



Session IV Industry Feedback

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Evaluation of Parameters used in Progressive Damage Models

David Plechaty, Kevin Carpenter, John Parmigiani | Oregon State University

- How do we identify widely-appropriate models for failure modes or establish limits of applicability?
- How important is it to fundamentally understand the mechanisms underlying the features that are apparent in the material response? Are there theories or work to understand this?
- Are there fundamental material tests that can isolate these failure modes in specific composite material components?
- Can analytic analysis be used to guide coupon design based on material properties? Was modeling or analysis done to assess the local load distribution resulting from the discontinuities in the coupon?
- Matrix compression would seem to be highly dependent on volumetric constraint. How can this be accounted for either in material characterization or application during analysis?

Development of a Building Block Approach for Crashworthiness Testing of Composites

Dan Adams, Mark Perl, Dalton Ostler, Erin Blessing, Michael Terry | University of Utah

- Are “hard” laminates optimal for crash conditions? What is the tradeoff between strength vs. energy absorption? Can these characteristics be combined in a structure to optimize overall crash performance?
- Does placing stiffer plies are center impact overall buckling stability of the configured structural element?
- Is there competition between static properties and crash/energy absorption on a material basis? Does this suggest directions for material optimization? Are there low-level material properties that can suggest better performance for crash conditions (interlaminar fracture toughness? OHC?)
- What role does rate play in material performance? How much does material or structural performance need to be optimized for an expected failure rate?
- Would locally tailored or steered composites have potential to optimize performance?

Safety and Certification of Discontinuous Fiber Composite Structures

Marco Salviato, Jinkyu Yang, Mark Tuttle | University of Washington

- When do manufacturing effects limit the size of the constituent component? What are the tradeoffs for larger platelet sizes?
- Do the ductile failure characteristics of DFC materials lead to “residual strength” capability beyond initial failure? Is this be a characteristic that could be leveraged for specific applications?
- Bounding approach is viable for strength characteristics but what is the appropriate approach for modulus variation and load distribution effects?
- Are there statistical/probabilistic approaches that are applicable to this problem?
- Is there potential to mix constituent component sizes to optimize properties or reduce variation?