





Inspection for Ice or Water in Honeycomb

Excitation methods:

- Cooling from flight (Flight Line procedure)
- Air Heater

Boeing Procedure 737 NDT, Part 9, 51-00-01 **Aircraft**: B737-200, -200C, -300, -400, -500

AT - Kit: 99A55407320000 and 99A55407321000

\$FLIR





The ALOHA Incident



On April 28, 1988, at 1346, a Boeing 737-200, N73711, operated by Aloha Airlines Inc., as flight 243, experienced an **explosive decompression and structural failure at 24,000 feet**, while en route from Hilo, to Honolulu, Hawaii.

Approximately 18 feet of the cabin skin and structure aft of the cabin entrance door and above the passenger floor-line separated from the airplane during flight.

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System for Inspection of Fuselage



Defects like delaminations, loose rivets or water inclusions can be reliably detected within short time.



Inspection of Fuselage







Automation Technology

Inspection of Fuselage



Test panel (section of B737 fuselage): Large area disbondings can be clearly Identified in the result image

Vision Systems for Automation









INSPECTION KITS





Automation Technology

Accessories-Kit "Hot Air"

Detection of trapped water or ice in honeycomb, e.g. elevator, rudder

Applicable to:

Airbus

- Procedure: 51-10-25, 55-40-02, 55-20-08, 55-20-11
- Aircraft: A300-600
- Kit No: 99A55407320000

Boeing

- Boeing Procedure 737 NDT, Part 9, 51-00-01
- Aircraft: B737-200, -200C, -300, -400, -500





JetCheck Fuselage Inspection of Disbonds in bonded Aluminium Structures, e.g. disbonds between fuselage skin and doublers Applicable to:

- Boeing Procedure 737 NDT, Part 9, 51-00-04 and 53-30-01
- Aircraft: B737-200, -200C, -300, -400, -500





Thermography-Base-Kit "C-Check Professional"

Detection of trapped water or ice in honeycomb, e.g. elevator, rudder Detection and Inspection of Repairs in composite structures

Applicable to:

- Airbus
 - Procedure: 55-20-07, 51-10-25, 55-40-02, 55-20-08, 55-20-11
 - Aircraft: A300-600

Boeing

- Boeing Procedure 737 NDT, Part 9, 51-00-01
- Aircraft: B737-200, -200C, -300, -400, -500





EXAMPLES OF COMPOSITE INSPECTION





Delamination of Stringers in CRP





Results of Measurements

<section-header><image><image><image><image>







Results of Measurements

Sample #3 - Lasershock-induced Delamination







Impact Damage in CFRP

Delamination in CFRP due to mechanical impact shown at different depth. Near surface -> rear surface



Defect in Honeycomb



Inspection of CFRP



Testing of propeller blade (Transall)



Delamination in propeller blade







CFRP structure with foam core













Inspection of CFRP Prepreg material





Vibro Thermography Applications

Inspection of Turbine Blades



Turbine Blade: Surface (cracks are marked)



- Result images front and rear: - Indications from surface cracks are marked red
- All other indications are caused by hidden cracks or clusters of micro-cracks





Vibro Thermography Applications

Crack Detection in Wheels







Result images: Detected voids are marked





Pulse Thermography Applications

Inspection of Laser Welded Seams



Automation Technology





Thank you very much for your attention.



IrNDT Add on Module: Database

Database Module

Implementation of a Client/Server Database for Quality Assurance, Trends Assessment ⇒ Management of Inspection Results and associated Data, Measurement Parameters

Data Access via Internet or Intranet from any Location on the World.

Allows Remote Evaluation and Interpretation of the Measurement Results ⇒ Reduced need on the skills and experience of the local inspector



Database Module

- Powerful Search and Sorting Functionality
- Supports all kind of Result-Images, IR-Images, Standard Images (JPEG, TIFF, BMP, ...) and associated Data; Supports e.g. Boeing Maus V Ultrasound C-Scans
- Automated loading of Result-images and Measurement Parameters from DB-Client or DB-Server
- Direct export of Result Images, associated Data and Measurement Parameters to DB on the Push of a Button
- Database Client contains powerful Image Processing Modules: Image Stitching, Image Comparison, Image Processing, Image Measurement, Image Labeling, Word Report Generator, PPT Report Generator

Automation Technology







Import & Export

- · Import and export of any images
- Assign additional information to each image like keywords, measurement parameters, descriptions ...
- Assign values from a predefined list, e.g. materials, measurement equipment, ...

DB Searching

- Each image is stored with additional user information, e.g. part description, material, measurement parameters, ...
- You can search for any text in all or just selected
 user information
- You can search for individual fields with same contents, e.g. search for all measurements with same part
- You can sort by individual database fields, e.g. sort by the parts serial number







Database Module

Report

- User Template for Report Generation with variable number of images per Report.
- User Template can be freely designed.
- Report can include any Database fields and Image Measurement results.
- Simple drag and drop interface for assigning images to Report.
- Integrated Image Manipulation
- Zoom functionality let you create a zoomed view of the database image







IrNDT Add on Module: Database

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Database Module

Measurement

- Supports calibration within image
- Measurement functions for
 - Length
 - Area
 - Distances
 - Angle
 - Diameter
- Counting of Objects
- All graphical attributes are editable, e.g. Colors, Visibility,
- Measured values are stored in DB
- Measured values are available for automated Inclusion in Reports





Database Module

Image Comparison

- Allows easy and fast comparison of images
- Image Subtraction mode
- Transparent mode
- Automated resizing of images
- Swap of foreground and background image





