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2004 Bonded Structures Initiative

Primary Deliverables

- Survey industry to benchmark critical technical issues and engineering practices for existing applications
- Bonded Structure Workshops in 2004 to review the survey and gather more insights from experts
 - To be coordinated with June Mil-17 meetings
 - Follow-on workshop in Europe (TBD)
- Develop FAA Technical Center Report(s) on critical technical issues and existing engineering practices
- Late 2004 FAA draft policy covering safety issues and certification considerations for bonded structure





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2004 Bonded Structure Initiative

Objectives for 6/04 Workshop & Follow-on Report(s)

Primary objective

Collect & document technical details that need to be addressed for bonded structures, including critical safety issues and certification considerations

Secondary objectives

- 1) Give examples of proven engineering practices*
- 2) Identify needs for engineering guidelines, shared databases and standard tests & specs*
- 3) Provide directions for research and development*

Background: The primary objective relates to a FAA goal for outlining *what* needs to be considered for aircraft safety and certification. Secondary objectives are intended to help industry develop guidelines, standards and training in addressing the critical issues.



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Levels of Application Criticality

	Flight Safety	Loads	Environment	Service Experience	Process Control
Most Critical	Primary Single load path	High shear Moderate peel	High temp, moisture and fluids	Bad service records	Inadequate control
	Complex?	Inaccurate?	Unknown?	No service records?	Unknown Mistake?
	Primary Multi-load path	Moderate shear Some peel	Standard temp, moisture and fluids	Limited good service records	Sufficient Control
Least Critical	Secondary structure	Low shear No peel	Benign environment	Good service records	Extensive Controls



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Critical Bonding Issues

Bonding processes lead to a complex material system (substrate, adhesive and an interface region that is more complex than either)

Subpart B: Design FAR 23/25/27/29.601 General
and Construction FAR 35.15 Design features

FAR 25.601: “The airplane may not have design features or details that experience has shown to be hazardous or unreliable. The suitability of each design detail or part must be established by tests.”



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Future Plans

- Draft FAA Technical Center Reports
 - Primary content: information collected on bonding issues critical to safety & certification (before/during/after workshop)
 - Secondary content: Give examples of proven engineering practice, future R&D directions and standards support needs
 - Following a rigorous review process, publicly release reports for purposes of training, coordination and standardization
- Draft FAA policy to summarize critical bonding issues
 - Released per FAA internal and public processes
- Continue to work on composite safety and certification initiatives related to bonded structures



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Summary

- Safety management of bonded structures includes:
 - Adequate qualification/control of materials and processes
 - Coordinated design development and substantiation
 - Robust manufacturing and maintenance implementation
 - Continuous updates based on service experience
- Communications following the workshop
 - Public website will post workshop presentations
<http://www.niar.wichita.edu/faa>
 - Please send your thoughts and notes to WSU
 - All inputs will be considered in drafting FAA Report(s)
<http://actlibrary.tc.faa.gov>

Thank-you for your help

Workshop Dedications

for Contributions to Bonded Structures Initiatives



Mr. Don Oplinger
December 2, 1928
June 12, 2000



Dr. Jack Lincoln
March 22, 1928
February 10, 2002



Dr. Jim Starnes
March 2, 1939
October 27, 2003