

Shock Working Group Meeting

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The Aerospace Corporation

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Shock Testing Issues and Initiatives at Sandia National Laboratories (U)

By

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Chart 1: Statement of Shock Testing Problem

- What shock testing issues are driving your institution?
 - *Ability to conduct high-level margin tests with precise control of amplitude vs. frequency to explore failure modes in shock*
 - Margin characterization is an area of intense interest
 - We have limited ability to conduct very high-level, high precision pyroshock simulations in the laboratory
 - *Using alternate shock characterizations to better characterize the true environments, our test simulations and our implied performance margins*
 - Some tools, such as energy-based analysis have gotten significant traction
 - These tools have significantly added to our understanding of shock failures and our ability to quantify them
 - We routinely analyze shock environments using these tools, but need to drive the transition to including them in specification documents
 - *Need for robust wireless instrumentation*
 - Continue to evaluate MEMS based sensors for pervasive monitoring
 - *Perfecting predictive physics-based models to optimize design*
 - Provide more realistic shock input loads
 - Improve modeling techniques for energy dissipation through joints

Chart 2: Method of Achieving Consensus of Solution of Shock Testing Problem

- What should aerospace testing community create/do to alleviate the problem?
 - *Facilitate research into alternate shock environment characterization*
 - *Facilitate research into more controlled (amplitude vs. frequency) shock test methods*
 - *Foster knowledge preservation through “best-practices” documents, wikis and “non-attributable” lessons learned data bases*
- What should the government do to alleviate the problem?
 - *Insert explicit language in MIL-STD documents that allows tailoring of test methods and specifications to suit specialized circumstances*
 - *Require customer organization to demonstrate that test requirements are achievable using the test methods specified before imposing them on a vendor / testing house*
- What's your vision of the future of shock testing
 - *Better test / model integration*
 - Using models to design tests to explore and quantify shock failures
 - *Better, more descriptive, more discriminating tools in specification documents*
 - Especially tools that incorporate uncertainty quantification