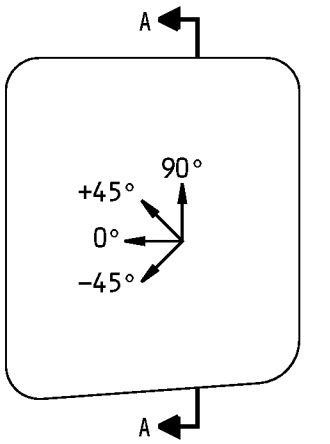


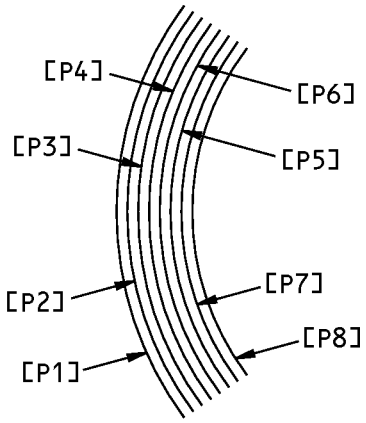


Ply Direction and Ply Sequence for Figure 2, Item [7]
Figure 7

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [7]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)
P2, P4, P5, P7	0 or 90 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)

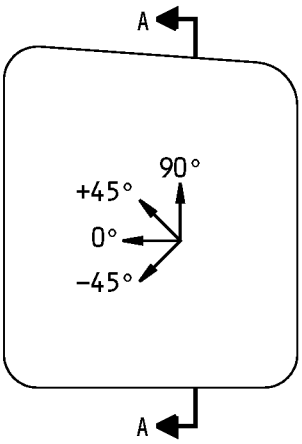


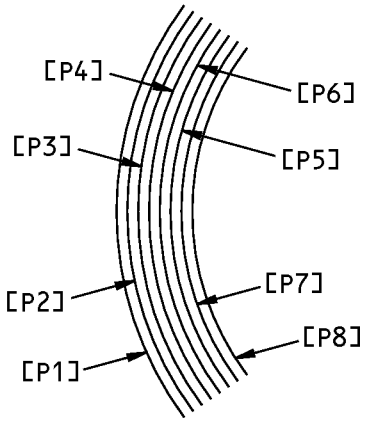


Ply Direction and Ply Sequence for Figure 2, Item [8]
Figure 8

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [8]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)
P2, P4, P5, P7	0 or 90 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)





Ply Direction and Ply Sequence for Figure 2, Item [9]
Figure 9

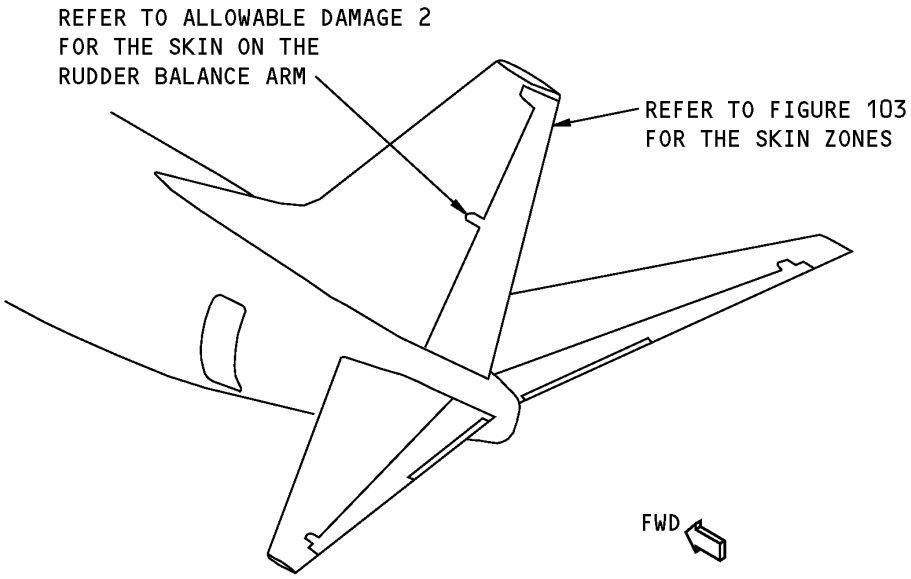
Table 9:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [9]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)
P2, P4, P5, P7	0 or 90 degrees	Fiberglass prepreg fabric as given in BMS 8-79, Style 7781, Class III, Grade B, (Style 1581 is optional)

ALLOWABLE DAMAGE 1 - RUDDER SKIN

1. Applicability

A. Allowable Damage 1 gives the allowable damage limits for the Rudder Skin shown in Rudder Skin Location, Figure 101/ALLOWABLE DAMAGE 1.



Rudder Skin Location
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Definitions of Damage Size, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

B. Remove all contamination and water from the structure.

(1) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(2) Refer to 51-30-05 for possible sources of equipment and tools you can use to remove the damage.

(3) Refer to 51-70-04 for the damage removal procedures.

C. Seal all permitted damage areas that are not more than one ply deep and agree with the allowable damage limits. Refer to Paragraph 4./ALLOWABLE DAMAGE 1 Seal the damage with one of the two methods that follow:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure that the tape is in satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60, Type II enamel to the exterior surfaces of the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

D. Seal all permitted damage areas that are more than one ply deep and agrees with the allowable damage limits as follows:

(1) Use a vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

(4) Repair the damage at or before 250 flight cycles from the time the seal was made.

E. Refer to Rudder Skin Zones, Figure 103/ALLOWABLE DAMAGE 1 for the locations of the rudder skin zones.

F. Make sure that the rudder is balanced. Refer to 51-60-07 for the balance procedures.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS		
TYPE OF STRUCTURE	**ZONE LOCATION**	**PARAGRAPH**
HONEYCOMB CORE AREA	1	4.A
	2	4.B
	3	4.C
	4	4.D
	5	4.E
SOLID LAMINATE AREA	6	4.F
	7	4.G

3. References

Reference	Title
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03	NON-METALLIC MATERIALS

(Continued)

Reference	Title
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-07	RUDDER BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-06, REPAIR GENERAL	Room Temperature Cure Repairs With Wet Layup Materials For Glass Fabric Reinforced Plastic Solid Laminates and Honeycomb Core Panels
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Zone 1 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.00 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one carbon ply in depth

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one carbon ply in depth.

(b) A maximum of 2.0 inches in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inches in diameter.

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2.

(6) Delaminations are permitted if they are:

(a) A maximum of 2.0 inches in diameter of the carbon ply

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass fiber plies
- Are sealed as given in Paragraph 2

B. Zone 2 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth

(b) A maximum of 2.0 inches in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inches in diameter

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2.

(6) Delaminations are permitted if they are:

(a) A maximum of 2.00 inches in diameter of the carbon ply

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

C. Zone 3 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one carbon ply in depth

(b) A maximum of 2.0 inches in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inch in diameter

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2

(6) Delaminations are permitted if they are:

(a) A maximum of 2.0 inches in diameter of the carbon ply

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

D. Zone 4 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A Maximum of 5.0 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one carbon ply in depth.

(b) A maximum of 2.0 inches in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inches in diameter

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2.

1) Are sealed as given in Paragraph 2

(6) Delaminations are permitted if they are:

(a) A maximum of 2.00 inches in diameter

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

E. Zone 5 - Honeycomb Core Area

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 5.0 inches in length

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one carbon ply in depth.

(b) A maximum of 2.0 inches in diameter

(c) A minimum of 5.00 inches away from the edge

(5) Holes and Punctures are permitted if they are:

(a) A maximum of 2.0 inches in diameter

(b) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2.

(6) Delaminations are permitted if they are:

(a) The diameter is a maximum of 2.0 inches

(b) The damage is a minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

F. Zone 6 - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.625 inch in length

(c) A maximum of 0.25 inch in width

(d) Not more than one fastener or fastener hole in eight is damaged

(e) A minimum of 5.00 inches away from the edge of any damaged hole, damaged part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(4) Dents that do not cause damage to the carbon fibers are permitted if they are:

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.625 inch in diameter

(c) Not more than one fastener hole in eight is damaged

(d) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) A maximum of 0.625 inch in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that are sealed as given in Paragraph 2.

(6) Delaminations are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) A maximum of 0.625 inch in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(7) Edge Erosion is permitted as shown in Upper and Lower Elevator Skin Panel Allowable Damage, Figure 104/ALLOWABLE DAMAGE 1.

(8) Edge damage is permitted if it is:

(a) A maximum of one ply in depth

(b) A maximum of 0.25 inch in width

G. Zone 7 - Solid Laminate Areas

(1) Nicks, Gouges, and Scratches that do cause damage to the glass fibers are permitted.

(2) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if they are :

(a) A maximum of one ply in depth

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) A maximum of 0.625 inch in length

(c) A maximum of 0.25 inch in width

(d) Not more than one fastener or fastener hole in eight is damaged

(e) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:
- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(4) Dents are permitted if:

(a) Not more than one fastener or fastener hole in ten is damaged

(b) They are a maximum of one ply in depth

(c) A maximum of 0.625 inch in diameter

(d) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(5) Holes and Punctures are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) A maximum of 0.625 inch in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

(6) Delaminations are permitted if:

(a) Not more than one fastener or fastener hole in eight is damaged

(b) A maximum of 0.625 inch in diameter

(c) A minimum of 5.00 inches away from the edge of any hole, part edge or other damage.

NOTE: Other damage does not include nicks, gouges, and scratches that:

- Do not cause damage to the glass or carbon fiber plies
- Are sealed as given in Paragraph 2

(7) Edge Erosion is permitted as shown in Upper and Lower Elevator Skin Panel Allowable Damage, Figure 104/ALLOWABLE DAMAGE 1.

(8) Edge damage is permitted if it is:

(a) A maximum of one ply in depth

(b) A maximum of 0.25 inch in width.

H. Zone 8 - Honeycomb Core Area

(1) The same limits as described in either Zone 2 or Zone 4 are permitted.

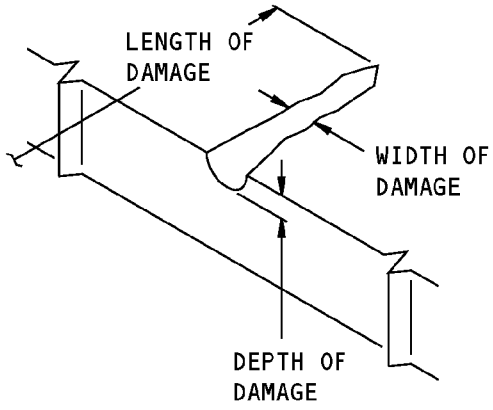
I. Lightning Strike Trailing Edge Damage

(1) You are permitted to remove damage as given in Figure 105 provided:

(a) There are a minimum of (10) fastener lengths not damaged between any (2) damaged fastener locations.

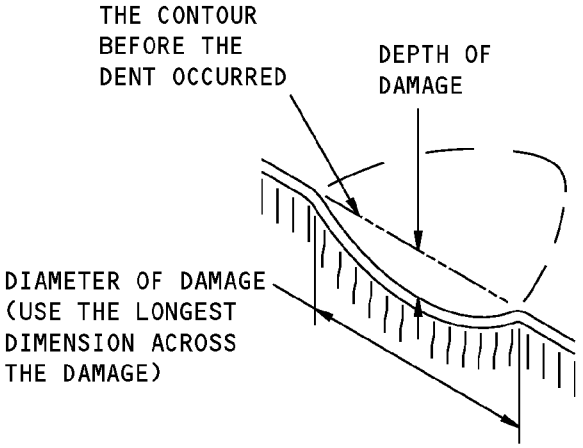
(b) The damage removal is to both the right and left side skin panel.

NOTE: Damage removal is permitted to both sides of the skin panel at the same fastener location. Refer to Figure 105.



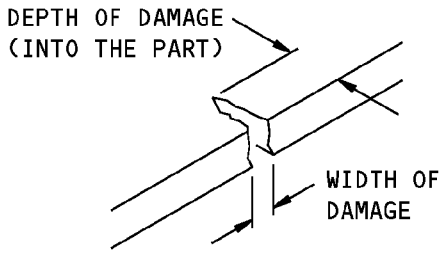
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR DENT DAMAGE

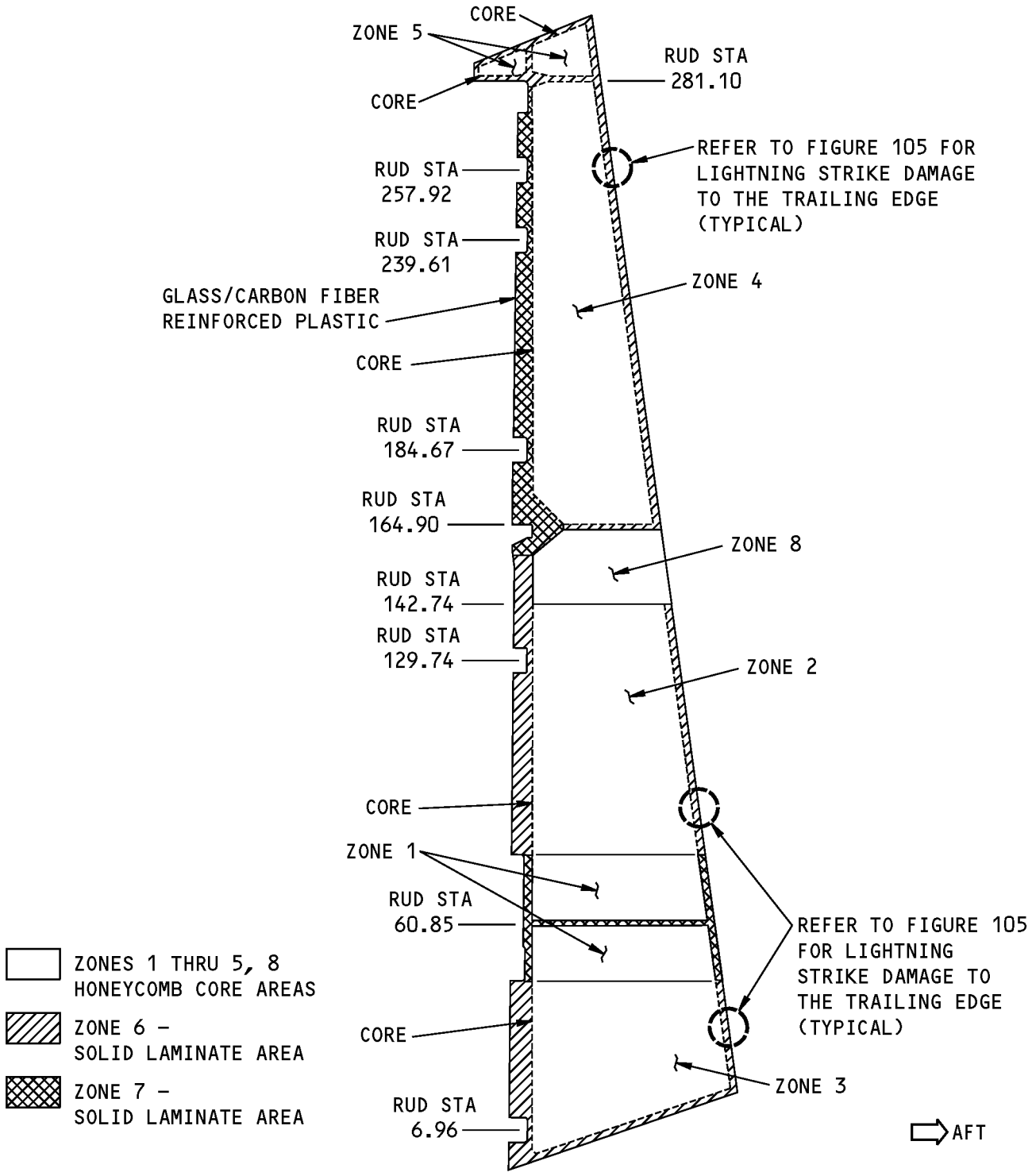
B



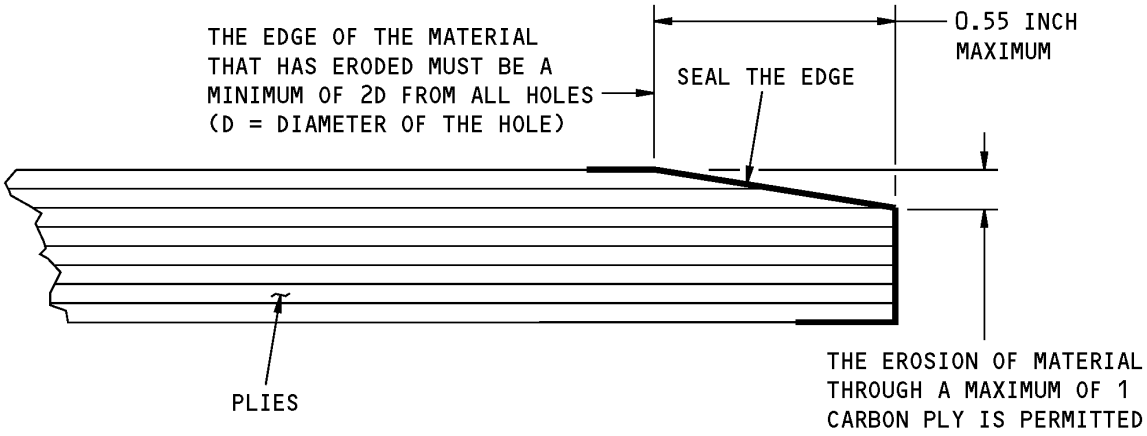
SIZE DEFINITIONS FOR EDGE DAMAGE

C

Definitions of Damage Size
Figure 102

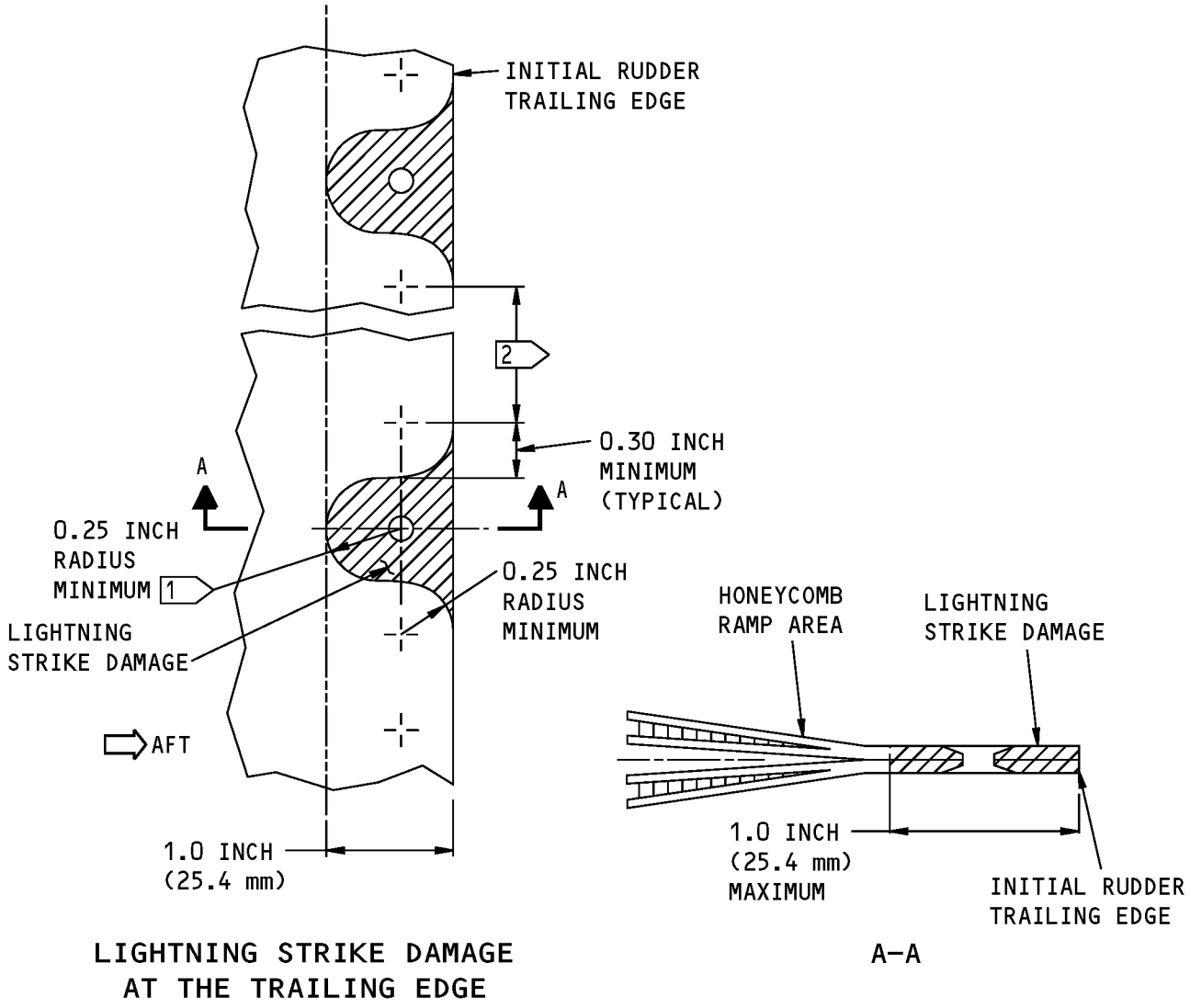


Rudder Skin Zones
Figure 103



SEALING OF EROSION DAMAGE AT AN EDGE OF COMPOSITE PARTS

Upper and Lower Elevator Skin Panel Allowable Damage
Figure 104



NOTES

1 DAMAGE IS NOT PERMITTED INTO THE HONEYCOMB RAMP AREA.

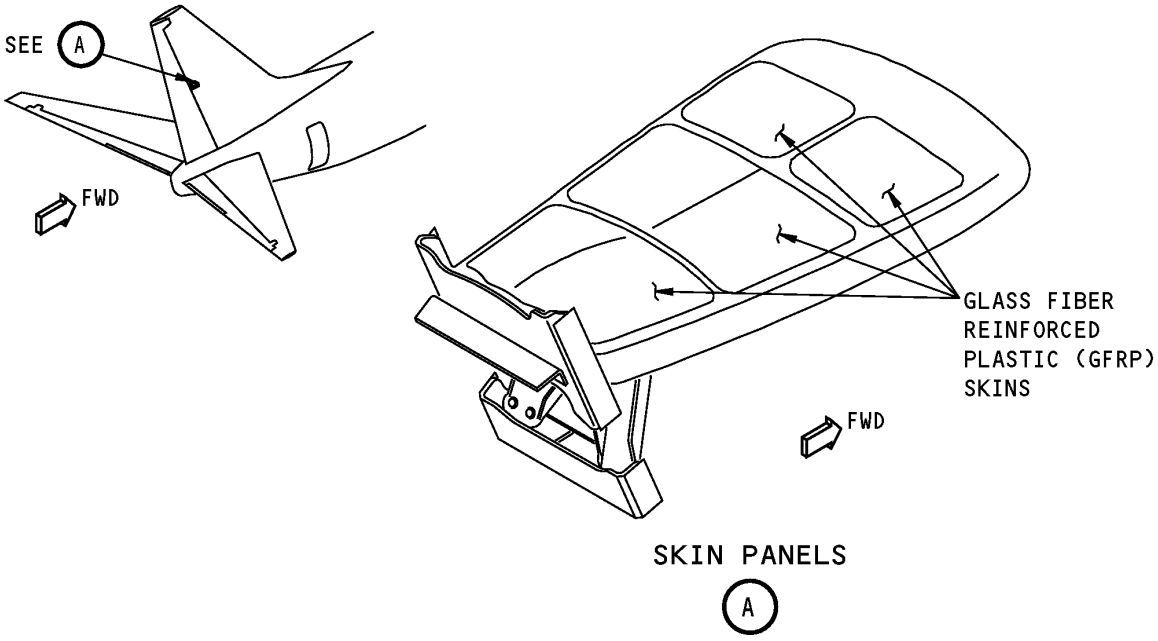
2 MAKE SURE THERE ARE A MINIMUM OF TEN (10) FASTENERS NOT DAMAGED BETWEEN ANY ADJACENT LIGHTNING STRIKE DAMAGE.

Rudder Skin Trailing Edge Lightning Strike Damage
Figure 105

ALLOWABLE DAMAGE 2 - RUDDER BALANCE ARM SKIN

1. Applicability

A. This subject gives the allowable damage limits for the skin panels on the rudder balance arm as shown in Rudder Balance Arm Skin Location, Figure 101/ALLOWABLE DAMAGE 2.



Rudder Balance Arm Skin Location
Figure 101

2. General

A. Do an inspection of the damaged area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other equivalent inspection procedures that have been examined and found to be satisfactory by the operator, can be used.

B. Refer to Definitions of Damage Size, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, and C for the definitions of the length, width, and depth of damage.

C. Remove contamination and water from the structure surface.

D. Seal all permitted damage areas that agree with the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 2 Seal the damage with one of the two methods that follows:

(1) Make a temporary seal for damage 1 ply deep or less.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) Make sure that the tape is in a satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal for damage 1 ply deep or less.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60 enamel to the areas sealed with epoxy resin. Refer to AMM 51-21-00/701.

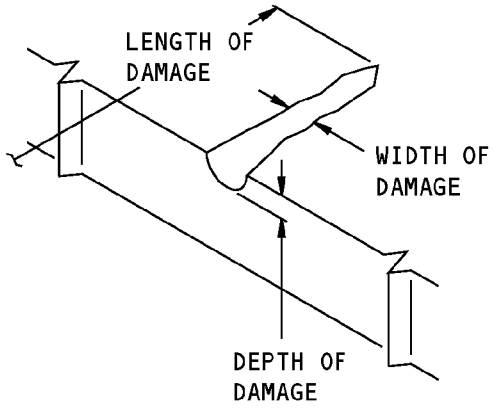
(3) For damage to locations that are more 1 ply in depth then do as follows:

(a) Apply vacuum and heat to the damage area to remove all moisture.

(b) Apply aluminum foil tape (speed tape)

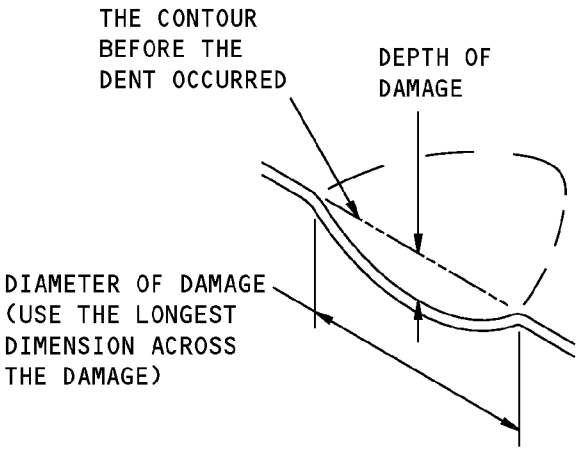
(c) Keep a record of the location

(d) Repair the damage before 250 flight cycles from the time the seal was made



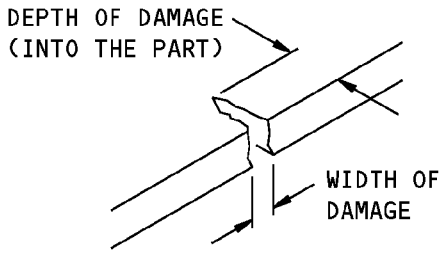
SIZE DEFINITIONS FOR NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR DENT DAMAGE

B



SIZE DEFINITIONS FOR EDGE DAMAGE

C

Definitions of Damage Size
Figure 102

3. References

Reference	Title
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05, GENERAL	Equipment and Tools For Repairs
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

B. Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(1) The depth is a maximum of one ply. If the depth is more than one ply, then use the limits for holes and punctures

(2) Not more than one fastener hole in six is damaged

(3) The damage is 6D (D= diameter of fastener) away from fasteners

(4) Damage is less than 0.625 inch in length

(5) Damage is a minimum of 4.0 inches away from other damage.

C. Dents are permitted if:

(1) The glass fiber is not damaged. If the glass fiber is damaged, then use the limits for nicks, gouges and scratches

(2) The diameter is a maximum of 0.625 inch

(3) The depth is not more than one ply deep

(4) The dent is 6D (D = diameter of fastener) away from fastener locations

(5) Thd damage is a minimum of 4.0 inches away from other damage.

D. Holes and Punctures are permitted if:

(1) The diameter is a maximum of 0.625 inch

(2) The damage is 6D (D = diameter of fastener) away from fastener locations

(3) The damage is a mimimum of 4.00 inches away from other damage.

E. Delaminations are permitted if:

(1) The diameter is a maximum of 0.625 inch

(2) The damage is 6D (D = diameter of fastener) away from fastener locations

(3) The damage is 4.00 inches away from other damage.

F. Edge damage is permitted if:

(1) The depth is a maximum of 0.10 inch

(2) The width is a maximum of 0.50 inch

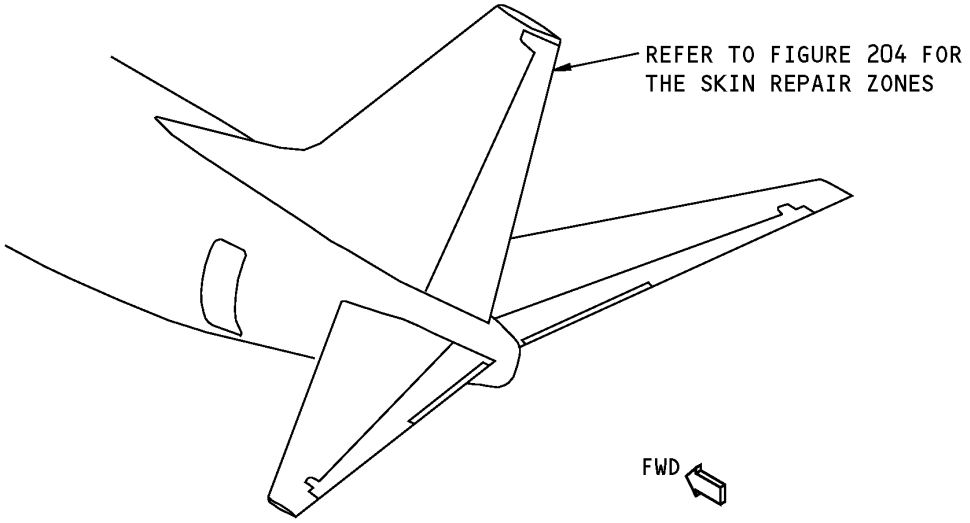
(3) The damage is 4D (D = diameter of fastener) away from the edge of other damage.

REPAIR 1 - RUDDER SKIN

1. Applicability

A. Repair 1 is applicable to the Rudder Skin panels as shown in Rudder Skin Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.



Rudder Skin Location
Figure 201

2. General

A. Repair 1 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the rudder, as necessary. Refer to AMM 27-21-11/401.

C. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

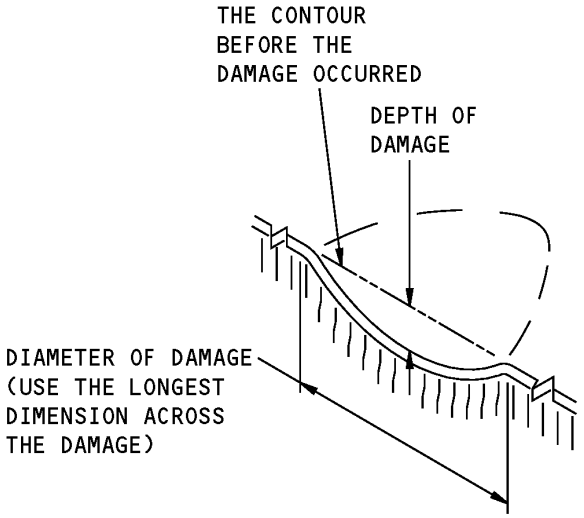
(1) Refer to Definitions of Damage Size, Figure 202/REPAIR 1 for the definitions of the diameter and depth of damage.

(2) Refer to Definitions of the Facesheets, Figure 203/REPAIR 1 for the definitions of the facesheets of a honeycomb core area.

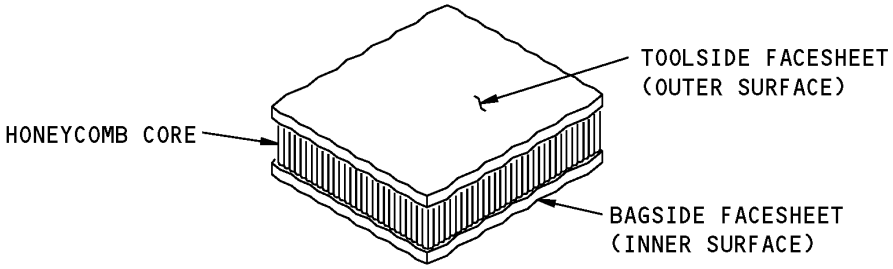
D. Do the repair as given in Paragraph 4./REPAIR 1.

E. Make sure that the rudder is balanced. Refer to 51-60-07 for the balance procedures.

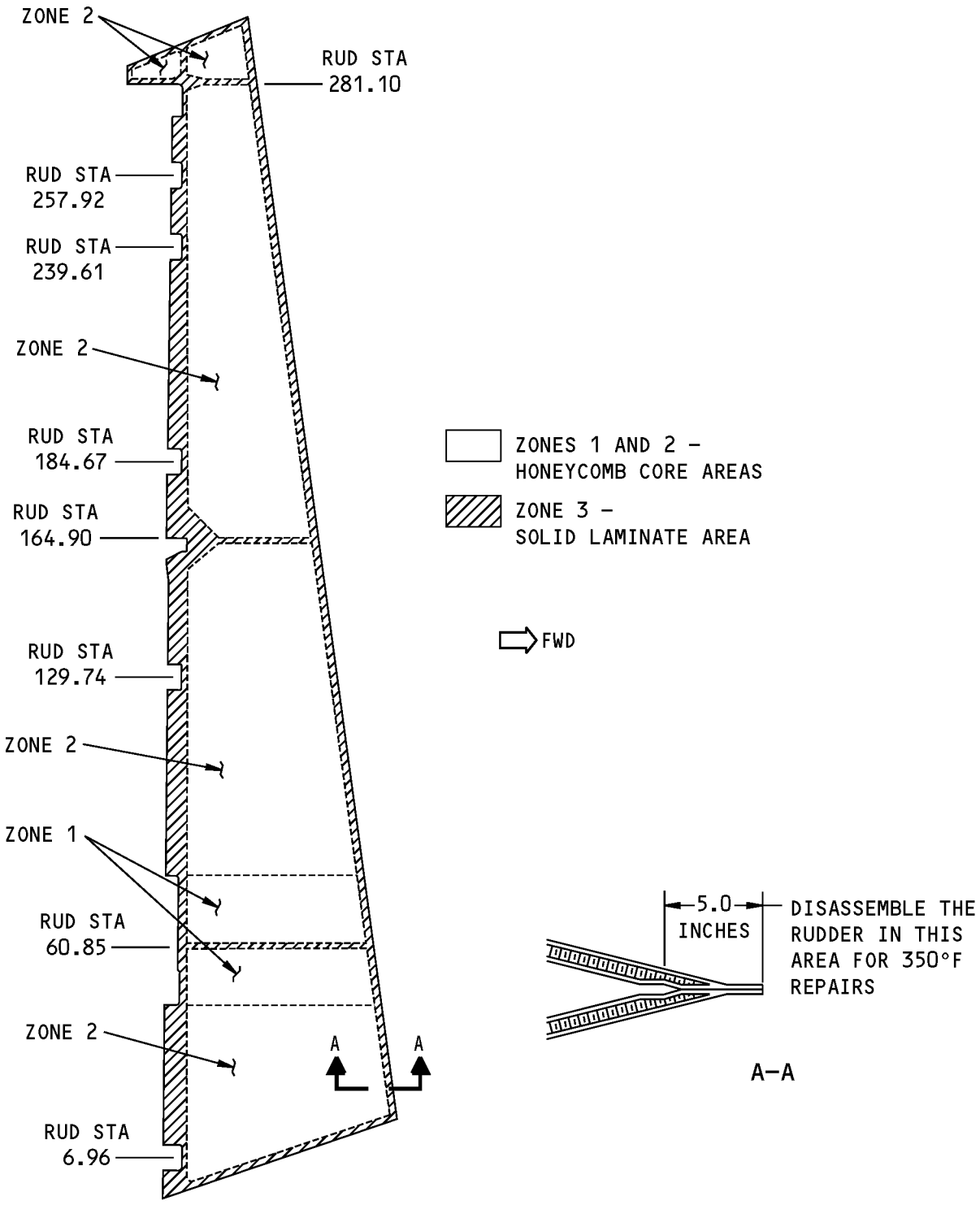
F. Install the rudder, as applicable. Refer to AMM 27-21-11/401.



Definitions of Damage Size
Figure 202



Definitions of the Facesheets
Figure 203



Rudder Skin Zones
Figure 204

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02, GENERAL	Fastener Installation and Removal
51-40-03, GENERAL	Fastener Substitution
51-60-07	RUDDER BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
AMM 27-21-11/401	Rudder - Removal/Installation
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure

4. Repair Instructions

A. If a dent is 1.50 inches in diameter or less, and has no fiber damage or delamination, then fill the dent with potting compound and apply a fiberglass patch as given in Repair 14 of 51-70-04.

B. If Paragraph 4.A./REPAIR 1 is not applicable, then refer to:

(1) Table 201 for the repair data that is applicable to damage in Zones 1, 2, and 3.

C. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2.5D (D = fastener diameter) away from a fastener hole.

(3) Inspect Category B repairs after each 400 flight hour interval or more frequently. Refer to 737 NDT Part 1, 51-01-01 for inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator, can be used.

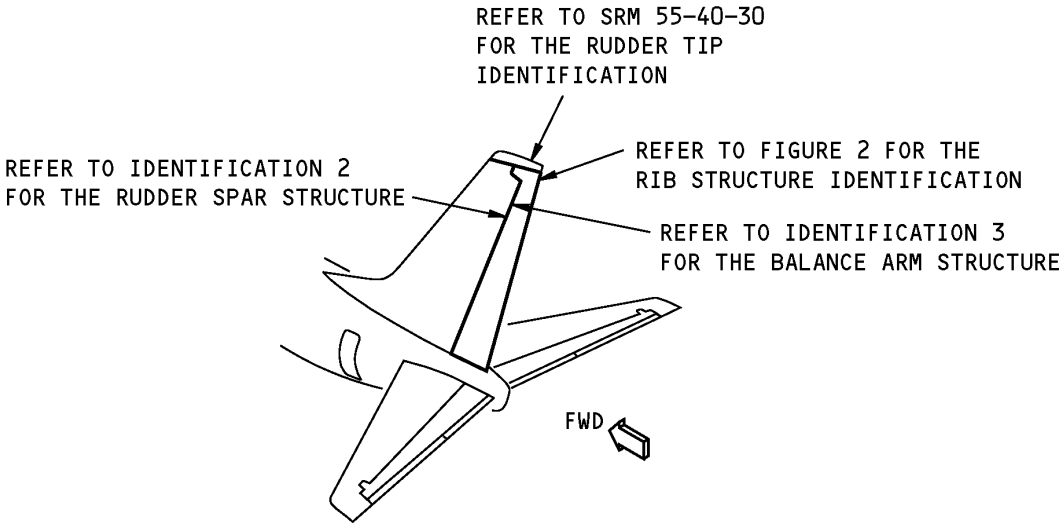
D. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged.

Table 201:

REPAIR DATA FOR ZONE 1, 2, AND 3 OF THE 350°F (177°C) CURE RUDDER SKIN PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Contact The Boeing Company.	Damage that is a maximum of: - 5.0 inches in diameter	Damage that is a maximum of: - 5.0 inches in diameter	There are no size limits on the repair.

REPAIR DATA FOR ZONE 1, 2, AND 3 OF THE 350°F (177°C) CURE RUDDER SKIN PANELS				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
		One repair for each 144 square inches 3.0 inches minimum clearance from: - other repairs - fastener holes - panel edges	One repair for each 144 square inches 3.0 inches minimum clearance from: - other repairs - fastener holes - panel edges	
REPAIR PROCEDURES	————	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.D

IDENTIFICATION 1 - RUDDER RIB STRUCTURE

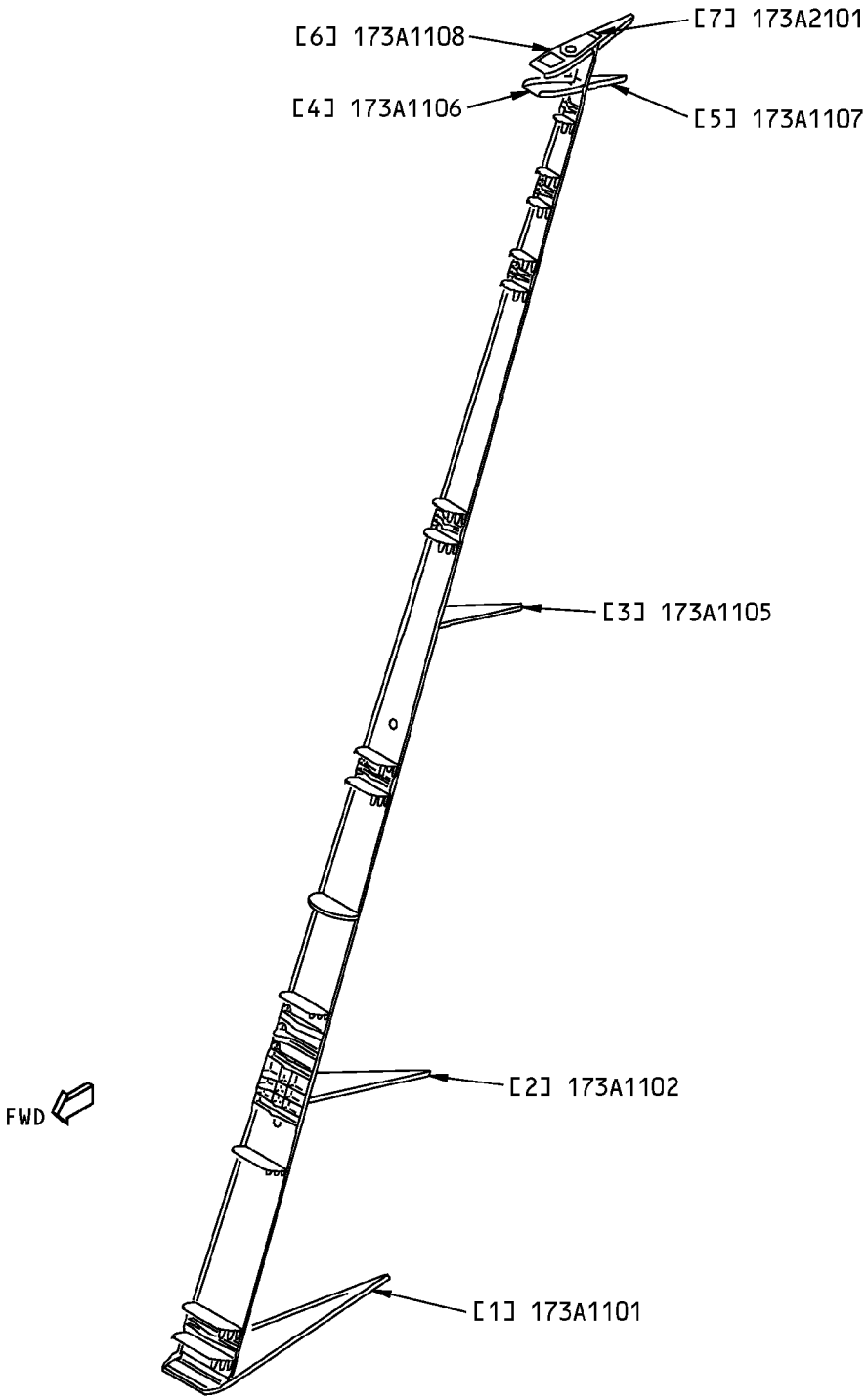


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Rudder Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0100	Rudder Functional Product Collector
173A0150	Centerline Diagram - Rudder
173A1001	Rib Installation - Lower Closure, Rudder
173A1002	Rib Installation - Main Actuator, Rudder
173A1005	Rib Installation - Balance Arm, Rudder
173A1006	Rib Installation - Forward Tip Balance, Rudder
173A1007	Rib Installation - Aft Tip Balance, Rudder
173A1008	Rib Installation - Upper Closure, Rudder



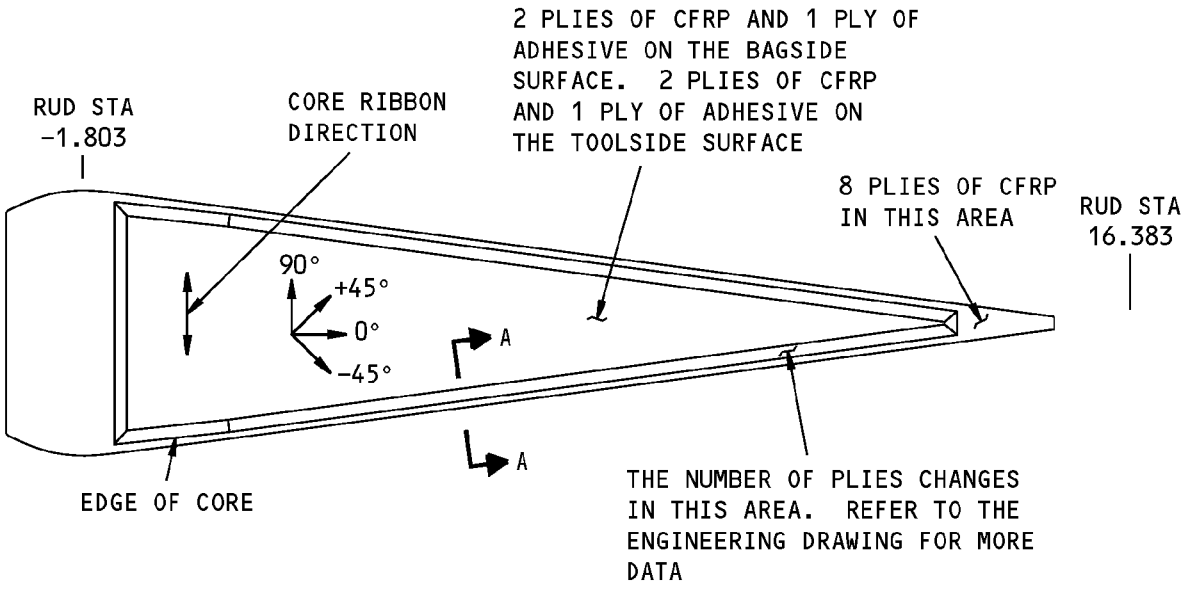
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Rudder Rib Structure Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Lower Closure Rib - Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) honeycomb sandwich	CUM LINE 001 THRU 472
	Skin		Refer to Figure 3, Detail A	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Lower Closure Rib - Bonded Part Skin		CRFP solid laminate with Glass Fiber Reinforced Plastic (GFRP) isolation ply Refer to Figure 3, Detail B	CUM LINE 473 AND ON
[2]	Main Actuator Rib - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 4	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[3]	Balance Arm Rib - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 5	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[4]	Forward Tip Balance Rib - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 6	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[5]	Aft Tip Balance Rib - Bonded Part		CFRP Woven Fabric	
	Skin		Refer to Figure 7	
[6]	Upper Closure Rib Assembly - Bonded Part		CFRP honeycomb sandwich	
	Skin		Refer to Figure 8	
	Core		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
(7)	Rib Post		CFRP Woven Fabric Refer to Figure 9	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

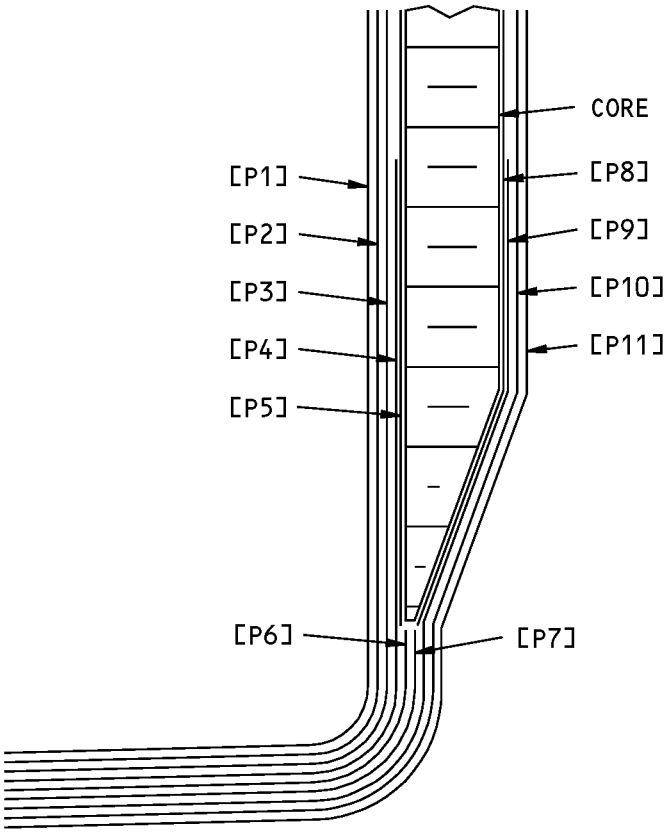
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

NOTES

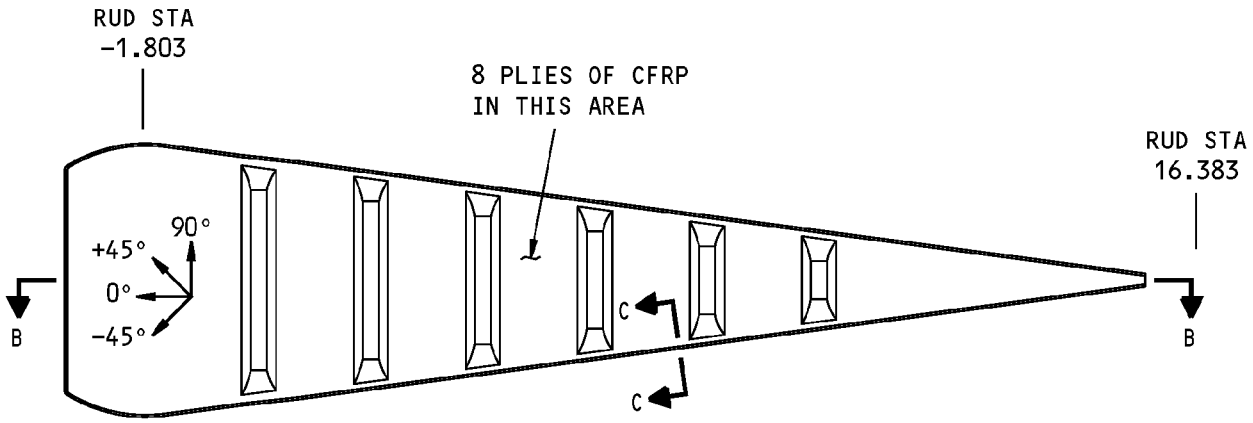
- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTION A-A FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A-A.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Closure Rib, Figure 2, Item [1]
Figure 3 (Sheet 1 of 4)



PLY LAYUP SEQUENCE
A-A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Closure Rib, Figure 2, Item [1]
Figure 3 (Sheet 2 of 4)



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

PLY LAYUP DIRECTION

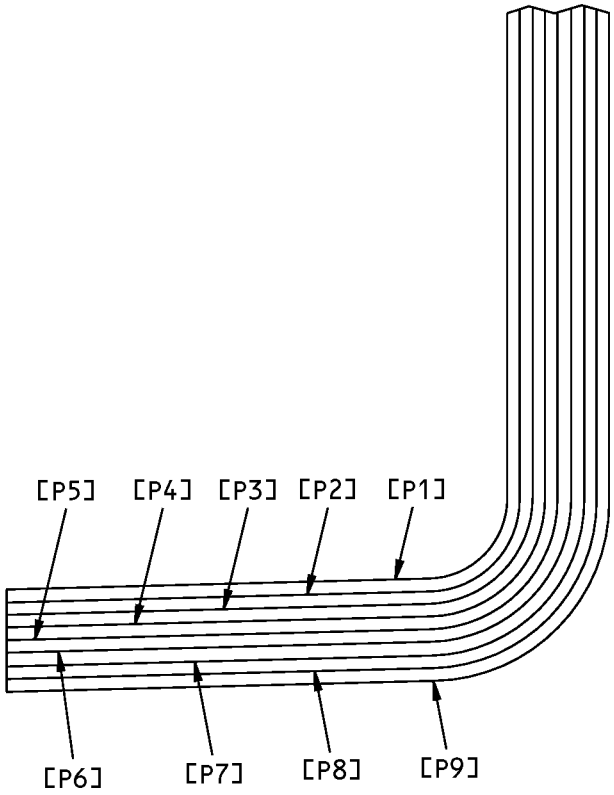
B

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL B FOR THE 0 DEGREE PLY DIRECTION.
- REFER TO SECTION B-B FOR THE PLY SEQUENCE. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 4 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION C-C.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Closure Rib, Figure 2, Item [1]
Figure 3 (Sheet 3 of 4)

B–B



VIEW ROTATED 90 DEGREES COUNTER CLOCKWISE
PLY LAYUP
C–C

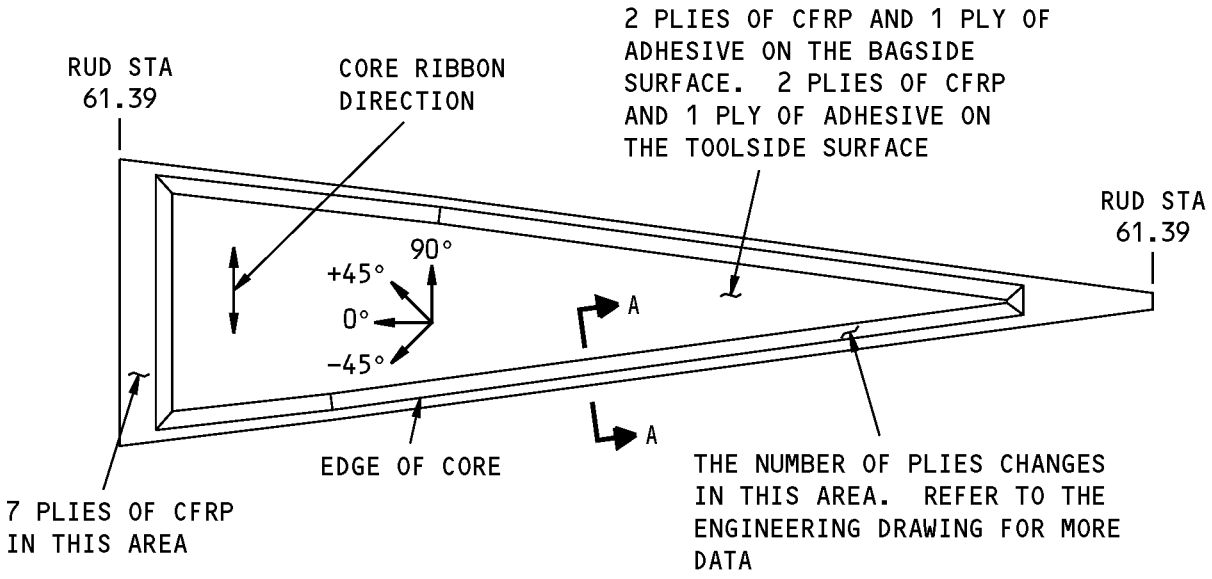
Ply Direction, Core Ribbon Direction, and Ply Sequence for the Lower Closure Rib, Figure 2, Item [1]
Figure 3 (Sheet 4 of 4)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3, Detail A		
PLY	**DIRECTION**	**MATERIAL**
P1	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P4, P9, P11	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Style 3K-70-PW
P3, P6, P7, P10	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P5, P8	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 3, Detail B		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	CFRP woven fabric as given in BMS 9-8, Type 1, Class 2, Style 3K-70-P
P2, P4, P5, P7	0 or 90 degrees	CFRP woven fabric as given in BMS 9-8, Type 1, Class 2, Style 3K-70-P
P9	Optional	GFRP woven fabric as given in BMS 9-3, Type D, Class 7, Style 120



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

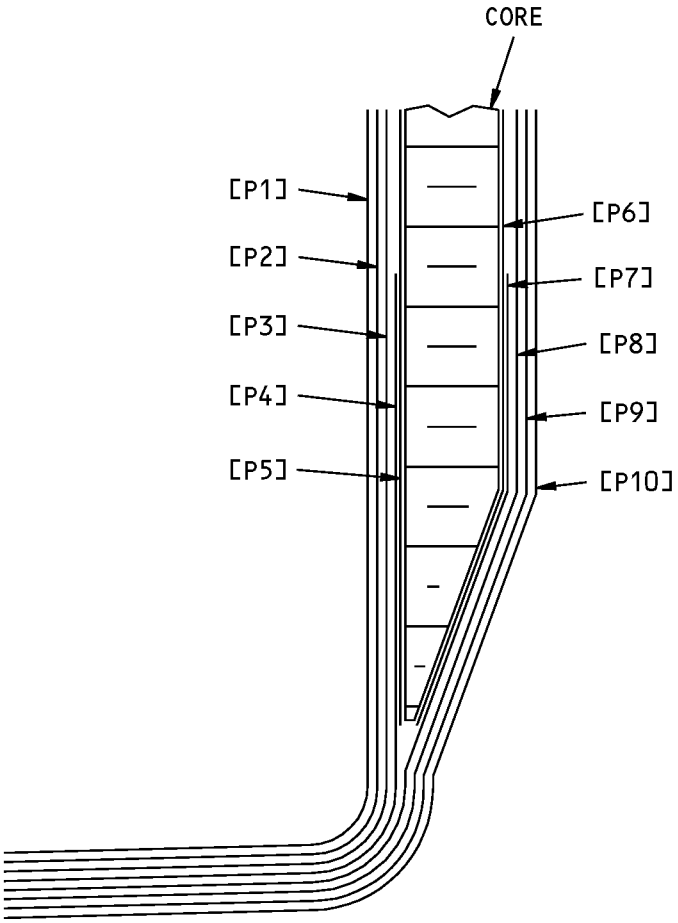
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTION A-A FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 5 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A-A.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Main Actuator Rib, Figure 2, Item [2]
Figure 4 (Sheet 1 of 2)

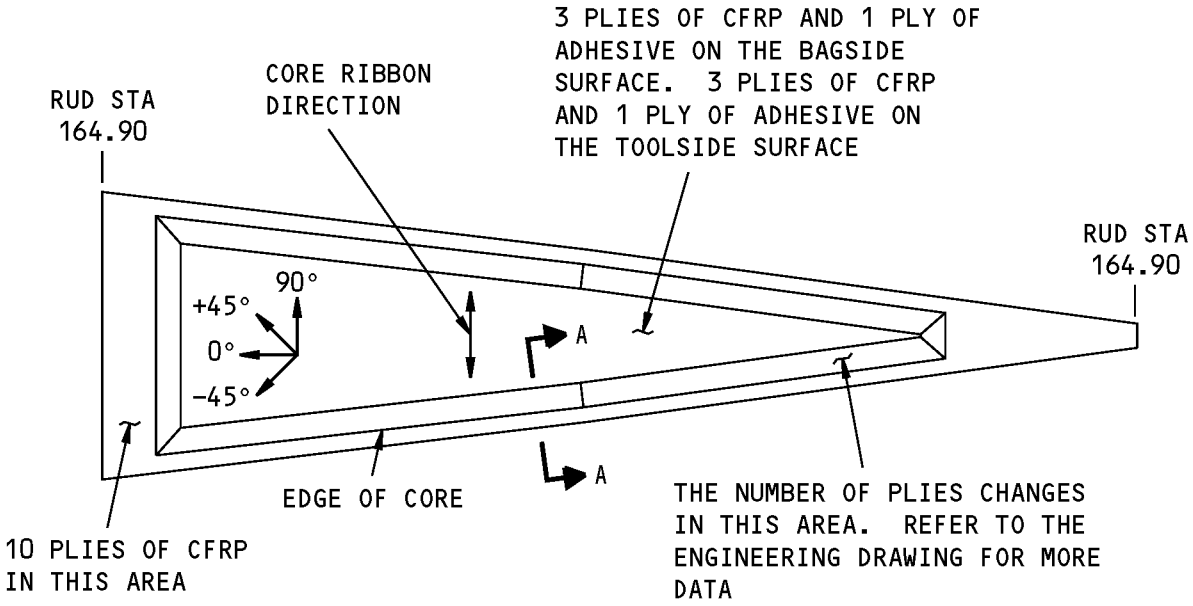


PLY LAYUP SEQUENCE
A–A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Main Actuator Rib, Figure 2, Item [2]
Figure 4 (Sheet 2 of 2)

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P10	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P4, P7, P9	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P8	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P5, P6	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

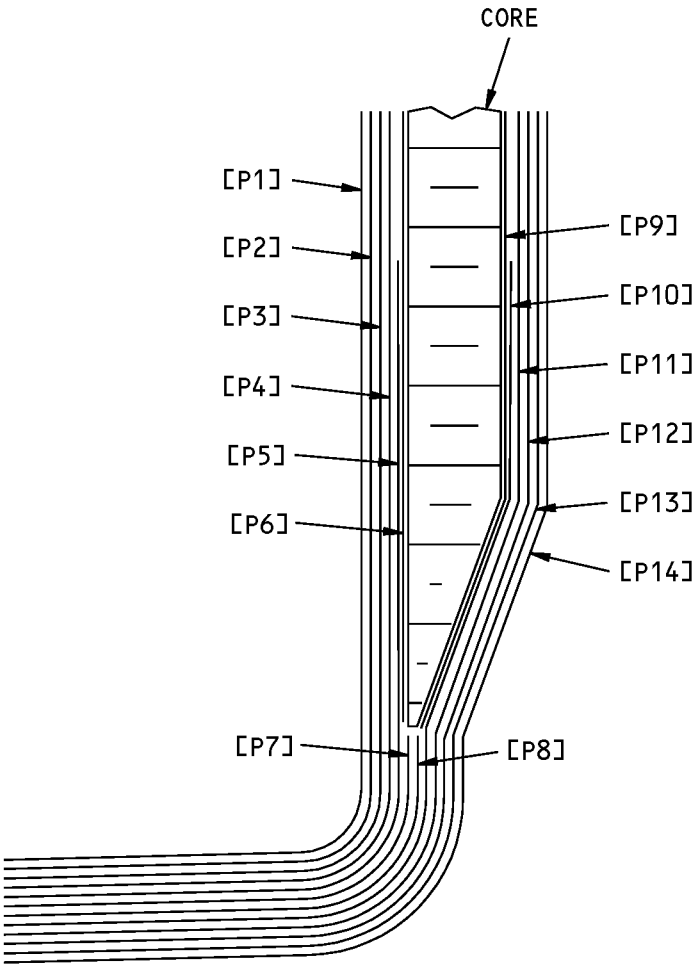
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTION A-A FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 6 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A-A.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Balance Arm Rib, Figure 2, Item [3]
Figure 5 (Sheet 1 of 2)

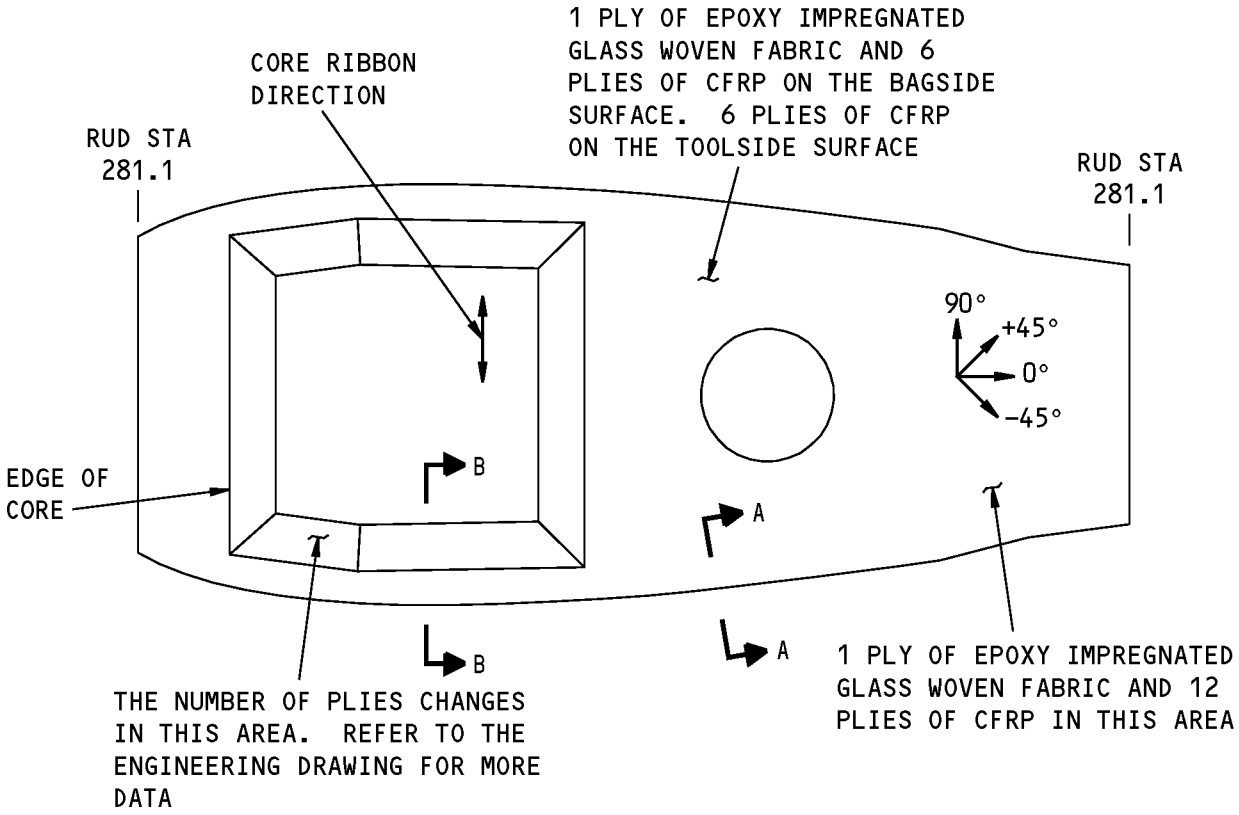


PLY LAYUP SEQUENCE
A–A

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Balance Arm Rib, Figure 2, Item [3]
Figure 5 (Sheet 2 of 2)

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 5		
PLY	**DIRECTION**	**MATERIAL**
P1, P14	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P4, P7, P8, P11, P13	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P5, P10, P12	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P6, P9	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

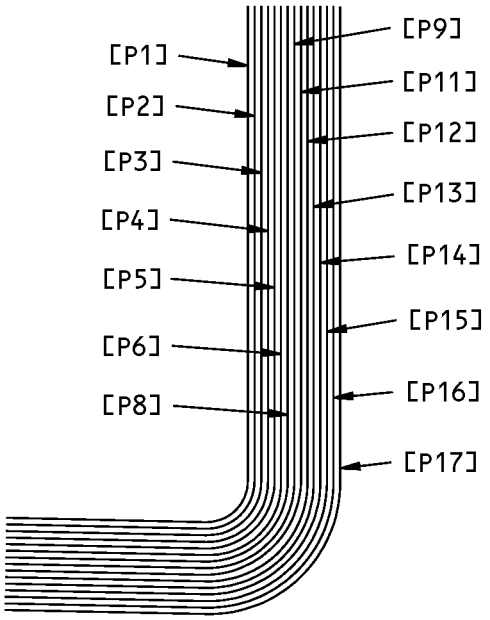
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

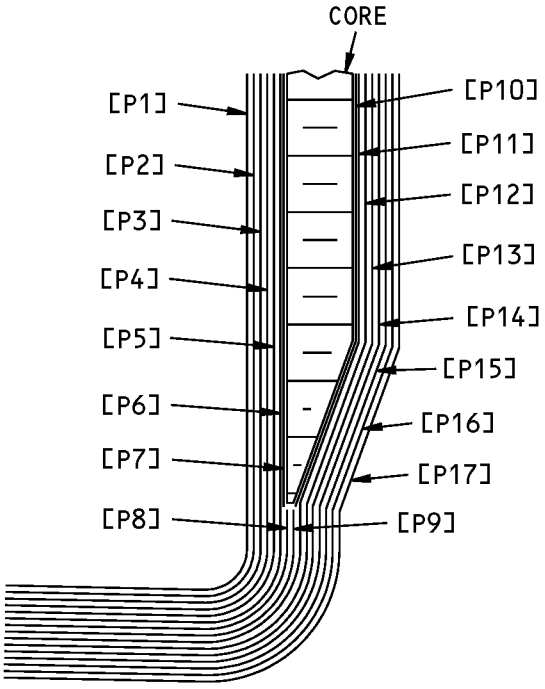
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTIONS A-A AND B-B FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 7 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTIONS A-A AND B-B.

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Forward Tip Balance Rib, Figure 2, Item [4]
Figure 6 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A

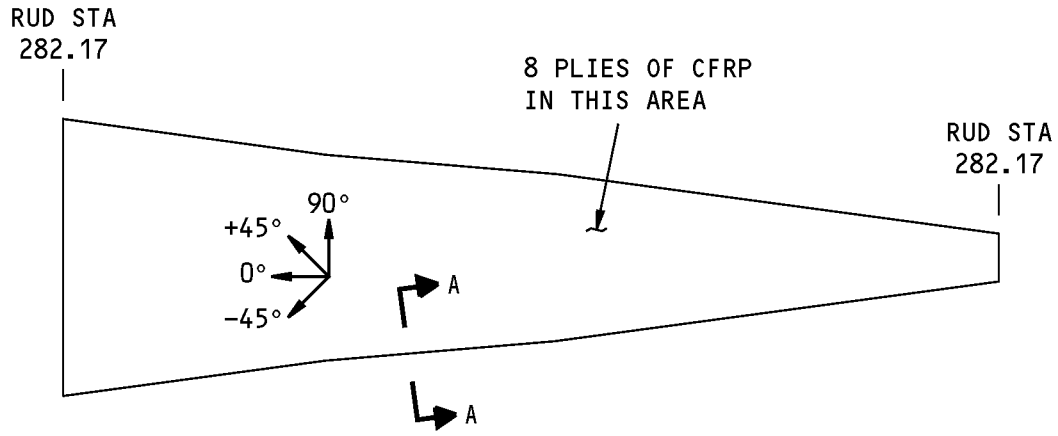


PLY LAYUP SEQUENCE
B–B

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Forward Tip Balance Rib, Figure 2, Item [4]
Figure 6 (Sheet 2 of 2)

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1, P17	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P4, P6, P11, P13, P15	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P5, P8, P9, P12, P14	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P7, P10	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A
P16	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Class III, Style 108



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

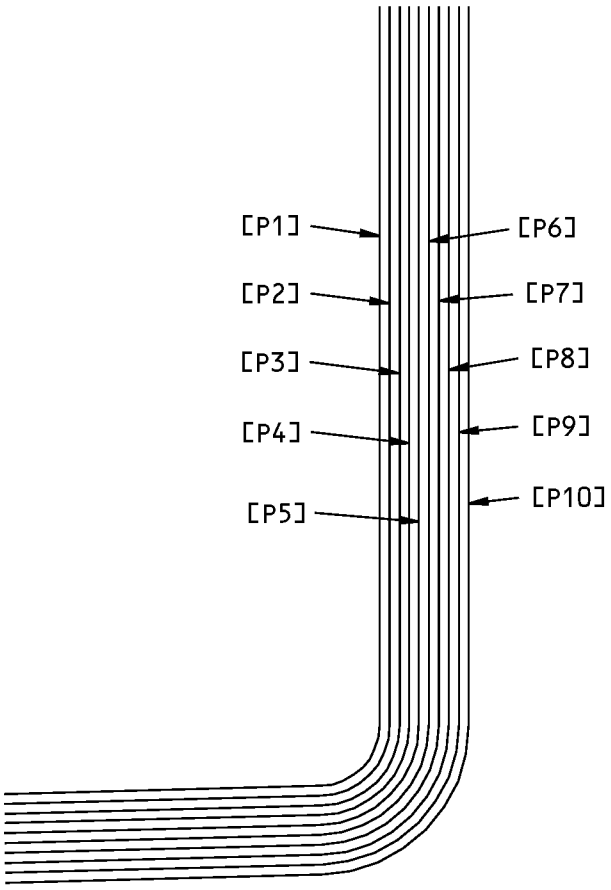
PLY LAYUP DIRECTION

A

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION.
- REFER TO SECTION A-A FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 8 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A-A.

Ply Direction, and Ply Sequence for the Aft Tip Balance Rib, Figure 2, Item [5]
Figure 7 (Sheet 1 of 2)

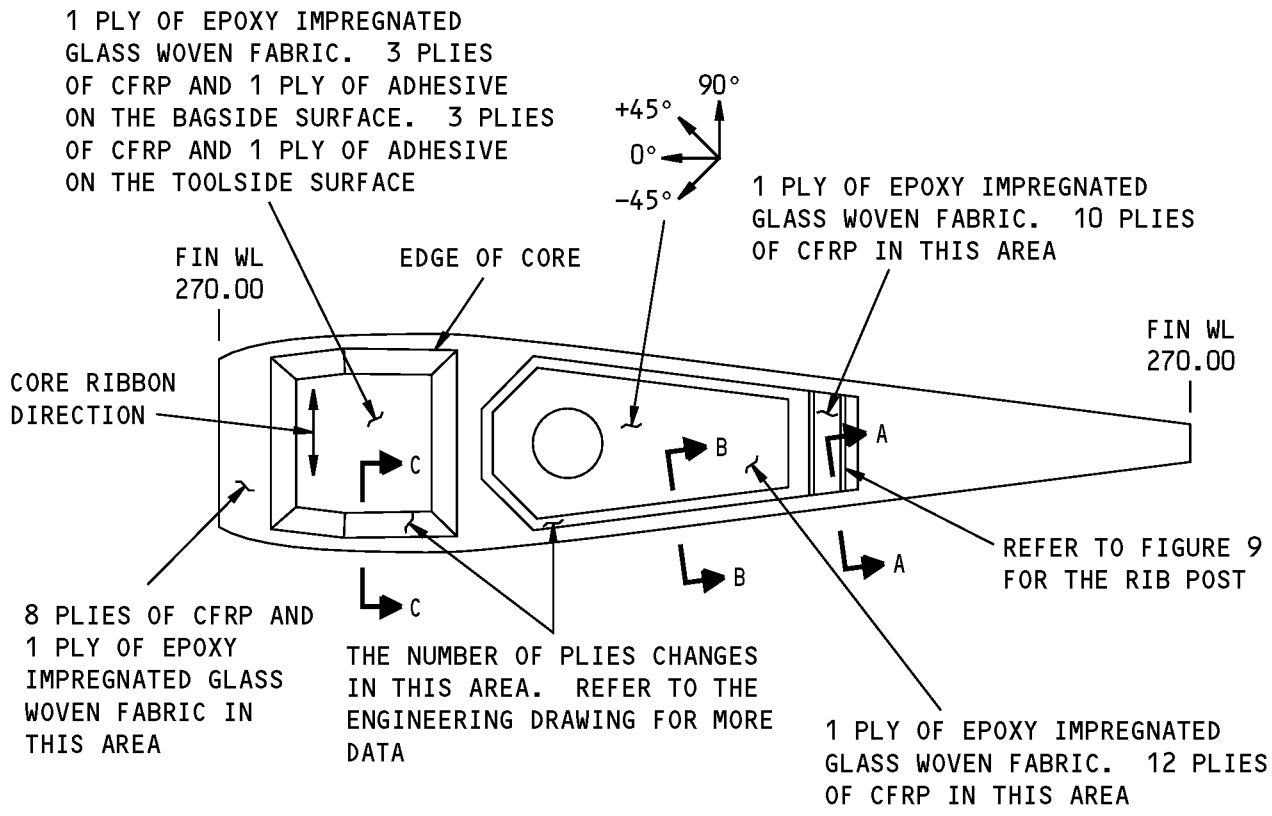


PLY LAYUP SEQUENCE
A-A

Ply Direction, and Ply Sequence for the Aft Tip Balance Rib, Figure 2, Item [5]
Figure 7 (Sheet 2 of 2)

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 7		
PLY	**DIRECTION**	**MATERIAL**
P1, P10	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P4, P7, P9	+ or - 45 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P5, P6, P8	0 or 90 degrees	Epoxy impregnated graphite woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



PLAN VIEW IS SHOWN

VIEW IS ON THE BAGSIDE SURFACE

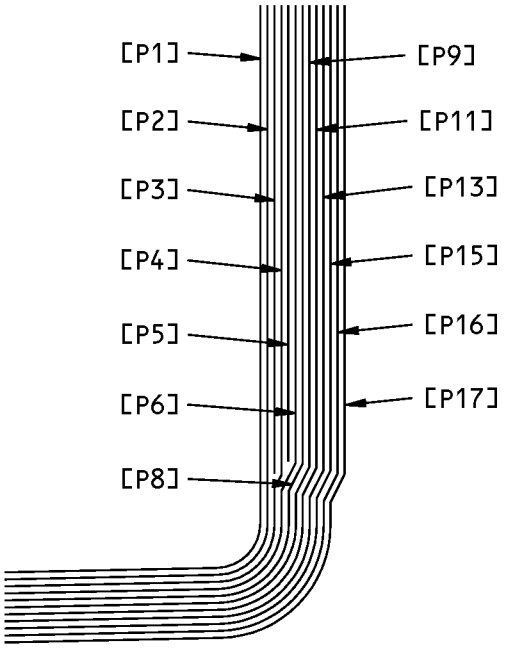
PLY LAYUP DIRECTION AND CORE RIBBON DIRECTION

(A)

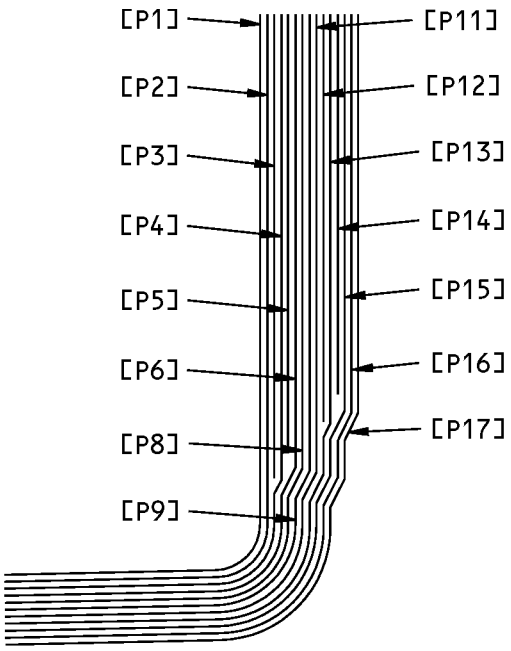
NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTIONS A-A, B-B, AND C-C FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 9 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTIONS A-A, B-B, AND C-C.

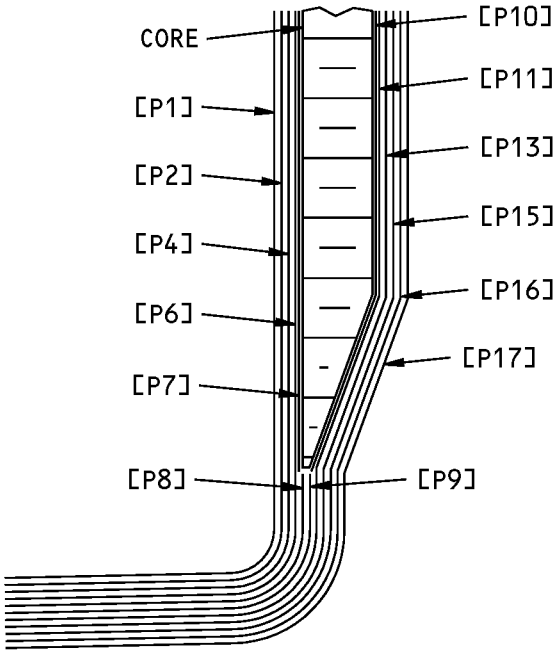
Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Closure Rib, Figure 2, Item [6]
Figure 8 (Sheet 1 of 2)



PLY LAYUP SEQUENCE
A–A



PLY LAYUP SEQUENCE
B–B

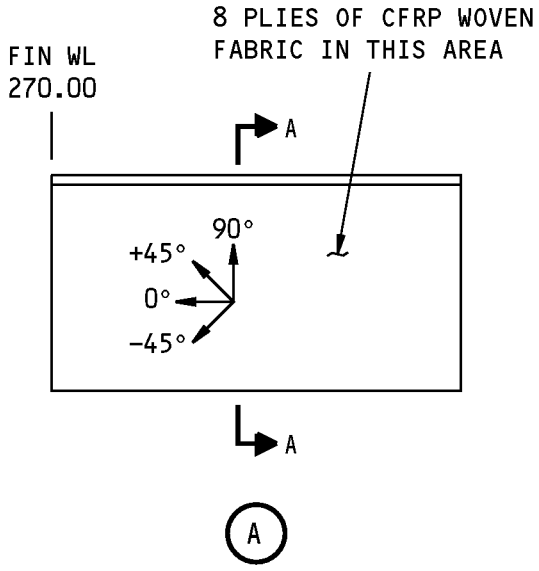


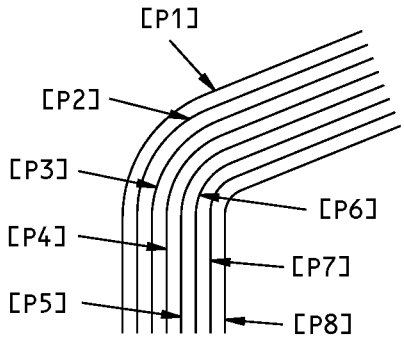
PLY LAYUP SEQUENCE
C–C

Ply Direction, Core Ribbon Direction, and Ply Sequence for the Upper Closure Rib, Figure 2, Item [6]
Figure 8 (Sheet 2 of 2)

Table 9:

PLY MATERIAL AND DIRECTION FOR FIGURE 8		
PLY	**DIRECTION**	**MATERIAL**
P1, P17	Optional	1 mil white Tedlar as given in BAC 5317-4
P2, P5, P8, P9, P12, P15	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P4, P6, P11, P13, P14	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P7, P10	Optional	Adhesive film as given in BMS 8-245, Type II, Class 1, Grade 03A
P16	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Class III, Style 108





PLY LAYUP SEQUENCE
A–A

NOTES

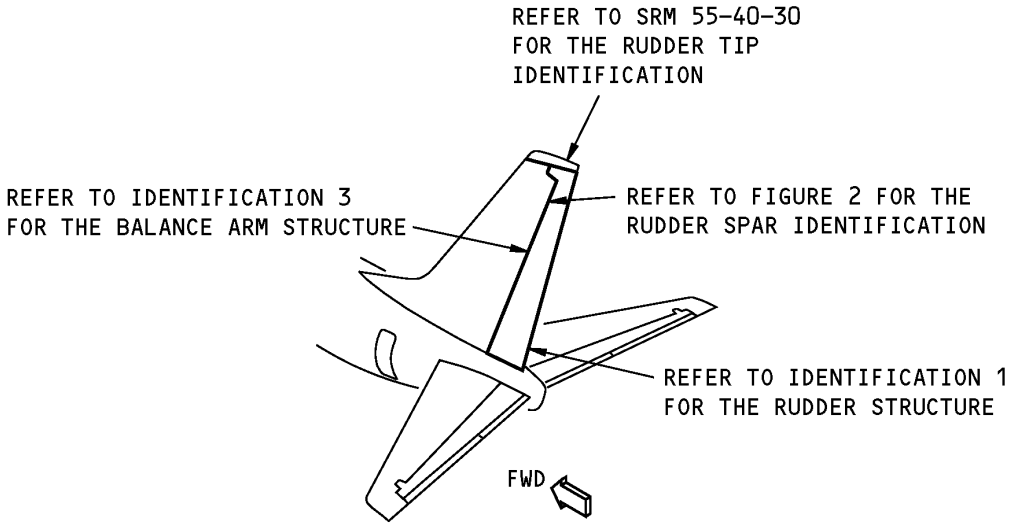
- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION.
- REFER TO SECTION A–A FOR THE PLY SEQUENCE. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.
- REFER TO TABLE 10 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTION A–A.

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [7]
Figure 9

Table 10:

PLY MATERIAL AND DIRECTION FOR FIGURE 9		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P5, P7	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

IDENTIFICATION 2 - RUDDER SPAR RIB STRUCTURE

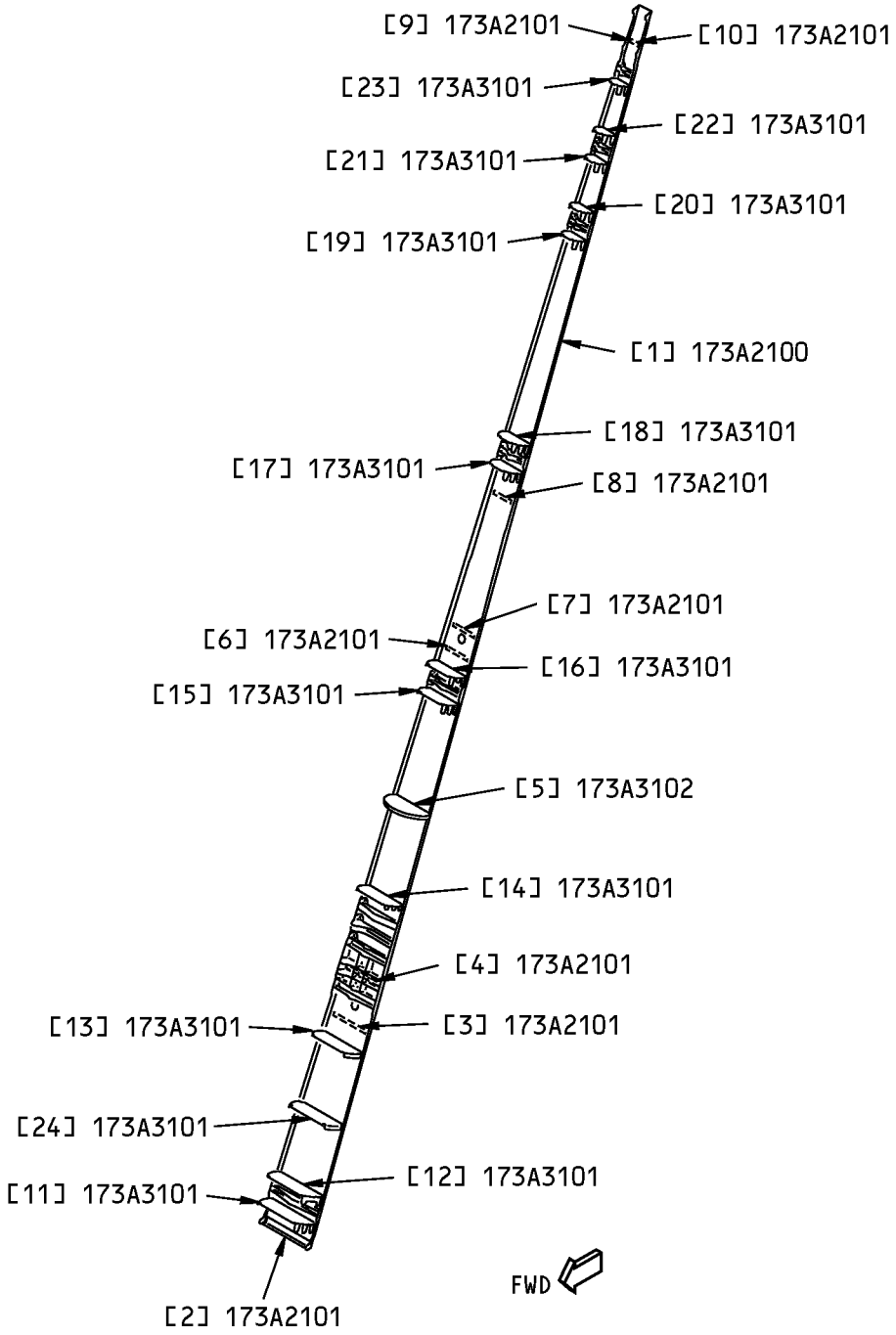


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Rudder Spar Rib Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0100	Rudder Functional Product Collector
173A0150	Centerline Diagram - Rudder
173A2001	Spar Installation - Rudder



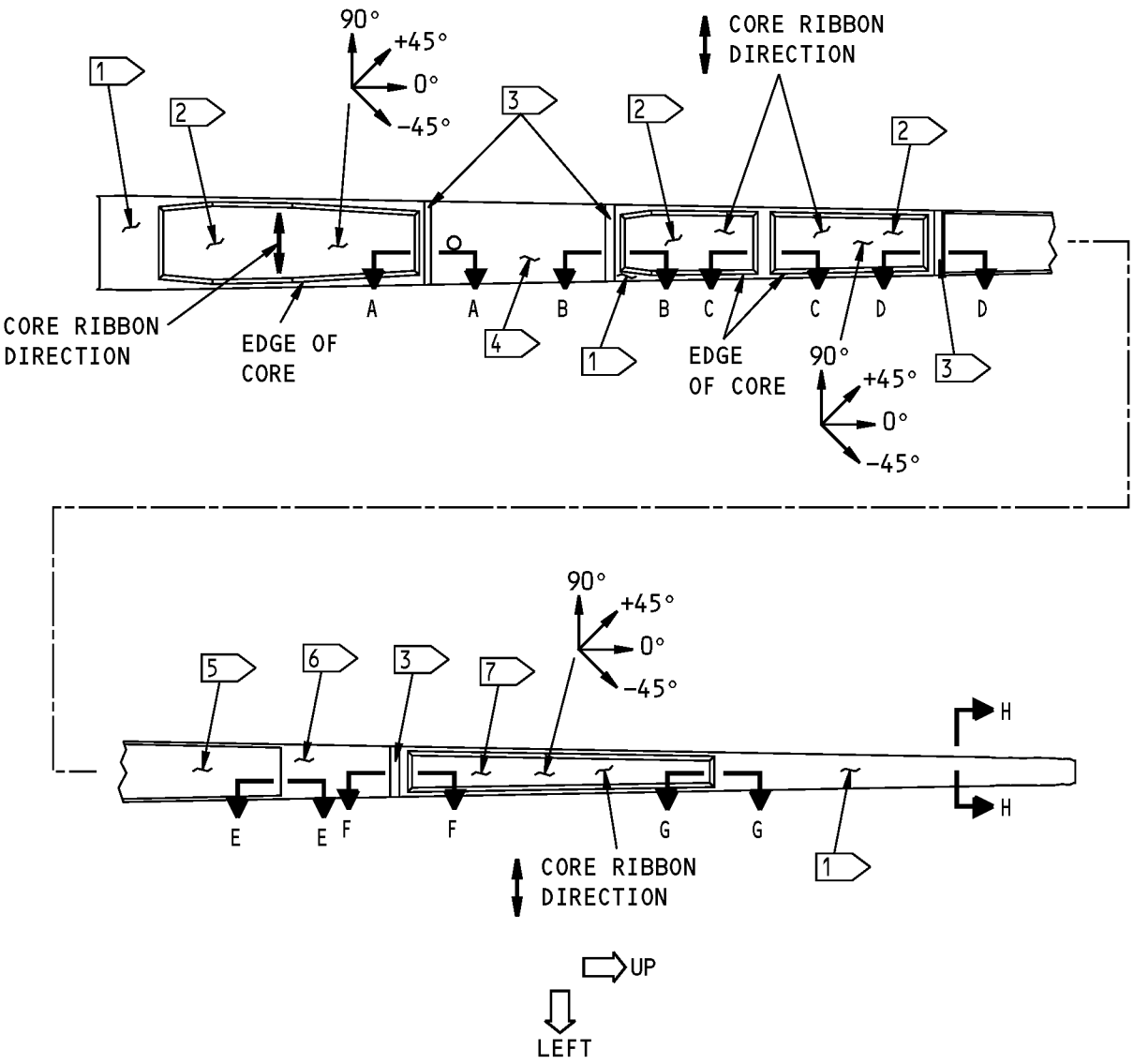
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Rudder Spar Rib Structure Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rudder Spar-Bonded Part		Carbon Fiber Reinforced Plastic (CFRP) and fiberglass honeycomb sandwich	
	Skin		Refer to Figure 3	
	Core - RUD STA 8.09 to RUD STA 48.10		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - RUD STA 79.02 to RUD STA 100.16		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - RUD STA 102.08 to RUD STA 126.30		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
	Core - RUD STA 189.00 to RUD STA 236.10		Non-metallic honeycomb as given in BMS 8-124, Class IV, Type V, Grade 3.0	
[2]	Rib Post		CFRP woven fabric Refer to Figure 4	
[3]	Stiffener		CFRP woven fabric Refer to Figure 5	
[4]	Rib Post		CFRP woven fabric Refer to Figure 6	
[5]	Air Rib Dam	0.063 (1.60)	2024-T42 clad as given in QQ-A-250/5	
[6]	Stiffener		CFRP woven fabric Refer to Figure 7	
[7]	Stiffener		CFRP woven fabric Refer to Figure 8	
[8]	Stiffener		CFRP woven fabric Refer to Figure 9	
[9]	Rib Post		CFRP woven fabric Refer to Figure 10	
[10]	Rib Post		CFRP woven fabric Refer to Figure 11	
[11]	Rib - RUD STA 4.50	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[12]	Rib - RUD STA 11.00	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	CUM LINE 001 THRU 120
	Rib - RUD STA 11.00	0.063 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	CUM LINE 121 AND ON
[13]	Rib - RUD STA 45.70	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	CUM LINE 001 THRU 120
	Rib - RUD STA 45.70	0.063 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	CUM LINE 121 AND ON
[14]	Rib - RUD STA 79.92	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[15]	Rib - RUD STA 127.30	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[16]	Rib - RUD STA 133.80	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[17]	Rib - RUD STA 182.20	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[18]	Rib - RUD STA 188.90	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[19]	Rib - RUD STA 237.15	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[20]	Rib - RUD STA 243.80	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[21]	Rib - RUD STA 255.45	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[22]	Rib - RUD STA 262.10	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[23]	Rib - RUD STA 273.85	0.040 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	
[24]	Rib - RUD STA 28.39	0.063 (1.02)	2024-T42 clad sheet as given in QQ-A-250/5	CUM LINE 121 AND ON

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).



PLY LAYUP AND CORE RIBBON DIRECTION FOR THE FRONT SPAR BETWEEN STATION 0 AND FIN WATERLINE 270.00

NOTES

- THE PLY DIRECTION IS THE WARP DIRECTION OF THE FABRIC. REFER TO DETAIL A FOR THE 0 DEGREE PLY DIRECTION AND THE CORE RIBBON DIRECTION.
- REFER TO SECTIONS A-A, B-B, C-C, D-D, E-E, F-F, G-G, AND H-H FOR THE PLY SEQUENCE AT THOSE LOCATIONS. REFER TO THE ENGINEERING DRAWING FOR MORE DATA.
- REFER TO TABLE 3 FOR THE DIRECTION AND MATERIAL OF THE PLIES SHOWN IN SECTIONS A-A, B-B, C-C, D-D, E-E, F-F, G-G, AND H-H.

Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 1 of 5)

NOTES

- FILM ADHESIVE USED AS GIVEN IN BMS 8-245, TYPE II, CLASS 1, GRADE 03A

1 1 PLY OF EPOXY PREIMPREGNATED GLASS WOVEN FABRIC AND 10 PLIES OF CFRP WOVEN FABRIC IN THIS AREA.

2 1 PLY OF FILM ADHESIVE AND 2 PLIES OF CFRP WOVEN FABRIC ON THE BAGSIDE SURFACE. 1 PLY OF FILM ADHESIVE AND 2 PLIES OF CFRP WOVEN FABRIC ON THE TOOLSIDE SURFACE.

3 THE NUMBER OF PLIES CHANGES IN THIS AREA. REFER TO THE ENGINEERING DRAWINGS FOR MORE DATA.

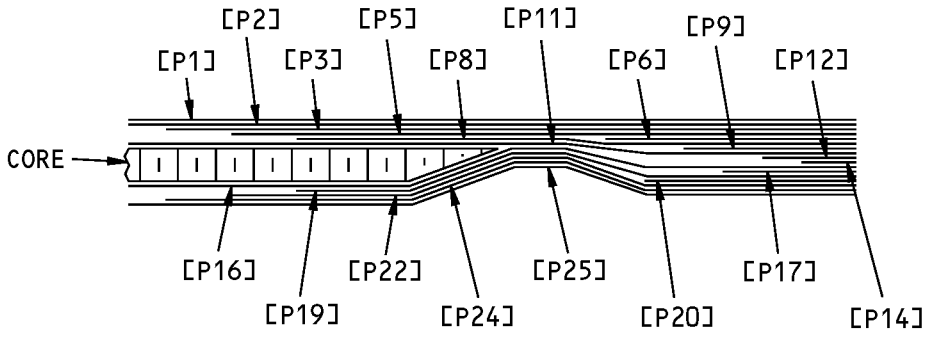
4 1 PLY OF EPOXY PREIMPREGNATED GLASS WOVEN FABRIC AND 16 PLIES OF CFRP WOVEN FABRIC IN THIS AREA.

5 1 PLY OF EPOXY PREIMPREGNATED GLASS WOVEN FABRIC AND 18 PLIES OF CFRP WOVEN FABRIC IN THIS AREA.

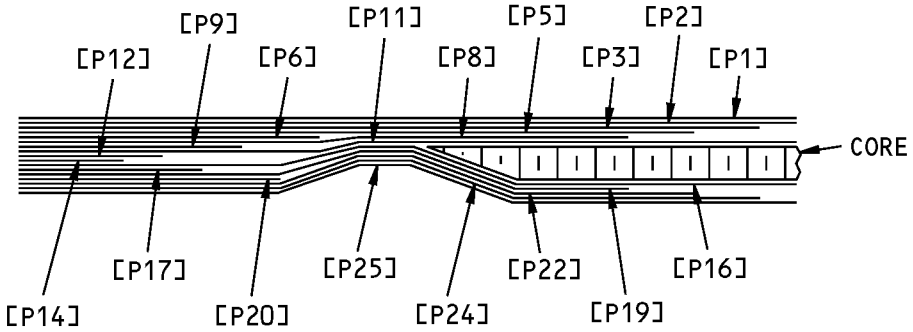
6 1 PLY OF EPOXY PREIMPREGNATED GLASS WOVEN FABRIC AND 14 PLIES OF CFRP WOVEN FABRIC IN THIS AREA.

7 3 PLIES OF CFRP WOVEN FABRIC ON THE BAGSIDE SURFACE. 3 PLIES OF CFRP WOVEN FABRIC AND 1 PLY OF EPOXY IMPREGNATED GLASS WOVEN FABRIC ON THE TOOLSIDE SURFACE.

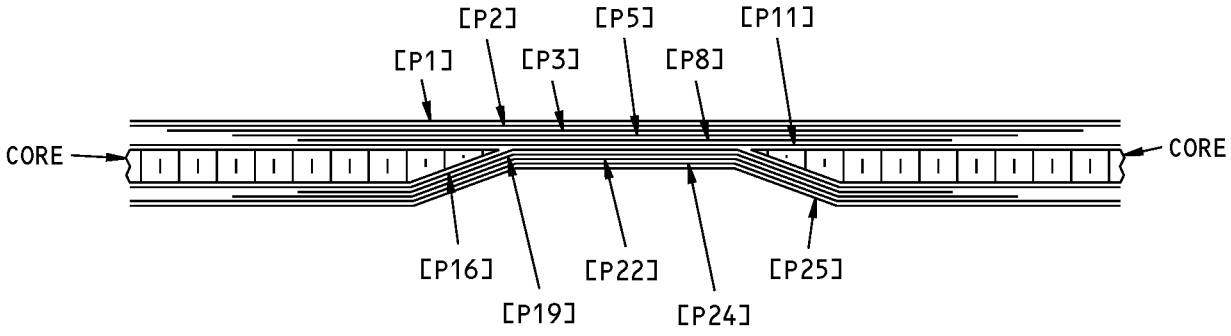
Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 2 of 5)



A–A

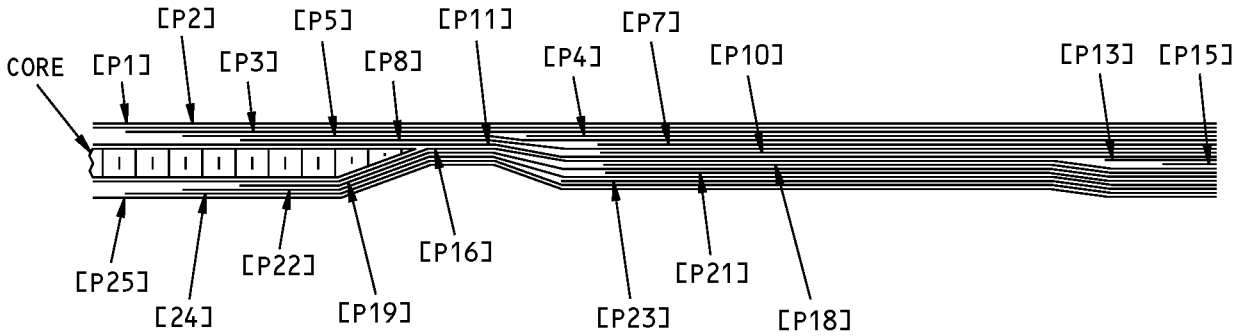


B–B

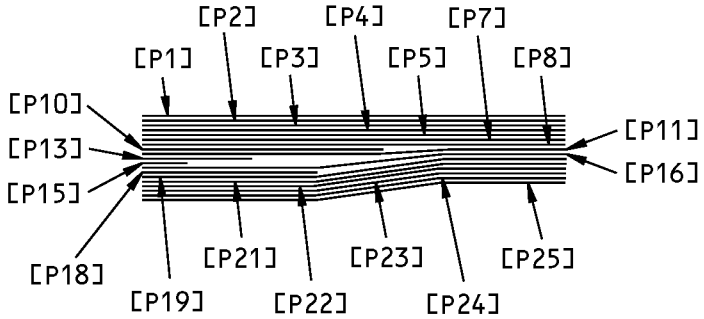


C–C

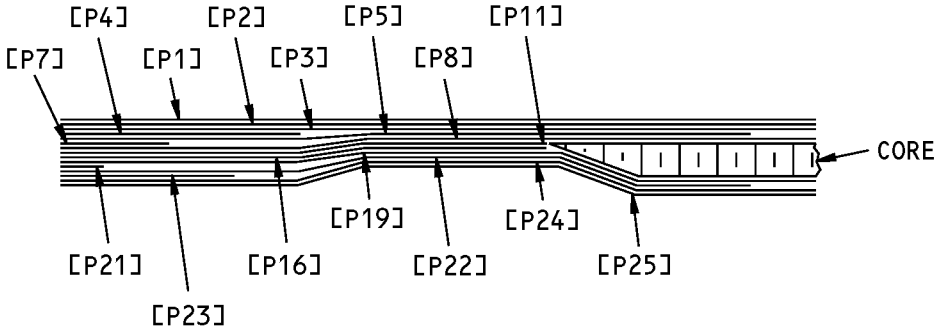
Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 3 of 5)



D–D

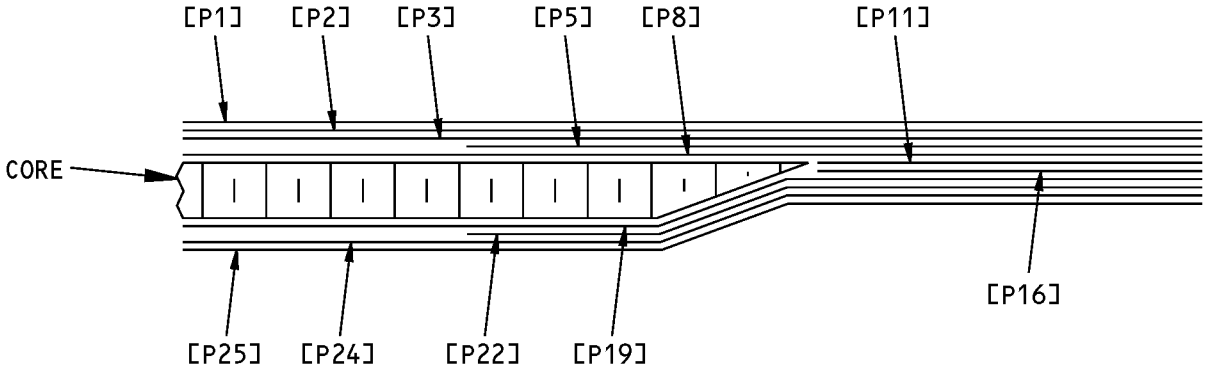


E–E

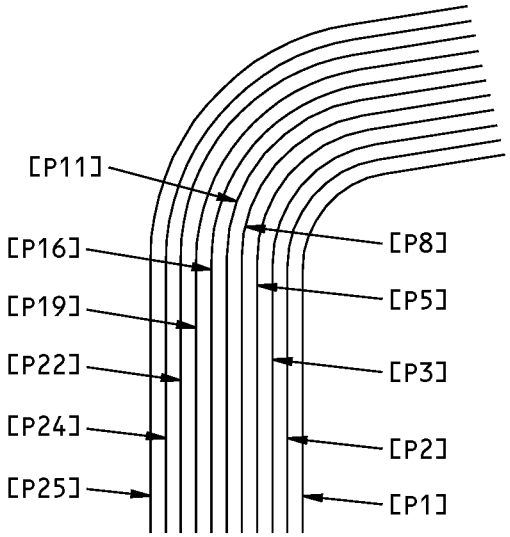


F–F

Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 4 of 5)



G–G

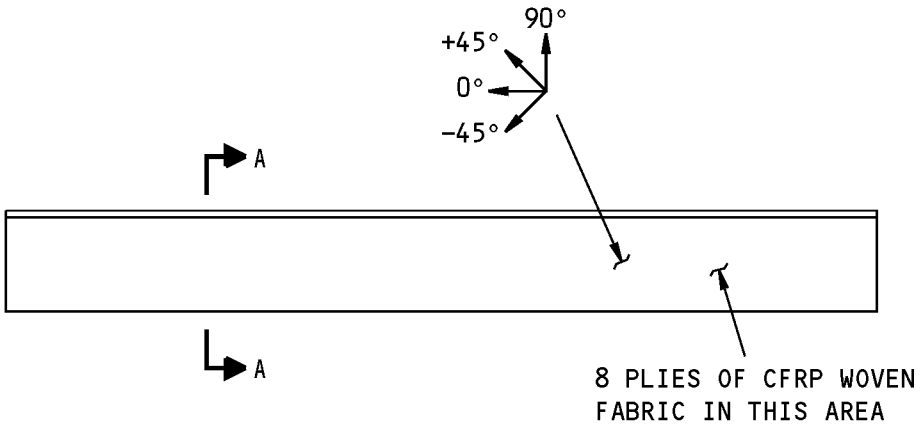


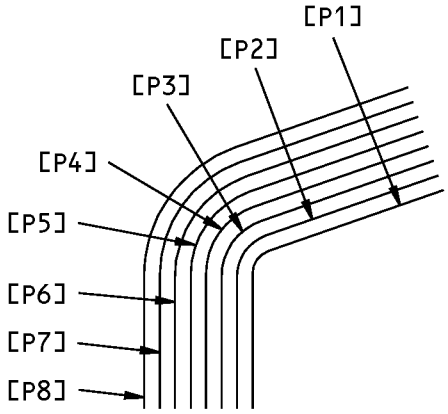
H–H

Ply Direction, Ply Sequence and Core Ribbon Direction for Figure 2, Item [1]
Figure 3 (Sheet 5 of 5)

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-139, Class III, Style 108
P2, P4, P5, P8, P9, P10, P12, P13, P14, P15, P17, P18, P19, P22, P23, P25	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P3, P6, P7, P11, P16, P20, P21, P24	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



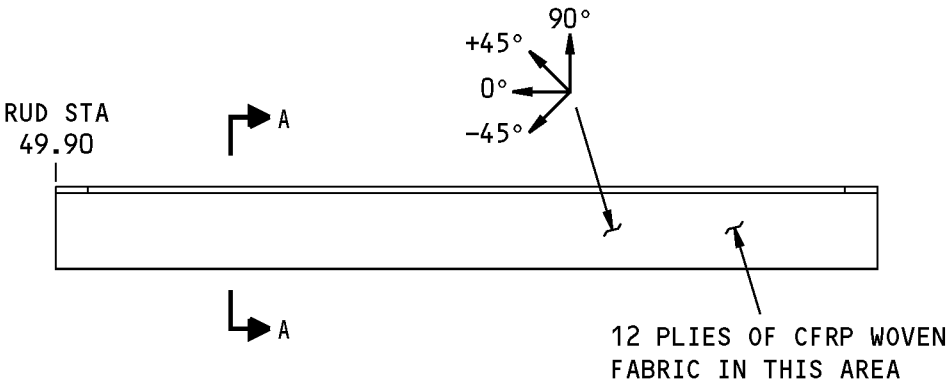


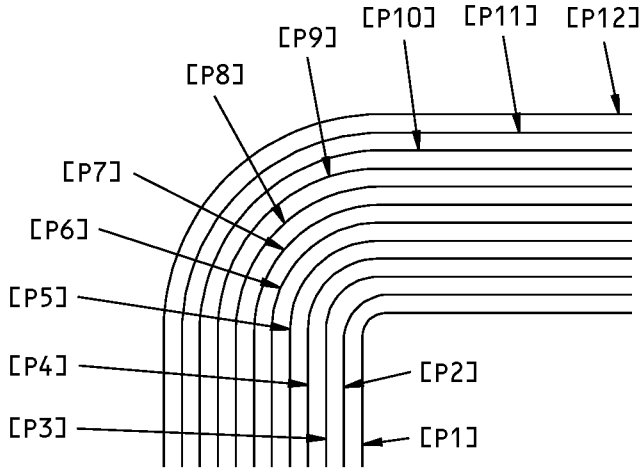
A–A

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [2]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 4		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P6, P8	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P5, P7	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



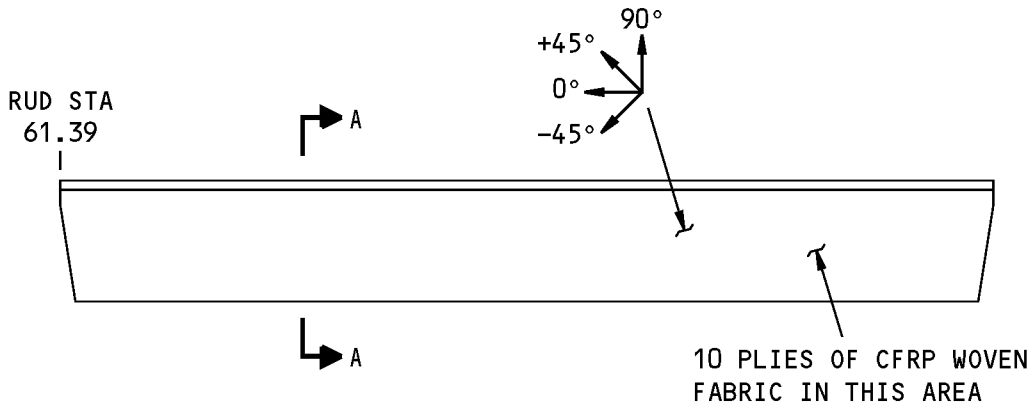


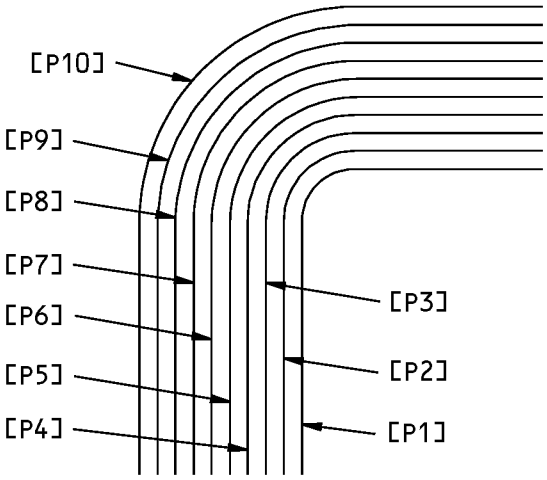
A–A

Ply Direction and Ply Sequence for the Stiffener, Figure 2, Item [3]
Figure 5

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 5		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



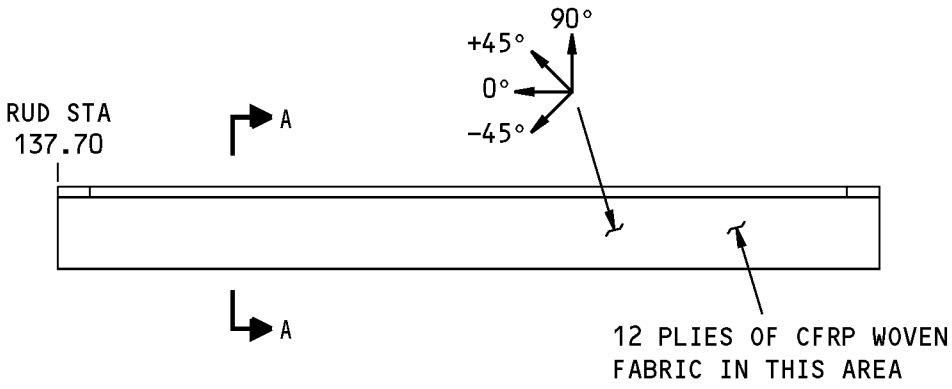


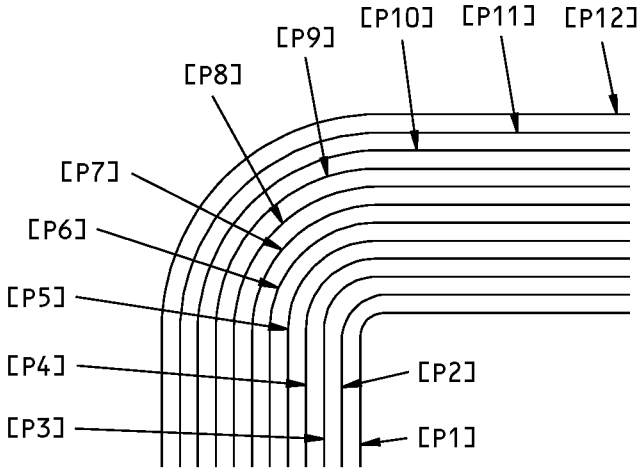
A–A

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [4]
Figure 6

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 6		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P6, P8, P10	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P7, P9	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



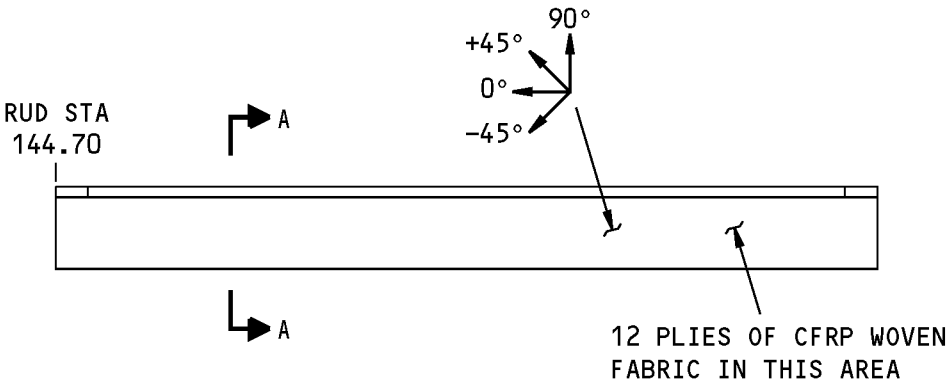


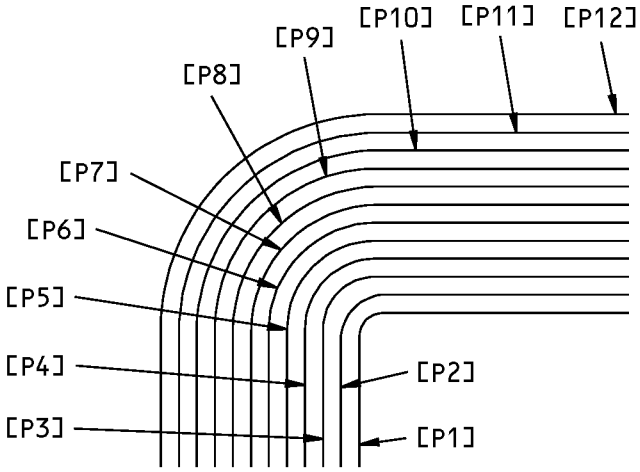
A–A

Ply Direction and Ply Sequence for the Stiffener, Figure 2, Item [6]
Figure 7

Table 7:

PLY MATERIAL AND DIRECTION FOR FIGURE 7		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



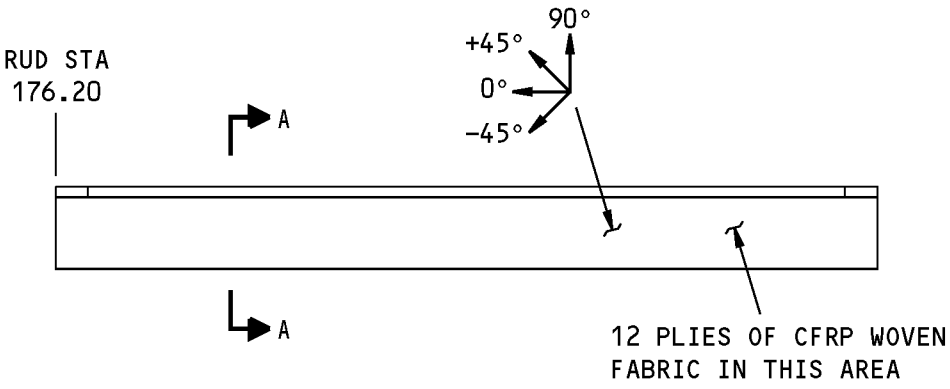


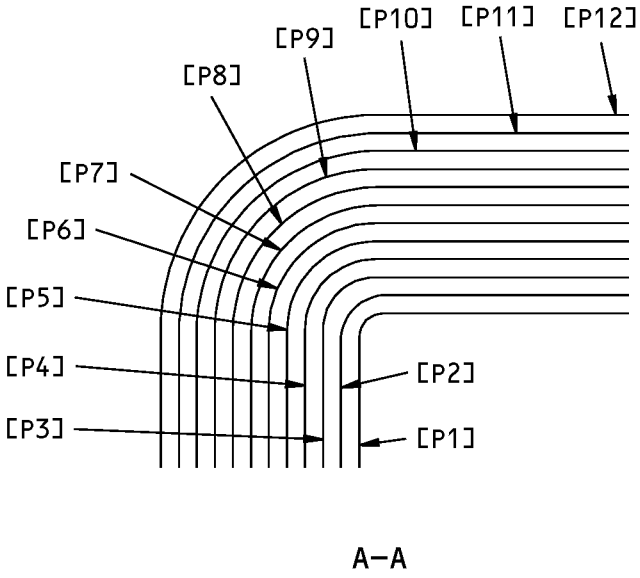
A–A

Ply Direction and Ply Sequence for the Stiffener, Figure 2, Item [7]
Figure 8

Table 8:

PLY MATERIAL AND DIRECTION FOR FIGURE 8		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, TYpe IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



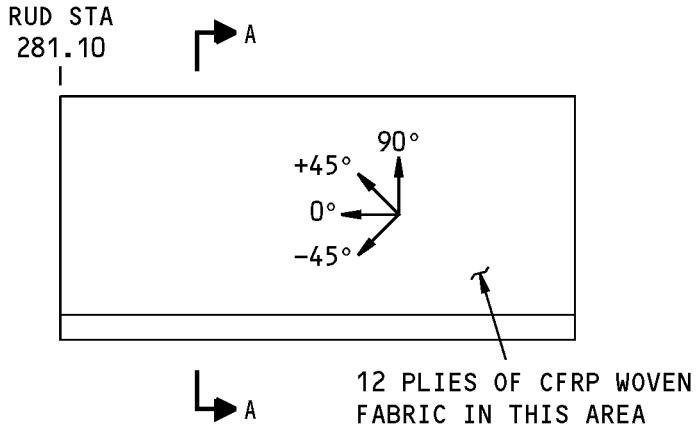


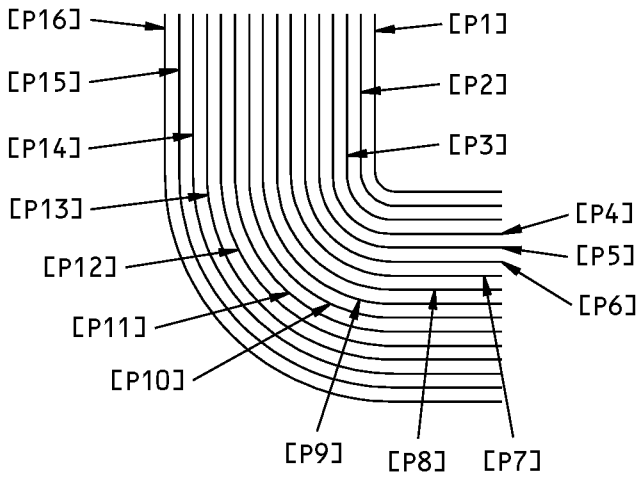
A–A

Ply Direction and Ply Sequence for the Stiffener, Figure 2, Item [8]
Figure 9

Table 9:

PLY MATERIAL AND DIRECTION FOR FIGURE 9		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P8, P10, P12	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P7, P9, P11	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW



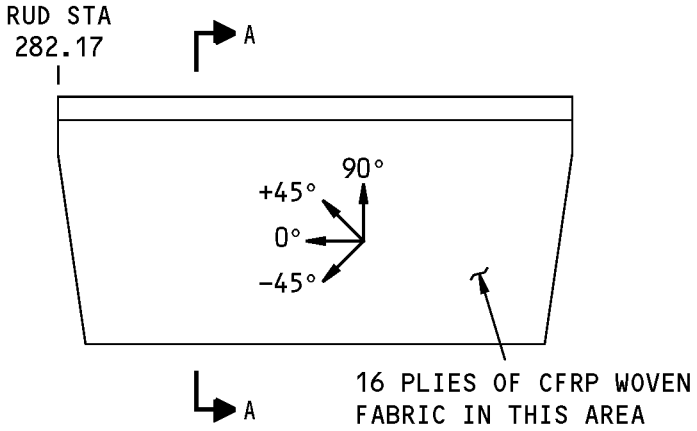


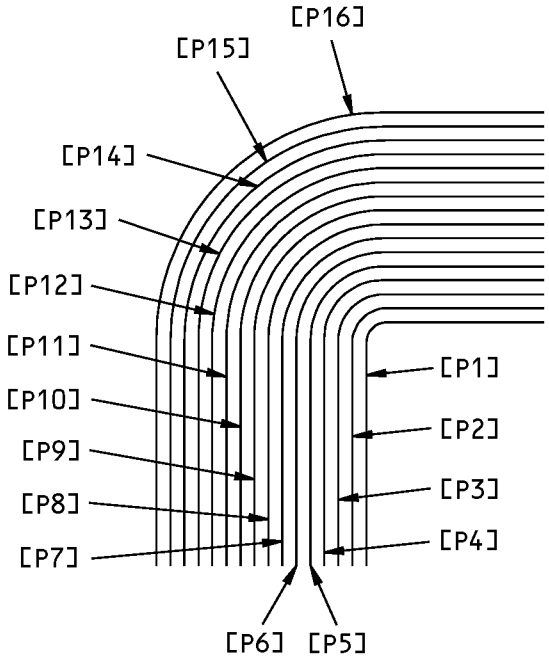
A–A

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [9]
Figure 10

Table 10:

PLY MATERIAL AND DIRECTION FOR FIGURE 10		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7, P10, P12, P14, P16	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P8, P9, P11, P13, P15	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW





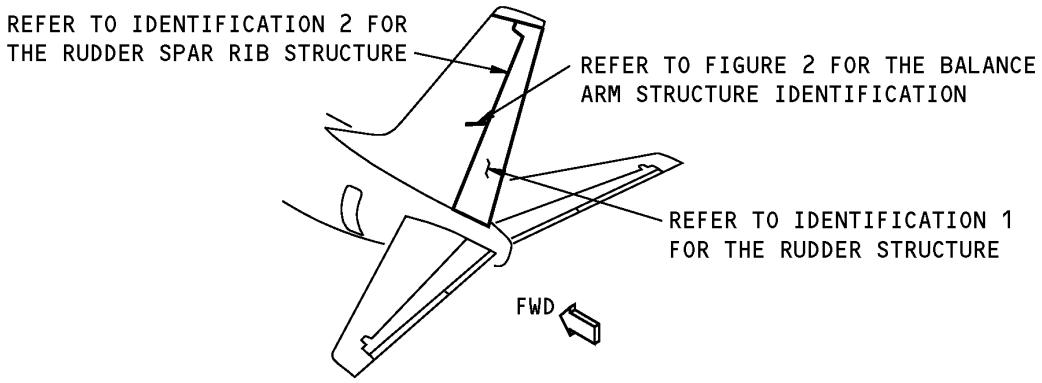
A–A

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [10]
Figure 11

Table 11:

PLY MATERIAL AND DIRECTION FOR FIGURE 11		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7, P10, P12, P14, P16	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P8, P9, P11, P13, P15	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

IDENTIFICATION 3 - RUDDER BALANCE ARM STRUCTURE

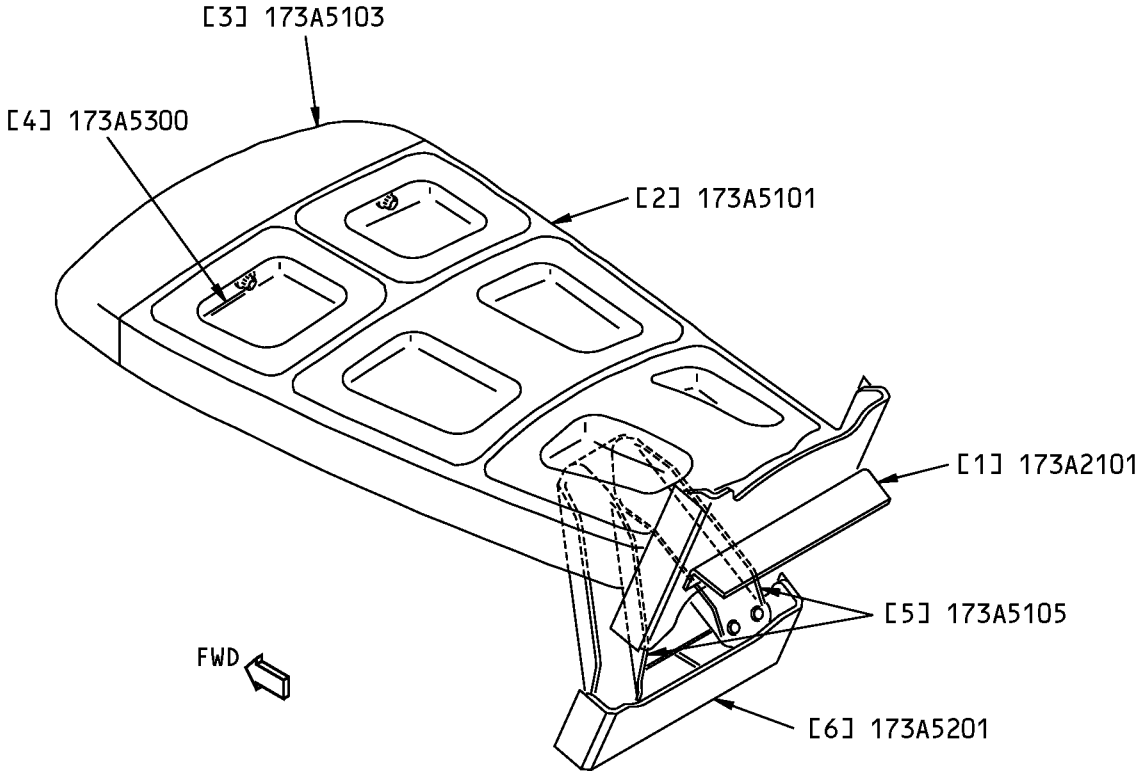


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Balance Arm Structure Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0002	Rudder Adjust Weight Installation
173A0100	Rudder Functional Product Collector
173A0150	Centerline Diagram - Rudder
173A5000	Balance Arm Installation - Rudder
173A5001	Balance Arm Assembly - Rudder



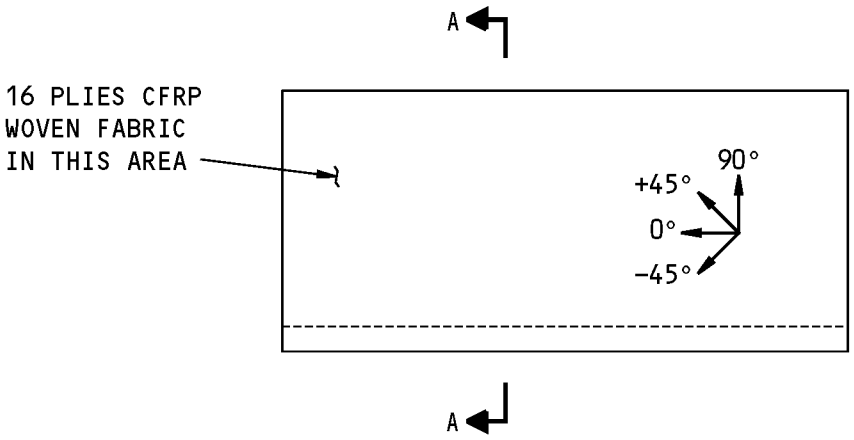
NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

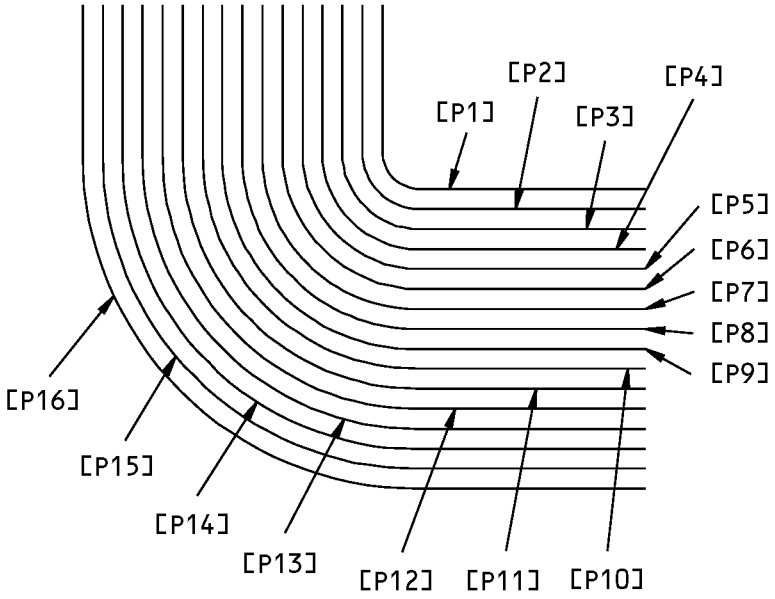
Balance Arm Structure Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Rib Post		Carbon Fiber Reinforced Plastic (CFRP) woven fabric Refer to Figure 3	
[2]	Balance Arm Casting		A357.0-T6 high strength aluminum casting as given in MIL-A-21180 with Class 11 mechanical properties	
[3]	Balance Weight		Tungsten base high-density metal as given in MIL-T-21014	
[4]	Adjust Weight		Tungsten base high-density metal as given in MIL-T-21014	
[5]	Strut-Balance Arm	0.750 (19.1)	7050-T7451 plate as given in AMS 4050. Ultrasonic inspect as given in BAC 5439, Class B (Optional: Class A)	
[6]	Strut Support Fitting		7050-T7451 plate as given in AMS 4050. Ultrasonic inspect as given in BAC 5439, Class B (Optional: Class A)	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).





PLY LAYUP SEQUENCE
A–A

Ply Direction and Ply Sequence for the Rib Post, Figure 2, Item [1]
Figure 3

Table 3:

PLY MATERIAL AND DIRECTION FOR FIGURE 3		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7, P10, P12, P14, P16	+ or - 45 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW
P2, P4, P6, P8, P9, P11, P13, P15	0 or 90 degrees	CFRP woven fabric as given in BMS 8-256, Type IV, Class 2, Style 3K-70-PW

ALLOWABLE DAMAGE 1 - RUDDER SPAR AND SPAR RIBS

1. Applicability

A. Allowable Damage 1 gives the allowable damage limits for the rudder spar and spar ribs shown in Rudder Structure Location, Figure 101/ALLOWABLE DAMAGE 1.

2. General

A. Do an inspection of the damaged area to find the length, width and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to 737 NDT Part 1, 51-01-02 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT.

(2) Refer to Definitions of Damage Size, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

B. Remove all contamination and water from the structure. Refer to 51-30-05 and 51-70-04 for the tools and the cleanup procedures.

C. Seal all permitted damage areas that are not more than one ply deep. Refer to the allowable damage limits. Seal the damage with one of the two methods that follows:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location.

(c) If the tape is on the external surface of the spar, then make sure that it is in satisfactory condition after each 400 flight hour interval or more frequently.

(d) Repair the damage at or before 5000 flight hours or 18 months, that which occurs first, from the time the seal was made.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

D. Seal all permitted damage areas that are more than one ply deep. Refer to the allowable damage limits. Seal the damage as follows:

(1) Use a vacuum and heat to remove moisture from the solid laminate and/or honeycomb cells. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

(3) Keep a record of the location.

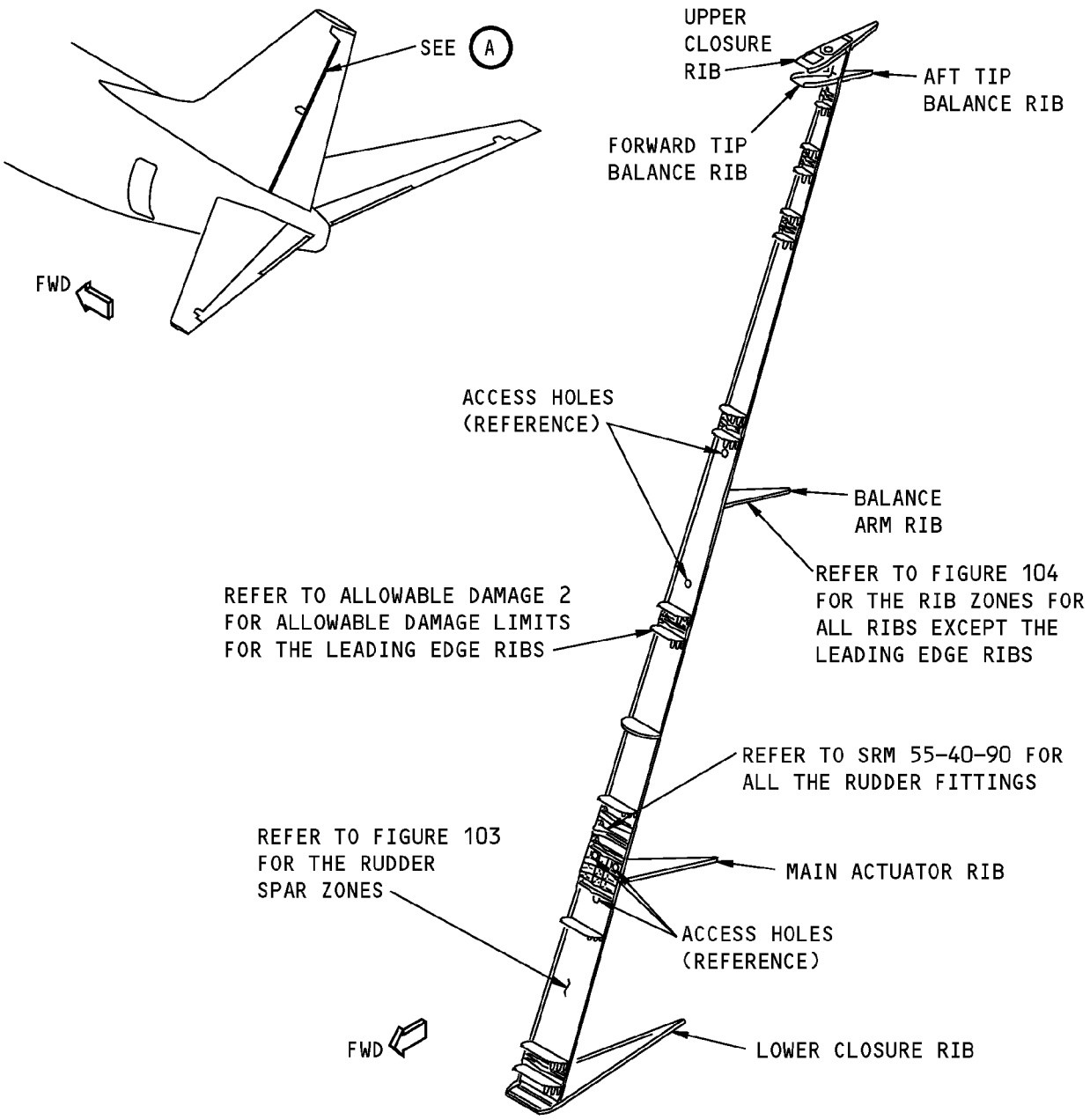
(4) Repair the damage at or before 400 flight hours from the time the seal was made.

E. The definition of the words "other damage" as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause carbon fiber damage and are sealed.

F. Make sure that the rudder is balanced. Refer to 51-60-07 for the balance procedures.

Table 101:

PARAGRAPH REFERENCES FOR THE ALLOWABLE DAMAGE LIMITS		
TYPE OF STRUCTURE	**ZONE LOCATION**	**PARAGRAPH**
SOLID LAMINATE AREA	1	4.A
	2	4.C
HONEYCOMB CORE AREA	1	4.B
	2	4.D

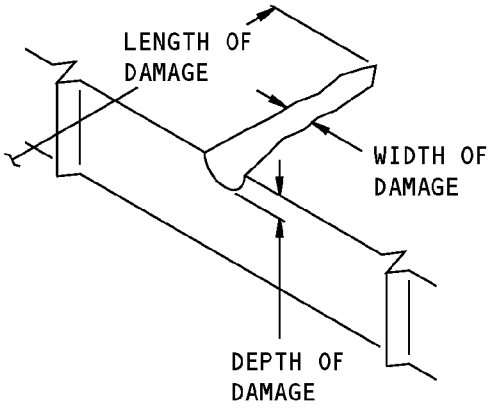


NOTE: THE RUDDER SPAR AND RIBS (EXCEPT THE LEADING EDGE RIBS) ARE MADE OF CARBON FIBER REINFORCED PLASTIC (CFRP).

RUDDER SPAR AND RIBS

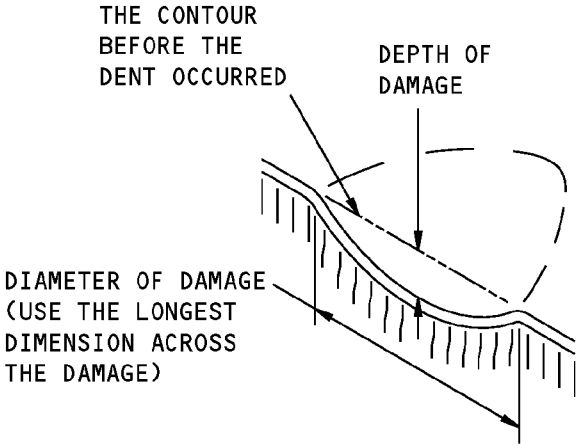
A

Rudder Structure Location
Figure 101



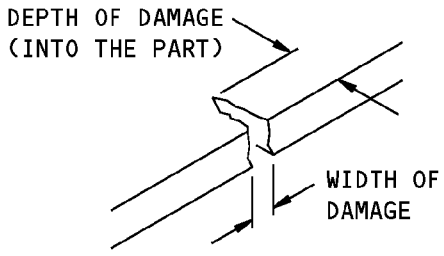
SIZE DEFINITIONS FOR
NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

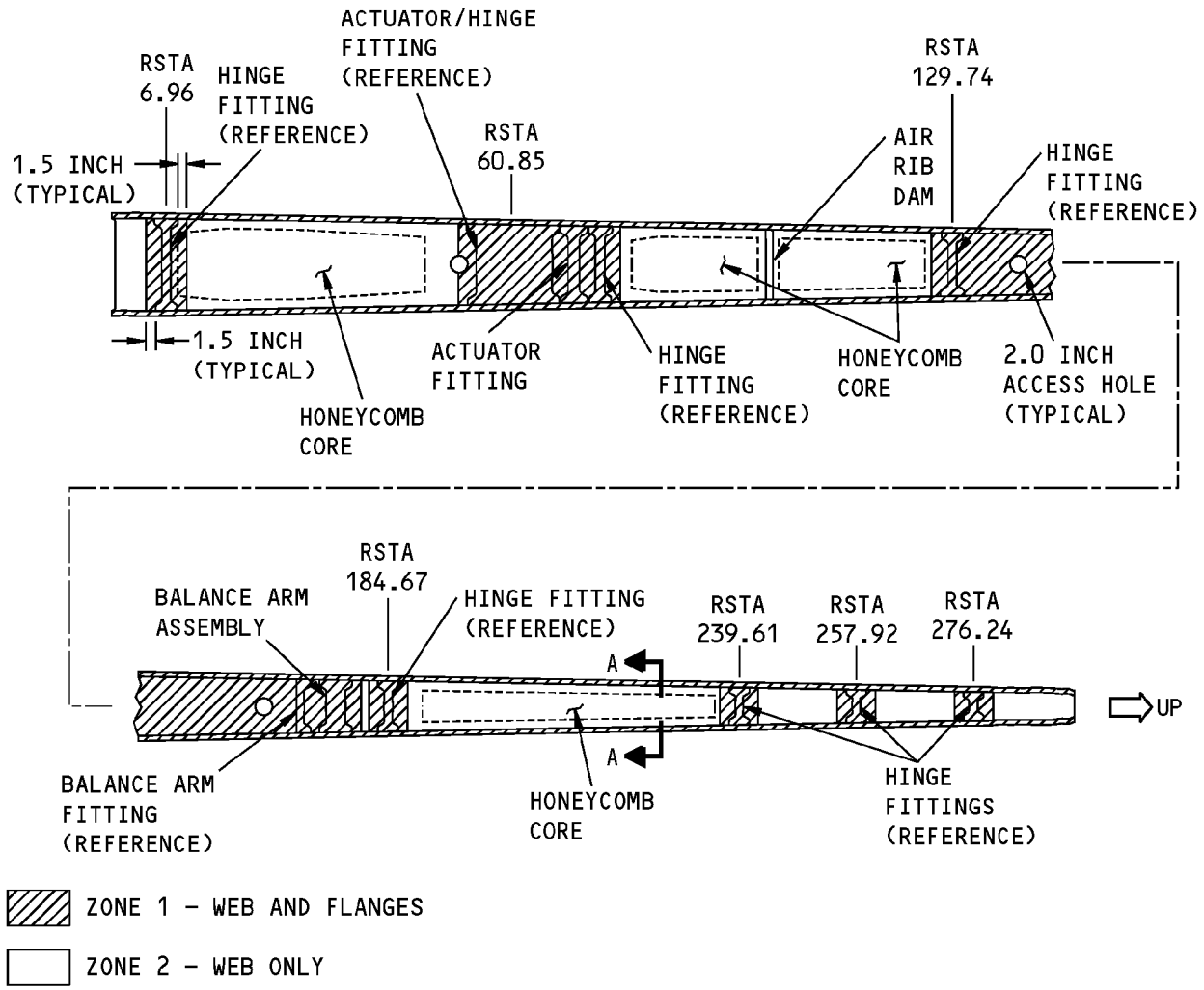
B



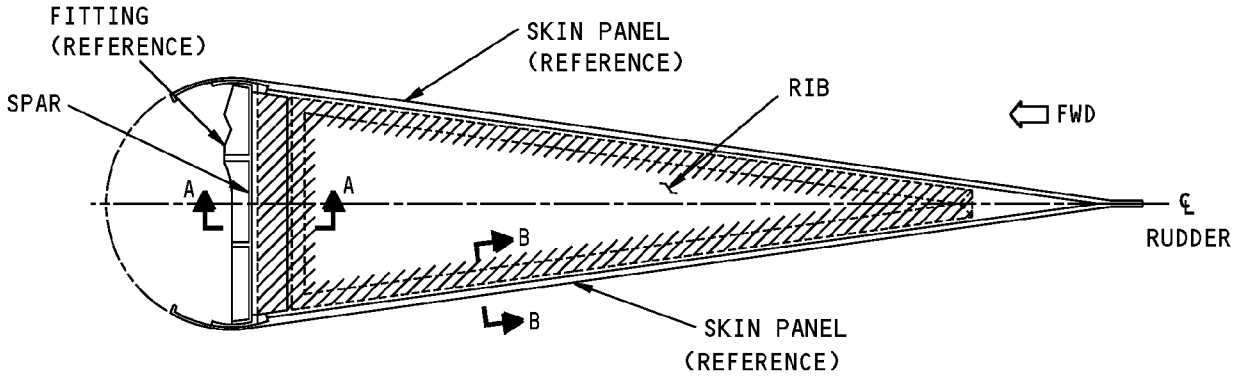
SIZE DEFINITIONS FOR
EDGE DAMAGE

C

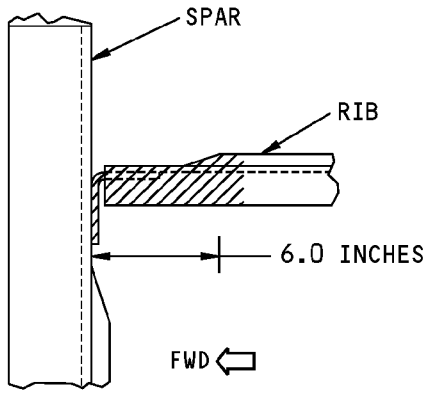
Definitions of Damage Size
Figure 102



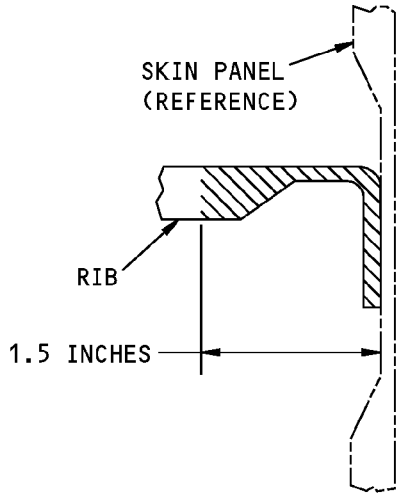
Rudder Spar Zone Locations
Figure 103



THE BALANCE ARM RIB IS SHOWN,
THE OTHER RIBS ARE ALMOST THE SAME



A–A



B–B

ZONE 1

ZONE 2

NOTES

- USE THE ZONE 2 LIMITS FOR THE UPPER CLOSURE RIB, AFT TIP BALANCE RIB, AND FORWARD TIP BALANCE RIB.

Rudder Rib Zone Locations
Figure 104

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-05, GENERAL	Repair Sealing
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-07	RUDDER BALANCE PROCEDURE
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00 P/B 701	INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits for the Rudder Spar and Ribs

A. Solid Laminate Area of Zone 1

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the fiberglass ply are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are not permitted.

(4) Holes and Punctures are not permitted.

(5) Dents are not permitted.

(6) Delaminations are not permitted.

(7) Edge damage is permitted if:

(a) The depth is a maximum of one ply

(b) The width is a maximum of 0.25 inch

(c) The damage is a minimum of 6 inches away from the edge of other damage.

B. Honeycomb Core Area of Zone 1

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are not permitted.

(3) Dents that do not cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one face sheet

(b) The diameter is a maximum of 0.5 inch

(c) The damage is a minimum of 6 inches away from the edge of other damage.

(4) Holes and Punctures are not permitted.

(5) Delaminations are not permitted.

C. Solid Laminate Area of Zone 2

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the fiberglass ply are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one ply

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) The length is a maximum of 1.0 inch

(c) The width is a maximum of 0.25 inch

(d) Not more than 1 fastener hole in 6 is damaged

(e) The damage is a minimum of 3 inches away from the edge of other damage.

(4) Dents that do not cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one ply

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply.

(b) The diameter is a maximum of 0.625 inch

(c) Not more than 1 fastener hole in 6 is damaged

(d) The damage is a minimum of 3 inches away from the edge of other damage.

(5) Holes and Punctures are permitted if:

(a) The diameter is a maximum of 0.25 inch

(b) The damage is a minimum of 3 inches away from the edge of other damage, a fastener hole, or a part edge.

(6) Delaminations are permitted if:

(a) The depth is a maximum of one ply

(b) The diameter is a maximum of 0.50 inch

(c) The damage is a minimum of 3 inches away from the edge of other damage, a fastener hole, or a part edge.

(7) Edge damage is permitted if:

(a) The depth is a maximum of one ply

(b) The width is a maximum of 0.25 inch

(c) The damage is a minimum of 3 inches away from the edge of other damage or a hole.

D. Honeycomb Core Area of Zone 2

(1) Nicks, Gouges, and Scratches that do not cause damage to the carbon fibers are permitted.

(2) Nicks, Gouges, and Scratches that cause damage to the fiberglass fibers are permitted.

(3) Nicks, Gouges, and Scratches that cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one ply

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(b) The length is a maximum of 0.625 inch

(c) The width is a maximum of 0.25 inch

(d) The damage is a minimum of 3 inches away from the edge of other damage.

(4) Dents that do not cause damage to the carbon fibers are permitted if:

(a) The depth is a maximum of one face sheet

NOTE: Use the limits for holes and punctures if there is carbon fiber damage or if the dent depth is more than one ply.

(b) The diameter is a maximum of 0.5 inch

(c) The damage is a minimum of 3 inches away from the edge of other damage.

(5) Holes and Punctures are permitted if:

(a) A maximum of one face sheet and the core in depth

(b) The diameter is a maximum of 0.50 inch

(c) The damage is a minimum of 3 inches away from the edge of other damage or a fastener hole.

(6) Delaminations are permitted if:

(a) The diameter is a maximum of 0.5 inch

(b) The damage is a minimum of 3 inches away from the edge of other damage or a fastener hole.

ALLOWABLE DAMAGE 2 - LEADING EDGE RIBS OF THE RUDDER STRUCTURE

1. **Applicability**

   A. This subject gives the allowable damage limits for the leading edge ribs of the rudder structure shown in Leading Edge Rib Locations, Figure 101/ALLOWABLE DAMAGE 2.

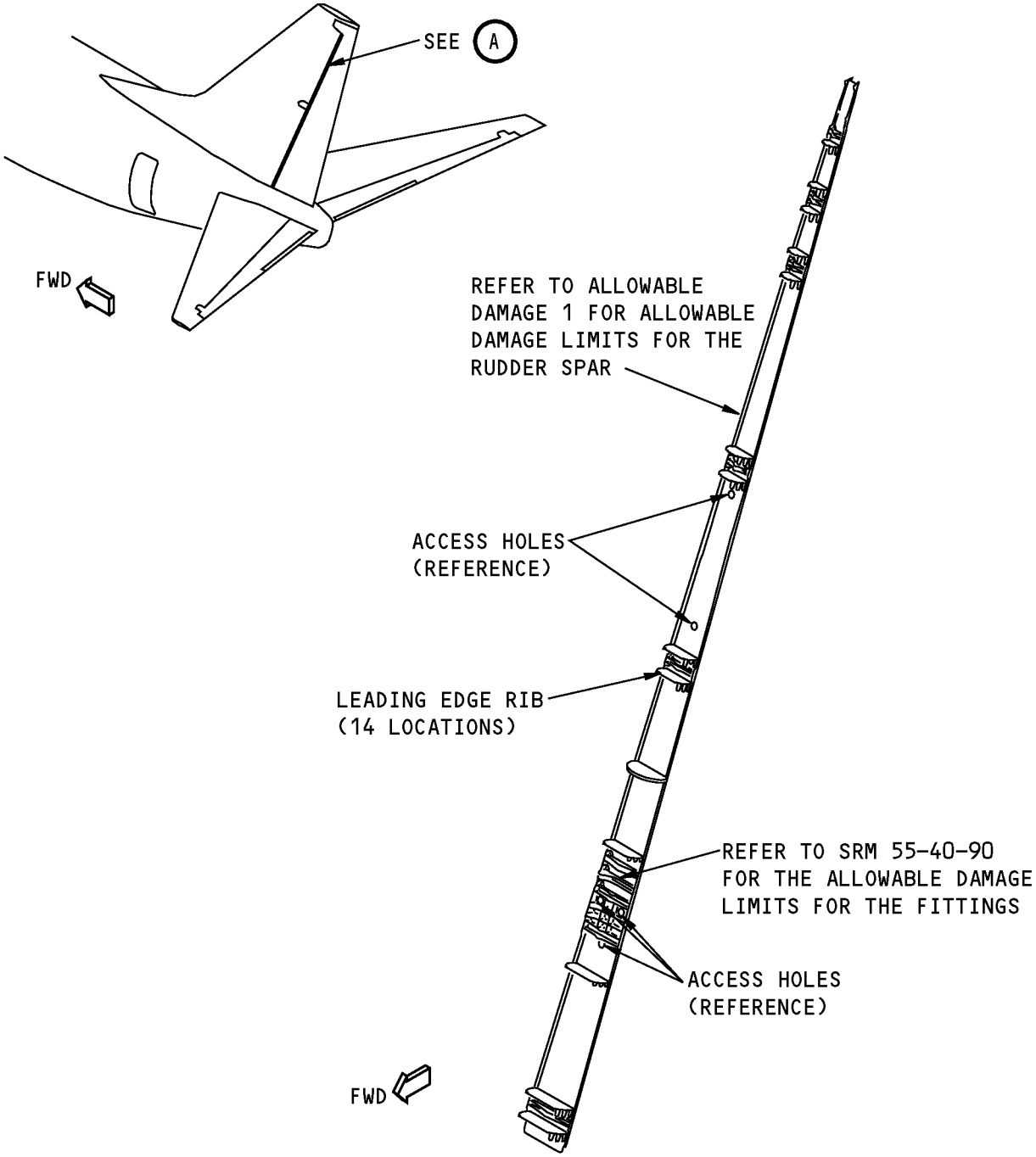
2. **General**

   A. Remove the damaged material, as applicable. Make sure that the material to be removed is less than or equal to the allowable damage limits.

   B. Apply a chemical conversion coating to the bare surfaces of the reworked areas. Refer to 51-20-01.

   C. Apply a layer of BMS 10-79, Type III primer to the bare surfaces of the reworked areas. Refer to SOPM 20-44-04.

   D. Apply a layer of BMS 10-60 enamel to the reworked areas. Refer to AMM 51-21-00/701.



Leading Edge Rib Locations
Figure 101

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05, GENERAL	Equipment and Tools For Repairs
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Cracks:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, and B.

B. Nicks, Gouges, Scratches, and Corrosion:

(1) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Details A, B, C, D, and E.

C. Dents:

(1) Refer to Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 2, Detail F for the damage that is permitted.

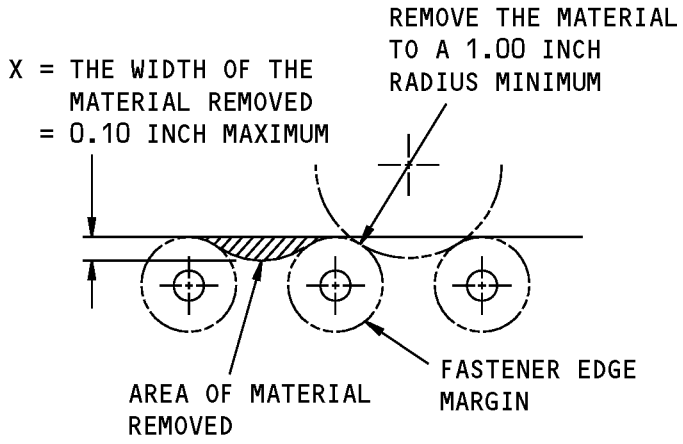
D. Holes and Punctures:

(1) The maximum diameter of damage permitted is 0.25 inch (6.35 mm) after cleanup.

(2) The damage must be 1.00 inch (25.4 mm) minimum from other holes, part edge, or other damage.

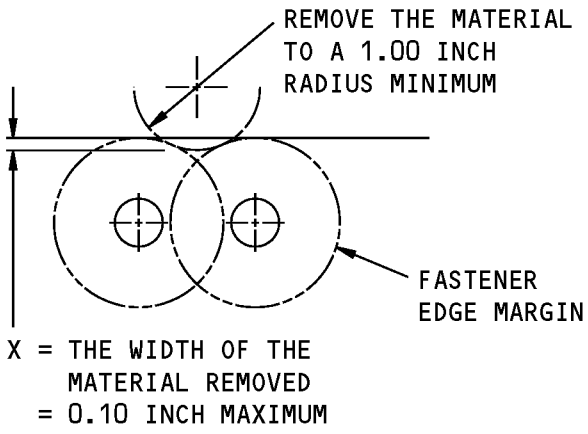
(3) Fill the hole with a 2117-T3 or 2117-T4 aluminum rivet.

(a) Install the rivet without sealant.



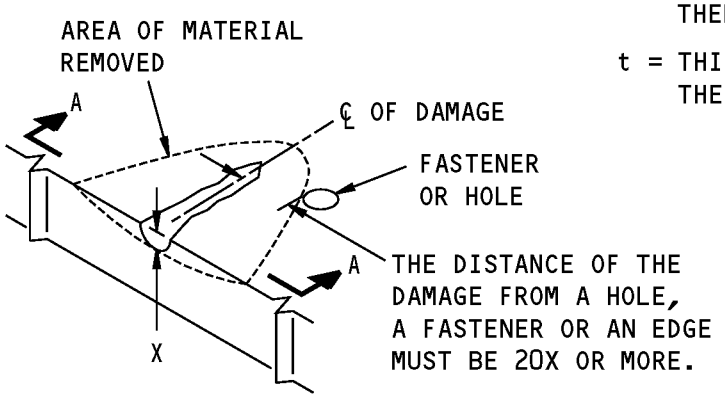
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

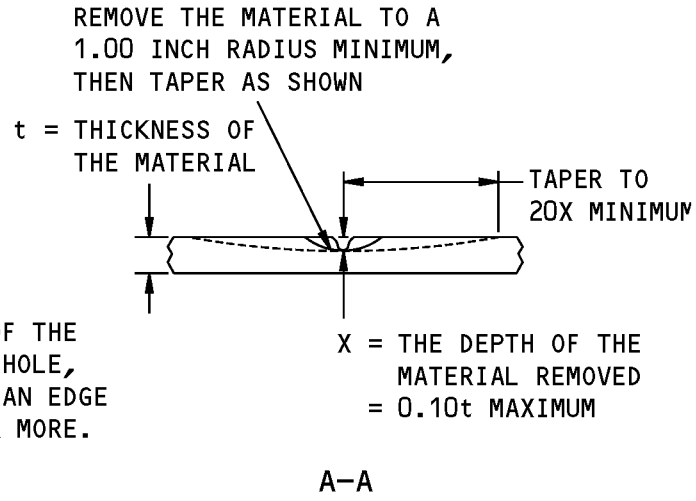
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B



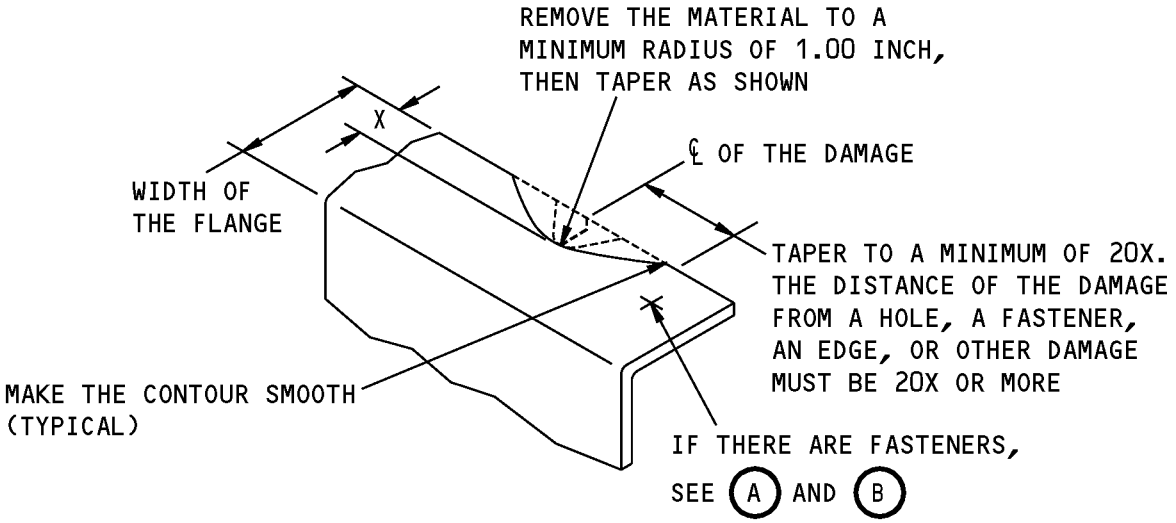


A–A

REMOVAL OF DAMAGED MATERIAL ON A SURFACE

C

Allowable Damage Limits
Figure 102 (Sheet 1 of 3)

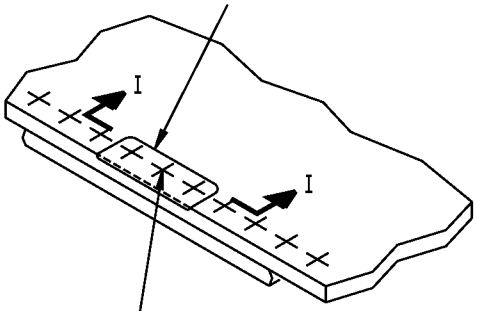


X = WIDTH OF THE MATERIAL THAT IS REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL ON AN EDGE

D

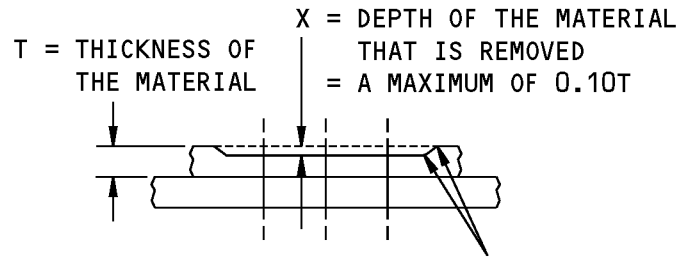
THE REMOVAL OF MATERIAL AROUND THREE FASTENERS IN A GROUP OF TEN IS PERMITTED TO A MAXIMUM DEPTH OF X



REMOVE THE FASTENERS BEFORE THE DAMAGE IS REMOVED. INSTALL THE FASTENERS AFTER THE REWORK IS DONE

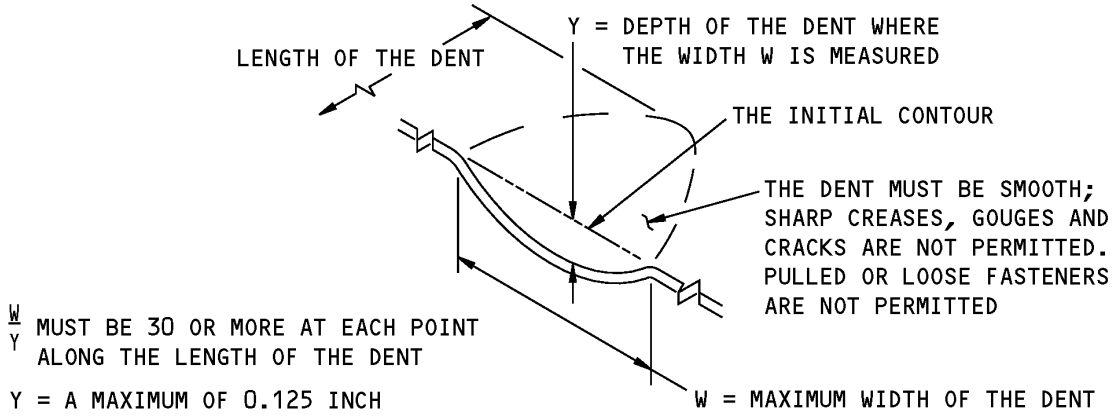
REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E



I–I

Allowable Damage Limits
Figure 102 (Sheet 2 of 3)



DENT THAT IS PERMITTED

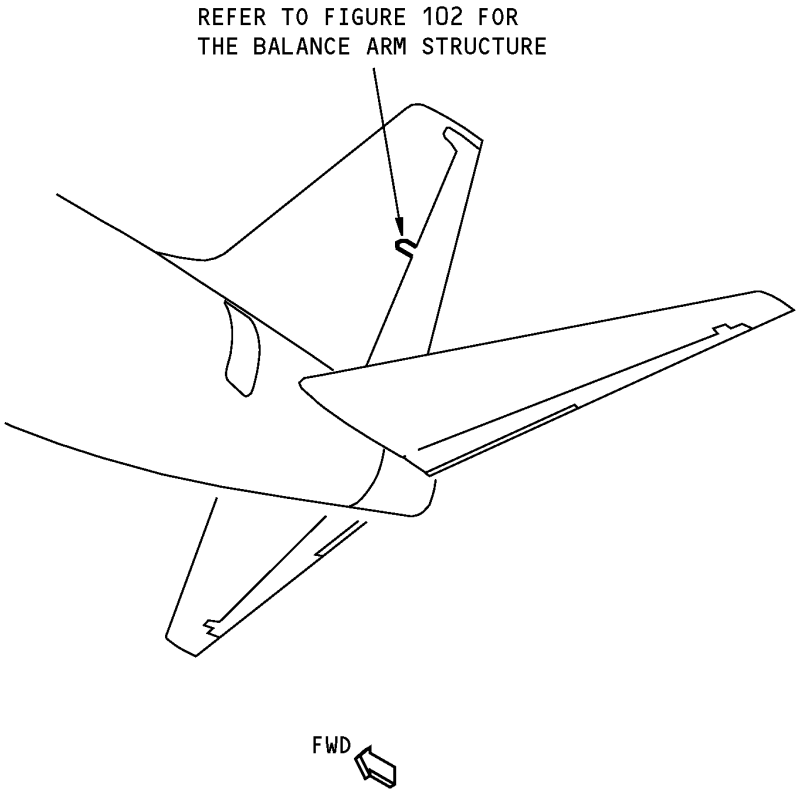
F

Allowable Damage Limits
Figure 102 (Sheet 3 of 3)

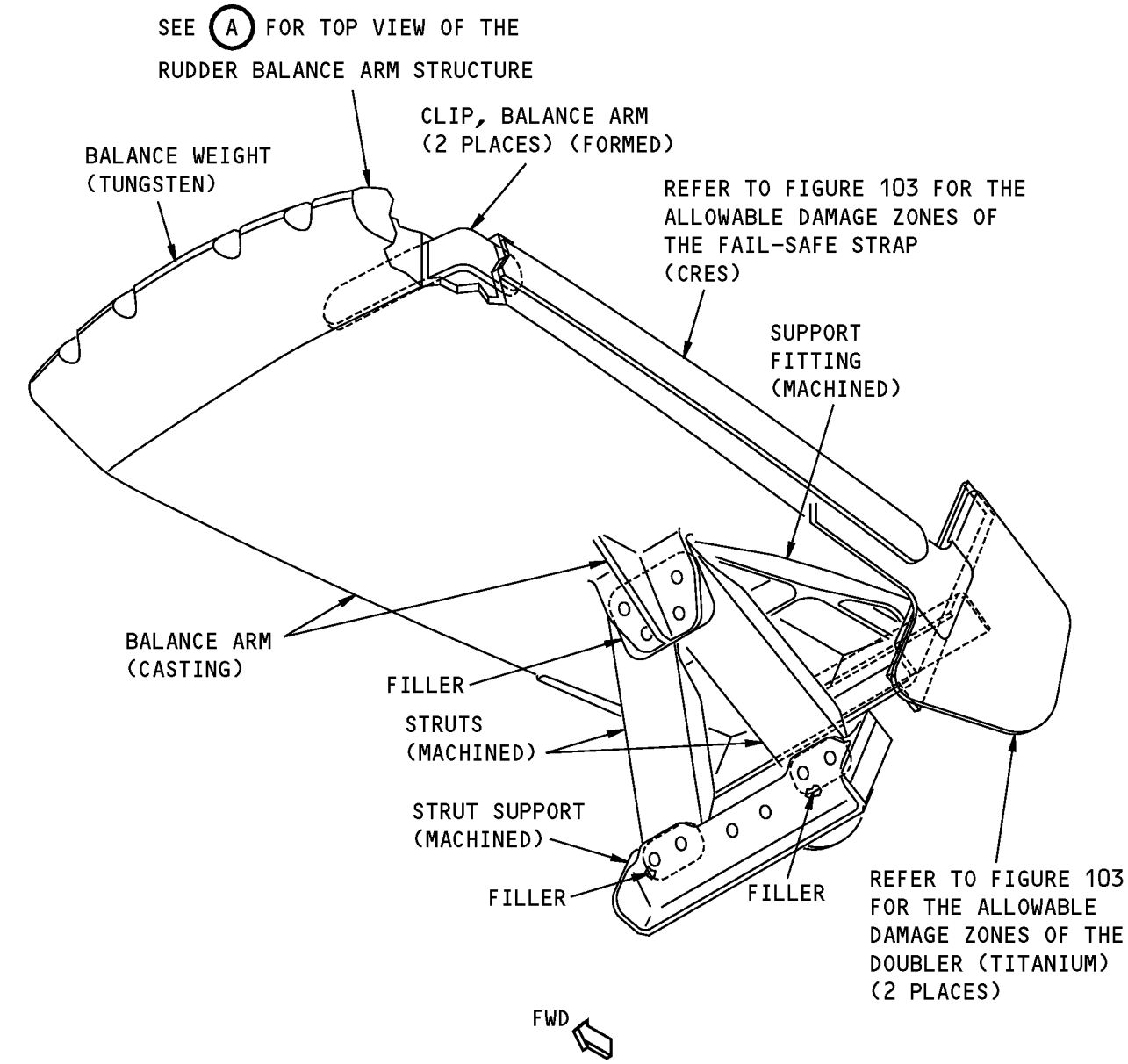
ALLOWABLE DAMAGE 3 - RUDDER BALANCE ARM STRUCTURE

1. Applicability

A. This subject gives the allowable damage limits for the balance arm structure shown in Rudder Balance Arm Location, Figure 101/ALLOWABLE DAMAGE 3.



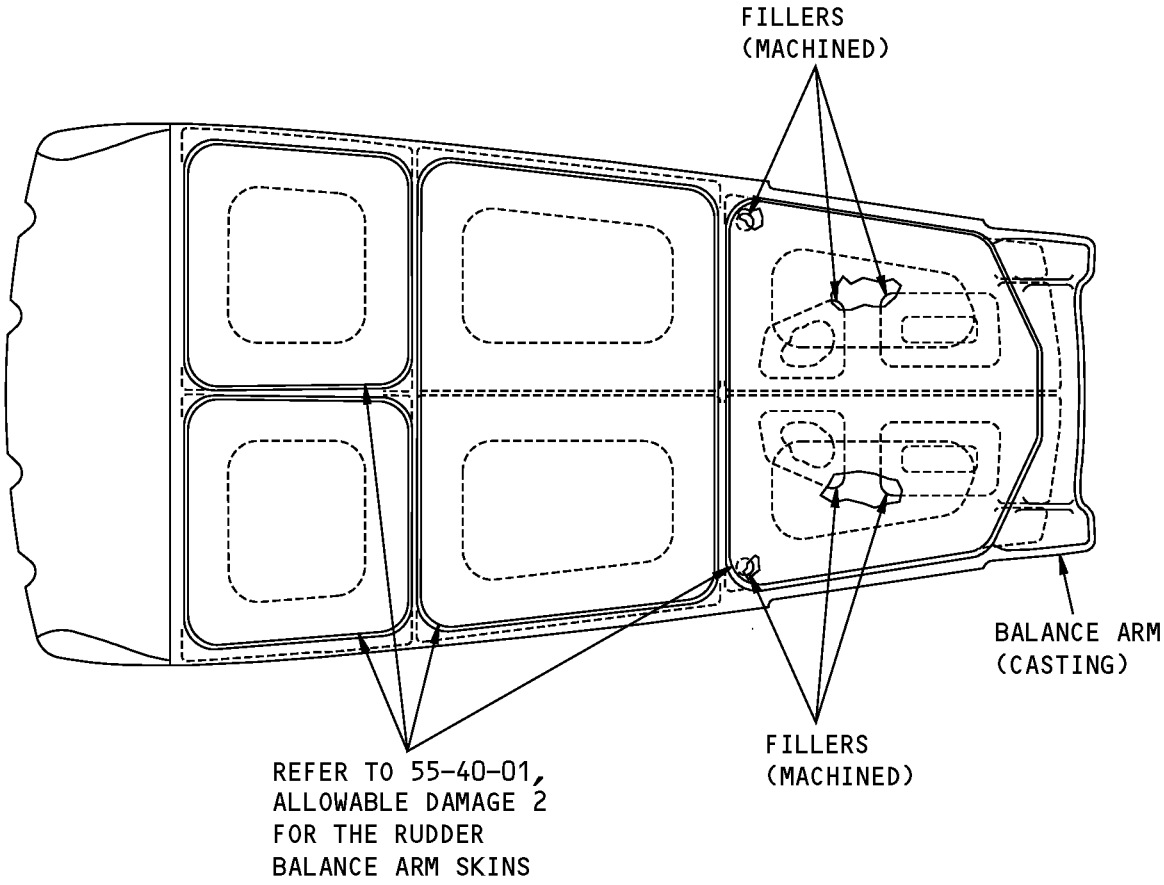
Rudder Balance Arm Location
Figure 101



NOTES

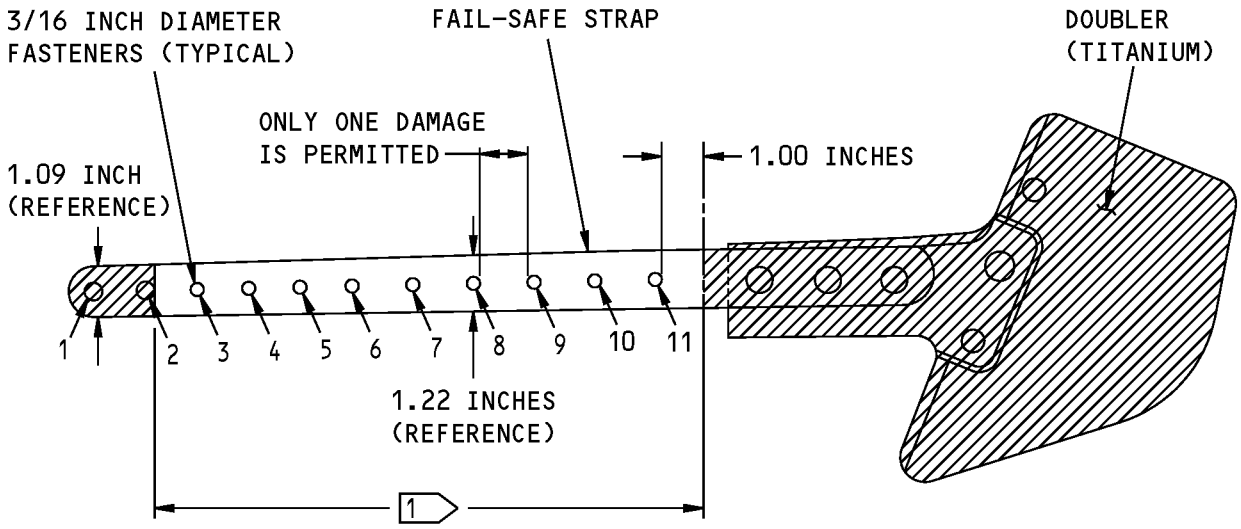
- ALL PARTS ARE MADE OF ALUMINUM UNLESS OTHERWISE NOTED.

Rudder Balance Arm
Figure 102 (Sheet 1 of 2)



TOP VIEW
BALANCE ARM STRUCTURE
A

Rudder Balance Arm
Figure 102 (Sheet 2 of 2)



NOTES

NO DAMAGE IS PERMITTED

1 THE MAXIMUM DAMAGE DEPTH PERMITTED AT THE STRAP EDGES ACROSS FROM FASTENER LOCATIONS IS 0.15 INCH.

THE MAXIMUM DAMAGE DEPTH PERMITTED AT THE STRAP EDGES OTHER THAN EDGES ACROSS FROM FASTENER LOCATIONS IS 0.20 INCH.

REFER TO FIGURE 104, DETAIL F, FOR THE REMOVAL OF DAMAGE.

- IF DAMAGE IS FOUND ON THE FAIL SAFE STRAP, YOU MUST DO AN INSPECTION OF THE ADJACENT STRUCTURE.

  MAKE SURE THERE IS NO DAMAGE IN THE ADJACENT STRUCTURE.

Allowable Damage Zones - Doubler and Fail Safe Strap Assembly
Figure 103

2. General

A. Refer to Paragraph 4./ALLOWABLE DAMAGE 3 for the allowable damage limits.

B. Remove the damage material as necessary.

(1) Refer to 51-10-02 for inspection and removal of the damage.

(2) Refer to 51-30-03 for possible sources of the abrasive and other materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

C. After you remove the damage, do the steps that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

(1) Flap peen or shot peen the reworked area of the balance arm struts, strut supports or support fittings.

(a) Refer to 51-20-06 for the shot peen intensity and shot number.

(b) Refer to SOPM 20-10-03 for the flap peen or shot peen procedures.

(2) Apply a chemical conversion coating to the bare reworked surfaces of the aluminum parts. Refer to 51-20-01.

(3) Apply a cadmium plating to the bare reworked surfaces of the CRES parts. Refer to SOPM 20-42-05.

(4) Apply a layer of BMS 10-79, Type III primer to the bare reworked surfaces of the aluminum and CRES parts. Refer to SOPM 20-44-04.

(5) Apply a layer of BMS 10-60 enamel to the reworked areas of the aluminum and CRES parts. Refer to AMM 51-21-00/701.

(6) Make sure that the rudder is balanced. Refer to 51-60-07 for the balance procedures.

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-40-02, GENERAL	Fastener Installation and Removal
51-60-07	RUDDER BALANCE PROCEDURE
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-42-05	Bright Cadmium Plating
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Balance Arm, Support Fitting, Strut Support, Struts, Clips and Fillers

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 3, Details A, B, and D.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 3, Details A, B, C, D and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Fail-Safe Straps

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 3, Detail F.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 104/ALLOWABLE DAMAGE 3, Details C, E and F.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

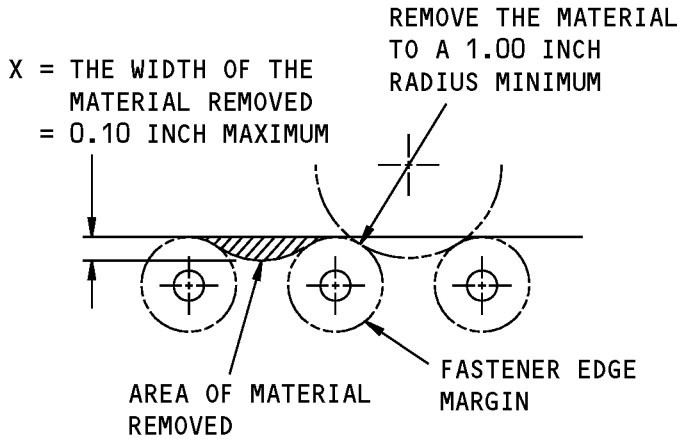
C. Doublers

(1) Cracks are not permitted.

(2) Nicks, Gouges, Scratches, and Corrosion are not permitted.

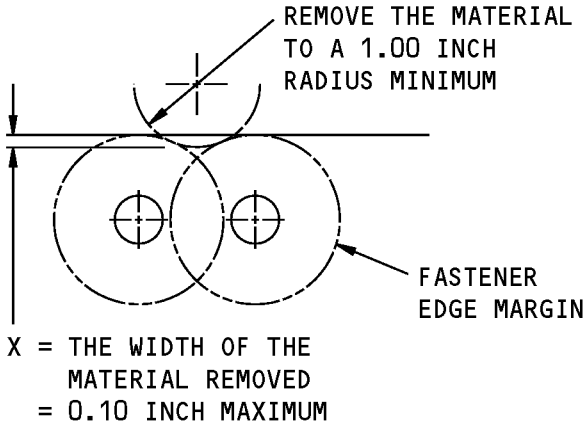
(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.



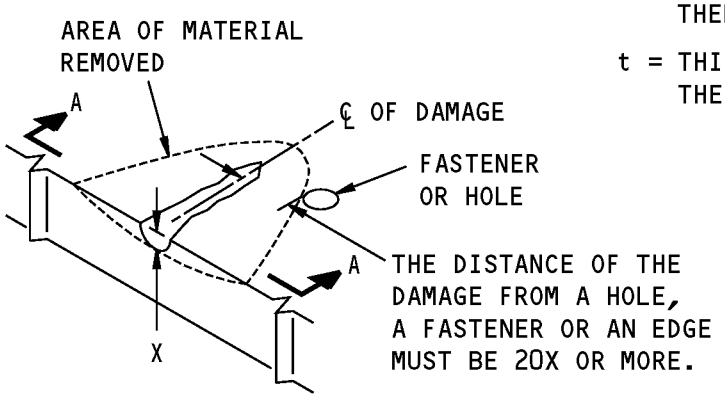
REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

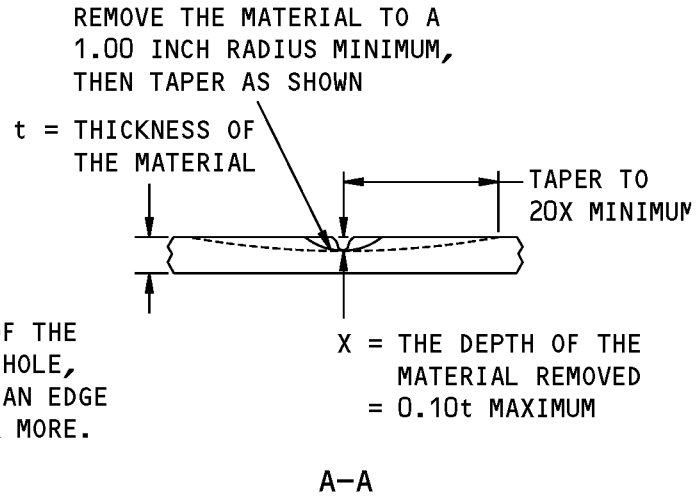
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B



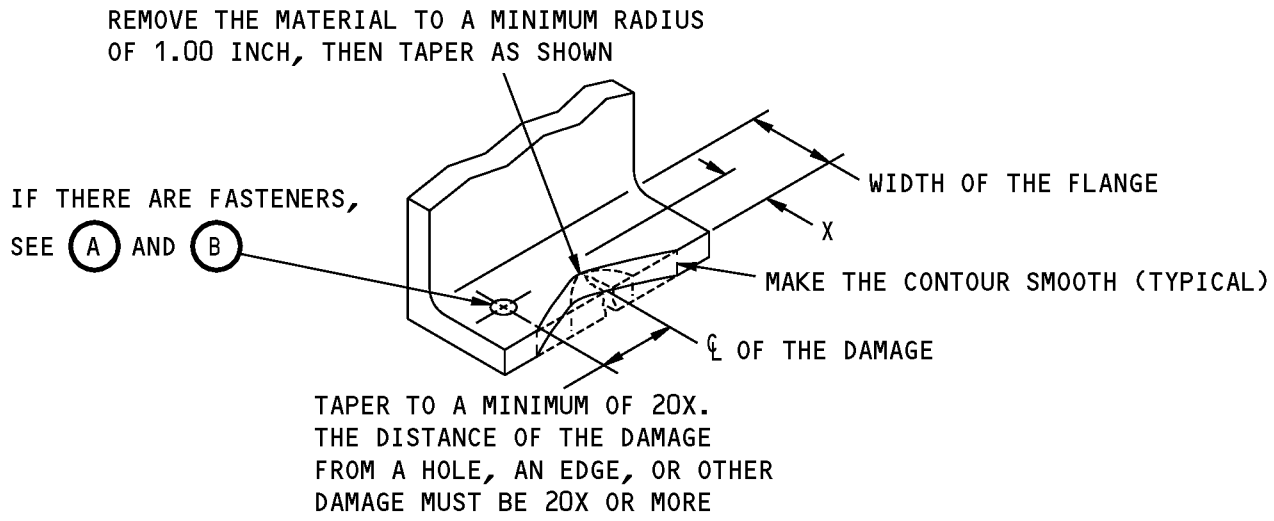


A–A

REMOVAL OF DAMAGED MATERIAL ON A SURFACE

C

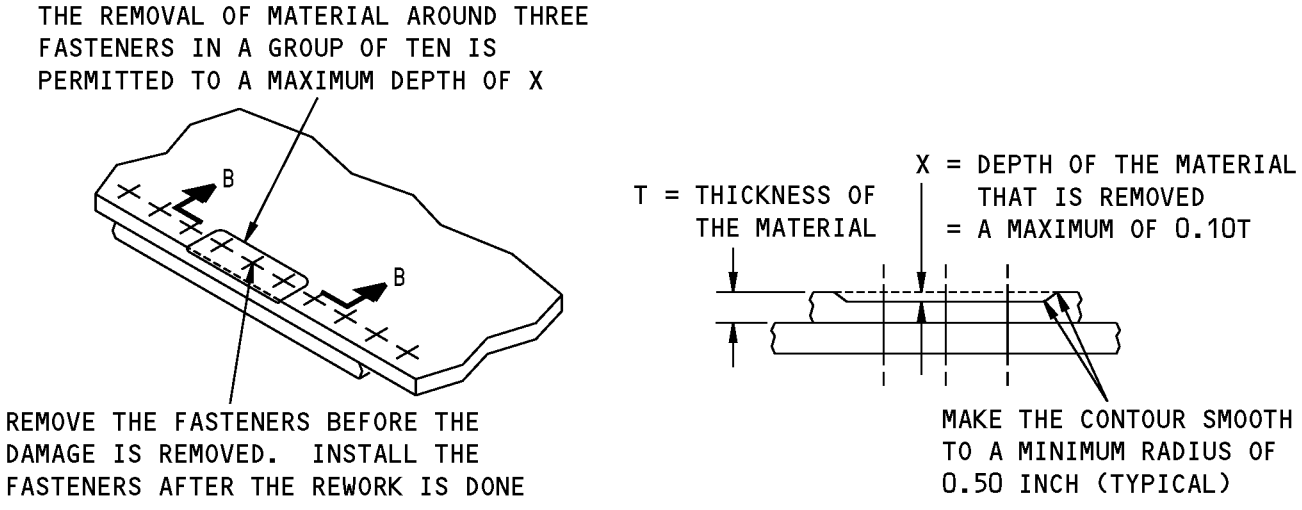
Allowable Damage Limits
Figure 104 (Sheet 1 of 3)



X = WIDTH OF THE MATERIAL REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

D

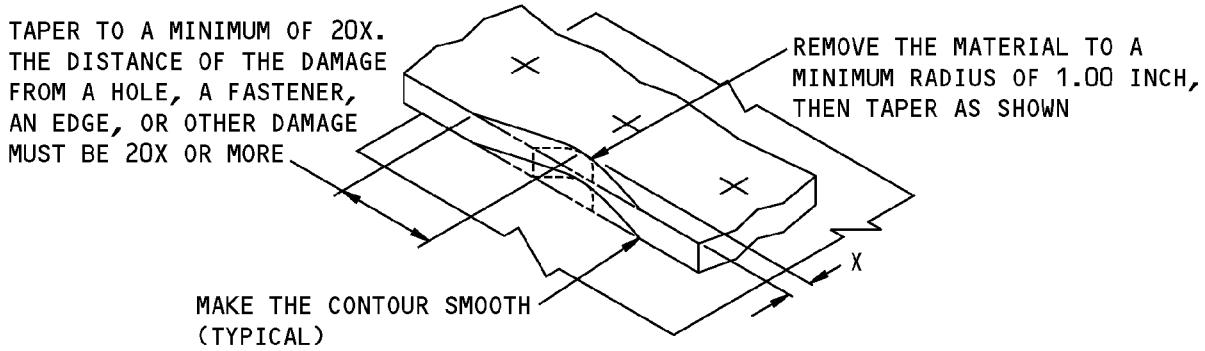


REMOVAL OF DAMAGE AROUND THE FASTENERS ON AN EDGE OR A SURFACE

E

B–B

Allowable Damage Limits
Figure 104 (Sheet 2 of 3)



X = DEPTH OF THE MATERIAL THAT IS REMOVED
(REFER TO FIGURE 103 ON PAGE 106)

REMOVAL OF DAMAGED MATERIAL FROM THE FAIL-SAFE STRAP

F

Allowable Damage Limits
Figure 104 (Sheet 3 of 3)

REPAIR 1 - RUDDER STRUCTURE

1. Applicability

A. Repair 1 is applicable to the rudder structure as shown in Rudder Structure Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.

2. General

A. Repair 1 gives instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Remove the rudder, as necessary. Refer to AMM 27-21-11/401.

C. Remove the skin, as necessary to get access to the spar and ribs. Refer to 51-40-02 for fastener removal procedures.

D. Remove the fittings or the leading edge ribs from the spar, as necessary to get access to the spar. Refer to SOPM 20-10-08.

E. Do an inspection of the damaged area to find the dimensions of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02, and NDT, Part 1, 51-01-03 for inspection procedures.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator, can be used.

(1) For the honeycomb core areas, the tap test is an alternative procedure to an instrumented NDT. Refer to 737 NDT Part 1, 51-05-01 for the inspection procedures.

(2) Refer to Definitions of Damage Size, Figure 202/REPAIR 1 for the definitions of the length, width and depth of damage.

(3) Refer to Definitions of the Facesheets, Figure 203/REPAIR 1 for the definitions of the facesheets of a honeycomb core area.

F. Refer to Rudder Spar Zone Locations, Figure 204/REPAIR 1 for the rudder spar zone locations.

G. Refer to Rudder Rib Zone Locations, Figure 205/REPAIR 1 for the rudder rib zone locations.

H. Do the repair as given in Paragraph 4./REPAIR 1

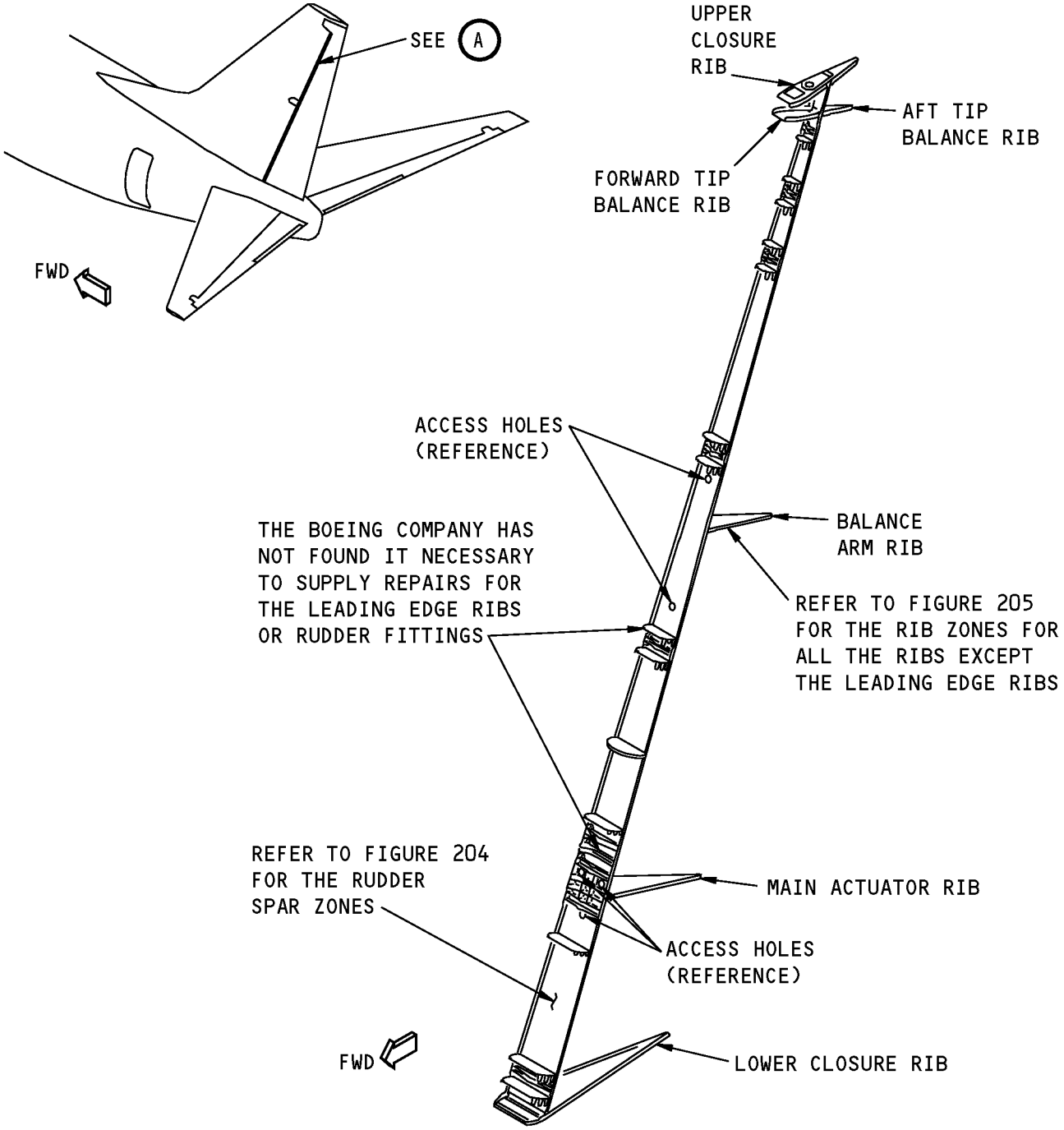
I. Install the fittings or the leading edge ribs on the spar, as applicable.

(1) Apply BMS 5-95 sealant to the mating surfaces. Refer to 51-20-05.

J. Install the skin, as applicable. Refer to 51-40-02 for fastener installation procedures.

K. Make sure that the rudder is balanced. Refer to 51-60-03.

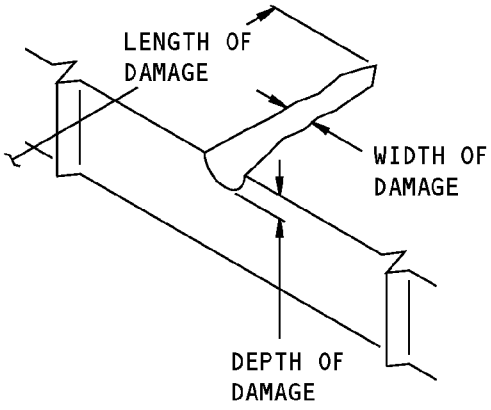
L. Install the rudder, as applicable. Refer to AMM 27-21-11/401.



RUDDER SPAR AND RIBS (CARBON FIBER REINFORCED PLASTIC)

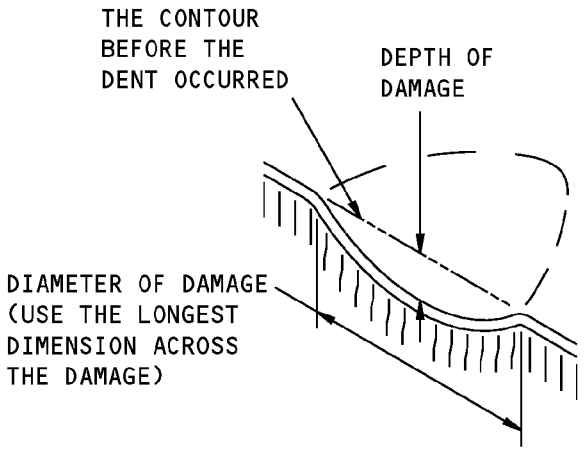
A

Rudder Structure Location
Figure 201



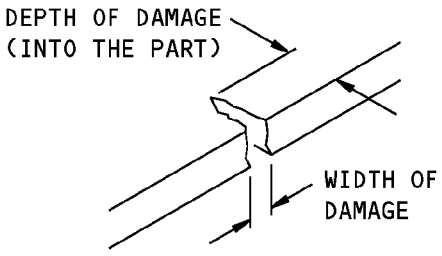
SIZE DEFINITIONS FOR
NICK, GOUGE, OR SCRATCH DAMAGE

A



SIZE DEFINITIONS FOR
DENT DAMAGE

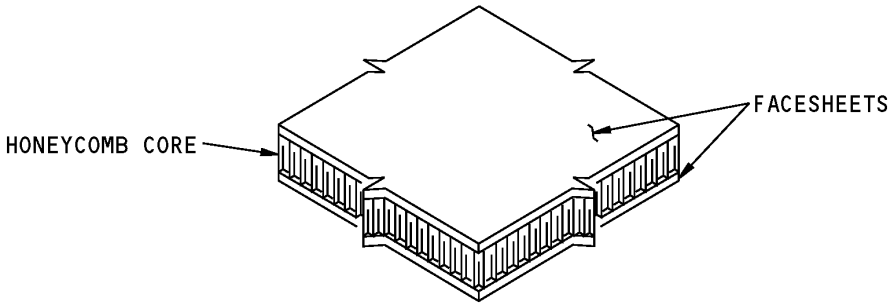
B



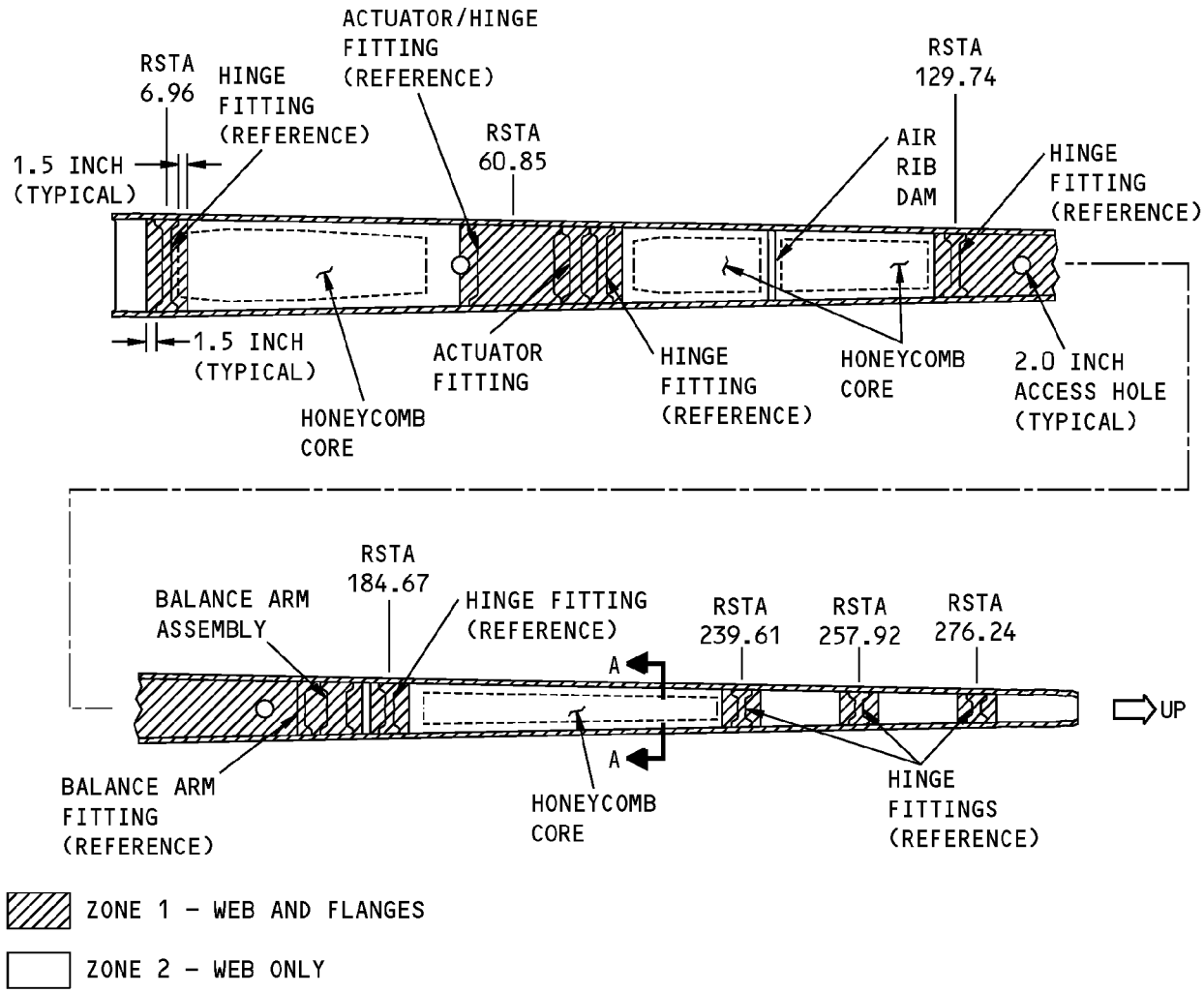
SIZE DEFINITIONS FOR
EDGE DAMAGE

C

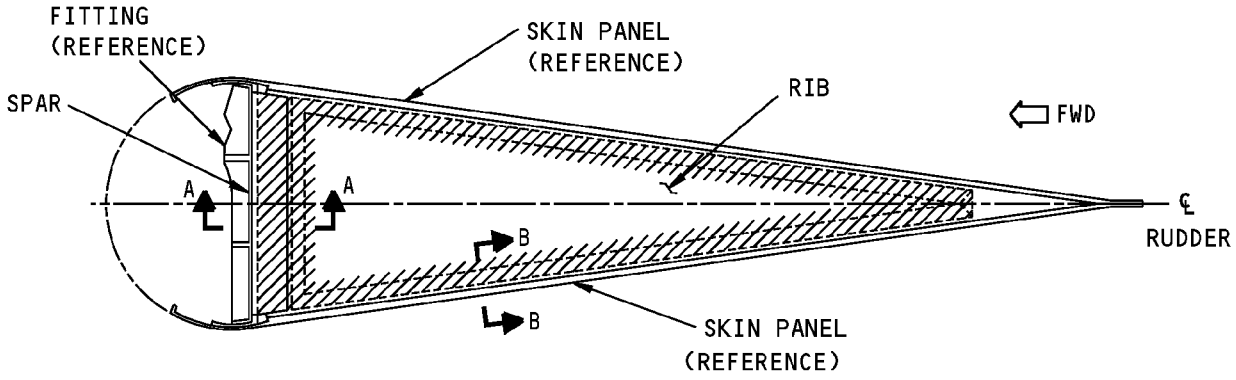
Definitions of Damage Size
Figure 202



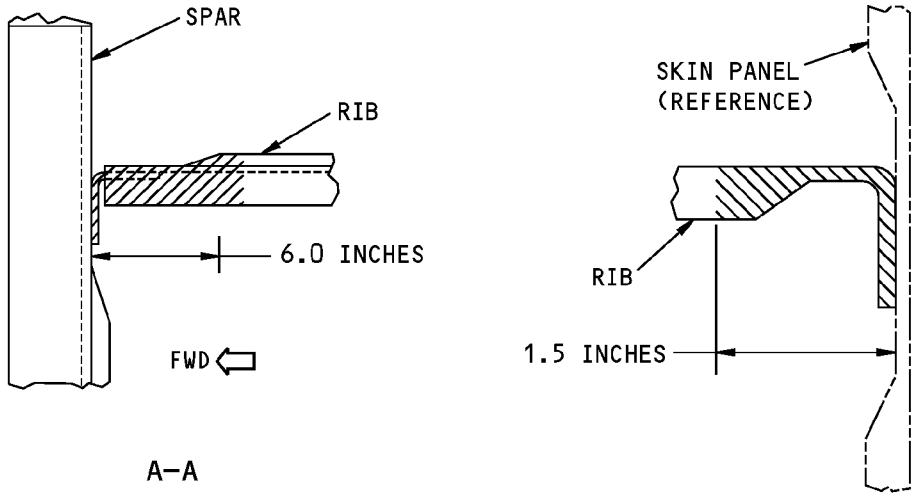
Definitions of the Facesheets
Figure 203



Rudder Spar Zone Locations
Figure 204



THE BALANCE ARM RIB IS SHOWN,
THE OTHER RIBS ARE ALMOST THE SAME



ZONE 1

ZONE 2

NOTES

- USE THE ZONE 2 LIMITS FOR THE UPPER CLOSURE RIB, AFT TIP BALANCE RIB, AND FORWARD TIP BALANCE RIB.

Rudder Rib Zone Locations
Figure 205

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05	REPAIR SEALING
51-30-05, GENERAL	Equipment and Tools For Repairs
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-40-03, GENERAL	Fastener Substitution
51-60-03	AILERON TAB BALANCE PROCEDURE
51-60-07, GENERAL	Rudder Balance Procedure
51-70-04, REPAIR P/B REPAIR	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
55-40-02, ALLOWABLE DAMAGE 1	Rudder Spar and Spar Ribs
55-40-02, ALLOWABLE DAMAGE 2	Leading Edge Ribs of the Rudder Structure
55-40-02, ALLOWABLE DAMAGE 3	Rudder Balance Arm Structure
AMM 51-21-00	INTERIOR AND EXTERIOR FINISHES
AMM 27-21-11/401	Rudder - Removal/Installation
SOPM 20-10-08	Removal of Faying Surface Sealed Metal Fittings from Composite Structures
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage
737 NDT Part 1, 51-01-03	NDT Assessment of Lightning Strike Damage to Graphite/Epoxy Composite Structure
737 NDT Part 1, 51-05-01	Tap Test Inspection of Honeycomb Sandwich Structure

4. Repair Instructions

A. Do as follows when you make a repair:

(1) When you remove the damage, do not cut or make an abrasion into the radius of the structure.

(2) If the repair plies make an overlap of a hole or cutout, do the steps that follow:

(a) Cure the repair.

(b) Drill or cut the plies to the initial diameter of the hole or cutout.

(3) If you need clearance with adjacent structure, install a tapered shim on each side of the repair.

(4) It is permitted to put the repair plies around the full width of the structure.

(a) Do not make an overlap of the edges of the structure.

B. Refer to:

(1) Table 201/REPAIR 1 for the repair data that is applicable to damage in the solid laminate area of Zone 1.

(2) Table 202/REPAIR 1 for the repair data that is applicable to damage in the honeycomb core area of Zone 1.

(3) Table 203/REPAIR 1 for the repair data that is applicable to damage in the solid laminate area of Zone 2.

(4) Table 204/REPAIR 1 for the repair data that is applicable to damage in the honeycomb core area of Zone 2.

C. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two more structural plies of fabric for each facesheet, or side of the part that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

(3) Inspect Category B repairs after each 400 flight hour interval or more frequently. Refer to 737 NDT Part 1, 51-01-01 for inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

NOTE: Other equivalent inspection methods that have been examined and found to be satisfactory by the operator, can be used.

D. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged (plus a filler ply).

Table 201:

REPAIR DATA FOR THE SOLID LAMINATE AREA OF ZONE 1 ON THE 350°F (177°C) CURE RUDDER STRUCTURE	
REPAIR TYPE	**PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**350°F (177°C) CURE**
REPAIR DIMENSIONS AND LIMITS	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	Refer to SRM 51-70-05 and Paragraph 4.D

Table 202:

REPAIR DATA FOR THE HONEYCOMB CORE AREA OF ZONE 1 ON THE 350°F (177°C) CURE RUDDER STRUCTURE			
REPAIR TYPE	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: 1.00 inch (25.4 mm) in diameter One facesheet and the honeycomb core in depth 3.0 inches (76.2 mm) minimum clearance from: - other repairs - fastener holes - part edges	Damage that is a maximum of: 1.00 inch (25.4 mm) in diameter One facesheet and the honeycomb core in depth 3.0 inches (76.2 mm) minimum clearance from: - other repairs - fastener holes - part edges	There are no limits on the dimensions of the repair.
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.D

Table 203:

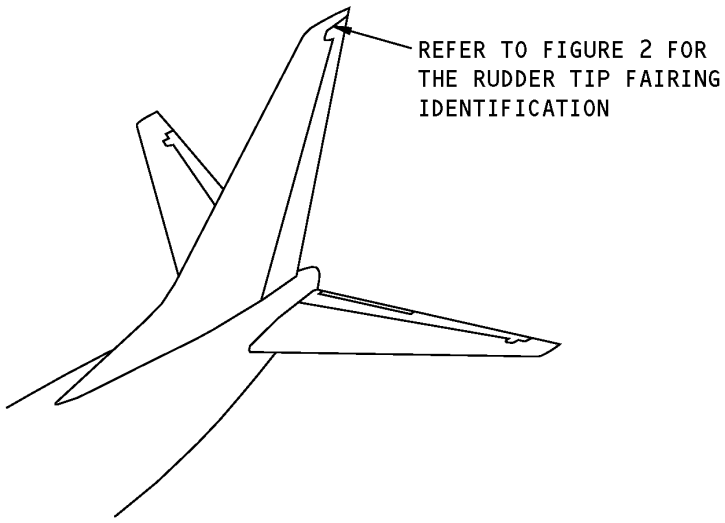
REPAIR DATA FOR THE SOLID LAMINATE AREA OF ZONE 2 ON THE 350°F (177°C) CURE RUDDER STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: 0.50 inch (12.7 mm) in diameter 20 percent of the smallest dimension across the part at the damage location One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from: - other repairs - fastener holes - part edges	Damage that is a maximum of: 2.0 inches (50.8 mm) in diameter 40 percent of the smallest dimension across the part at the damage location One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from: - other repairs - fastener holes - part edges	Damage that is a maximum of: 2.0 inches (50.8 mm) in diameter 40 percent of the smallest dimension across the part at the damage location One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from: - other repairs - fastener holes - part edges	There are no limits on the dimensions of the repair.
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.D

Table 204:

REPAIR DATA FOR THE HONEYCOMB CORE AREA OF ZONE 2 ON THE 350°F (177°C) CURE RUDDER STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
REPAIR SIZE AND LIMITS	Damage that is a maximum of: 0.50 inch (12.7 mm) in diameter 20 percent of the smallest dimension across the part at the damage location One facesheet and honeycomb core in depth One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from:	Damage that is a maximum of: 4.0 inches (101.6 mm) in diameter 50 percent of the smallest dimension a-cross the part at the damage location One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from:	Damage that is a maximum of: 4.0 inches (101.6 mm) in diameter 50 percent of the smallest dimension across the part at the damage location One repair for each 144 inches^2 (929.03 cm^2) 3.0 inches (76.2 mm) minimum clearance from:	There are no limits on the dimensions of the repair

REPAIR DATA FOR THE HONEYCOMB CORE AREA OF ZONE 2 ON THE 350°F (177°C) CURE RUDDER STRUCTURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED IAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**	**350°F (177°C)**
	- other repairs - fastener holes - part edges	- other repairs - fastener holes - part edges	- other repairs - fastener holes - part edges	
REPAIR PROCEDURES	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.D	SRM 51-70-05 and Paragraph 4.D

IDENTIFICATION 1 - RUDDER TIP FAIRING SKINS

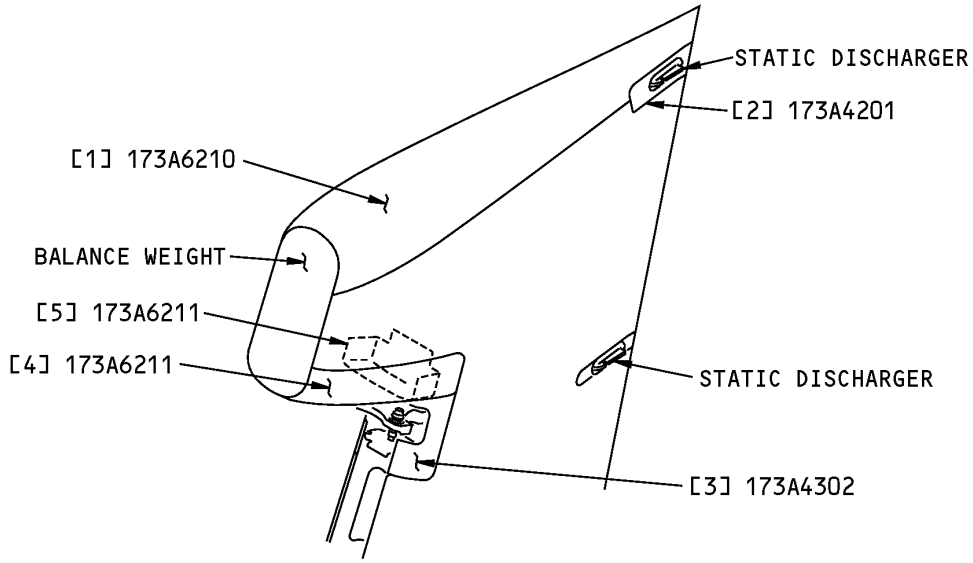


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Rudder Tip Fairing Skin Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0100	Rudder Functional Product Collector
173A4300	Cover Panel Assembly
173A6000	Rudder Tip Installation
173A6201	Rudder Tip Lower Fairing Assembly
173A6210	Rudder Tip Upper Fairing - Bonded Part



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

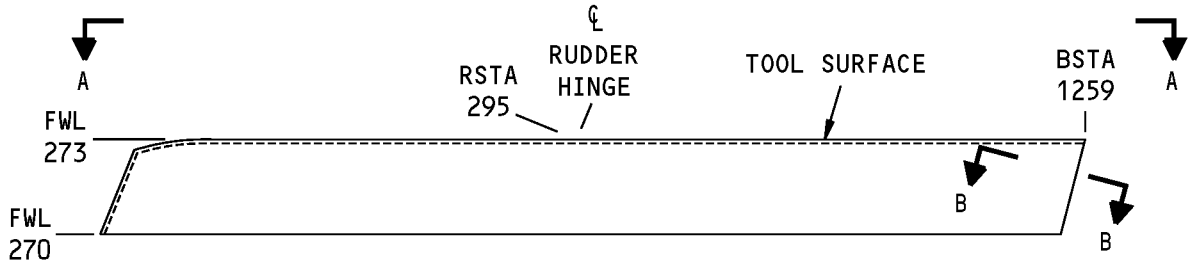
LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE

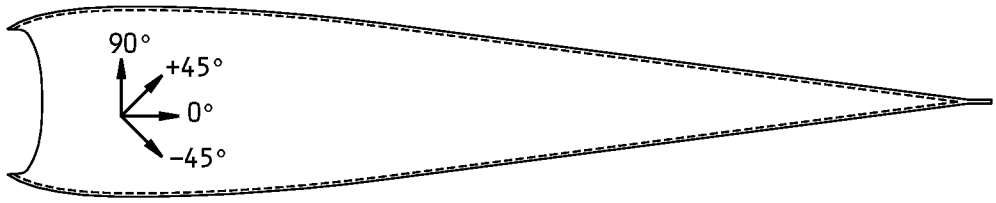
Rudder Tip Fairing Skin Identification
Figure 2

Table 2:

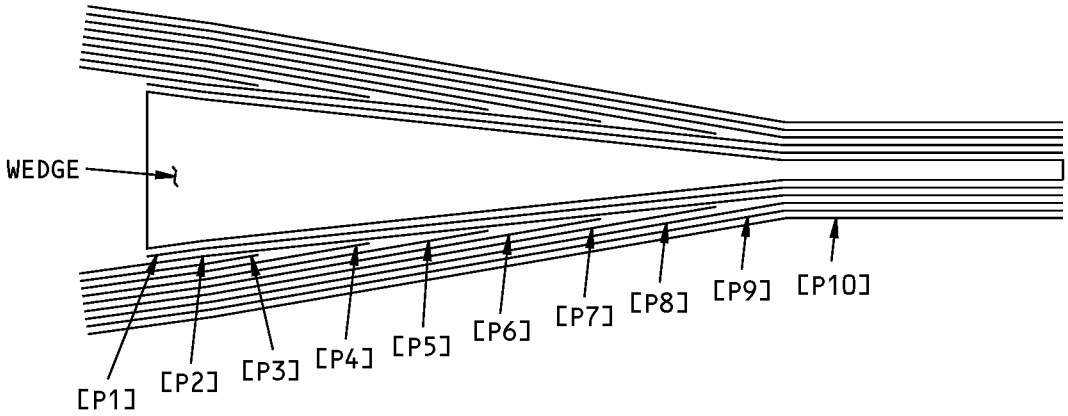
LIST OF MATERIALS FOR FIGURE 2				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Upper Fairing			
	Fairing		Glass Fiber Reinforced Plastic (GFRP) laminate with aluminum foil mesh lightning protec- tion. Refer to Figure 3	
	Wedge		Phenolic sheet as given in ASTM D709, Type IV, Grade G-3	
[2]	Splice Plate	0.063 (1.60)	6061-T4 clad sheet as given in QQ-A-250/11	
[3]	Hinge Cover		GFRP laminate. Refer to Figure 4	
[4]	Lower Fairing		GFRP laminate. Refer to Figure 5	
[5]	Closure		GFRP laminate. Refer to Figure 6	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).





A–A

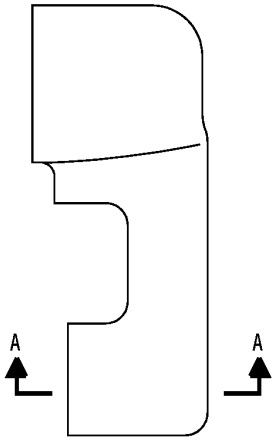


B–B

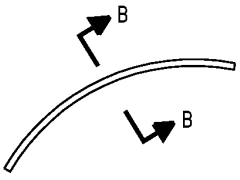
Ply Direction and Ply Sequence for the Upper Fairing, Figure 2, Item [1]
Figure 3

Table 3:

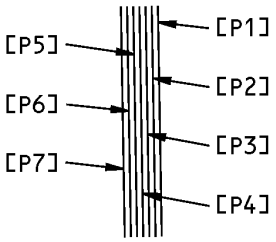
PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [1]		
PLY	**DIRECTION**	**MATERIAL**
P1	——	Adhesive film as given in BMS 5-129, Type 2, Grade 5
P2, P4, P6, P8	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B
P3, P5, P7	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B
P9	——	Adhesive film as given in BMS 8-245, Type III, Class 1, Grade 05
P10	——	Expanded aluminum foil mesh as given in BMS 8-336, Type I, Class 1, Grade 016, Form A



THE LEFT HINGE COVER IS SHOWN,
THE RIGHT HINGE COVER IS OPPOSITE



A–A (TYPICAL)

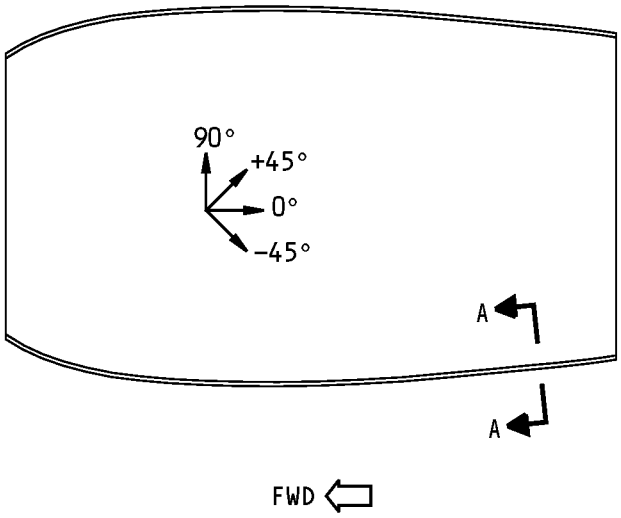


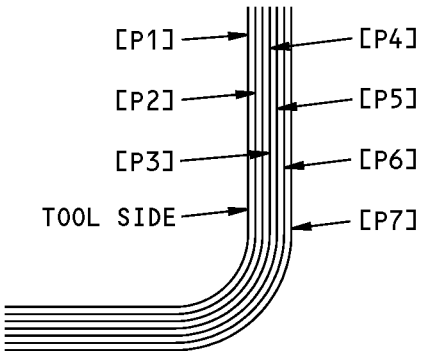
B–B

Ply Sequence for the Hinge Cover, Figure 2, Item [3]
Figure 4

Table 4:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [3]		
PLY	**DIRECTION**	**MATERIAL**
P1 through P7	Optional	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B



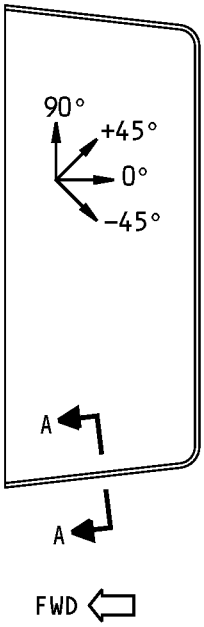


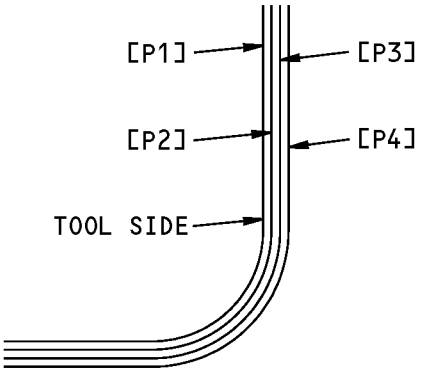
A–A

Ply Direction and Ply Sequence for the Lower Fairing, Figure 2, Item [4]
Figure 5

Table 5:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [4]		
PLY	**DIRECTION**	**MATERIAL**
P1, P3, P5, P7	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B
P2, P4, P6	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B





A–A

Ply Direction and Ply Sequence for the Closure, Figure 2, Item [5]
Figure 6

Table 6:

PLY MATERIAL AND DIRECTION FOR FIGURE 2, ITEM [5]		
PLY	**DIRECTION**	**MATERIAL**
P1, P4	0 or 90 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B
P2, P3	+ or - 45 degrees	Epoxy impregnated glass woven fabric as given in BMS 8-79, Style 1581 or Style 7781, Class III, Grade B

ALLOWABLE DAMAGE 1 - RUDDER TIP FAIRING SKINS

1. Applicability

A. Allowable Damage 1 is applicable to damage on rudder tip fairing skins shown in Figure 101.

2. General

A. Do an inspection of the damaged area to find the length, width, and depth of the damage. Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

(1) Refer to Damage Definitions, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C for the definitions of the length, width, and depth of the damage.

B. Remove all the contamination and water from the fairing.

(1) Refer to 51-30-05 for possible sources of the tools and equipment you can use to remove the damage.

(2) Refer to 51-70-04 for the cleanup procedures.

C. Seal all the permitted damage areas that are not more than one ply in depth. Refer to the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 1 Use one of the two methods that follows:

(1) Make a temporary seal.

(a) Apply aluminum foil tape (speed tape).

(b) Keep a record of the location of the damage.

(c) If the tape is on the exterior surface of the fairing, then make sure that it is in satisfactory condition at normal maintenance intervals.

(2) Make a permanent seal.

(a) Apply BMS 8-207 or BMS 8-301 epoxy resin to the area as given in 51-70-08.

(b) Apply one layer of BMS 10-79, Type III or BMS 10-103, Type I primer. Refer to SOPM 20-44-04.

(c) Apply one layer of BMS 10-60, Type II enamel to the exterior surfaces of the rudder tip fairing skins that are sealed with epoxy resin. Refer to AMM 51-21-00/701.

D. Seal all of the damage areas that are more than one ply in depth. Refer to the allowable damage limits given in Paragraph 4./ALLOWABLE DAMAGE 1

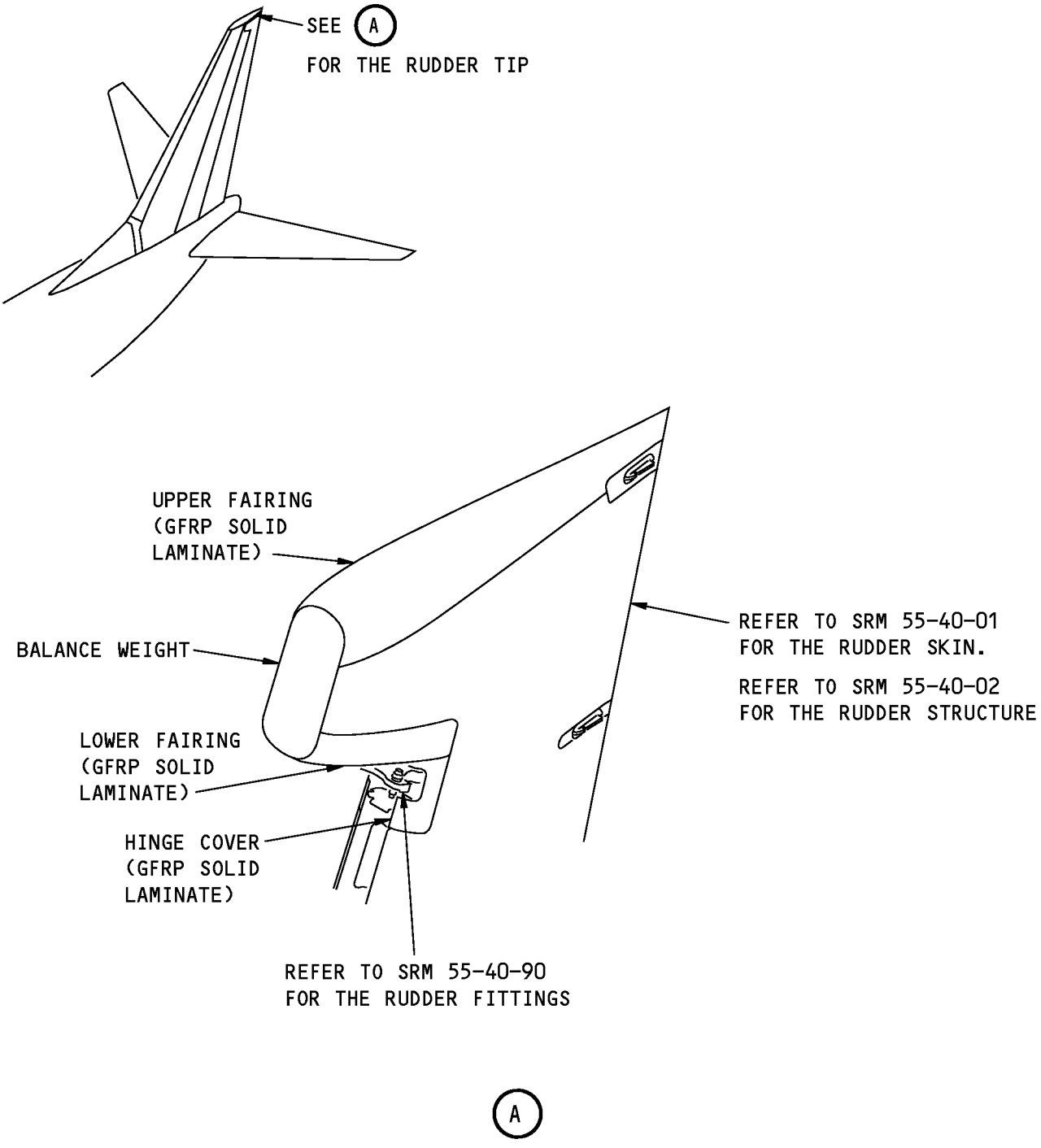
(1) Use a vacuum and heat to remove moisture from the solid laminate. Refer to 51-70-04.

(2) Make a temporary seal with aluminum foil tape (speed tape).

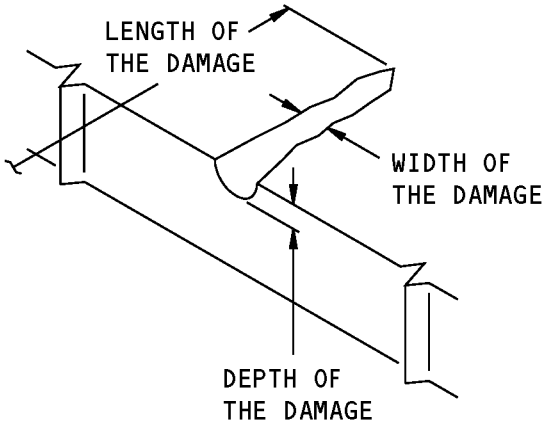
(3) Keep a record of the location of the damage.

(4) Repair the damage at or before 250 flight cycles from the time the seal was made.

E. The definition of the words "other damage", as used in the allowable damage limits, does not include nicks, gouges, and scratches that do not cause damage to the glass fibers and are sealed.

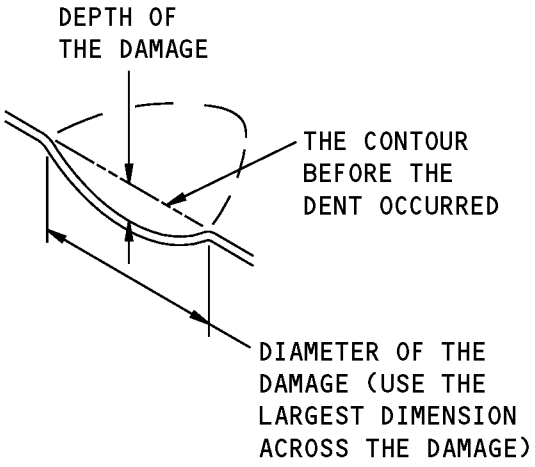


Rudder Tip Fairing Skin Location
Figure 101



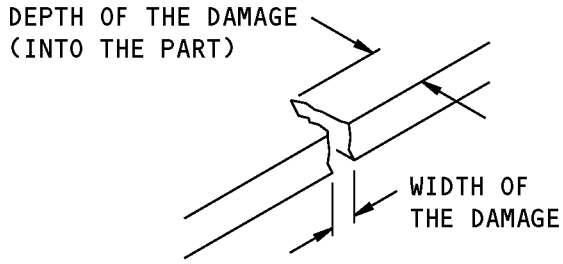
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Damage Definitions
Figure 102

3. References

Reference	Title
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-01, GENERAL	Protective Treatment of Metallic and Composite Materials
51-20-05, GENERAL	Repair Sealing
51-30-03, GENERAL	Sources for Non-Metallic Repair Materials
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
51-60-04, GENERAL	Elevator Balance Procedure For Airplane Line Numbers 1 Through 1174 Prior To Completion of Service Bulletins 737-55-1080, 737-55-1081, and 737-55-1082
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-08	RESIN SWEEP-FAIR PROCEDURES
AMM 51-21-00/701	Interior And Exterior Finishes - Cleaning/Painting
SOPM 20-44-04	Application of Urethane Compatible Primers
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Allowable Damage Limits

A. Nicks, Gouges, and Scratches that do not cause damage to the glass fibers are permitted.

B. Nicks, Gouges, and Scratches that cause damage to the glass fibers are permitted if:

(1) The depth is a maximum of one ply.

NOTE: Use the limits for holes and punctures if the damage is more than one ply in depth.

(2) The length is a maximum of 5.0 inches (127.00 mm)

(3) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage.

C. Dents that do not cause damage to the glass fibers are permitted if:

(1) The depth is a maximum of 0.05 inch (1.27 mm)

NOTE: Use the limits for holes and punctures if the damage is more than 0.05 inch (1.27 mm) in depth.

(2) The diameter is a maximum of 2.0 inches (50.80 mm)

(3) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

D. Holes and Punctures are permitted if:

(1) The diameter is a maximum of 2.0 inches (50.80 mm)

(2) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

E. Delaminations are permitted if:

(1) The diameter is a maximum of 2.0 inches (50.80 mm)

(2) The damage is a minimum of 2D (D = the diameter of the damage) away from the edge of other damage, a hole, or the edge of the part.

F. Edge damage is permitted if:

(1) The depth is a maximum of 0.10 inch (2.54 mm)

(2) The width is a maximum of 0.50 inch (12.70 mm)

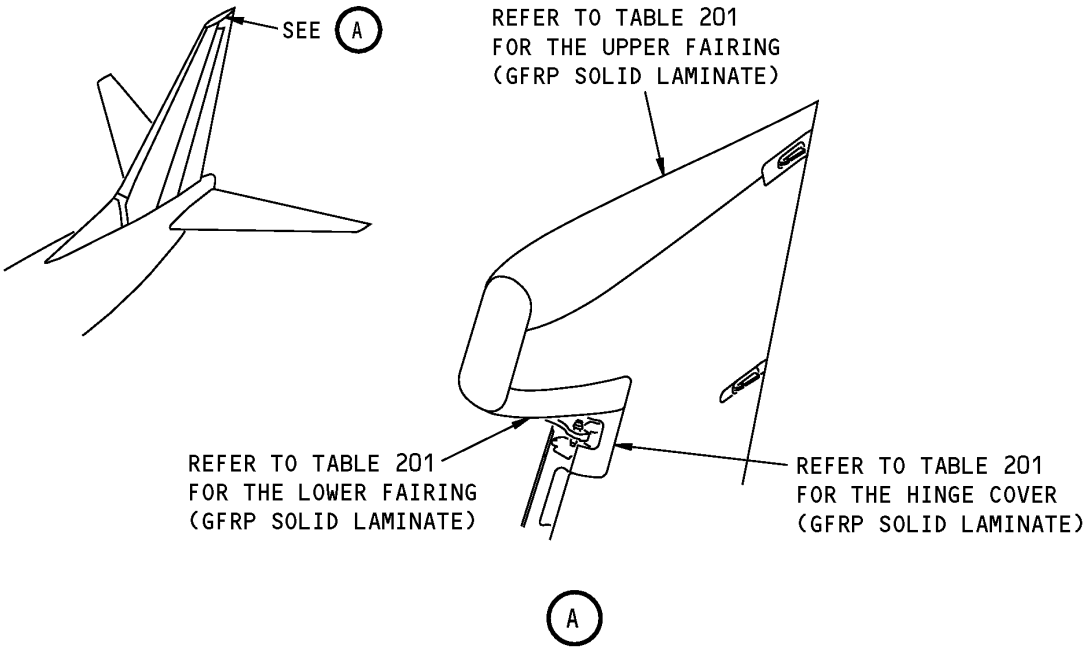
(3) The damage is a minimum of 4D (D = the diameter of the damage) away from the edge of other damage.

REPAIR 1 - RUDDER TIP FAIRING SKINS

1. Applicability

A. Repair 1 is applicable to the skin parts of the rudder tip fairing skins made of Glass Fiber Reinforced Plastic (GFRP) as shown in Rudder Tip Fairing Skin Location, Figure 201/REPAIR 1.

B. Repair 1 is applicable to damage that is more than the limits permitted in Allowable Damage 1. Refer to Allowable Damage 1 for the type and size of damage that is permitted.



Rudder Tip Fairing Skin Location
Figure 201

2. General

A. Repair 1 gives the instructions for Category A and B repairs. Refer to 51-00-06 to find the definitions of the different categories of repairs.

B. Get access to the damaged area.

(1) If necessary, remove the rudder tip fairing skins.

(2) Refer to 51-40-02 for information on fastener removal.

C. Do an inspection of the damaged area to find the dimensions of the damage.

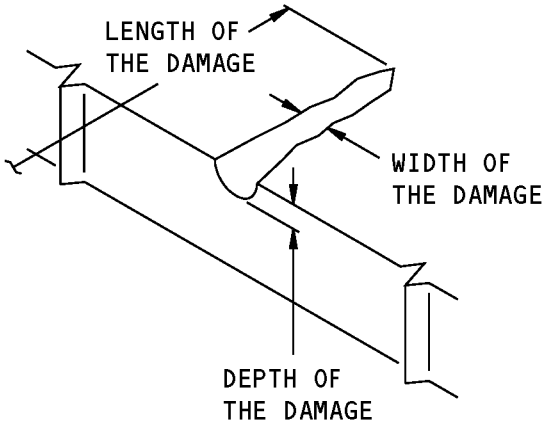
(1) Boeing recommends that you use an instrumented Non-Destructive Test (NDT) procedure. Refer to NDT, Part 1, 51-01-02 for the inspection procedures.

NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

D. Refer to Damage Definitions, Figure 202/REPAIR 1, Details A, B, and C for the definitions of the length, width, and depth of damage.

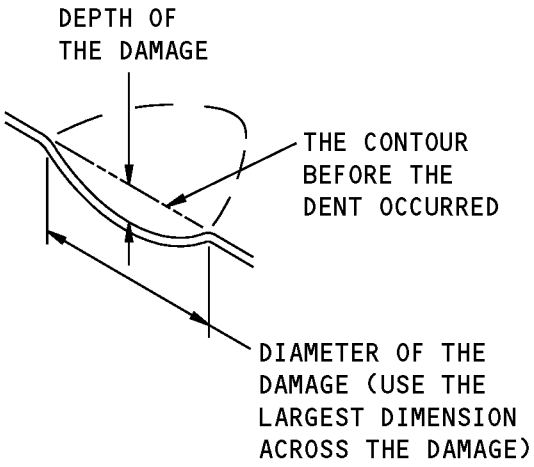
E. Do the repair as given in Paragraph 4./REPAIR 1

F. Put the rudder tip fairing skin back to the initial condition, as applicable.
   (1) Install the fairing if it was removed. Refer to 51-40-02 for the data about fastener installation.



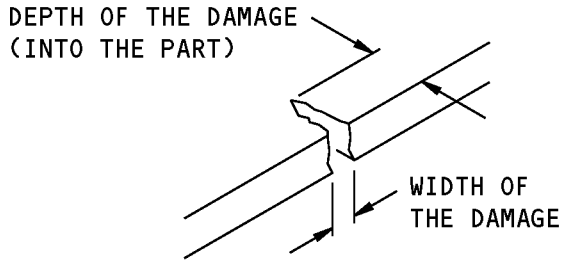
DEFINITIONS OF THE SIZES FOR NICK, GOUGE, AND SCRATCH DAMAGE

A



DEFINITIONS OF THE SIZES
FOR DENT DAMAGE

B



DEFINITIONS OF THE SIZES
FOR EDGE DAMAGE

C

Damage Definitions
Figure 202

3. References

Reference	Title
51-00-06	STRUCTURAL REPAIR DEFINITIONS
51-10-01, GENERAL	Aerodynamic Smoothness Requirements
51-10-02, GENERAL	Inspection and Removal of Damage
51-20-05, GENERAL	Repair Sealing
51-40-02	FASTENER INSTALLATION AND REMOVAL
51-70-04	REPAIR PROCEDURES FOR WET LAYUP MATERIALS
51-70-05, REPAIR GENERAL	Repair Procedures for Preimpregnated Materials
51-70-06, REPAIR GENERAL	Room Temperature Cure Repairs With Wet Layup Materials For Glass Fabric Reinforced Plastic Solid Laminates and Honeycomb Core Panels
737 NDT Part 1, 51-01-01	Inspection of Repairs to Composite Structure
737 NDT Part 1, 51-01-02	NDT Examination of Composite Structure for Impact Damage

4. Repair Instructions

A. If a dent is 2 inches (50.80 mm) in diameter or less, and has no fiber damage or delamination, then fill the dent with potting compound and apply a fiberglass patch as given in Repair 14 of 51-70-04.

B. If Paragraph 4.A./REPAIR 1 is not applicable, then refer to Table 201/REPAIR 1 for the repair data that is applicable to damage to the rudder tip fairing skins.

C. For repairs made with wet layup materials, do as follows, as applicable:

(1) Use one repair ply of fabric for each initial ply that was damaged.

(2) Add two structural plies of fabric for each facesheet that is repaired. Put one structural ply at ±45 degrees to the core ribbon direction and the other at 0 or 90 degrees.

NOTE: Repair plies or added plies are not necessary in the repair of delamination at an edge if the delamination is a minimum of 2D (D = fastener diameter) away from a fastener hole.

(3) Examine Category B repairs after each interval of 800 flight hours or more frequently. Refer to 737 NDT Part 1, 51-01-01 for the inspection procedures. If deterioration is found, then they must be replaced with Category A repairs.

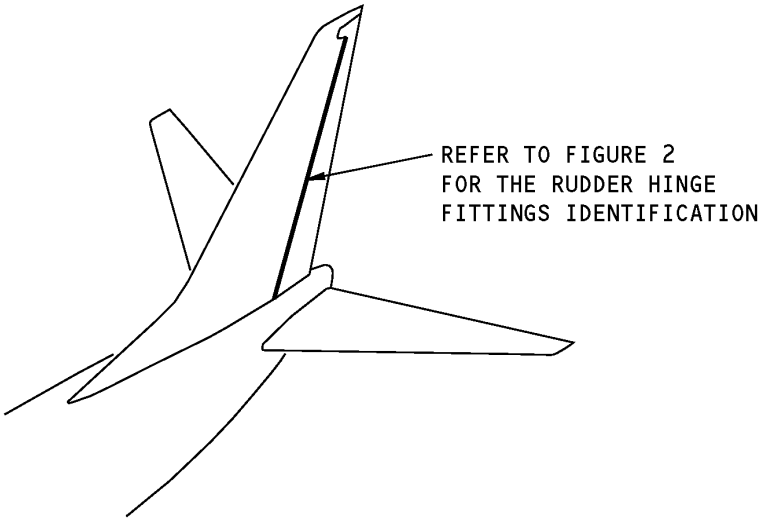
NOTE: Other inspection methods that have been examined and found to be satisfactory by the operator can be used.

D. For repairs made with preimpregnated layup materials, use the same number of repair plies as the number of initial plies that were damaged.

Table 201:

REPAIR DATA FOR THE RUDDER TIP FAIRING SKINS - 250°F (121°C) CURE				
REPAIR TYPE	**CATEGORY B WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A WET LAYUP**	**CATEGORY A PREIMPREGNATED LAYUP**
REPAIR CURE TEMPERATURE	**Room Temperature**	**150°F (66°C)**	**200°F (93°C)**	**250°F (121°C)**
REPAIR SIZE AND LIMITS	Contact The Boeing Company	Damage that is a maximum of: - 5.0 inches (127.00 mm) in diameter - 2.0 inches (50.8 mm) minimum clearance from: - other repairs - fastener hole - panel edges	Damage that is a maximum of: - 5.0 inches (127.00 mm) in diameter - 2.0 inches (50.8 mm) minimum clearance from: - other repairs - fastener holes - panel edges	There are no limits on the dimensions of the repair
REPAIR PROCEDURES	————————	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-04 and Paragraph 4.C	SRM 51-70-05 and Paragraph 4.C

IDENTIFICATION 1 - RUDDER HINGE FITTINGS

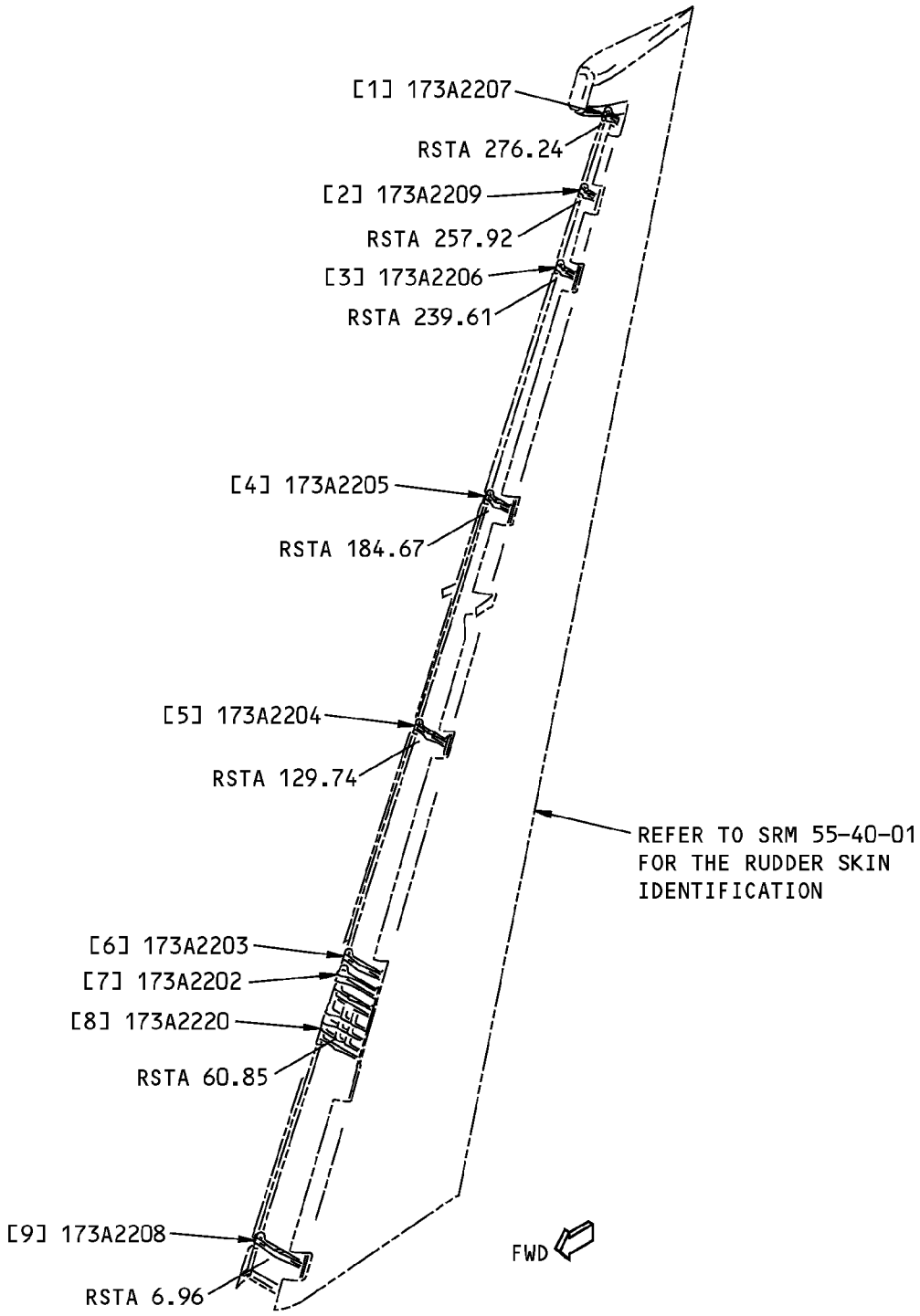


NOTE: REFER TO TABLE 1 FOR THE REFERENCE DRAWINGS.

Rudder Hinge Fittings Location
Figure 1

Table 1:

REFERENCE DRAWINGS	
DRAWING NUMBER	**TITLE**
173A0001	Rudder Installation
173A0100	Rudder Functional Product Collector
173A0103	Rudder Assembly
173A2001	Spar Installation - Rudder
173A2200	Fitting Assembly - Thrust and Actuator, Rudder



NOTE: REFER TO TABLE 2 FOR THE LIST OF MATERIALS.

Rudder Hinge Fittings Identification
Figure 2

Table 2:

LIST OF MATERIALS FOR FIGURE 1				
ITEM	**DESCRIPTION**	**T*[1]**	**MATERIAL**	**EFFECTIVITY**
[1]	Hinge Fitting STA 276.24		7050-T7451 plate as given in AMS 4050. Refer to the production drawing for the machined areas, and the grain direction	
[2]	Hinge Fitting STA 257.92		7050-T7451 plate as given in AMS 4050. Refer to the production drawing for the machined areas, and the grain direction	
[3]	Hinge Fitting STA 239.61		7050-T7451 plate as given in AMS 4050. Refer to the production drawing for the machined areas, and the grain direction	
[4]	Hinge Fitting STA 184.67		7050-T7451 plate as given in AMS 4050. Refer to the production drawing for the machined areas, and the grain direction	
[5]	Hinge Fitting STA 129.74		7050-T7451 plate as given in BMS 7-323. Refer to the production drawing for the machined areas, and the grain direction	
[6]	Hinge Fitting STA 74.80		7050-T7451 plate as given in BMS 7-323. Refer to the production drawing for the machined areas, and the grain direction	
[7]	Actuator Fitting		7050-T7451 plate as given in BMS 7-323. Refer to the production drawing for the machined areas, and the grain direction	
[8]	Thrust Fitting		7050-T7451 plate as given in BMS 7-323. Refer to the production drawing for the machined areas, and the grain direction	
[9]	Hinge Fitting STA 6.96		7050-T7451 plate as given in BMS 7-323. Refer to the production drawing for the machined areas, and the grain direction	

*[1] Note: T = Pre-manufactured thickness in inches (millimeters).

ALLOWABLE DAMAGE 1 - RUDDER HINGE FITTINGS

1. Applicability

A. This subject gives the allowable damage limits for the rudder hinge fittings shown in Rudder Hinge Fitting Location, Figure 101/ALLOWABLE DAMAGE 1.

2. General

A. Refer to Paragraph 4./ALLOWABLE DAMAGE 1 for the allowable damage limits.

B. Remove the damage as necessary.

(1) Refer to 51-10-02 for the investigation and removal of damage.

(2) Refer to 51-30-03 for possible sources of nonmetallic materials you can use to remove the damage.

(3) Refer to 51-30-05 for possible sources of the equipment and tools you can use to remove the damage.

(4) Put a surface finish of 125 microinches Ra or better on the reworked areas.

C. After you remove the damage, do the steps that follow.

WARNING: MAKE SURE THAT YOU WEAR EYE PROTECTION WHEN YOU USE THE FLAP PEEN WHEEL. IF YOU DO NOT OBEY, AN INJURY CAN OCCUR.

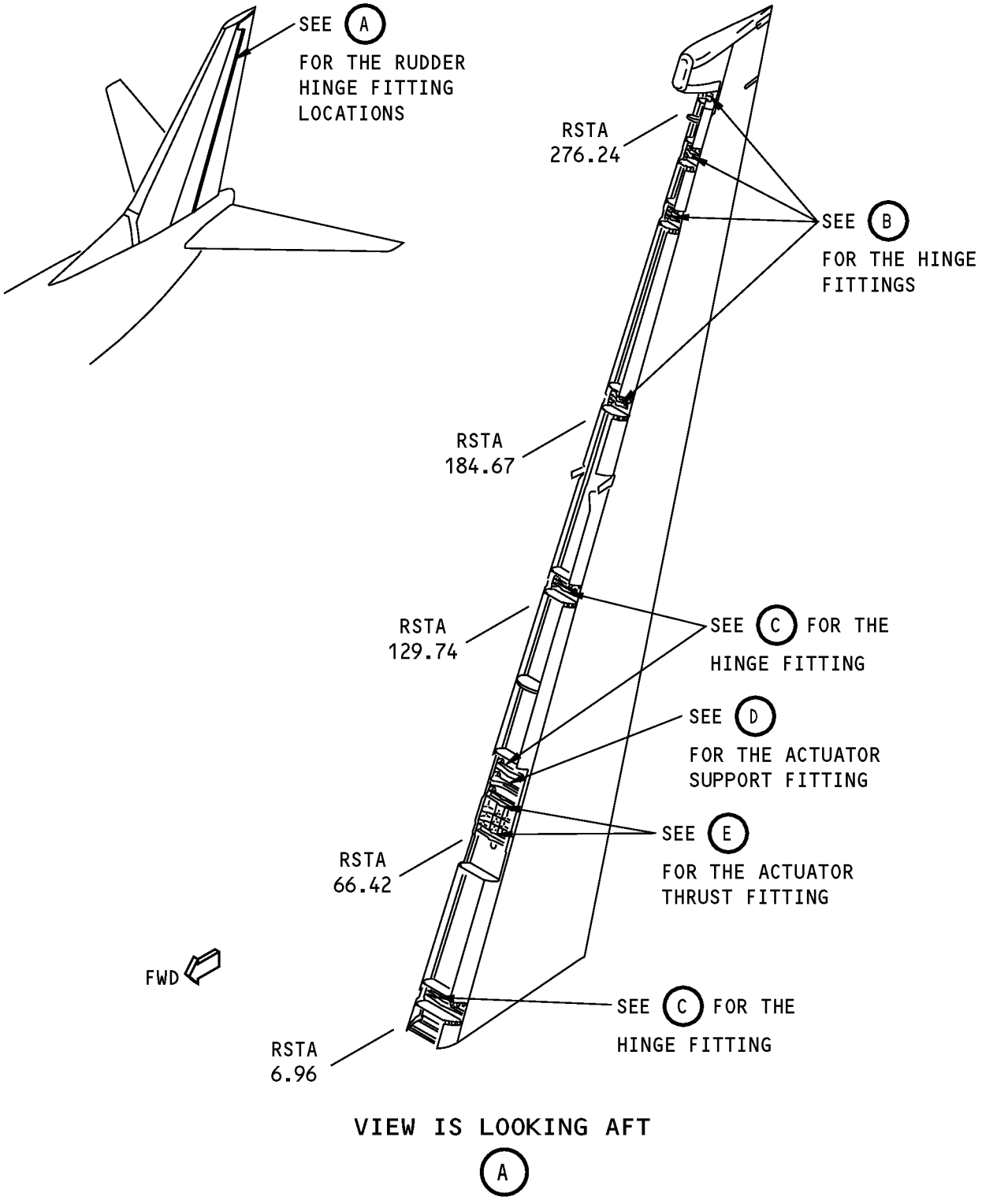
(1) Flap peen or shot peen the reworked areas of the parts, but not the inner surfaces of the lug bores.

(a) Refer to 51-20-06 for the shot peen intensity and shot number.

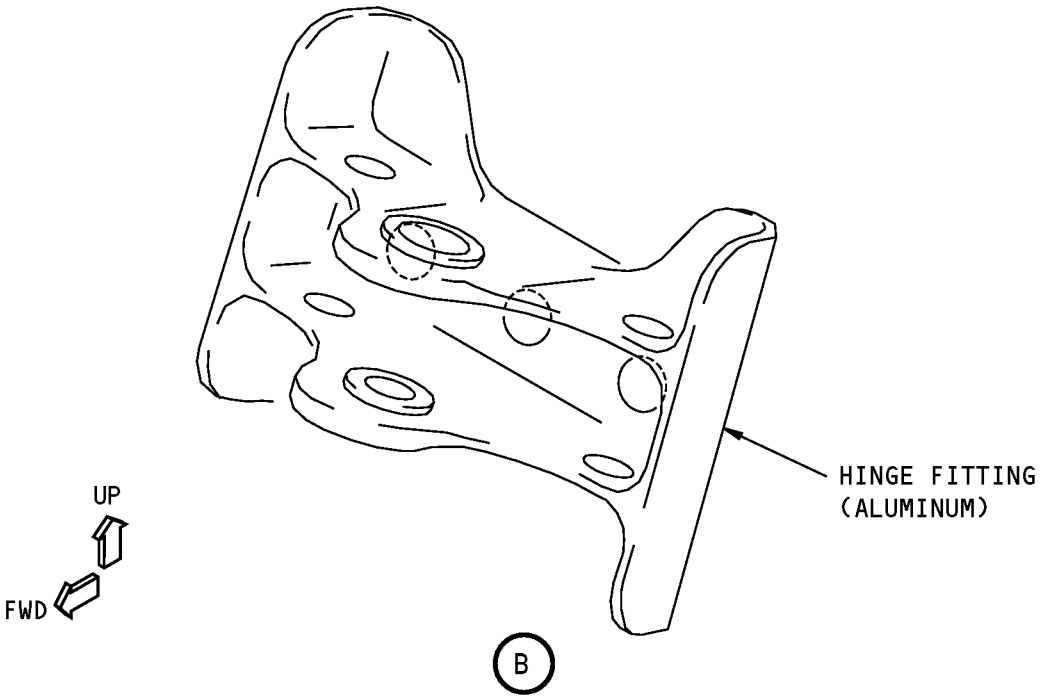
(b) Refer to SOPM 20-10-03 for the flap peen and shot peen procedures.

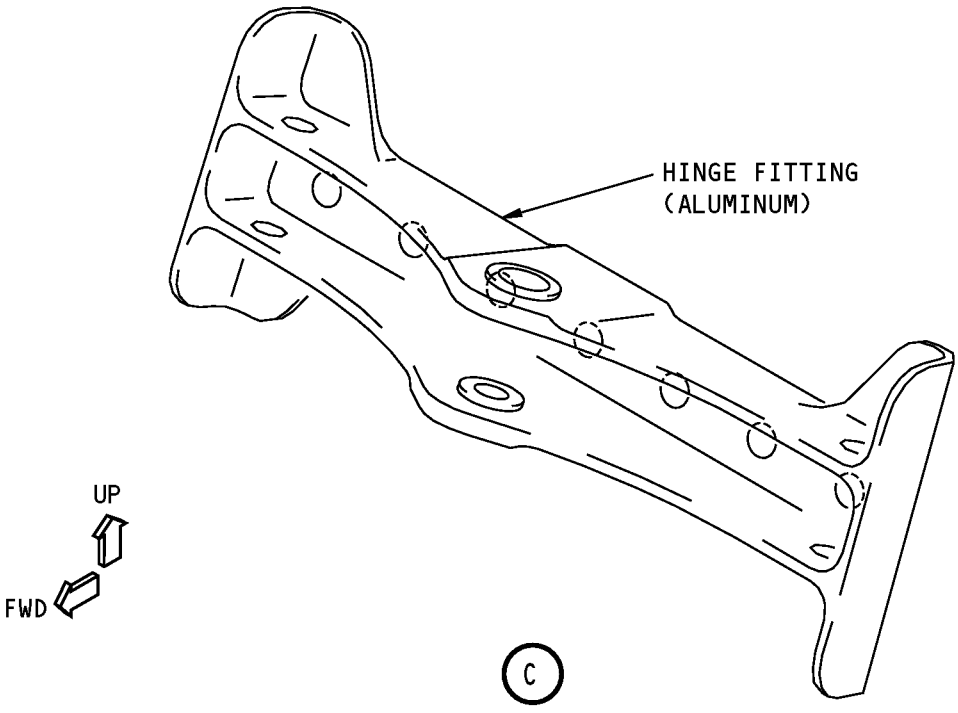
(2) Apply a chemical conversion coating to the reworked areas. Refer to 51-20-01.

(3) Apply a layer of BMS 10-79, Type III primer to the reworked areas. Refer to SOPM 20-44-04.

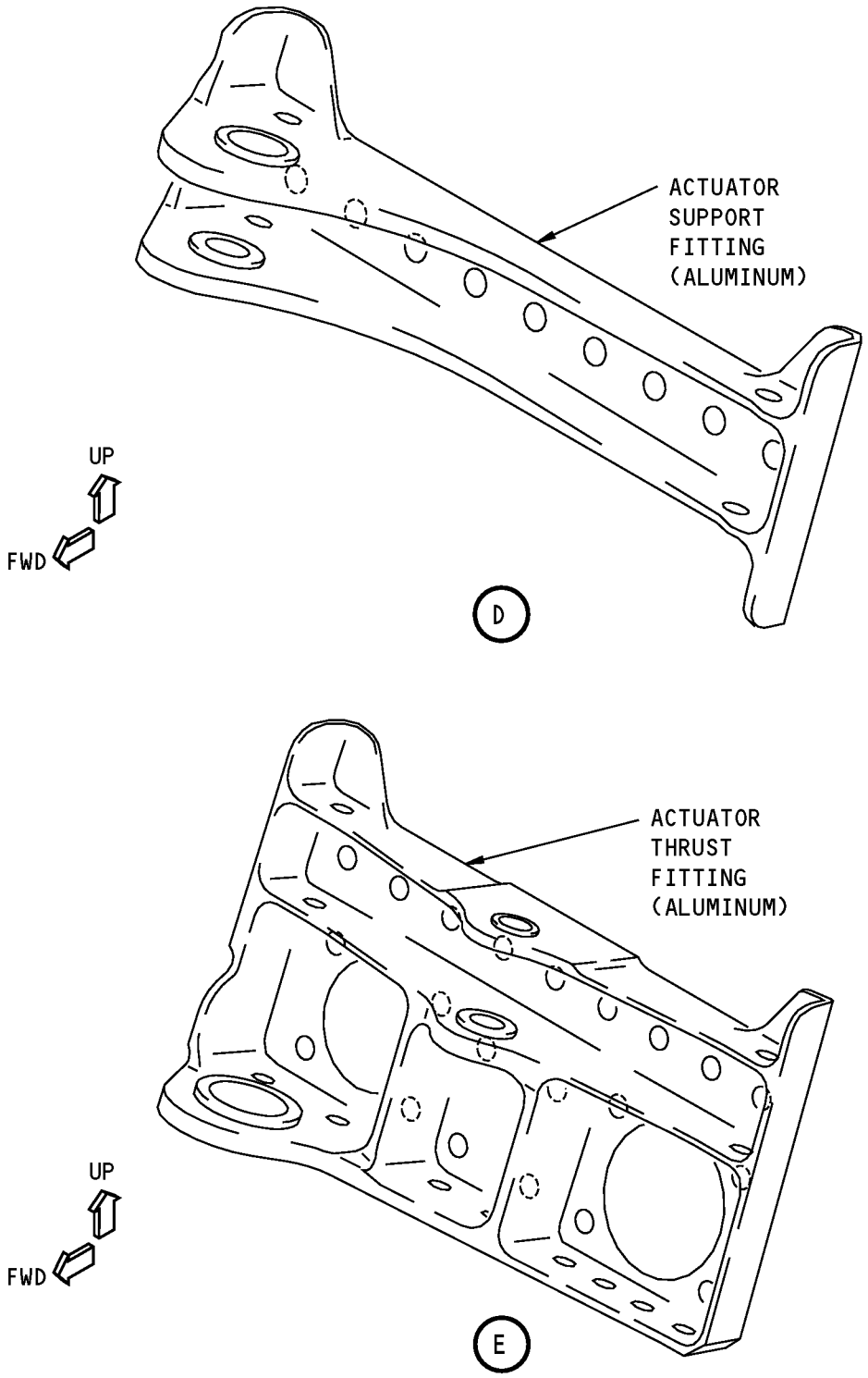


Rudder Hinge Fitting Location
Figure 101 (Sheet 1 of 3)





Rudder Hinge Fitting Location
Figure 101 (Sheet 2 of 3)



Rudder Hinge Fitting Location
Figure 101 (Sheet 3 of 3)

3. References

Reference	Title
51-10-02	INSPECTION AND REMOVAL OF DAMAGE
51-20-01	PROTECTIVE TREATMENT OF METALLIC AND COMPOSITE MATERIALS
51-20-06	SHOT PEENING
51-30-03	NON-METALLIC MATERIALS
51-30-05	EQUIPMENT AND TOOLS FOR REPAIRS
SOPM 20-10-03	General - Shot Peening Procedures
SOPM 20-20-02	Penetrant Methods of Inspection
SOPM 20-44-04	Application of Urethane Compatible Primers

4. Allowable Damage Limits

A. Hinge Fittings (Except at RSTA 129.74 and RSTA 184.67)

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, D, and E.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

B. Hinge Fitting at RSTA 129.74

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

C. Hinge Fitting at RSTA 184.67

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and C.

(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, C, and D.

(3) Dents are not permitted.

(4) Holes and Punctures are not permitted.

D. Actuator Thrust Fitting

(1) Damage is not permitted.

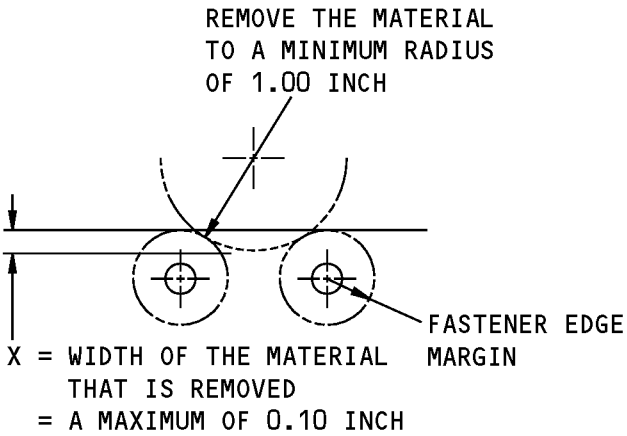
E. Actuator Support Fitting

(1) Cracks:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A and B.

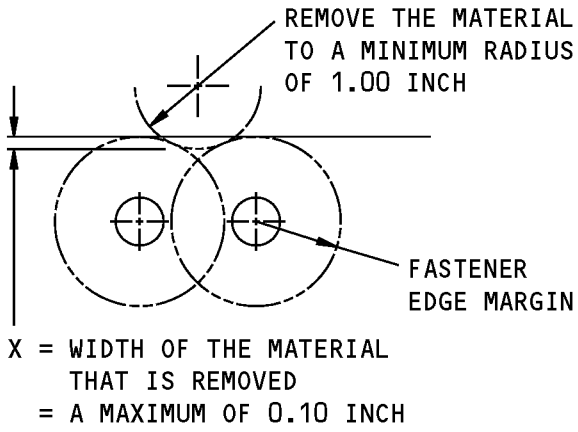
(2) Nicks, Gouges, Scratches, and Corrosion:

(a) Remove the damage as shown in Allowable Damage Limits, Figure 102/ALLOWABLE DAMAGE 1, Details A, B, and E.



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS DO NOT HAVE AN OVERLAP

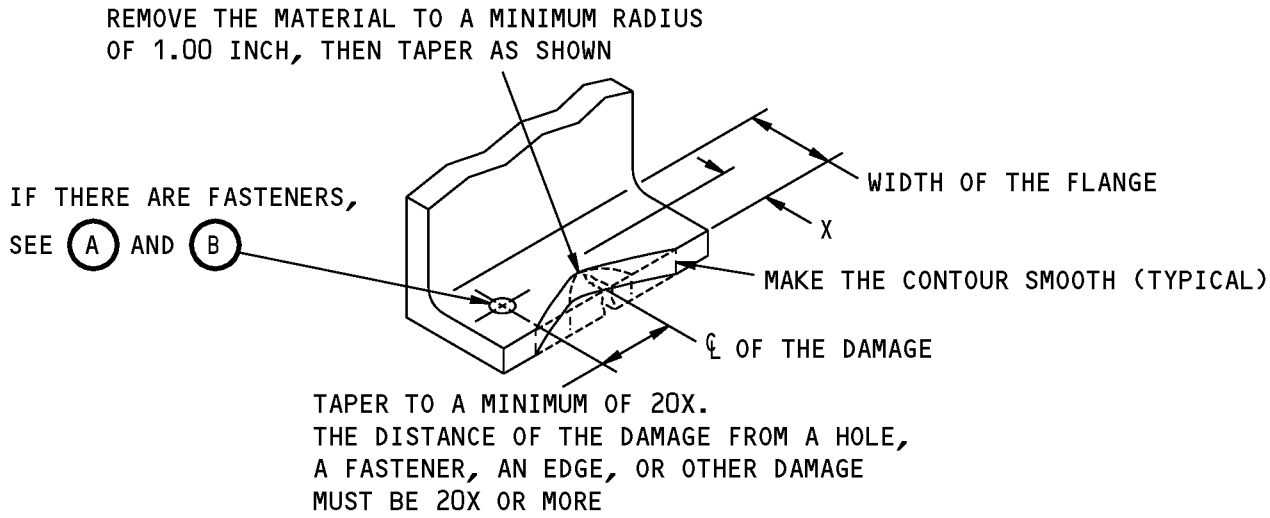
A



REMOVAL OF DAMAGED MATERIAL AT EDGES WHERE THE FASTENER EDGE MARGINS HAVE AN OVERLAP

B

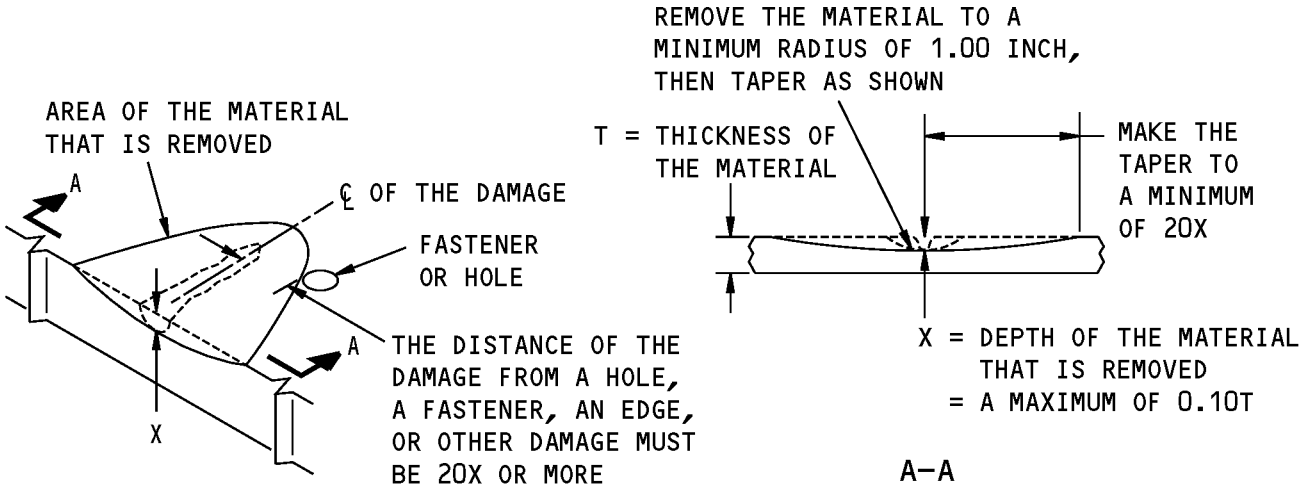
Allowable Damage Limits
Figure 102 (Sheet 1 of 3)



X = WIDTH OF THE MATERIAL REMOVED
= A MAXIMUM OF 10 PERCENT OF THE WIDTH OF THE FLANGE

REMOVAL OF DAMAGED MATERIAL AT AN EDGE

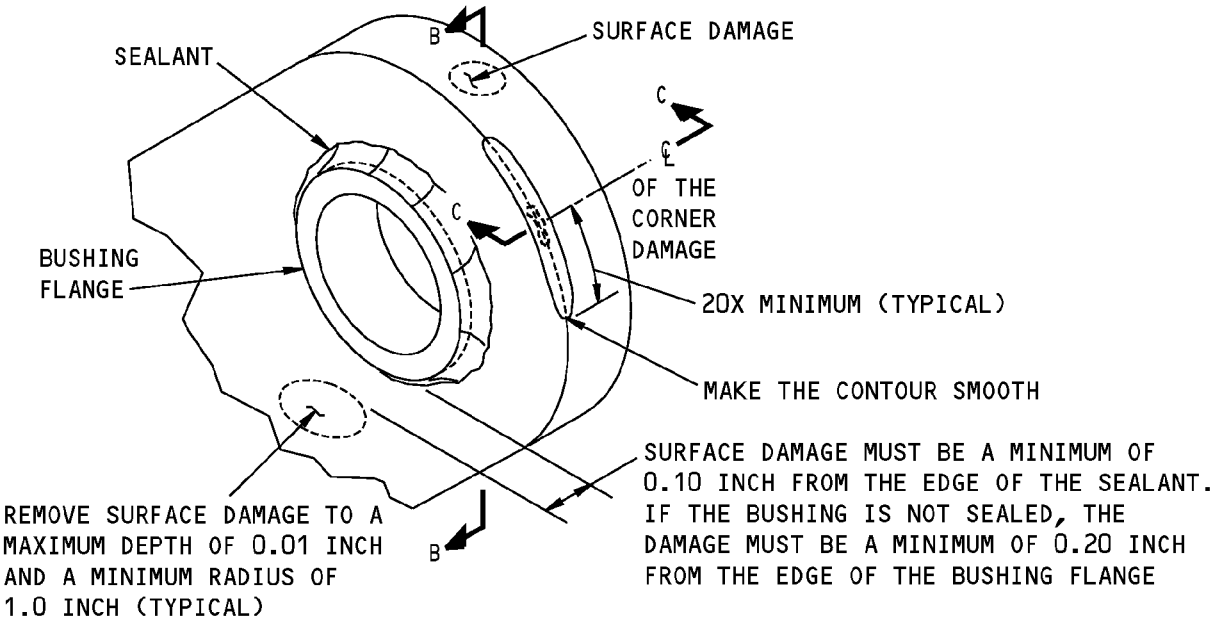
C



REMOVAL OF DAMAGED MATERIAL
ON A SURFACE

D

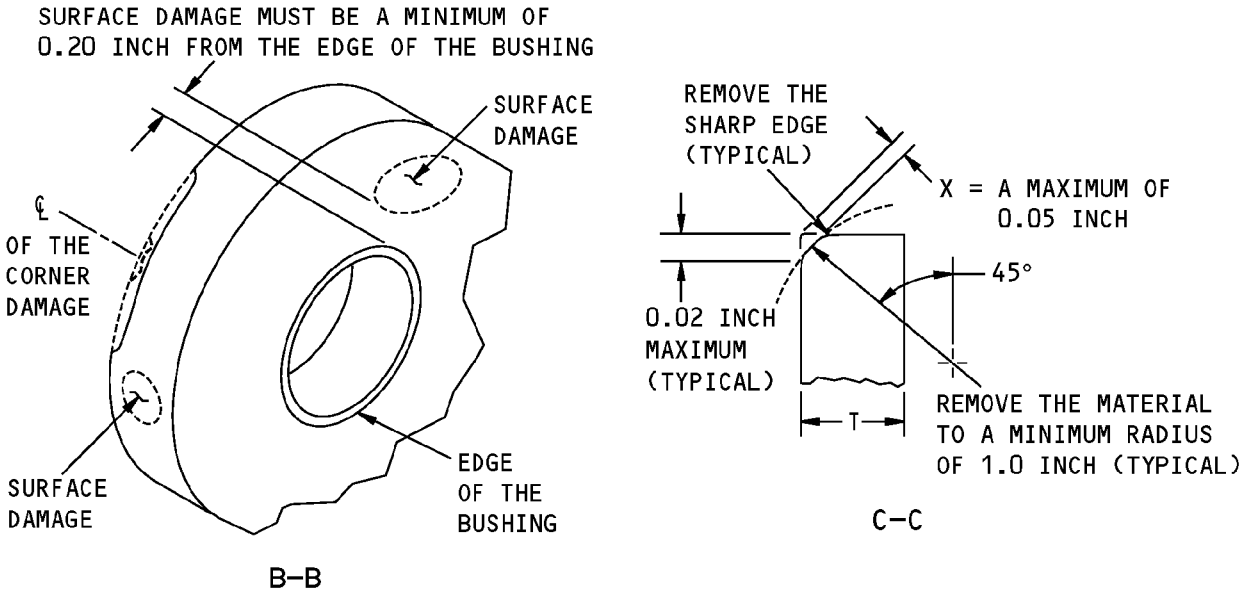
Allowable Damage Limits
Figure 102 (Sheet 2 of 3)



NOTE: DAMAGED SEALANT IS NOT PERMITTED. IF THE SEALANT IS DAMAGED, LOOK FOR MIGRATION OR ROTATION OF THE BUSHING. IF THERE IS NO MIGRATION, ROTATION, OR CORROSION, REMOVE THE DAMAGED SEALANT AND APPLY A NEW FILLET SEAL.

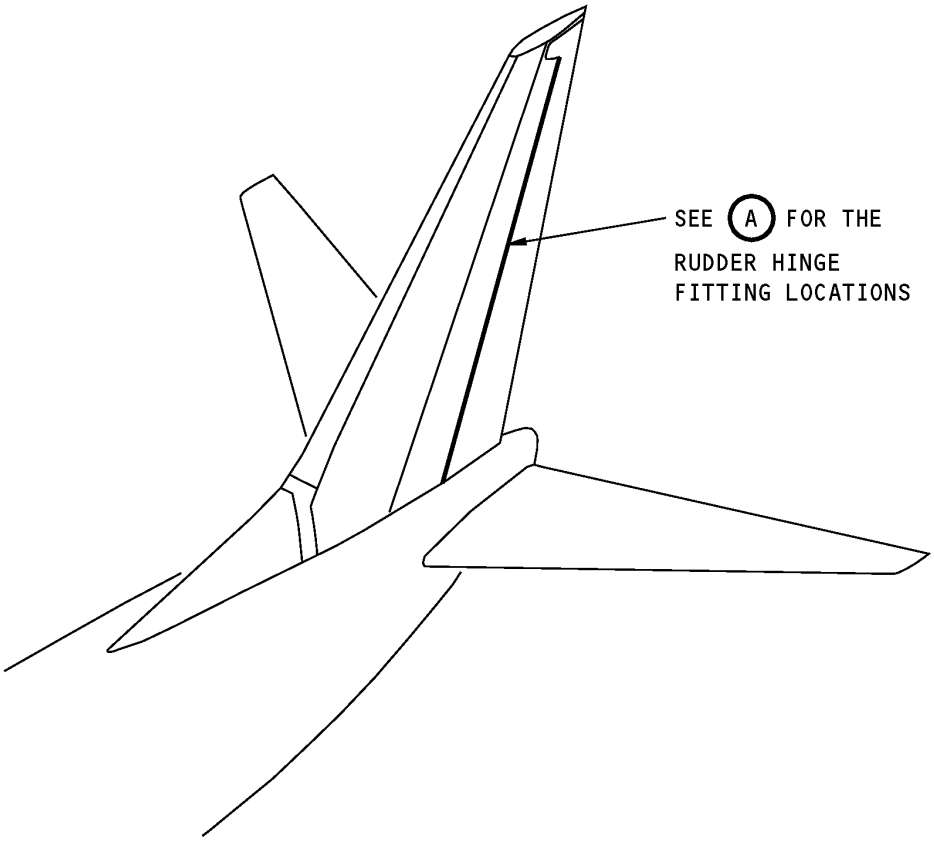
REMOVAL OF SURFACE AND EDGE DAMAGE FROM A LUG THAT HAS A BUSHING

(E)

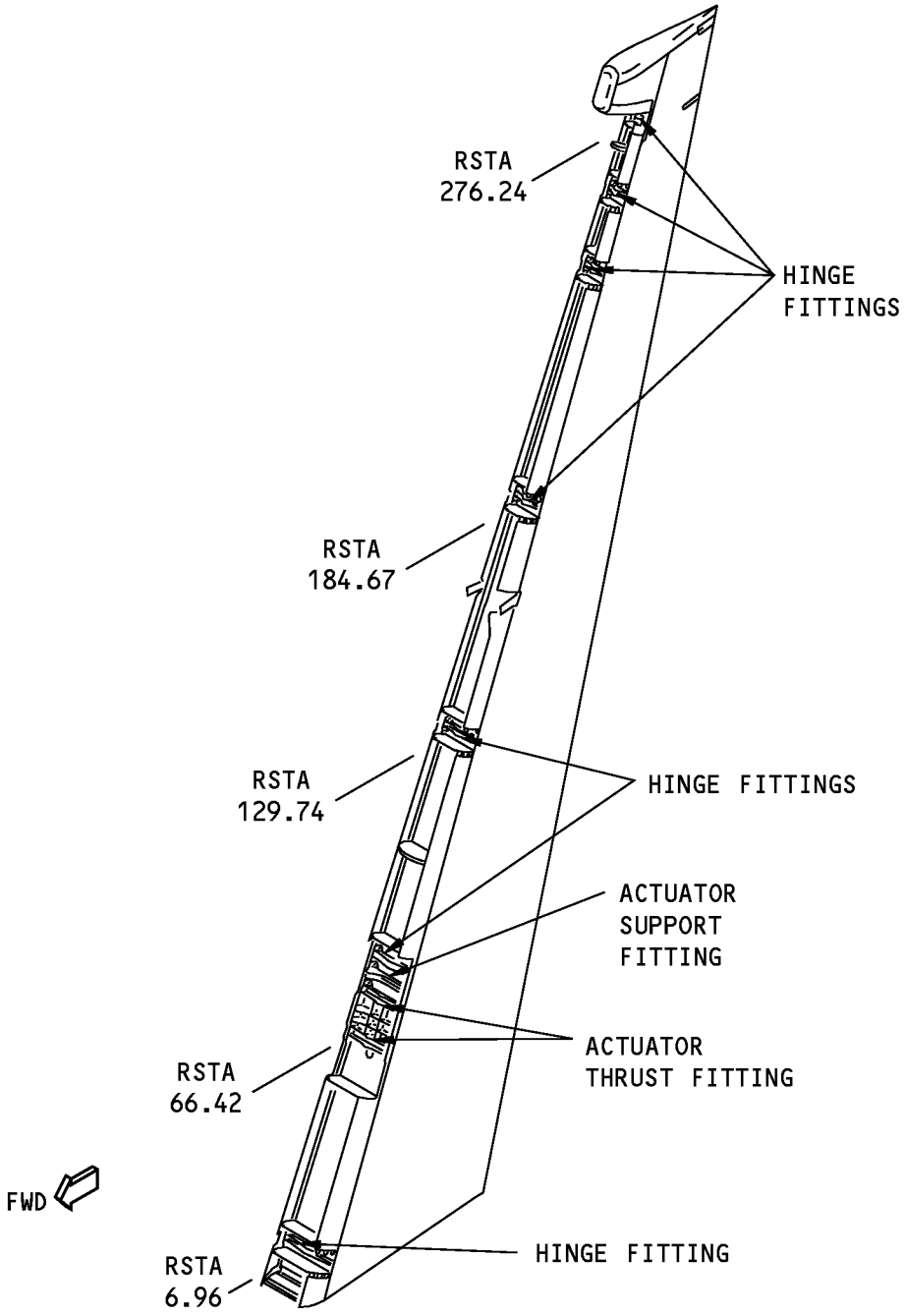


Allowable Damage Limits
Figure 102 (Sheet 3 of 3)

REPAIR 1 - RUDDER HINGE FITTINGS



Rudder Hinge Fitting Repair
Figure 201 (Sheet 1 of 2)



NOTE: THERE ARE NO REPAIRS FOR THESE PARTS IN THE STRUCTURAL REPAIR MANUAL AT THIS TIME.

VIEW IS LOOKING AFT

A

Rudder Hinge Fitting Repair
Figure 201 (Sheet 2 of 2)