

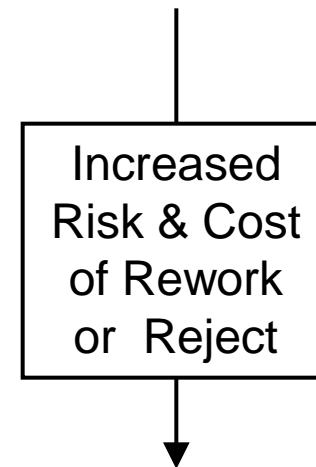
Composites / Metal Bond Material & Process Control Perspectives (Major OEM – Small Airplanes)

*September 14, 2010 FAA / NCAMP M&P Workshop
National Center for Aviation Training (NCAT), Wichita KS
Presenter: Engin Sabuncu*

M&P Control Perspectives

- Process Control: Monitoring and controlling of a process to ensure conforming product

- Controls take place:
 - Before Part Manufacture
 - During Part Manufacture
 - After Part Manufacture



Controls Before Part Mfg.

- Materials
 - Material Qualification
 - Material Spec. & Supplier PCDs
 - Supplier Certifications
 - Raw Materials (Fibers, Chemicals, Additives, etc)
 - Finished Product (Prepregs, Film Adhesives, Bond Primers, etc)
 - Temperature Controlled Shipping – Recorders
 - Part Manufacturer Receiving Inspection
 - Uncured Material Properties (Chemical, Physical)
 - Cured Material Properties (Mechanical)
 - Environmentally Controlled Storage

Controls Before Part Mfg.

■ Facilities

- Facility Qualifications / Periodic Requals
- Curing Device (Autoclave, Oven, Press) Certifications
- Freezer / Storage Area Certifications
- Environmentally Controlled Area Certifications
- Layup Aids, Tools, Heat Gun, etc. Certifications
- Tank Chemistries for Anodize Process for Metal Bond

Controls Before Part Mfg.

■ Parts

- Part First Article Qualifications / Periodic Requals
- Prefit of Bond Assy Details
- Water Break Free Surface Checks
- Strict Contamination Control for Bond Details

■ Operators

- Operator Certifications for Special Processes
 - Layup, Bagging, Bond Primer Spray, Media Blast
- Operator Periodic Training / SOJT

Controls Before Part Mfg.

- Change Control
 - Any changes in Materials, Process, Facilities, Design, or Personnel that will affect the outcome will require requalification.

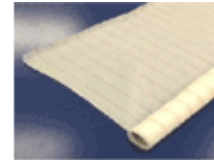
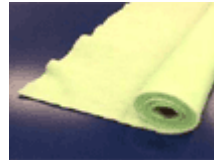
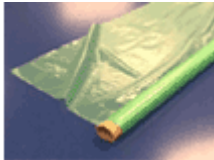
Controls During Part Mfg.

- Materials
 - Shelf Life & Out Time Tracking
 - Workability & Visual Material Defects
 - Automated Ply Cutting



Controls During Part Mfg.

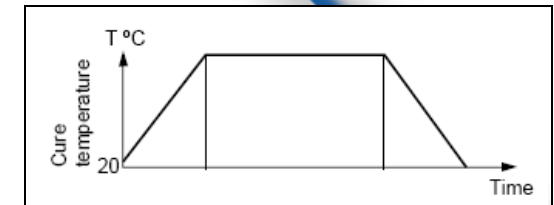
- Facilities
 - Environmental Controls
- Layup
 - Automated Ply Positioning / Verification
 - Detailed Planning and Visual Aids
 - Vacuum Bag Leak Checks
 - Spec Controlled Expendable Materials, Tools, etc



Controls During Part Mfg.

- Curing Process
 - Cure Parameters Recorded (Time, Temperature, Vacuum, Pressure)

- Finishing & Machining Operations
 - Spec Controlled Machining Tools / Operations
 - Spec Controlled Pin Hole Fillers, Surfacers, Etc
 - Spec Controlled Media Blast Operations for Metal Bonded Assys



Controls During Part Mfg.

- Anodize for Metal Bonding
 - Tank Time and Temperatures
 - Water Break Free Surface Checks
 - Amperage and Voltage Tracking
 - Anodize Layer Light Inspection



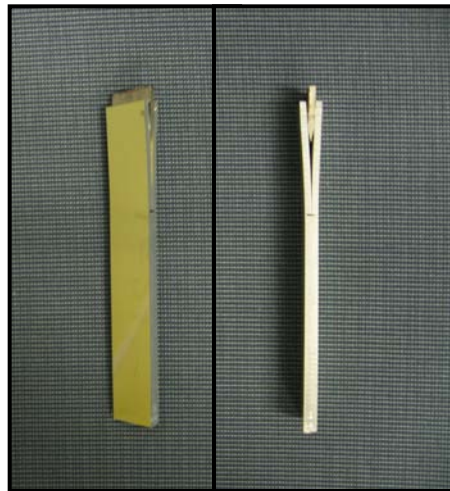
Controls After Part Mfg.

- Visual Inspections: Visible Defects, Bondlines, etc.
- Non Destructive Evaluation



Controls After Part Mfg.

- Thickness Checks for Plies, Bondlines, Bond Primer, Paint
- Form, Fit and Functional Checks
- Process Control Testing: Verifies Material, Process, Operator at time of Mfg.



Controls After Part Mfg.

- Buyoff: Final Paperwork / Data Review



THANK YOU

QUESTIONS ?



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