



Testing and Material Modeling Software for Crash & Safety Simulation

DatapointLabs/Matereality – Hubert Lobo

CARHS Automotive CAE Grand Challenge 2011 - April 20, 10:45 - 12:15, Conference Room 5

Introduction

The testing of materials for use in crash and safety simulations and the conversion of test data into material models is a process that is not well standardized in the industry. Consequently, CAE users face uncertainty and risk in this process that can have a negative impact on simulation quality. In this workshop, we present approaches currently used in the US for the gathering of high quality test data plus the acclaimed Matereality CAE Modeler software that is used to transform high strain-rate data into crash material cards.

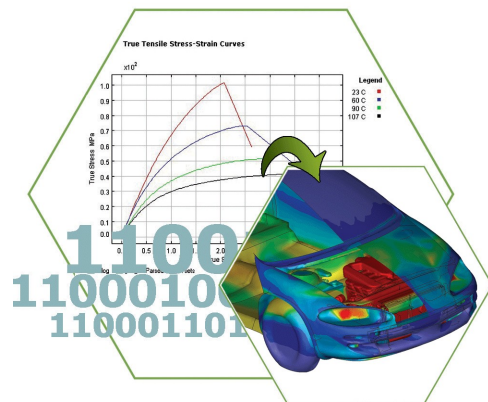
The workshop will feature live demonstration and training in the use of the CAE Modelers for LS-DYNA, PAMCRASH, Abaqus and ANSYS. This will give the attendee a working knowledge of how to model their materials to give accurate and predictable simulation results. The workshop will also touch on newly developed Reverse Material Modeling technology that permits the import of a material model from one CAE software to another.

The second part of the workshop will illustrate standardized methods for testing of materials for crash. This will include comments about testing philosophy, experimental technique, sampling and specimen geometry. The benefits and limitations of some commonly used crash material models will be discussed. Model selection criteria for different kinds of material behaviors will be presented. Methods for assessing data quality will also be covered.

Material Modeling Software for Crash Simulation – 45 min

Matereality's CAE Modeler software used for the conversion of rate dependent properties into material models for different CAE software products used in crash simulation. The live session will include:

- How to pick the correct material model to represent the observed behavior
- Interactive model tuning and export
- Crash material modeling for LS-DYNA, PAMCRASH, Abaqus and ANSYS CAE
- Reverse material modeling: how to import a material model from one CAE software to another
- Copy and edit whereby the user can modify and save a personal copy of raw material data for advanced material modeling and transformation.



Material Testing for Crash Simulation – 40 min

Testing methodologies employed at DatapointLabs for the testing of rate-dependent properties of materials for use in crash and safety simulation.

- A test philosophy for representing rate dependency of materials
- Experimental technique including sampling and specimen geometries
- Overcoming material model limitations when representing non-linear materials
- Assessment of crash material data quality, expected trends & validation
- Specific comments for unfilled and fiber-filled polymers, foams, rubber and metals.



DatapointLabs

About DatapointLabs

DatapointLabs is an expert materials testing company supporting the design and product development community with services for plastics, rubber, composites, foam, ceramics, food and metals. Fully equipped with modern instruments and expert personnel, and testing over 1000 materials a year, DatapointLabs is a center of excellence for physical properties of materials in the solid and melt state, including mechanical, rheological, thermal, pVT, DMA, impact, fatigue, and creep.

For more information, visit www.datapointlabs.com, telephone 1-607-257-1784, or email mail@datapointlabs.com



About Matereality

Matereality, L.L.C., based in the United States, is in the business of hosting cloud material databases for use in manufacturing enterprises. With this ready-for-deployment patented technology, every company can now afford to have a fully functional secure material database that can grow proportionate to its needs and budget. The database can collect and store any properties of any materials used by an enterprise and provides SaaS software to view, utilize and manage this data effectively. The company serves a diverse user base including automotive, appliance, tier-one, material suppliers and processors, electronics, mold makers, medical devices, and consumer product verticals.

For more information, visit www.matereality.com, telephone 1-607-257-1784, or email info@matereality.com

About the Speaker, Hubert Lobo

Mr. Hubert Lobo is a recognized leader in the understanding of non-linear material behavior, and how it impacts virtual product design. With more than twenty years of experience in this area, he brings valuable insights to the product development community in its efforts to design with modern day materials. Mr. Lobo has a Masters degree in Engineering from Cornell University. He has authored numerous articles and books, including the Handbook of Plastics Analysis. In 2002, the Society of Plastics Engineers honored Mr. Lobo, recognizing his pioneering work in quantification of material behavior for CAE.