JAMS 2010 Discussion/Industry Feedback

Session 1: Structural Integrity

"Aging Effects Evaluation of a Beechcraft Starship Main Wing"

- It would be good to get more prototype structures/parts into aircraft.
- Teardown inspections on service bulletin repairs to evaluate repairs would be useful.
- There is a lack of paper trail on repairs.
- Teardowns of problematic structures suggested.
- Large scale articles/panels such as Boeing 747 and 767 are not accessible for teardown or major repair studies

"Development and Evaluation of Fracture Mechanics Test Methods for Sandwich Composites"

- Honeycomb fracture toughness similar to metals.
- There are still difficulties in understanding sandwich structures.
- Does ASTM represent a real engineering test?

"Failure of Notched Laminates under Out-of-Plane Bending"

- Large damage simulated in large coupon tests.
- Analysis is very important to cost reduction of testing.
- People are too wrapped up in failure criterion.
- Mesh sensitivity is a key issue in modeling.
- People hold findings too close to their chest.
- We need rational rules for guidelines.
- There is a certain emotional attachment to particular analysis methods.

"Structural Health Monitoring for Life Management of Aircraft"

- We are interested in composites not GLARE.
- Different structures pose unique challenges to SHM.
- Reduction in stiffness is more crucial than defect size.
- The work in SHM is overly simplified and there is a need for more realistic structures to be looked at.
- Real structures can be done. On-site dispersion curves can be found. Transducers can be tailored to a particular structure.

Session 2: Certification/Repair

"Safety Management"

- A safety video was suggested.
- There is a need for practical solutions for accident reporting/identification.
- Knowledge transfer issues is very important to workforce, how to get communication down to the lowest levels to report incident while performing maintenance

"Certification of Discontinuous Composite Material Forms for Aircraft Structures"

- There was concern over the distribution or orientation of the chips considering the size of the coupons.
- The fatigue spectrum is important in durability testing of these materials.
- Same problems as 20 years ago exist.
- There are inherent difficulties in putting new material forms on aircraft.
- There should be less testing and more simulation.
- How can one justify using variable stiffness materials in stiffness driven applications?
- There is not enough analysis

"CACRC Depot Bonded Repair Investigation"

- It is suggested to make the repairs more difficult for the technicians by using complex structures.

"Inverse/Optimal Thermal Repair of Composites"

- Thermal runaway can occur and cause additional damage.
- Transient thermal data is sufficient.

"Statistical Analysis Program for Generating Material Allowables"

No comments

"VARTM Variability and Substantiation"

No comments

"Environmental Compensation Factor Influence on Composite Design and Certification"

- Mission profiles vary from plane to plane.
- There was a concern over the ability to detect micro-cracks.

Session 3: Bonding

"Identification and Validation of Analytical Chemistry Methods for Detecting Composite Surface Contamination and Moisture"

- The sensitivity of the sensor to variations in thickness was suggested for further study.
- Possibility of coordination between UW and University of Florida to study on different contamination variables

"Evaluation of Friction Stir Weld Process and Properties for Aerospace Application e-NDE for Friction Stir Processes"

- The durability of metallic and composite bonds is an issue.

"Improving Adhesive Bonding through Surface Characterization"

- In repairs, the effect of a scarf on contact angle measurements was brought up.
- Once the surface is contaminated with contact angle fluid, how do you clean it?
- Some non-factory, in-field techniques suggested.
- There is still a need to understand what an acceptable level of contamination is.
- As the work progresses, additional variables keep popping up. When does it stop?
- Chemical tests are superior to mechanical tests for bonds.
- Fickian diffusion of moisture through cured adhesive was discussed as a possible degradation mechanism to bonds.
- There is a need for a durability test for adhesive bonds.

Session 4: Crashworthiness

- Closing the gap between government and private industry.
- Strain rate sensitivity.
- All current research focuses on mechanical issues. Is it possible for occupant protection to be addressed in the future?
- Bring these projects to CMH-17 community.

Session 5: Damage Tolerance

"Load-Life-Damage Hybrid Approach for Substantiation of Composite Aircraft Structures"

- There is a need to improve in-service inspection techniques including optimizing the frequency of inspection.
- Visual inspection has many limitations.
- A better understanding of reliability is required.
- Scatter of larger damage of interest.

"Analysis of Fasteners as Disbond Arrest Mechanism for Laminated Composite Structures"

- Boeing is extremely interested in this topic.
- Fastener can be used as fail-safe mechanism.
- Analysis needs to be done to predict the worst-case scenario and how to tie it the real world problem.
- Continue to get support and coordinate with industry to define new practical problem.
- A mode-2 test programs is needed.
- Arrestment features will continue to be around (e.g. 787).
- There is a desire to have no-bearing fasteners.
- Closed form analytical solutions are always valuable.
- Alternatives to fasteners are available—there are other ways to arrest crack growth.

"Impact Damage Formation on Composite Aircraft Structures"

- There is a need for damage progression consideration—need to improve understanding.
- Shell elements might not capture everything.
- People are looking for practical guidance to give to operations.
- There is some overlap with crashworthiness.
- DOD has shared interest.

"Integrated Aeroservoelastic Uncertainty/Damage Tolerance/Reliability of Composite Aircraft"

- It is difficult to find small dampers.
- An air pocket can help.
- There is challenge with determining what magnitude of damage to inflict.