
AGENDA:

- **SRM Build up and task evaluation:**
 - Vendor SRM
 - IPC, AMM, Ect. (Goodrich)
 - Small talk repair
 - Cat A, B and C
- **Bolted repair intro:**
 - SRM Repair and Why
 - Inspection
- **Lightning strike on fuselage:**
 - SRM
 - Procedure for Temporary and permanent repair.
- **SRM Task Evaluation and preparation:**
 - Individual task evaluation.
 - Flap repair
 - Fairing panel repair.

SKILLMAN DAY 4

WHERE TO FIND REPAIR

Aircraft SRM

VENDOR SRM

IPC

CMM

AMM

NDI/NTM

GOODRICH



AMM B737-800

- 21-20-02 AIR CONDITIONING SYSTEM DUCTS
 - 21-20-02-8 AIR CONDITIONING SYSTEM DUCTS - REPAIRS
 - 21-20-02-8 General
 - 21-20-02-330-801 Taped Joint Repair - Fiberglass/Kevlar Duct
 - 21-20-02-330-802 External Patch - Fiberglass/Kevlar Duct
 - 21-20-02-330-803 Structural Repair - Fiberglass/Kevlar Duct
 - 21-20-02-330-804 Taped Joint Repair - Polyurethane Foam Duct
 - 21-20-02-330-805 Duct End Repair - Polyurethane Foam Repair
 - 21-20-02-330-806 External Patch - Polyurethane Foam Duct
 - 21-20-02-330-807 Structural Repair - Polyurethane Foam Duct
 - 21-20-02-330-808 Inner Lining Repair - Polyurethane Foam Duct
 - 21-20-02-330-809 Duct Section Replacement - Polyurethane Foam Duct
 - 21-20-02-330-810 Tape Replacement - Polyimide Foam Insulation Duct
 - 21-20-02-330-811 Insulation Repair - Polyimide Foam Insulation Duct
 - 21-20-02-330-812 Insulation Replacement - Polyimide Foam Insulation Duct
 - 21-20-02-330-813 Tape Replacement - Fiberglass Insulated Duct
 - 21-20-02-330-814 Insulation and Covering Repair - Fiberglass Insulated Duct
 - 21-20-02-330-815 Insulation and Covering Replacement - Fiberglass Insulated Duct
 - 21-20-02-330-816 External Patch - Reinforced Thermoplastic Laminate Duct
 - 21-20-02-330-817 Structural Repair - Reinforced Thermoplastic Laminate Duct
 - 21-20-02-330-818 Duct End Repair - Reinforced Thermoplastic Laminate Duct

AMM A320

<u>EQUIPMENT/FURNISHINGS - GENERAL</u>	25-00-00	
REPAIRS	801	ALL
Removal of Air Bubbles under Decorative Foil	801	ALL
Minor Repair to the Decor Foil of Flat Composite Components	804	ALL
Repairs to Decor Foil with Pressure Sensitive Adhesive	808	ALL
Repairs to Polycarbonate (PC) Sheet Components	811	ALL
Repairs to Cabin Polycarbonate (PC) Composite Components with Honeycomb Core	817	ALL
Repairs to Nonstructural Components (not in the Cargo Compartments)	824	ALL
Repairs to Surface Damage of Composite Components (not in the Cargo Compartments)	833	ALL
Repair to the Moisture Barrier Foil (Mylar)	839	ALL
Repair to the Nontextile Floor Covering (NTF)	841	ALL
Repair of Insert Nut Connections Installed in Components with Honeycomb Core	849	ALL
Repair of an Overhead Stowage Compartment	856	ALL
Repair of the Lavatory Plastic Wash Basin	864	020-099, 101-199 201-299,
Repair of Painted Components	876	ALL
Toilet Shroud - Repair	883	020-099, 101-199 201-299,
Toilet Seat - Repair	887	ALL
Repair of the Lavatory Floor Pan	891	ALL
Cargo Compartment Linings with Honeycomb Core - General	A802	ALL
Repair/Protection Information		
Repair to the Flanges of the	A816	ALL

**SRM
V2500
GOODRICH**

- 54-20-00 FAN COWL
 - STRUCTURE IDENTIFICATION
 - ALLOWABLE DAMAGE
 - GENERAL REPAIR
 - LIST OF APPROVED REPAIRS
 - REPAIR 001 - FAN COWL EDGE EROSION DAMAGE REPAIR (VRS2728/2729)
 - REPAIR 002 - FAN COWL MAIN AREA FULL PENETRATION REPAIR (VRS2827/2872)
 - REPAIR 003 - FAN COWL SURFACE DAMAGE REPAIR (VRS2828/2873)
 - REPAIR 004 - FAN COWL HONEYCOMB DENT REPAIR (VRS2726/2727)
 - REPAIR 005 - (VRS2838) CANCELLED
 - REPAIR 006 - FAN COWL SCRATCHES OR GOUGE REPAIR(VRS2836/2920/2842)
 - REPAIR 007 - FAN COWL ACCESS PANEL OPENING LANDS SURFACE DAMAGE REPAIR (VRS2839/2923)
 - REPAIR 008 - LEFT FAN COWL OIL FILLER AND CHIP DETECTOR ACCESS DOOR LAND REPAIR (VRS2868)
 - REPAIR 009 - FAN COWL ACCESS PANEL INTERFACE LAND REPAIR (VRS2837/2924)
 - REPAIR 010 - LEFT FAN COWL ACCESS PANELS MAIN AREA SURFACE DAMAGE REPAIR (VRS2869)
 - REPAIR 012 - FAN COWL DOOR EDGE DELAMINATION REPAIR (VRS2834/2877)
 - REPAIR 013 - FAN COWL DOOR DELAMINATION REPAIR (VRS2829/2874)
 - REPAIR 014 - FAN COWL DOOR LANDS SURFACE DAMAGE REPAIR (VRS2830/2876)
 - REPAIR 015 - FAN COWL ACCESS PANEL LANDS SURFACE DAMAGE REPAIR (VRS2832)
 - REPAIR 016 - (VRS2835) CANCELLED
 - REPAIR 017 - (VRS2831/VRS2878) CANCELLED
 - REPAIR 018 - FAN COWL AFT DOOR LANDS REPAIR (VRS2833/2875)

**CMM
V2500
GOODRICH**

- Repair
 - General Repair
 - Repair Number to VRS Number
 - VRS Number to Repair Number
 - Rep - 001 Repair Delamination
 - Rep - 002 Repair Delamination of Fan Cowl Door Edges
 - Rep - 003 Repair Scratches and Gouges
 - Rep - 004 Repair a Dent in Honeycomb Area - DELETED
 - Rep - 005 Repair Edge Erosion
 - Rep - 006 Replace External Paint
 - Rep - 008 Replace Identification Marks, Left Fan Cowl
 - Rep - 009 Replace Latch Bearing Plate, Left Fan Cowl
 - Rep - 010 Repair Outlet Grill, Left Fan Cowl
 - Rep - 011 Replace Identification Marks, Right Fan Cowl
 - Rep - 012 Repair Outlet Grill, Right Fan Cowl
 - Rep - 013 Replace Hinge on Oil Filler Door
 - Rep - 014 Hand Blend and Polish Left Fan Cowl Access Panels
 - Rep - 015 Install Oversize Fasteners on Access Panel, Left Fan Cowl
 - Rep - 016 Replace Hinge on Air Start Door
 - Rep - 017 Hand Blend and Polish Right Fan Cowl Access Panels
 - Rep - 018 Repair Scratches and Gouges on Edges of Right Fan Cowl Access Panels

- [-] 51 - CHAPTER 51 - Standard Practices and Structures
 - [+] 51-00 - STANDARD PRACTICES AND STRUCTURES - GENERAL
 - [+] 51-10 - INVESTIGATION, CLEANUP AND AERODYNAMIC SMOOTHNESS
 - [-] 51-11 - DAMAGE CLASSIFICATION
 - [+] 51-11-00 - DAMAGE CLASSIFICATION
 - [+] 51-11-11 - ALLOWABLE DAMAGE AND OPERATING LIMITS
 - [+] 51-11-12 - PRINCIPAL STRUCTURAL ELEMENTS
 - [+] 51-11-13 - DAMAGE/DEFECT REPORTING
 - [+] 51-11-14 - CLASSIFICATION - REPAIR APPROVAL
 - [+] 51-11-15 - DAMAGE/REPAIR RECORDING

A330

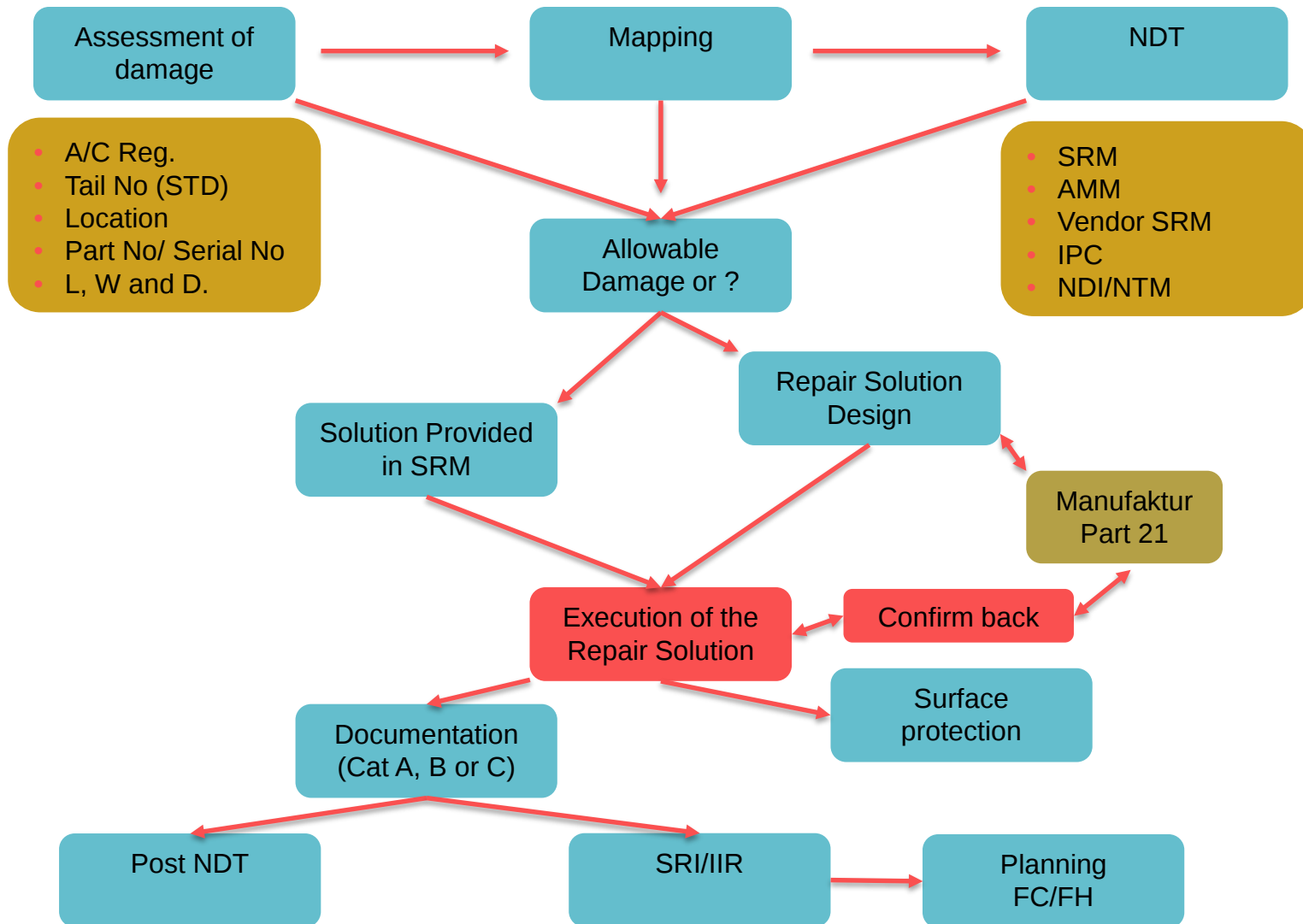
B737-800
SRM 51-00-06

The definitions of the different categories of damage tolerant repairs are as follows:

- (1) Category A Repair: A permanent repair for which the inspections given in the Maintenance Planning Data (MPD) document, are sufficient and no other actions are necessary.
- (2) Category B Repair: A permanent repair for which supplemental inspections are necessary at the specified threshold and repeat intervals.
- (3) Category C Repair: A time-limited repair where supplemental inspections are necessary at the specified threshold and repeat intervals followed by a replaced or reworked repair at the specified time limit.

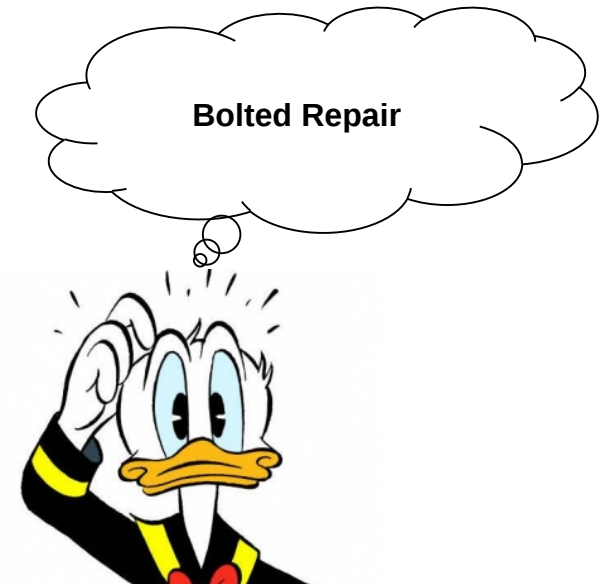
A330

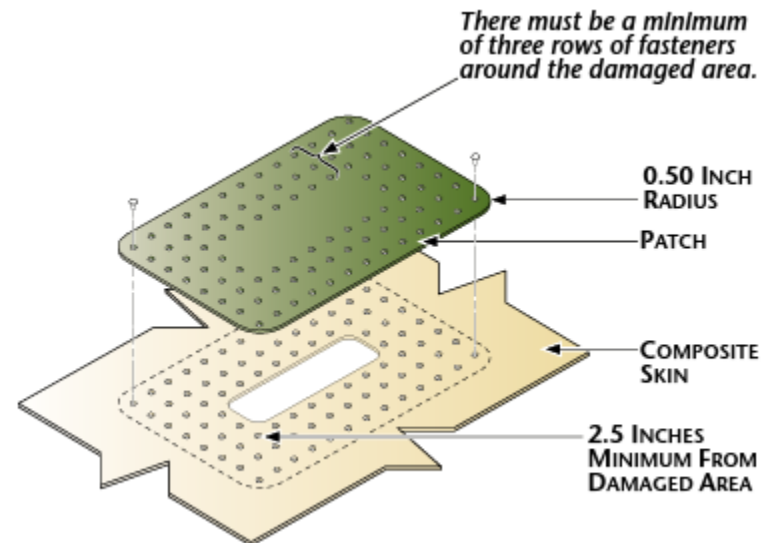
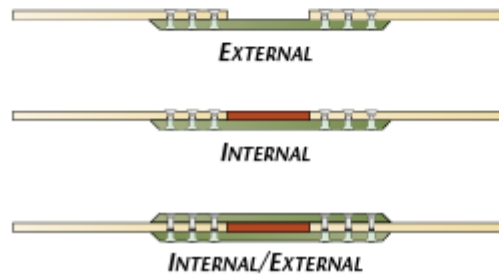
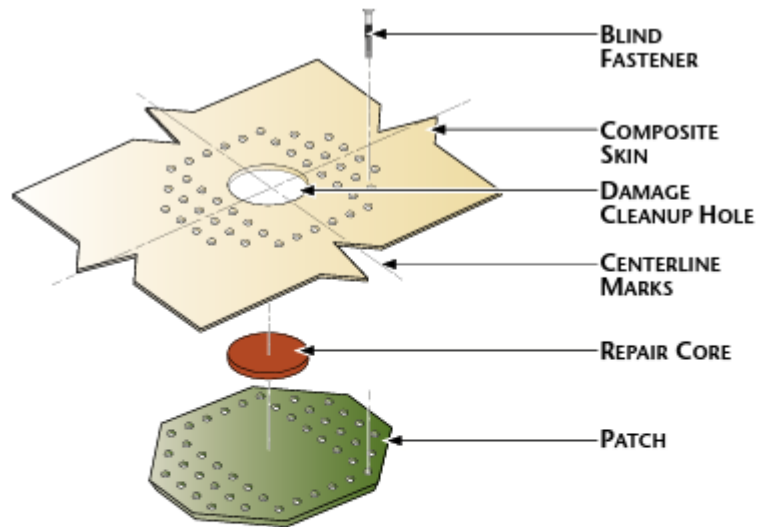
- **CATEGORY A:** A permanent repair design for which baseline zonal inspection (BZI) or Zonal Inspection Program (ZIP) is adequate to ensure continued airworthiness.
- **CATEGORY B:** A permanent repair design that requires supplemental inspections to ensure continued airworthiness. The calculated threshold is stated on the RDAS. Interval and inspection method are specified if the threshold is lower than Extended Service Goal (ESG) (if ESG is defined), or is lower than 1.25 Design Goal (DSG) if ESG is not defined. If the threshold is greater than ESG (if ESG is defined), and greater than 1.25 DSG (if ESG is not defined), this value is provided in the RDAS, as an advanced information-interval and method may be left open (i.e. TBD). Operators who are considering the feasibility to operate their aircraft beyond this threshold should contact AIRBUS at least 12 months before reaching the threshold to get the necessary details of interval and associated inspection method. -
- **CATEGORY C:** A temporary repair design that will need to be reworked or replaced prior to an established time limit. Supplemental inspections may be necessary to ensure continued airworthiness prior to this limit. Repair designs to life limited parts are also categorized as C, whether the repair design life limitation is below or above the original part life limitation. Contrarily to other category C repairs that have to be replaced at the most convenient maintenance check not to exceed their limit, it is generally not recommended replace the life limited parts that have been repaired prior to reach the repair design life limit (or the part life limit, whichever comes first), in particular when that limit greater than the Aircraft Design Service Goal.

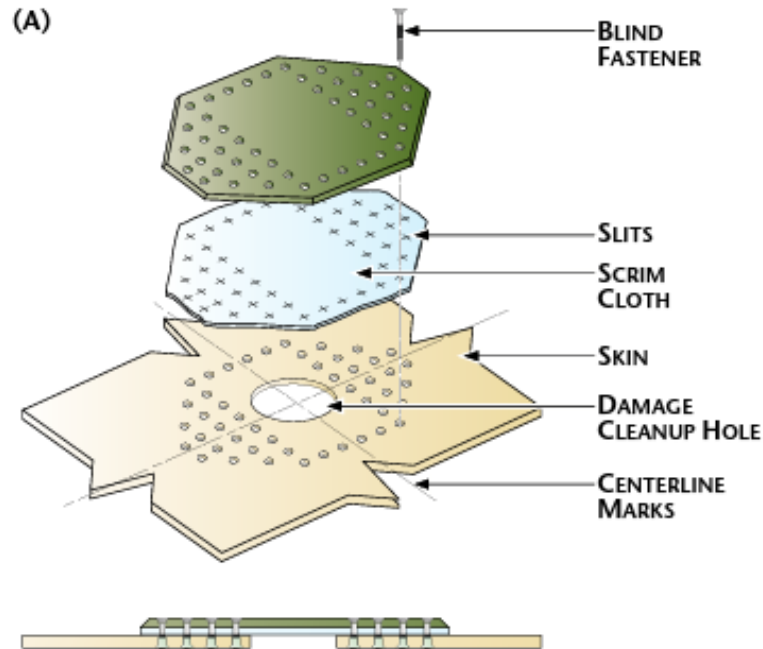


Same as structure repair, With exceptions:

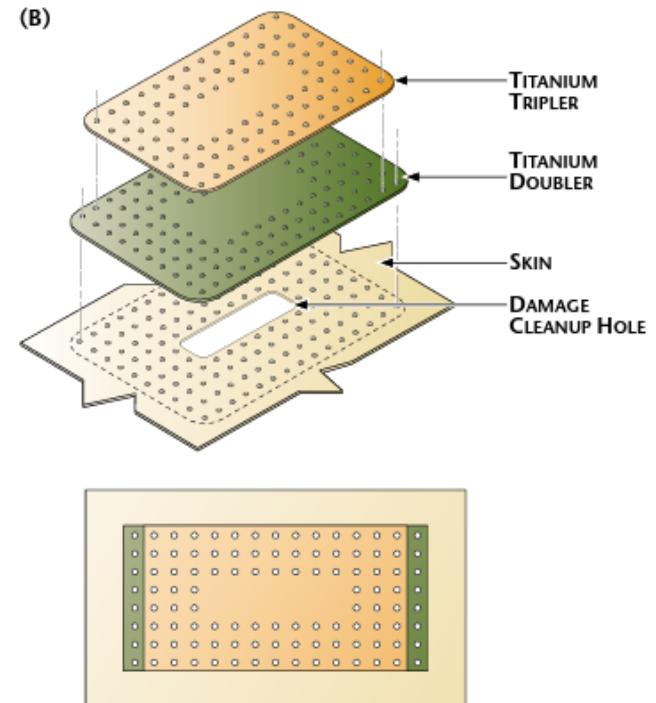
- Used for thicker Monolithic Structure.
- Awareness of conductivity and protection when select material.
- Maybe Cat B repair? Why?
- Drill bits and counter sinks tool.
- Mapping problem.
- Edge margin and hole distance.
- Selection of fastener (Titanium)
- Corrosion awareness.
- always follow SRM Instruction closely.







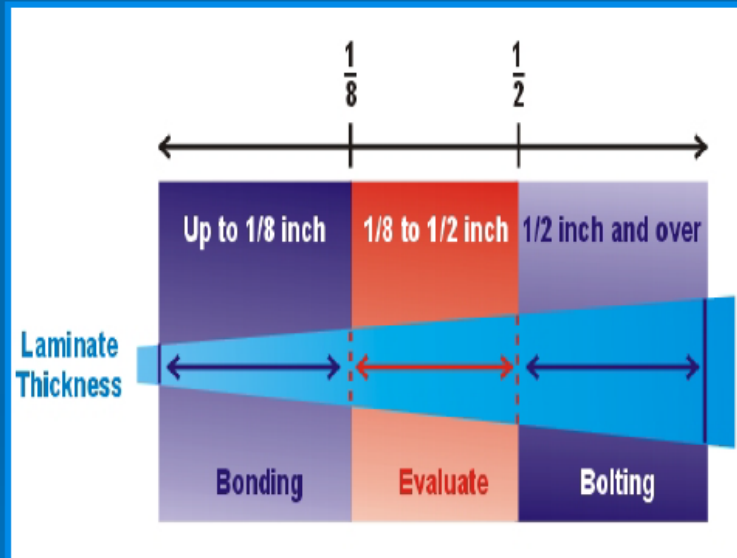
1. Fasteners must have a minimum spacing of $4D$ and a maximum spacing of $6D$
2. Fasteners must have a minimum edge distance of $3D$
3. Fasteners to edge of damage cleanup hole must be a minimum of $3D$
4. Drill pilot holes in patch first. Enlarge holes to final size after transferring holes to composite skin.



1. Corner radius - 0.5 Inches
2. Rivet spacing - 1 Inch
3. Fastener diameter - $\frac{3}{16}$ Inch
4. Edge Distance - $3D$
5. Rivet Spacing - 1 Inch

Figure 11-1-8. (A) Example of a bolted repair, (B) Example of a skin repair using titanium doublers

Bolted Doubler Repairs



- Determining when to use a doubler can be tricky.
- If the laminate is less than $\frac{1}{8}$ inch thick: tapered-scarf repair
- If the laminate is greater than $\frac{1}{2}$ inch thick: doubler repair
- In between: do a repair design analysis

Bolted Doubler Repairs

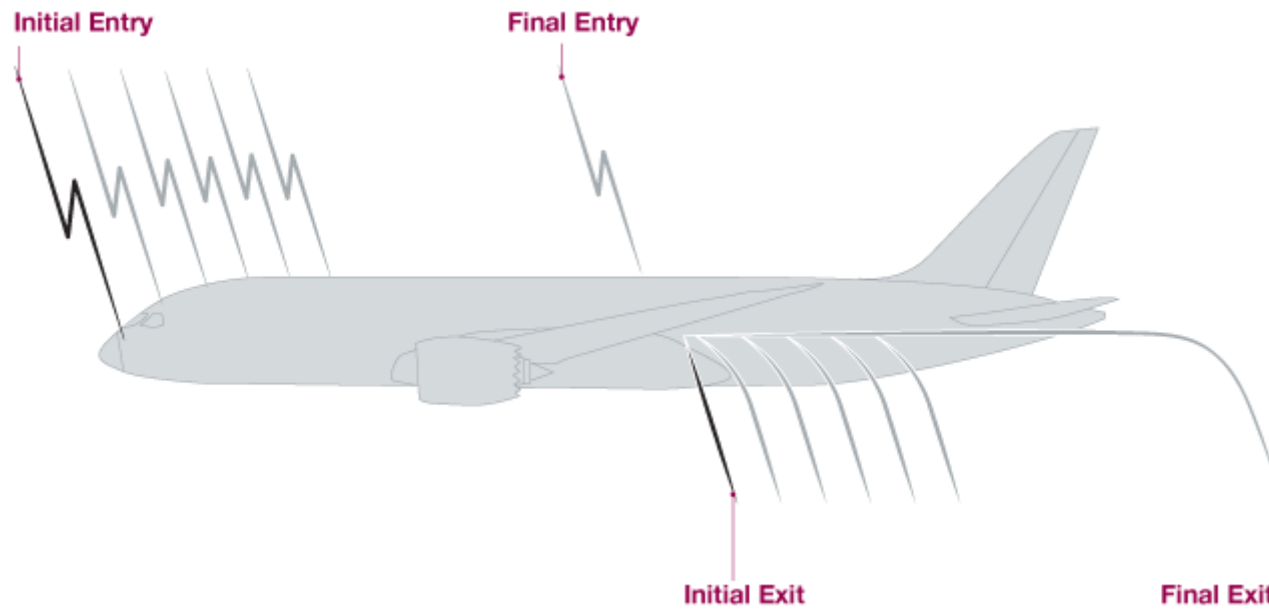
➤ Pros:

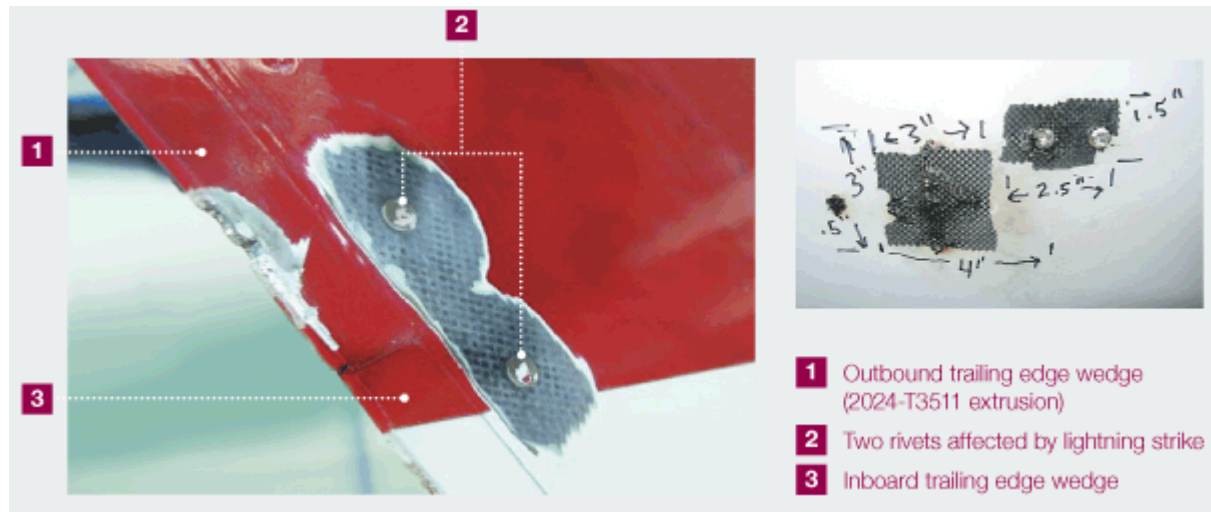
- Can be faster and easier to accomplish compared to taper-scarfed or stepped co-bonded repairs.
- Requires less removal of original structure (compared to step or tapered-scarf repairs) to accommodate the repair.
- Most mechanics are already trained in drilling & fastener installation procedures.

➤ Cons:

- Doublers must be made to closely match surface contour.
 - Can be problematic in compound areas
- Additional tooling may be required to facilitate fabrication of repair patch.
- Autoclave cure of composite patch may be required to achieve properties.

- Risks associated with drilling into underlying structure for fasteners.
- Expensive Ti fasteners required in carbon reinforced structures.
- Sealing of the repair questionable and not often durable.





- Manual Front Matter
- Highlights
- INTRODUCTION
 - General
 - Layout of the Manual Chapters
 - Effectivities
 - Page Block Allocation
 - Application of Numbering System
 - Procedure for Manual Usage
 - List of Effective Pages
 - Publication Alterations
 - Table of Contents
 - Regular Revisions
 - Revision Transmittal Sheet
 - Record of Revision approved by the D.G.A.C. / EASA
 - Temporary Revisions
 - Record of Temporary Revisions
 - List of Temporary Revisions
 - Revision Symbols
 - Registered Trade Names
 - Modification and Service Bulletin Lists
 - Consumable Materials
 - Abbreviations of Stations
 - Airplane Allocation List**
 - Weight Variant Information
 - Structural Repair Inspections

SAS

REG NO: LN-RKM
A/C MSN: 0496
Mode: A330-343
WV: 022
STD: 8

A/C MSN	WV	Model	STD	Version	Customer	Customer Abbreviation	Registration Number
0012	002	A330-342	6	CPA01 0010	DRAGONAIR	HDA	B-HLJ
0493	022	A330-223	7	LTU03 0006	AIR BERLIN	BER	D-ALPG
0494	022	A330-243	7	UAE02 0016	AZUL	AZU	PR-AIU
0496	022	A330-343	8	SAS02 0001	SCANDINAVIAN AIRLINES	SAS	LN-RKM
0497	022	A330-343	8	SAS02 0002	SCANDINAVIAN AIRLINES	SAS	LN-RKH

Theoretical Task

Repair 7 – Repair of Damage to the Edgeband and the Honeycomb Core

1. Applicability

- A. Repair 7 is a typical repair that is applicable to damage to the edgeband and the honeycomb panel.
- B. Repair 7 is not applicable to radomes and floor panels. Refer to SRM 53-10-72 for radomes and SRM 53-00-50 for floor panels.

2. General

- A. Repair 7 is a Category A damage tolerant repair. Refer to SRM 51-00-06 for the definitions of the different categories of repairs.
- B. Refer to Figure 201 for the layout of the repair parts.

3. References

- A. SRM 51-00-06, General – Structural Repair Definitions
- B. SRM 51-70-04, Repair General – Repair Procedures for Wet Layup Materials
- C. SRM 53-00-50, Repair General – Composite Floor Panel Repairs
- D. SRM 53-10-72, Repair General – Nose Radomes

4. Repair Instructions

- A. Find the limits of the damage. Refer to Repair General, Paragraph 4.A.
- B. Remove the damaged plies as given in Repair General, Paragraph 4.B.
- C. Remove all contamination and water from the damaged area as given in Repair General, Paragraphs 4.C and 4.D. Make sure the repair area is fully dry.
- D. Prepare the damaged area as given in Repair General, Paragraph 4.E.
- E. Cut out, clean, and install the core repair plug as given in Repair General, Paragraphs 4.F, 4.G, and 4.H.

Repair Instructions (Continued)

- F. Cure the core repair plug as given in Repair General, Paragraphs 4.I and 4.J.
- G. Clean the repair surfaces as given in Repair General, Paragraph 4.E.
- H. Prepare the repair plies as given in Repair General, Paragraph 4.N through 4.O.
- I. Install the fabric repair plies and the vacuum bag system as given in Repair General, Paragraph 4.P.
- J. Cure the repair as given in Repair General, Paragraph 4.Q.
- K. Examine the completed repair as given in Paragraph 4.R.
- L. Apply the finish to the repair area as given in Repair General, Paragraph 4.S.
- M. After repair of a flight control surface, check to see if it must be balanced again. Refer to SRM 51-60-00 for the procedures.

FIND THE NUMBER OF PLIES, PLY ORIENTATION, AND THE INITIAL MATERIAL IN THE SPECIFIED COMPONENT STRUCTURE IDENTIFICATION. REFER TO REPAIR GENERAL, TABLES 202 THROUGH 204 FOR THE REPAIR MATERIAL

ONE PLY OF BMS 9-3, TYPE H2 OR H3, OR TWO PLIES OF BMS 9-3, TYPE D. IMPREGNATE THE FABRIC WITH LAMINATING RESIN. FOR LESS THAN FULL DEPTH CORE REPLACEMENT, USE TWO PLIES OF BMS 9-3, TYPE H2 OR H3, OR TWO PLIES OF BMS 9-3, TYPE D FOR EACH TYPE H2 OR H3 PLY YOU USE. IMPREGNATE THE FABRIC WITH LAMINATING RESIN

TAPER SAND THE EDGE BAND
1

