A300-600
Center Wing Box
Ultrasonic Inspection

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History

Fastener holes of center wing box (CWB) lower skin

*Ref. A300-600 Non-Destructive Testing Manual 57-10-45, Procedures A, B, C*

- Airworthiness Directive (AD) driven inspection
- Original inspections began in 2006 with eddy current rotor bolt hole
  - Cracks were addressed per Airbus procedure
  - Required follow-up inspections conducted with ultrasonic testing (UT)
- Written procedures made no mention of removing sealant or paint, nor mentioned adjusting the gain during inspection
  - Wheel well area is susceptible to fuel and hydraulic leaks, which resulted in excess sealant and peeled/bulging paint in the inspection area
  - Non-routines were written to clean area
  - Findings resulted in inspections being elevated to FedEx & Airbus Engineering for repair procedures
Adjustment of Equipment on Reference Block

Ultrasonic Equipment Settings

- **Frequency**: 10MHz
- **Range**: 140 mm (5.512 in.)
- **Delay**: 0.000.s/s
- **MLT Velocity**: 3240 m/s (0.126 in./.s)
- **Rectification Mode**: Fullwave
Instrument Calibration

- **Procedure C Table**
  - Standard hole echo with slot echo/EDM notch
  - Range setting with location of slot echo on base line

<table>
<thead>
<tr>
<th>HOLE TYPE TO BE INSPECTED</th>
<th>HOLE ECHO “a”</th>
<th>SLOT ECHO “b”</th>
<th>REFERENCE HOLE</th>
<th>SEARCH UNIT</th>
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<td>D</td>
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</tbody>
</table>

DIAGRAMS FOR REFERENCE ONLY
A300-600 Non-Destructive Testing Manual 57-10-45, Procedures A, B, C
Preparation for Inspection – Procedure A Steps

A. Make sure that the surface to be inspected is clean and smooth
B. Check the inspection area for any visible damage or discontinuities

No NTM reference to remove paint
Preparation for Inspection – Procedure A

Inspection Areas (possible crack locations)
Preparation for Inspection – Procedure B

Inspection Area (possible crack location)

Procedure “B”

Wing

Fuselage

OUTBOARD

AFT

DIAGRAMS FOR REFERENCE ONLY

A300-600 Non-Destructive Testing Manual 57-10-45, Procedures A, B, C
Preparation for Inspection – Procedure C

Inspection Area (possible crack location)
UT Re-Inspection Sealant Challenge Encountered

- Excess sealant around fasteners and seams to repair fuel leaks
  - Transducer not positioned correctly

![Diagram showing areas of concern with orange and black markers indicating what needs paint and sealant removed.](image-url)
Transducer Positioning

Sealant NOT removed

Sound path is NOT aligned with the hole

Sealant has been removed

Sound path is aligned with the hole
UT Re-Inspection Paint Challenge Encountered

- Spray paint not allowed, roll or brush application only
Preparation for Inspection – Procedure B & C

2011 revision

A. Make sure that the surface to be inspected is clean and smooth
B. Check the inspection area for any visible damage or discontinuities

No NTM reference to remove paint

2016 revision

A. Check paint condition in inspection area and remove it if necessary
B. Check sealant condition on the edge to the splice. If the sealant prevents getting to hole echo, then remove sealant
C. Make sure that the surface to be inspected is clean and smooth
D. Check the inspection area for any visible damage or discontinuities
Example
Procedural Change to On-Aircraft Inspection Procedure

A. Apply couplant in the area to be inspected.

B. Couple the search unit to the inspection surface in a similar position to that shown in Figure 415.

C. Adjust the search unit position to get the signal from the bolt hole at the same position than during the calibration step. Adjust the gain to get a 100% FSH (full screen height) of the bolt hole.

D. Do swivel scan at this position.

E. Cracks will be indicated by a change over signal from the bolt hole to the crack. The bolt hole signal will fall and the crack signal will rise as the search unit is moved away from the bolt hole position, towards the crack position.

F. Measure the length of all detected cracks in accordance with Chapter 51-10-07, Page Block 401.

G. Repeat the Steps A thru F for all the inspection areas.
Summary

- Inspection procedures were incomplete
  - Procedures taken literally, without applying standard practices, could result in missed or inaccurate indications
- Challenge all operators to consider reviewing procedures
  - Document the tribal knowledge applied every day
  - Share best practices
Questions?