

NACELLE DAMAGE DESCRIPTION (NDD) GUIDE AND EXAMPLES

—
23rd March 2017



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| SAFRAN | | DAMAGE DESCRIPTION | | Cust. Request Reference | |
|--|--|------------------------------|--|-------------------------|-----------------|
| 24/7 Technical Call Center | | CUSTOMER SUPPORT ENGINEERING | | Date of Request | |
| Phone : + (33) 864 149 033 Fax : (33) 864 149 035 | | | | Page : 1 / 3 | |
| <p>IMPORTANT NOTE: All highlighted block must contain an entry in order to process a repair request. Inaccurate or missing information can result in delays, please ensure all details are addressed and all questions answered. For all request please contact anacelle.csc@safran.fr. A response will be provided after receipt of the complete damage description.</p> | | | | | |
| <hr/> <hr/> | | | | | |
| CUSTOMER INFORMATION | | | REQUEST TYPE AND PRIORITY | | |
| Contact Name | | Resp. need date | | Priority | |
| Requester entity | | | | | |
| E-mail Address | | | | | |
| Phone Number | | | | | |
| <hr/> | | | | | |
| AIRCRAFT INFORMATION | | | | | |
| Program | | Aircraft MSN | | | |
| Airline | | A/C Flight Hours (FH) | | | |
| Aircraft Tail Number | | A/C Flight Cycles (FC) | | | |
| AFFECTED NACELLE COMPONENT INFORMATION | | | MAIN AFFECTED DETAILED COMPONENT INFO | | |
| End item Designation | | Part Designation | | | |
| End item Part Number | | Part Number | | | |
| End item Serial Number | | Serial/Lot Number | | | |
| End item Flight Hours | | Engine Position | | | |
| End item Flight Cycles | | LH/RH on engine | | | |
| ATA Subcomp Name | | ATA Subcomp Num | | | |
| <hr/> | | | | | |
| EVENT DESCRIPTION | | | | | |
| Root cause | | | | | |
| Oper. consequences | | | | | |
| Nacelle Situation | | | | | |
| MAIN DAMAGE DESCRIPTION | | | MAX DAMAGE QUANTITY/DIMENS. (mm) | | |
| Main Damage Type | | Max diam. or length | | | |
| Affected area | | Min remaining thick. | | | |
| O'clock loc. of nacelle | | Max affected plies | | | |
| Main Location | | | | | |
| <p><small>Data: All damage must be described page 2</small></p> | | | | | |
| NON DESTRUCTIVE TEST | | | PREVIOUS REPAIR IN THE DAMAGED AREA (IF ANY) | | |
| NDT performed | | Repair doc ref. | | | |
| Findings | | Acoustic surface loss | | | mm ² |
| <hr/> | | | | | |
| OTHER DETAILS | | | | | |
| <div style="border: 1px solid black; height: 100px; width: 100%;"></div> | | | | | |



1

REMINDER

1. Reminder (as stated in “User guide” of NDD worksheet)

▪ Basics

- ◆ Check that the repair of reported damage is not already addressed in the technical documentation (AMM, SRM, CMM, SB...)
- ◆ The **estimated cost of repair** is not near to, or does not exceed, the cost of the replacement part
- ◆ All **highlighted blocks entry fields in yellow** of “NDD” worksheet have been **completed** → Inaccurate or missing information can result in delays

1. Reminder (as stated in “User guide” of NDD worksheet)

▪ Damage information required

- ◆ The damage report only concerns one end item and its related damage(s). Be sure to return **one separate Damage Description form per each end item**.
- ◆ Digital **photos** have been provided showing the **damage close-up, and from afar**; (the damage location, relative to the main structure, can be clearly seen).
- ◆ Detailed sketch(s), and/or marked-up photograph(s) adequately describe the following:
 - ☐ Damage **size** (length, width and depth)
 - ☐ **Location** (radial position (degrees or clock position), Power Plant Station (PPS) or proximity to adjacent landmark structure such as edge of part, local stiffeners, doublers, access panels, latches, hinges, ribs, fastener rows, etc.)
 - ☐ Clearly **identify damaged part**
 - ☐ **Orientation** (view looking forward or aft)
 - ☐ **CMM IPL/AMM/IPC references** should be included whenever possible.

2

MANDATORY INFORMATION



2.1 Why and which data are needed?

- **The highlighted blocks entry field in yellow are necessary and/or mandatory for the following reasons:**
 - Some information (such as part number, serial number, ATA reference, FC/FH...) are **needed to raise the Repair Design Approval Sheet (RDAS)** that substantiates the repair. If data are missing, RDAS can not be issued
 - Some information are **needed to develop the repair procedure** (such as damages description and dimensions, non destructive tests performed and associated results...). If data are missing, the repair procedure can not be developed
 - Some information (such as Airline owner, operational consequences, nacelle situation...) are **needed to capitalize** in SAFRAN Nacelles databases the damage occurrences and consequences for customer. This will permit to **prioritize field actions and propose customized solutions** to our customers

2.2 Relation with RDAS (Repair Design Approval Sheet)

| | | | |
|---|------------------------------|--|-------------------------|
| SAFRAN 2477 Technical Call Center Phone : + (33) 164 148 033 Fax : + (33) 164 148 035 | DAMAGE DESCRIPTION | | Cust. Request Reference |
| | CUSTOMER SUPPORT ENGINEERING | | Date of Request |
| | | | Page : 1 / 3 |

IMPORTANT NOTE: All highlighted block must contain an entry in order to process a repair request. Inaccurate or missing information can result in delays, please ensure all details are addressed and all questions answered, or all request please contact aircells.csp@snecma.fr. A response will be provided after receipt of the complete damage description.

| | | | |
|-----------------------------|--|----------------------------------|--|
| CUSTOMER INFORMATION | | REQUEST TYPE AND PRIORITY | |
| Contact Name | | Resp. need date | |
| Requester entity | | Priority | |
| E-mail Address | | | |
| Phone Number | | | |

| | | | |
|-----------------------------|--|----------------------------------|--|
| AIRCRAFT INFORMATION | | REQUEST TYPE AND PRIORITY | |
| Program | | Aircraft MSN | |
| Airline | | A/C Flight Hours (FH) | |
| Aircraft Tail Number | | A/C Flight Cycles (FC) | |

| | | | |
|---|--|--|--|
| AFFECTED NACELLE COMPONENT INFORMATION | | MAIN AFFECTED DETAILED COMPONENT INFO | |
| End item Designation | | Part Designation | |
| End item Part Number | | Part Number | |
| End item Serial Number | | Serial/Lot Number | |
| End item Flight Hours | | Engine Position | |
| End item Flight Cycles | | LH/RH on engine | |
| ATA Subcomp Name | | ATA Subcomp Num | |

| | |
|--------------------------|--|
| EVENT DESCRIPTION | |
| Root cause | |
| Oper. consequences | |
| Nacelle Situation | |

| | | | |
|--------------------------------|--|---|--|
| MAIN DAMAGE DESCRIPTION | | MAX DAMAGE QUANTITY/DIMENS. (mm) | |
| Main Damage Type | | Max diam. or length | |
| Affected area | | Min remaining thick. | |
| O'clock loc. of nacelle | | Max affected plies | |
| Main Location | | | |

Data: All damage must be described on page 2

| | | | |
|-----------------------------|--|---|-----------------|
| NON DESTRUCTIVE TEST | | PREVIOUS REPAIR IN THE DAMAGED AREA (IF ANY) | |
| NDT performed | | Repair doc ref. | |
| Findings | | Acoustic surface loss | mm ² |

EC00033F01mm

| | | | |
|--|--|-------------------------------------|--|
| SAFRAN | | REPAIR DESIGN APPROVAL SHEET | |
| Design Organisation Approval EASA.21J.413 | | Revision: A Page 1 of 2 | |

| | |
|--------------------------|---------------|
| 1. IDENTIFICATION | |
| A/C Type : T900_A380 | MSN: 58 |
| ATA: 78-20-03 | FC: 2943 |
| P/N: 178CR140000600 | S/N: FFD15070 |
| FH: 28712 | |

| | |
|--|--|
| 2. DAMAGE / REPAIR DESCRIPTION | |
| Title: Upper Bifurcation seal landing gouge | |
| Damage Description Reference: TS STR 013_17 & Additional data | |
| Damage / Repair description : During inspection, the upper bifurcation seal landing of the IFS has been found with gouge. Refer to the damage description for more details. | |
| Revision: N/A | |
| The repair consists in cutting out the damage, replacing the wear plate and installing a titanium doubler. Refer to the Service Instructions for further information. | |

| | | | |
|--|--|-------------|--|
| 3. SERVICE INSTRUCTION / PSCM REFERENCE: SIG OA380T-735 | | Revision: A | |
| REPAIR DESIGN JUSTIFICATION REFERENCE: ASY_DOAG_00235_17 | | Revision: A | |

| | | | |
|--|----------------------|--|--|
| 4. REPAIR CLASSIFICATION | | MAJOR <input type="checkbox"/> MINOR <input checked="" type="checkbox"/> | |
| REPAIR CATEGORY: | | SPECIFIC MAINTENANCE REQUIREMENTS : | |
| A <input checked="" type="checkbox"/> Permanent Repair with no additional requirements | Threshold | | |
| B <input type="checkbox"/> Permanent Repair with inspection required | Interval | | |
| C <input type="checkbox"/> Temporary or life limited repair | Method of Inspection | | |
| | | If temporary repair life limitation | |

| | |
|---|-------------|
| DESIGNATED AIRWORTHINESS ENGINEER APPROVAL | |
| Name : Frédéric AMBLARD | Signature : |
| Date : March 6th, 2017 | |

EC00033F01mm

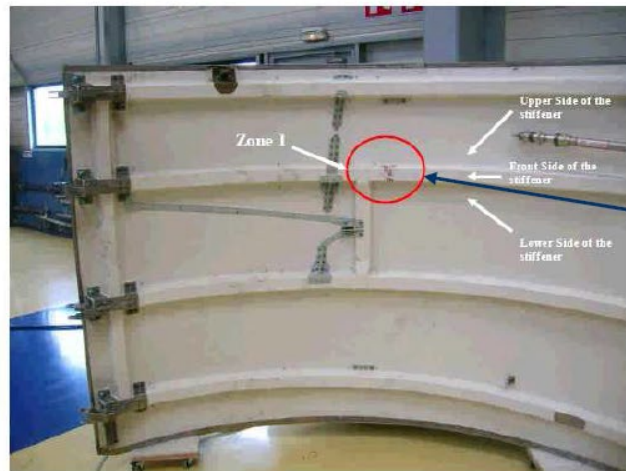
The technical information described above is approved under the authority of EASA approved Design Organisation Number EASA 21J.413 and per EASA rules Part 21 Subpart M. This approved data is based on the information provided by the requester to Safran Nacelles. Safran Nacelles disclaims any and all responsibilities for incorrect, inaccurate or incomplete information provided by the requester (including modification and Supplemental Type Certificate status). If this structural repair affects the compliance to a mandatory requirement, it is the operator's responsibility to obtain the necessary approval from its National Aviation Authority.



3

EXAMPLE OF NACELLE DAMAGE DESCRIPTION ILLUSTRATIONS

3.1 Example 1: cracks on composite structure



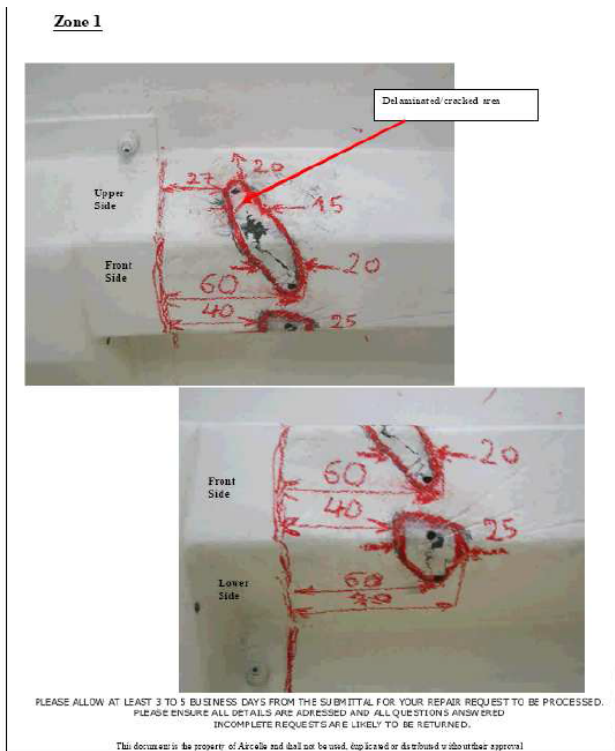
THE STIFFENER N° 2 HAS BEEN FOUND CRACKED ON THE FAN COWL AFTER DVI (DETAILED VISUAL INSPECTION)

NOTA : all dimensions are in millimeters

3.1 Example 1: cracks on composite structure

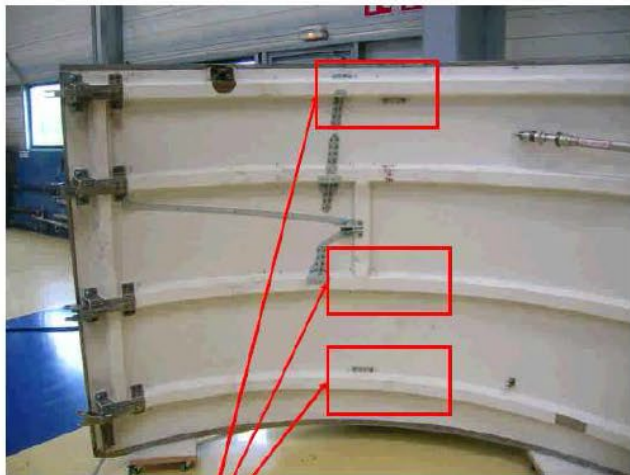
THE CRACKS ARE VISIBLE BUT THE ASSOCIATED DELAMINATION CAN ONLY BE DETECTED WITH NDT.

IN THIS CASE, THE INSPECTOR HAS PERFORMED AN ULTRASONIC TEST.



DAMAGES HAVE BEEN LOCATED USING THE CLOSEST LONGITUDINAL STIFFENER AS REFERENCE.

3.1 Example 1: cracks on composite structure



These areas on the three other stiffeners have been controlled by U-S inspection. They are free of any damage.

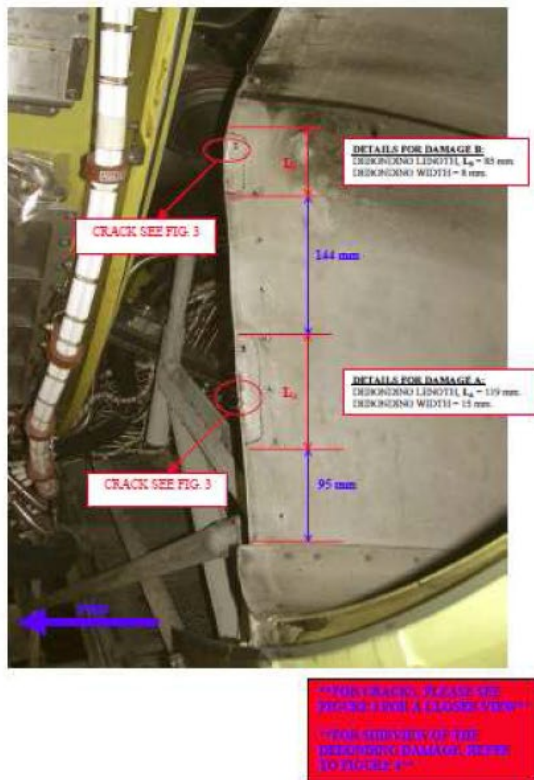
**THE OTHER STIFFENERS
AND THE OUTER SKIN HAVE
BEEN INSPECTED (ULTRA
SONIC), TO CONFIRM THE
DVI : THEY ARE FREE OF
DAMAGE.**

External skin : the external skin is free of damage (see following inspected areas)



3.2 Example 2: Impacts on metallic structure

FIGURE 2. ACTUAL PHOTO OF THE DAMAGES

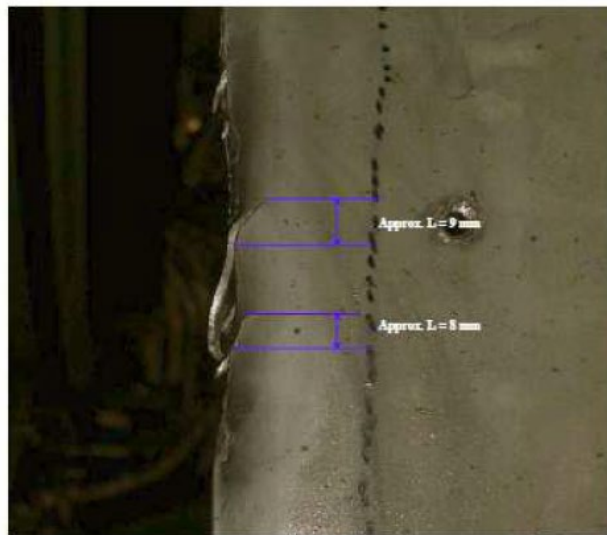


TAP TEST HAS BEEN PERFORMED AROUND THE 2 VISIBLE DAMAGES TO DETECT THE DISBONDED AREA.

THE DISBONDED AREA ARE LOCATED USING THE FLOW PATH FAIRING AS REFERENCE.

3.2 Example 2: Impacts on metallic structure

DAMAGE A

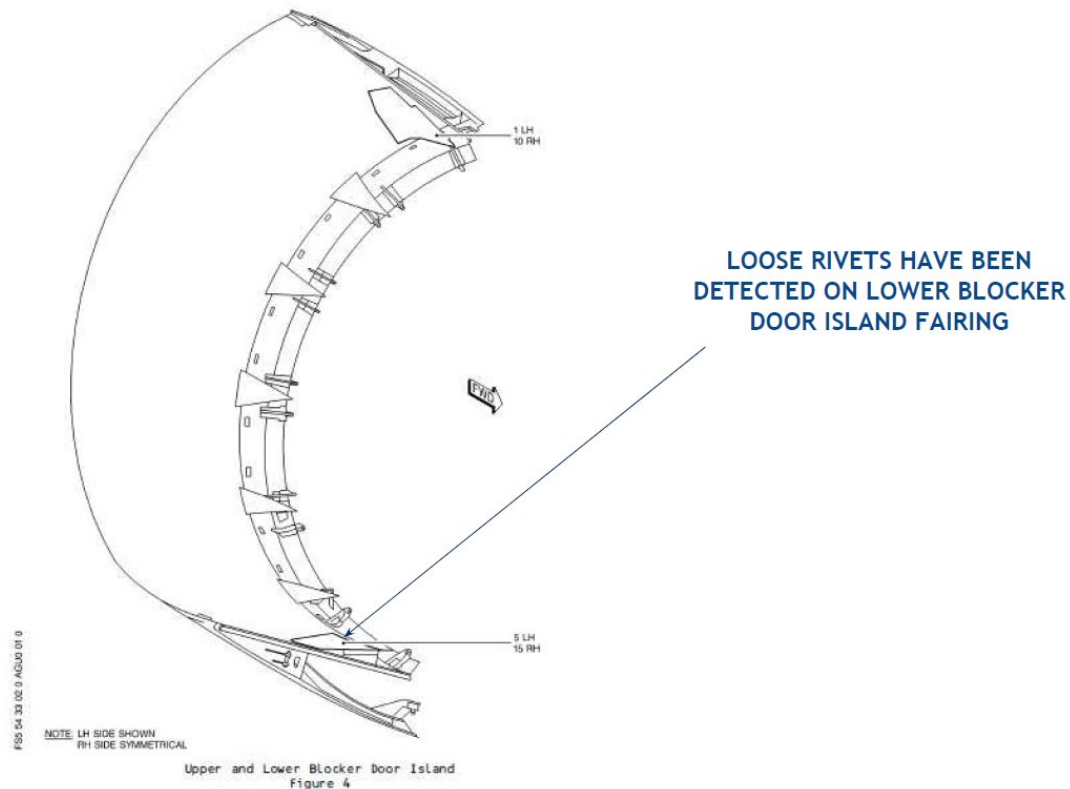


FLUORESCENT PENETRANT
HAS BEEN PERFORMED ON
BOTH DAMAGE FOR CRACK
DETECTION

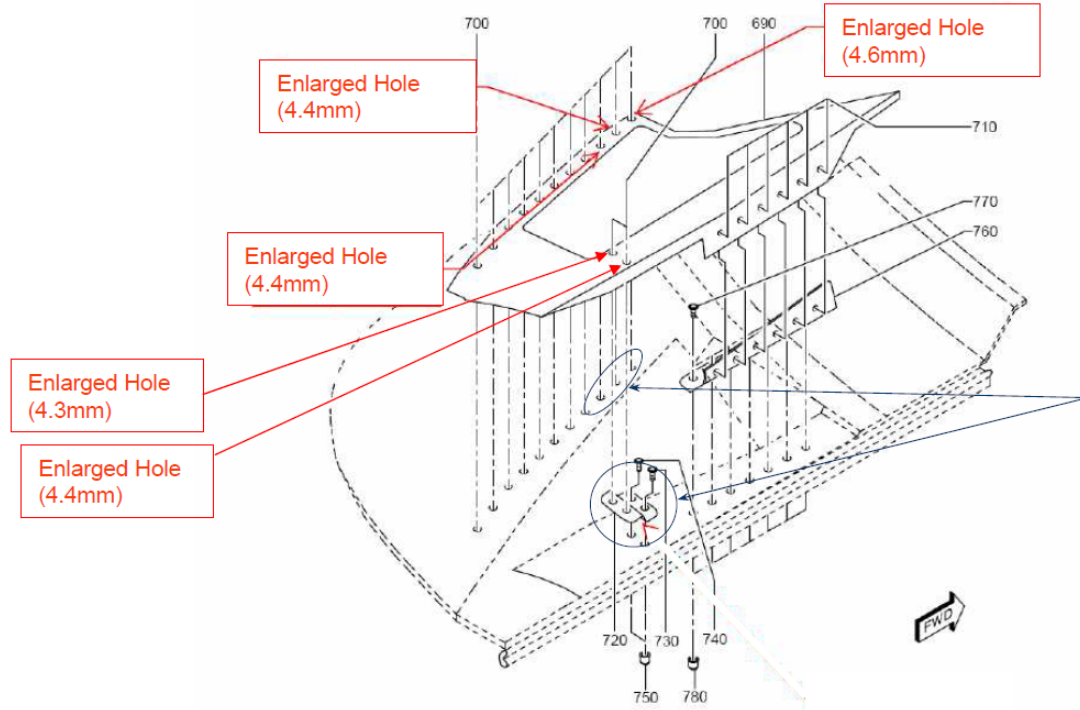
DAMAGE B



3.3 Example 3: Loose rivets on composite parts



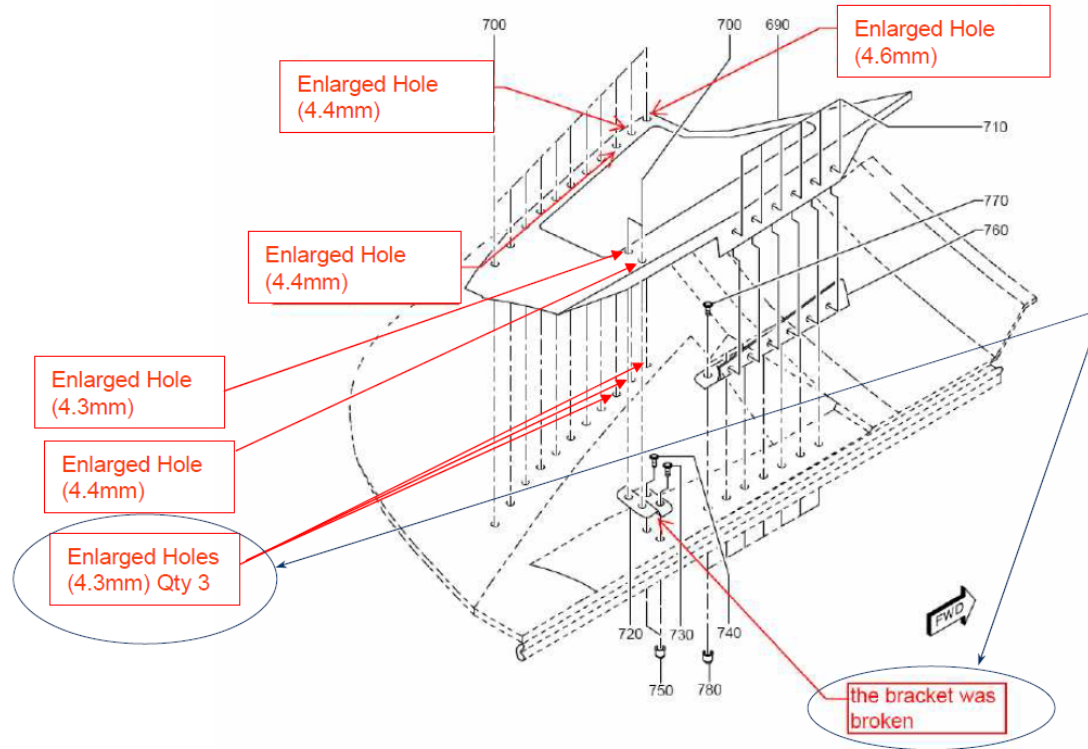
3.3 Example 3: Loose rivets on composite parts



**LOOSE RIVETS GENERALLY HAVE
CONSEQUENCES ON LOWER PARTS
OF THE ASSEMBLY**

**IN THIS CASE : METALLIC BRACKET
AND ACOUSTIC PANEL MUST BE
INSPECTED (MEASUREMENT OF
HOLES + NDT)**

3.3 Example 3: Loose rivets on composite parts



**METALLIC BRACKET WAS FOUND
BROKEN, AND HOLES IN ACOUSTIC
PANEL WERE ALSO ENLARGED.**

**COMPOSITE PARTS WERE FREE OF
DELAMINATION.**



4

REQUESTED DATA

4. Technical data requested pending damage type

▪ Location:

- > Distance between the edge of the damage and the center of fasteners
- > Distance between edge of the damage and edge of the panels (leading edge, trailing edge, 12OC edge, 6OC edge)
- > Distance between 2 fasteners is given from center of fasteners
- > Distance between 2 damages is given from edges of damages
- > Relative position of damages on each skin (sandwich area, through damage)

▪ Inspection (list is not exhaustive, you must refer to the Non Destructive test manual for more details):

- > Metallic skins:
 - ♦ Fluorescent Penetrant Inspection for cracks
 - ♦ Detailed visual inspection
 - ♦ Electrical conductivity... (pending of the damage)
 - ♦ Eddy Current test
- > Composite area:
 - ♦ Tap test for disbond in sandwich area (between skin and honeycomb core)
 - ♦ Ultrasonic inspection (monolithic and sandwich) for delamination
 - ♦ Detailed visual inspection

4. Technical data requested pending damage type

- **Impacts on composite sandwich / monolithic area:**

- > Location of the damage, distance with other damages and fasteners
- > Depth of the damage or number of missing/damaged plies
- > Impacts on honeycomb core,
- > Delamination / disbond / dents

- **Delamination:**

- > Location of the damage, distance with other damages and fasteners
- > Length and width
- > Depth of the damage or number of missing/damaged plies

- **Disbond:**

- > Location of the damage, distance with other damages and fasteners
- > Length and width

4. Technical data requested pending damage type

- **Dent, wear, gouge, scratch, hole:**

- > Location of the damage, distance with other damages and fasteners
- > Length and width
- > Depth of the damage or number of damaged plies

- **Cracks:**

- > Location of the damage, distance with other damages and fasteners
- > Length

- **Corrosion - after corrosion removal:**

- > Location of the damage, distance with other damages and fasteners
- > Length and width
- > Depth of the damage

- **Elongated holes:**

- > Location of the damage, distance with other damages and fasteners
- > Delamination
- > Broken / cracked metallic parts linked to the fasteners

5

DAMAGE DESCRIPTION CHECK LIST



5. Damage description check list – refer to NDD “User Guide” sheet

BASICS

- ☐ Check that the repair of reported damage is not already addressed in the technical documentation (AMM, SRM, CMM, SB...)
- ☐ The estimated cost of repair is not near to, or does not exceed, the cost of the replacement part.
- ☐ All highlighted blocks entry fields in yellow of “NDD” worksheet have been completed. Inaccurate or missing information can result in delays. If AOG be sure to provide aircraft location and next scheduled flight.

DAMAGE INFORMATION REQUIRED

- ☐ The damage report only concerns one end item and its related damage(s). Be sure to return one separate Damage Description form per each end item.
- ☐ Digital photos have been provided showing the damage close-up, and from afar; (the damage location, relative to the main structure, can be clearly seen).
- ☐ Detailed sketch(es), and/or marked-up photograph(s) adequately describe the following:
 1. Damage size (length, width and depth)
 2. Location (radial position (degrees or clock position), Power Plant Station (PPS) or proximity to adjacent landmark structure such as edge of part, local stiffeners, doublers, access panels, latches, hinges, ribs, fastener rows, etc.)
 3. Clearly identify damaged part.
 4. Orientation (view looking forward or aft)
 5. CMM IPL/AMM/IPC references should be included whenever possible. For guidance, refer to the structural identification section of the Structural Repair Manual (SRM).
- ☐ The cause of damage has been given. If cause is unknown, please state “Unknown”.
- ☐ The damage has been classified, and described according to the table below:

| | |
|--|---|
| Cracks in metallic components | Specify NDT method used to determine crack length and crack ends. |
| Nicks, scratches and gouges in metallic structure | Provide minimum remaining material thickness at location of defect after blending per SRM Chapter 51. Alternatively, if minimum remaining thickness is not possible, determine the material loss (depth). |
| Corrosion | Provide minimum remaining thickness after corrosion removal has been accomplished using methods available in applicable SRM |
| Oversized / elongated holes and loose rivets | Determine maximum diameter of hole required to remove elongation damage and confirm if underlying structure is affected. Maximum hole diameter and countersink diameter and depth along with edge distances need to be provided |
| Composite surface damage | Damage area and adjacent areas must be tap tested to detect any disbond from the core or ply delamination's are present. Determine how many plies are damaged. Provide a detailed mapping. |
| Composite edge erosion damage | Determine the number of structural (carbon) plies damaged (light sanding may be required to identify actual damage depth). |

Before submitting a Damage Description form, review this checklist line-by-line to ensure ALL boxes are checked. If any boxes cannot be checked, please contact your Field Service Representative for guidance.