
Mil Hdbk 17 Bonded structures workshop

Manufacturing implementation and experience

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- Primary objective
 - Collect, document, and get industry consensus of ***critical issues regarding manufacturing implementation and experience of bonded structures (preferably with ranking)***
- Secondary objective
 - How to address critical issues
 - Proven engineering practices
 - Provide directions for R&D
 - Identify needs for engineering guidelines, standard tests and specs

Importance of manufacturing

- *“Adhesive bonds seldom fail because of poor design or materials selection – they fail because of deficiencies in the manufacturing process and its implementation”*
- *“Adhesive bonding is a process where there is no post-event method for measurement of the success of the process”*
- *“Passing NDI is necessary but not sufficient to ensure bond integrity”*
- *“Bond integrity must be obtained by management of all aspects of the bonding process during manufacturing”*

Quotes adapted from:

M. Davies and D. Bond. Int. J. of Adhesion, 19 (1999) 91-105.

Some issues in manufacturing implementation

- Handling of the adhesive
 - Storage, aging
- Surface preparation
 - Environmental cleanliness and control, contamination
- Dispensing adhesive
 - Sequence and timing of bonding process steps, gap filling
- Dimensional control (adhesive layer thickness)
 - Dimensional control of substrates, verification of fit
- Bonding fixtures
 - Application of preloads, bondline thickness control, defects
- Cure control
 - Local variations in temperature and pressure, porosity
- NDI/quality control
 - Cured bondline evaluation, tracking outcome and bond process variables
- Scaling of processes to larger/smaller structures
 - Scaling of a developed process to a larger (smaller) structure
- General
 - Equipment maintenance, training of personnel, documentation of process, handling/storage/disposal of materials