2008 Spring AMTAS Adhesive Bonding Breakout Session

People/Industries represented:

Brian Flinn, UW – surface characterization, etc for what makes good surfaces to bond to
Dwayne McDaniel, FIU – electrochemical sensor for peel ply surface contamination detection
Tom Couhglin, Henkel – surface prep and adhesives
Dick Bossi, Boeing – bond strength measurement
Anthony Nguyen, Boeing LS M&P and Bonding
Gary Weber, Boeing & Grad Student in Flinn's group – Metal/composite bonding
Agnes Blom, Stork Fokker
Dave Berg, Boeing Structural Repair Manual
Pete Guschl, Surfx Technologies – PEEK/CFRP bonding – Plasma based composite surface prep
Katie Zhong, WSU professor mat'l technology – nano technology – for improving properties of resin systems

Pete VanVoast, Boeing – Bonding – esp. peel ply

Will Grace, Boeing – bonding

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Research Directions (especially Safety and Certification items):

- Repairs of thermoplastics – PEEK, etc
- BMI Repair
- Scarf repair surface characterization, modification for repair bonding.
- Highly polarized nano-BMI adhesive to enhance bonding to a less-than-optimum surface for bonding
- Suction –type proof loading of hc skins for disbonds
- Contamination detection – Duane's CFM – Chemical Force Microscopy
- Flinn's work – are there better surface energy test methods that can be an in –service inspection (better fluid than DMSO, or a combination of fluids).
- Continue characterizing the effect of surface energetics on bonding (Flinn program)
- Repairs to composite substrates tailored to maintain lightning performance
- Adhesive materials tailored for lightning performance (conductive)
- Equipment to perform combined thermal, humidity, mechanical cycling
- Low porosity wide area bonds (low pressure like for repairs)
- Automated bond Process and Control to minimize variability
- Accellerated methods to certify new materials (environmental effects – like fuel exposure)
- Moisture effects on bonding – prebond (like absorbed moisture in composite structure to be repaired)
    - Materials that are moisture resistant
    - Methods to measure water content in surfaces/materials to be bonded
    - Documented methods to remove moisture from laminate before bonding
- Structural Design for bonding
- Disbond arrestment features for adhesive bonding
- Measurement of Bond strength on various substrates (Non-Destructively)

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Bonding Education

- Edmonds curriculum involvement will begin this year from Boeing bonding group
- Brian Flinn – teaching composite repair course at Edmonds – several Boeing folks too
- Katie Zhong – Teaching nano-composite and multi-functionality course at Boeing – topic on bonding could be included.
- Need to get linkages into structural bonded joint design education