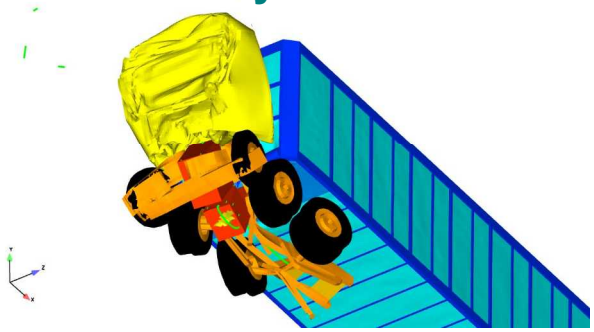
1524 – Solid Mechanics Analysis

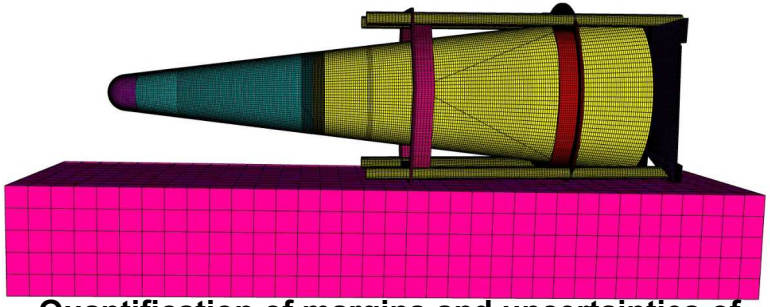
SAND2007-4297P

Mission: Research, development and application of non-linear Solid Mechanics methods and expertise to provide solutions to meet our customers' needs.

System Level Analyses of Transient Dynamic Events

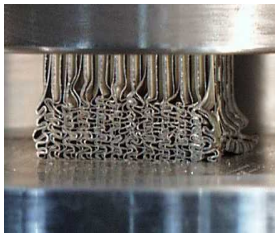


SGT accident scenario



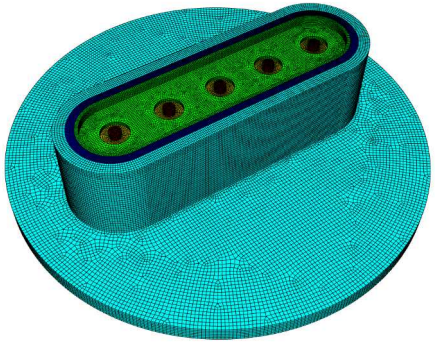
Quantification of margins and uncertainties of W76 exclusion region integrity

Constitutive model development

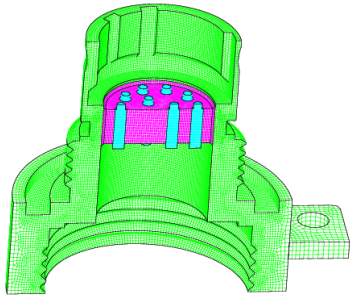


Crush of honeycomb energy absorber

Component Manufacturing and Performance Analyses

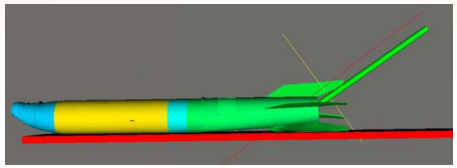


W76 ISL Utility Header

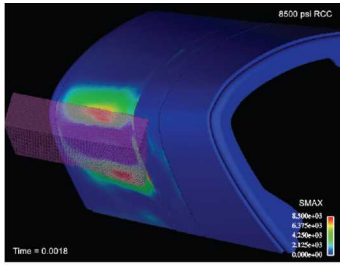


LAC 13-pin glass-to-metal seal

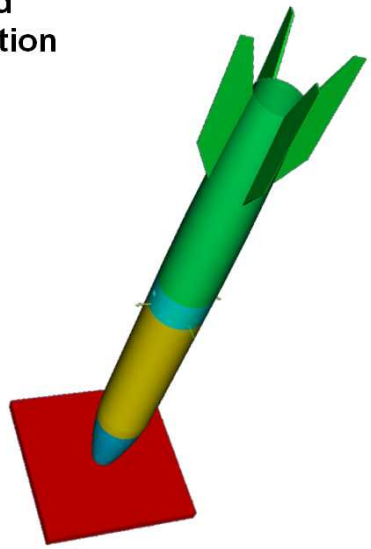
1524 - Systems Level Solid Mechanics Analyses



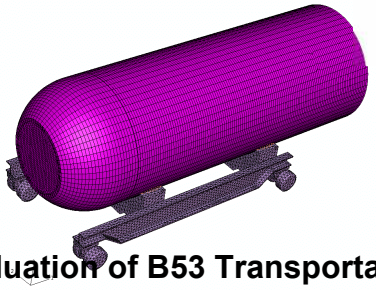
B61 Impact and Slapdown Simulation



Space Shuttle Leading Edge Impact Model



B61 Head-on Impact



Evaluation of B53 Transportation Tiedown Design

Capabilities

- Complex integration of FE models, constitutive models, mechanical environment definitions, test data, analysis codes, and post processing tools to include:
  - *Large deformation*
  - *Nonlinear material response*
  - *Coupled physics phenomenon*
  - *Massively parallel computing platforms*
  - *Interpretation of massive data sets*
- Tight Integration with Experimental Evaluation for:
  - *Supplement existing test data*
  - *Identify worst-case scenarios*
  - *Evaluation of conceptual designs*
  - *Design Optimization*
  - *Environment characterization*
  - *STS performance evaluation*
  - *Quantification of margins and uncertainties*
  - *Causal failure Investigation*

Customers

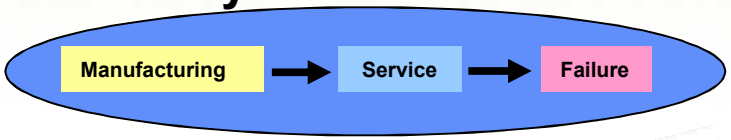
- NW, DOD, DHS, NASA

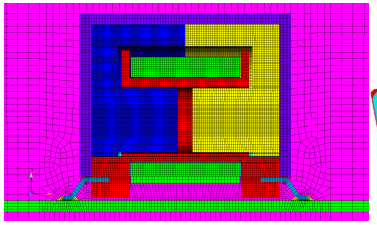
Contacts

- David Lo (dslo@sandia.gov)

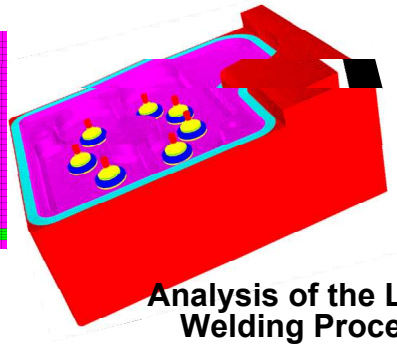
1524 – Component Level Solid Mechanics Analysis

Life Cycle Performance

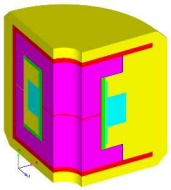




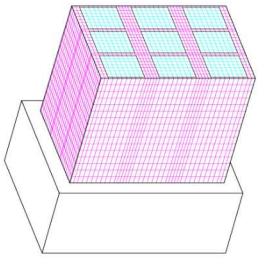
Encapsulation of an Inductor



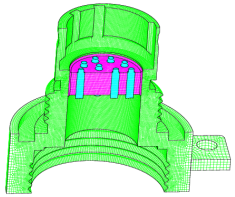
Analysis of the Laser Welding Process



Encapsulated High Voltage Transforme



Prototype thermopile



LAC 13-pin glass-to-metal seal

Capabilities

- Performance evaluation and margin assessment for components over entire lifecycle:
  - *Evaluate design alternatives*
  - *Design optimal manufacturing processes*
  - *Achieve performance specifications*
  - *Identify and mitigate failure mechanisms*
- Model development and application to include:
  - *Complex nonlinear material behavior*
  - *Thermo mechanical Response*
  - *Complex Geometry*
  - *Cohesive and Failure*
  - *Adhesive Failure* **Thermopile development**
  - *Thermal Stress*
  - *Cooling and Curing*

Customers

- NW, DOD, DHS, NASA

Contacts

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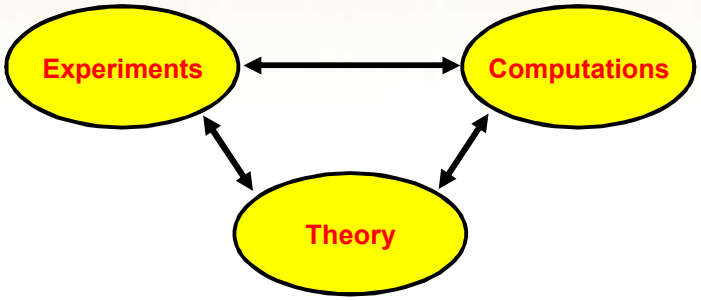
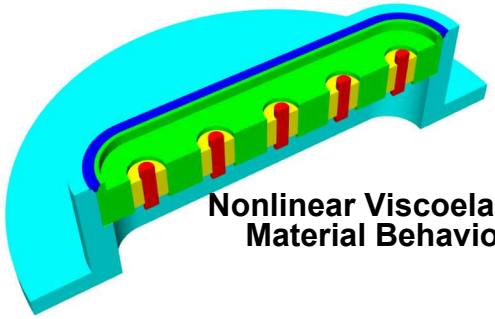
1524 – Specialized Material Constitutive Model Development

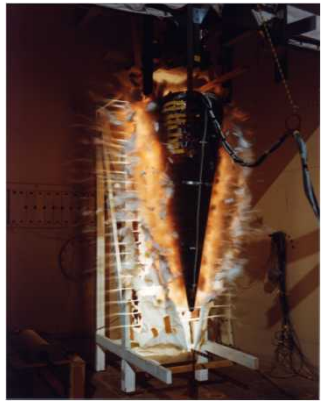




Nonlinear Viscoelastic Material Behavior

Composite Materials

Shock absorbing honeycomb



Capabilities

- Development of constitutive models for a variety of specialized materials:
  - *Metals and Solders*
  - *Composites*
  - *Foam and Honeycomb*
  - *Epoxies*
- LAME library interface captures complex phenomena:
  - *Large deformation*
  - *Nonlinear Viscoelastic response*
  - *Curing processes*
  - *Equation of State models*

Customers

- NW Components, Satellites, DOD, Industry

Contacts

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