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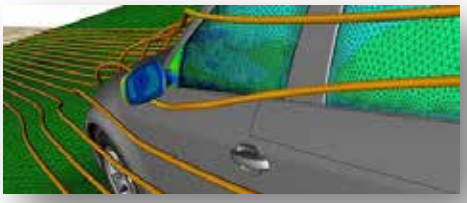

Call For Papers 15th International LS-DYNA Conference & Users Meeting

Workshops OnLine – Sarba Guha

LSTC Livermore Software Technology Corp.

DYNA MORE

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LSTC Information & Apps **Editor - Yanhua Zhao**

Announcements

July Classes sign up now – contact Aleta **Aleta@lstc.com**

10-11 Mon-Tue MI Occupant Simulation 2 S. Guha
24 Mon MI Intro to LS-PrePost 1 P. Ho / Q. Yan
25-29 Tue-Fri MI Intro to LS-DYNA

Call for Papers! Abstract Submission now on line.

15th International LS-DYNA® Users Conference & Users Meeting

Occupant Modeling Workshops & Other Learning Aids

LS-DYNA – Sarba Guha

YouTube Choices for the Month

Many choices – this month's picks

Sincerely,
Marsha Victory Trent Eggleston
Marnie Azadian Suri Bala Dilip Bhalsod Yanhua Zhao Aleta Hays

Livermore Software Technology Corporation

DYNAmore GmbH

15th International LS-DYNA® Users Conference & Users Meeting

June 10-12, 2018

Edward Hotel & Convention Center
Dearborn. MI. USA

Welcome:

The conference will host a forum for engineers, professors, students, consultants, industry leaders, and interested parties to exchange their ideas, and listen to the latest in industry and academic presentations..

The presenter (1) One Presenter of the accepted paper will receive a complimentary (no fee) conference registration, when they register using the "LSTC Conference" group registration code at the Edward Hotel.

Conference Dates:

Sunday	06/10/2018	Registration	Exhibition Area	Reception
Monday	06/11/2018	Registration	Exhibition Area	Banquet
Tuesday	06/12/2018	Registration	Exhibition Area	Closing
Wednesday/Thursday	06/13-14/2018	Training Classes		

Information:

Abstracts & papers papers@lstc.com
Participation, Registration conference@lstc.com

Abstract Submission on line:
Deadline: August 30, 2017
On line being processed by DYNAmore GmbH
www.dynamore.de/paper2018

Paper Submission: Deadline: February 14, 2018 FIRM

Notification and templates will be provided by DYNAmore
For any questions please write papers@lstc.com

Abstracts: www.dynamore.de/paper2018
Registration/Classes: www.ls-dynaconferences.com

Conference Call For Papers

- Acoustics
- Aerospace
- Automotive
  - Crashworthiness
  - Durability
  - NVH
- Ballistics and Penetration
- Biomechanics
- Civil Engineering
- Electromagnetics
- Fluid Dynamics
  - Compressible
  - ALE (Lagrangian, Eulerian)
  - CESE
  - Incompressible
- Granular Flow
- Heat Transfer
- Impact and Drop Testing
- Manufacturing Processes
- Material Parameter Identification
- Metal Forming
- Modeling Techniques
- Nuclear Power
- Occupant Safety
- Optimization
- Particle Method
  - Airbag Particle Method
  - Discrete Elements
  - Element Free Galerkin
  - Peradynamics
  - Smooth Particle Hydrodynamics
  - Smooth Particle Galerkin
- PrePost Processing
- Seismic Engineering
- Ship Building

Author: Christian Frech christian.frech@dynamore.de **Contact**: conference@dynamore.de

11th European LS-DYNA® Conference

Book of Abstracts and Proceedings Online

Website: www.dynalook.com

Book of Abstracts and Proceedings online

More than 45 sessions with over 190 Presentations have been the foundation for the success of the 11th European LS-DYNA Conference in Salzburg.

DYNAmore has now made the Book of Abstracts and the Proceedings available online. Take the opportunity to read about current trends and developments at:

www.dynalook.com

Conference Review : About 500 participants and over 30 exhibitors met in Salzburg to discuss current issues and to present their achievements. In addition to networking, the main focus was on professional exchange. But also the supporting program with an unforgettable show on the second evening ensured that the conference became an unforgettable event for all participants. The conference was rounded off by the accompanying seminars, in which the participants had the opportunity to discuss questions in detail.

Vote of thanks: DYNAmore would like to thank everyone involved. Sponsors, speakers and participants have made an important contribution to the success of the conference. Without their commitment, it would not be possible to realize a conference of this size. We would also like to thank the Salzburg Congress and the Sheraton Grand Salzburg for the excellent support and the delicious catering. The DYNAmore Team is already looking forward to the next European LS-DYNA Conference in 2019.

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Marcia Swan swan@datapointlabs.com

Matereality® Version 10 Eases Data Import, Supports Enterprise Simulation Workflows, and Enables Roles Management

Ithaca, NY USA - Matereality's Version 10 release provides new software components for its enterprise installations, including bulk data loading capabilities and enhanced material parameter conversion support for LS-DYNA® and Altair® RADIOSS™ material models. The release delivers tools to manage the CAD/PLM/CAE materials workflow and customize role-specific user experiences, and expands the authorship layer for creating and disseminating technical documentation.

Data Import

Company data is often contained in many isolated tables and databases which must be consolidated into the enterprise-wide system. This tedious process, a hurdle for enterprise-wide adoption, is greatly eased with the Simple Loader, a new app which enables bulk loading of tables of single-point property data from Excel, greatly speeding up the capture of large quantities of data. It is now possible to rapidly populate a materials database with relevant information of the enterprise. In addition to importing property data, bulk loaders are available to import lists of materials and specifications to Matereality's data libraries, making them more complete and meaningful.

Material Model Parameter Conversion

Incorporating a new software framework, Matereality v10 handles increased demand for material model parameter conversion. Support for LS-DYNA MAT_089 and MAT_019 is now available with graphical drag-and-drop capability to tune and extrapolate plasticity curves as well as rate-dependency parts of these models. Support for Altair's RADIOSSTM explicit solver has also been initiated with a CAE Modeler module for its commonly used Law 36. "We continue to devote resources to this important task of incorporating materials into simulation, bringing years of DatapointLabs experience to simplify this complex and sometimes confusing process," says Hubert Lobo, DatapointLabs founder and Matereality CTO. "For those of our clients who perform their own parameter conversion, a standard export from our software allows them to locate the right data and supply it to their own macros for streamlined data processing."

"We continue to devote resources to this important task of incorporating materials into simulation, bringing years of DatapointLabs experience to simplify this complex and sometimes confusing process."
—Hubert Lobo, DatapointLabs founder and Matereality CTO

Many enterprises have initiatives to bring simulation into the product development mainstream. An important process step is to ensure that the correct material models are used in the simulations. Matereality's CAE Materials library documents and stores material model files linked to the correct material or specification names used in PLM software. These stored material model files can be organized into Master Material files for export into Altair HyperWorks® and Beta CAE's ANSATM pre-processors. There, the files can be assigned to parts based on material IDs assigned from the bill of materials (BOM), ensuring consistent use of material models, even across globally distributed design teams.

Dashboards and Roles Management: Because of the diversity of users who need to interact with material information, it is important to create user experiences that correspond to their roles within the enterprise. The new roles manager framework allows system administrators to individualize dashboards, to present data and software tools of specific value to materials engineers, CAE experts, designers, and other professionals in their enterprise.

Expanded Authoring Capabilities: For added traceability, the new release provides text editing capabilities for documentation of the test methods used for property measurement. Test methods are displayed alongside properties and data certificates, so that engineers have all the information related to a piece of data available at their fingertips. Additionally, enterprise installations can author their own technical documentation, including instructions, how-to videos, and technical papers related to materials. A Knowmats app has been added to provide open access to a knowledge repository that has been set up to collect and disseminate knowledge related to the topic of "materials in simulation."

About Matereality: ".. Matereality® Software for Materials gives manufacturing enterprises the means to build a centralized, secure materials knowledge core to store properties, CAE material files, specifications, and material information on any material. ….".

Matereality is the software arm of DatapointLabs Technical Center for Materials, which provides accurate material testing, material parameter conversion and validation services for CAE, allowing companies to populate their databases with high-quality, application-ready data for design and new product development. Together, the companies form a comprehensive resource to strengthen the materials core of manufacturing enterprises.

For more information, - www.matereality.com , or send email to info@matereality.com .
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Marcia Swan, - : swan@datapointlabs.com
Europe: Barbara Leichtenstern
leichtenstern@datapointlabs.com

Composite Damage Modeling with MAT-162 and MAT-054: Sphere Impact on a Perfectly Clamped Composite Plate

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Assistant Professor, Department of Mechanical Engineering
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Phone (302) 690-4741 E-mail: bzhaque@udel.edu

MAT162 is a rate dependent composite progressive damage model for solid elements available in LS-DYNA. In composite shell elements, transverse shear damage cannot be defined, which is why a composite solid element defining transverse shear damage is essential in modeling problems where transverse shear damage is important. Shell elements are efficient for thin-section composites, whereas thick-section composites can be modeled using multiple through-thickness elements. MAT162 for solid elements have unique quadratic progressive damage modes, which no other material model offers. These unique damage modes, such as, (i) Tension-Shear, (ii) Axial Compression, (iii) Inter laminar Shear (ILS) and Delamination, (iv) Fiber Shear (FS) or Punch Shear (PS), and (v) Fiber Crush provides the theoretical framework for modeling most known composite damages.

The benefits of modeling progressive damage with MAT162 can be elucidated with simple examples. Consider the transverse impact of a 20mm sphere with an impact velocity of 50 m/s on an 80mm x 80mm x 2mm composite plate modeled with perfectly clamped boundary condition. Shell elements with MAT054 and solid elements with MAT162 damage predictions shows that MAT054 can only model in-plane tension and compression damage, while MAT162 can predict tension-shear along direction 1 & 2, in-plane shear, transverse shear and associated delamination.

A local MAT162 solid model in the anticipated damage region combined with global shell elements can be used to efficiently and accurately model large-scale impact applications such as crash analysis of automotive composite components and aerospace structures under impact loading conditions.

The University of Delaware Center for Composite Materials (UD-CCM) is teamed with Materials Sciences Corporation (MSC) in providing MAT162 technical support. The MAT162 User Manual and Example Problems can be downloaded from the UD-CCM MAT162 website:
http://www.ccm.udel.edu/software/mat162/

For more information on this article, please contact the author, Dr. Bazle Z. (Gama) Haque, bzhaque@udel.edu, or Materials Sciences Corporation at mat162@materials-sciences.com

Link for abstract:
http://www.ccm.udel.edu/software/mat162/examples/example-2/

Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others)

bzhaque@udel.edu

Short Course - Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others)
Tuesday, July 18, 2017 | 9am-5pm

Bazle Z. (Gama) Haque, Ph.D., Senior Scientist,

University of Delaware Center for Composite Materials (UD-CCM)
Assistant Professor of Mechanical Engineering,
Univ. of Delaware, Newark, DE 19716
P: (302) 690-4741 | E: bzhaque@udel.edu

Link for course/workshop: http://www.ccm.udel.edu/software/mat162/mat162_workshop/

Cost: In-House Class: $595 per person
Includes: Coffee, Lunch, Parking, CD with Course Content
Web Conference: $595 per person
Includes: CD with Course Content

Description: Progressive damage modeling of composites under low velocity impact, and high velocity impact is of interest to many applications including car crash, impact on pressure vessels, perforation and penetration of thin and thick section composites. This course will provide a comparison between available composite models in LS-DYNA for shell and solid elements, e.g., MAT2, MAT54, MAT59, & MAT162. Among these material models, rate dependent progressive composite damage model MAT162 is considered as the state of the art. This short course will include the theory and practice of MAT162 composite damage model with applications to low and intermediate impact velocities, understanding the LS-DYNA programming parameters related to impact-contact, damage evolution, perforation and penetration of thin- and thick-section composites. Printed copies of all lecture notes will be provided along with a CD containing all examples LS-DYNA keyword input decks used in this short course.

Progressive Composite Damage Modeling in LS-DYNA (MAT162 & Others)

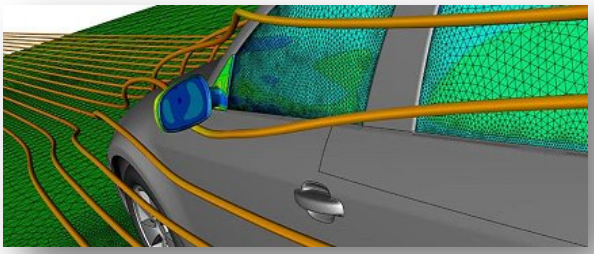
Topics Covered in this Short Course:

- Impact and Damage Modeling of Composites
- Application of MAT162 in Engineering and Research Problems
- Introduction to Composite Mechanics
- Introduction to Continuum Mechanics and Composite Mechanics
- Composite Material Models in LS-DYNA for Shell and Solid Elements
- Discussion on MAT2, MAT54, MAT59, & MAT162
- Theory and Practice in MAT162 Progressive Composite Damage Model for Unidirectional and Woven Fabric Composites
- MAT162 User Manual – Version 15A 2015
- Progressive Damage Modeling of Plain-Weave Composites using LS-Dyna Composite Damage Model MAT162
- Unit Single Element Analysis
- Comparison between Different LS-DYNA Composite Models
- Sphere Impact on Composite SHELL & SOLID Plates
- Low Velocity Impact and Compression after Impact Applications
- Modeling the Low Velocity Impact and Compression after Impact Experiments on Composites Using MAT162 in LS-DYNA
- Perforation Mechanics of 2-D Membrane and Thin Composites
- Penetration Mechanics of Composites and Soft-Laminates
- Introduction to LS-DYNA (Document Only)

http://www.ccm.udel.edu/software/mat162/mat162_workshop/

BETA CAE Systems announces the release of the v17.1.1 of its software suite

www.beta-cae.com/news/20170509_announcement_suite_v17.1.1.htm



Contents

Enhancements and known issues resolved in ANSA

Enhancements in ANSA

Scripting: A new python script function has been added [utils.ImportCustomToolbarsAndMenus()],to provide the capability to import custom toolbars and/or menus.

CompareTool: A new Python class [CompareTool] unifies all model comparison functions. This class replaces the CompareFromFile() function, which is now deprecated.

Data management: It is now possible to handle both 100% and 150% subsystems in ANSA DM.

Model Browser: Considerable performance improvement of "Update model set-up entities " that collects the model set-up entities of subsystems and simulation models based on their geometrical contents.

Connections & Assembly

- Improved performance for Spotwelds realization when a Reference Library is used for the Fe-Representation settings.
- Improved performance of Seamlines realization.
- File > Read connections: Reading connections of the same ID for different connection types is now allowed.
- Reference library entities for the entire FE representations from the options in Windows > Settings > Connections > Fe Rep Reference Properties, are now supported.

CHECKs

- **Free**: Function can now identify and fix nodes that are used only by time history entities.
- **Radioss**: Radioss 14 (2017) is now supported.
- **Safety**: The Low Speed Impact tool is supported for marking the ECE42 locations and the positioning (single or multi) of the impactor include.
- **SONATE:** Visualization of the coupling performed by SONATE.
- **Optimization Task:** The result of the Check Template Item is now checked in Report Item. The importance of the result is controlled by the user by declaring its status as Fatal or Warning.

Known issues resolved in ANSA

General: When an *.igs file was opened in ANSA with the option 'Read free geometry ' disabled, the Model Browser was displaying the geometric entities contained in the CAD file, while these were not shown in the Database Browser since they were not translated in the database.

Connections & Assembly: ANSA defaults of v17.0.x with assigned Fe Rep Reference Properties would not be read in properly in the v17.1.x.

Volume Mesh:

- Negative Volume: Specific cases where the check would report erroneous number of negative elements detected on model.
- Volumes: Case where AutoDetect failed to properly detect a closed volume.

NASTRAN: Deck Info: Mass Deck Info calculation was not correct when NSM set was referred to Nastran Header, because not all NSMs in the NSM set were considered.

SONATE: The reading of the Generalized Displacement output request was erroneous.

LS-DYNA: ANSA Kinematic positions were not output as PRIMER Kinematic comments.

ANSYS: The Preview Include structure option activation would fail to display the Include structure.

NVH Console: Assembly: When applying A/LC Points from within the NVH Console, named nodes were lost, upon changing the representation of the respective component.

Loadcase Manager: Fluid nodes were renumbered when imported from XML file.

Morph and Oprimization: The function "DV from entities ", (activated from Database Browser), would fail for some fields of specific entities.

For more details about the new software features, enhancements and corrections please, refer to the Release Notes document.

Known issues resolved in META

General: Deactivating Settings > Global Settings > General > GUI > Crash Report Path setting could prevent META from launching.

Supported Interfaces

Abaqus: Wrong axis might be used in certain cases when calculating material orientation defined by *ORIENTATION.

LS-DYNA: In some cases, SETs might not be input when there were ID conflicts for SETs of different types.

Unexpected termination when reading PAMCRASH Femzipped files.

Drawing: Shell elements were not displayed on work stations with NVIDIA Quadro K4000 graphics card, driver: 331.82.

Managing Curve Data: Context menu would not appearing when pressing right mouse button on a curve's point.

NVH Calculators: Responses calculated from Modal Response or FRF Assembly might not be correct if Medina files were provided as modal components.

META Viewer: Rendering Materials were not applied on the PIDs of the model when the project file was loaded in META Viewer.

Compatibility and Supported Platforms

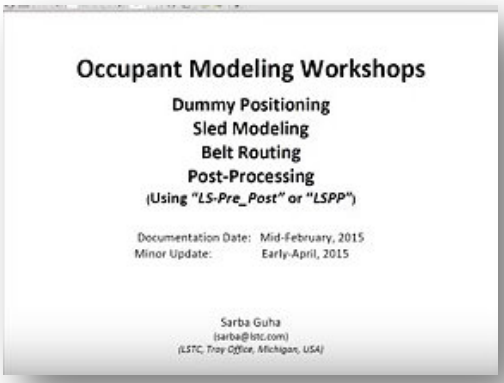
ANSA files saved by all the first and second point releases of a major version are compatible to each other. New major versions can read files saved by previous ones but not vice versa.

META Project files saved from version 17.1.1 are compatible and can be opened by META version 16.0.0 or later. To be readable by META versions earlier than v16.0.0, they have to be saved selecting the option "Version <16.0.0".

Support for 32-bit platform has been discontinued for all operating systems.

http://www.beta-cae.com/news/20170509_announcement_suite_v17.1.1.htm

LS-DYNA – Sarba Guha - Occupant Modeling Workshops & Other Learning Aids



Occupant Modeling Workshops & Other Learning Aids

By Sarba Guha, LSTC

Now Available On Line

With the completion of the content for the below online workshops offered by Sarba Guha, users have a new avenue for learning..

Additionally, this month they were used by Sarba, for a successful webex, offered by LSTC's Direct Distributor Complx in Mexico. The workshops were attended by many companies in Mexico, using LS-DYNA or planning to use LS-DYNA. For LS-DYNA demo, lease, purchase, training in Mexico visit: Complx www.complx.com .

"A huge advantage is that through each recording I can now teach a much larger audience. In the future I want to expand my recordings to cover many additional topics. I hope the workshops will help our worldwide users. In addition, they will remain for future young men and women to get a quick start in their own lives in the field of CAE." Sarba Guha

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Available at www.lstc.com/training_associates -

Occupant Modeling Workshops & Other Learning Aids - By Sarba Guha, LSTC

"About" corrections/explanations. All links open to new window

Workshop 1 Video About :Video 1 updates/explains corrections

Workshop 2 Video About :Video 2 updates/explains corrections

Workshop 3 Video

Workshop 4 Video

Workshop 5 Video About : Video 5 updates/explains corrections

Workshop 6 Video

Sled Environment About : Sled Environment/explains corrections

Workshop 7 Video

BOOKS – Engineering for the current and young

	**Finite Element Method: Applications in Solids, Structures, and Heat Transfer** (Mechanical Engineering) 1st Edition, Kindle Edition The finite element method (FEM) is the dominant tool for numerical analysis in engineering, yet many engineers apply it without fully understanding all the principles. Learning the method can be challenging, but Mike Gosz has condensed the basic mathematics, concepts, and applications into a simple and easy-to-understand reference.
	**A FIRST COURSE IN THE FINITE ELEMENT METHOD** The book is written primarily as a basic learning tool for the undergraduate students in civil and mechanical engineering who are primarily interested in stress analysis and heat transfer. The text offers ideal preparation for students who want to apply the finite element method as a tool to solve practical physical problems.

	**How to Build a Car: A high-speed adventure of mechanics, teamwork, and friendship** by Martin Sodomka (Author), Saskia Lacey (Author)
	**The Most Magnificent Thing! By: Ashley Spires** **"...the sometimes-frustrating process of translating ideas to reality and shows how a new perspective can help problem solve and rekindle enthusiasm and joy. Grades K-2."**

Editor: Marsha J. Victory livermorehorses@aol.com

Posts or Likes During May

DYNAmore Nordic AB

Meet us at NAFEMS World Congress 2017, where we will be exhibiting. The Congress takes place in Stockholm at the Waterfront Congress Centre, between June 11-14.

QuEST Global 3d

We are looking for an enthusiastic, confident and technology driven professional to join our team in Charlotte, NC, USA as a NX Modeler/Drafter.

George Gulliver Director - South Central - GM Commercial Fleet

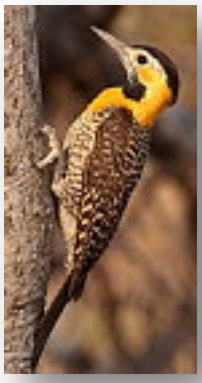
The company I work for makes these! So cool!

Bachar Aljundi Managing Director at Humanetics Innovative Solutions, Inc.

After 61 Years, Detroit Gets A Streetcar Once More

Why Do Woodpeckers Resist Head Impact Injury: A Biomechanical Investigation

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0026490



The numerical simulation was performed with the dynamic FE commercial package LS-Dyna version 971 (Livermore Software Inc.)

Why Do Woodpeckers Resist Head Impact Injury: A Biomechanical Investigation

Lizhen Wang, - Jason Tak-Man Cheung, - Fang Pu, - Deyu Li, - Ming Zhang , - Yubo Fan

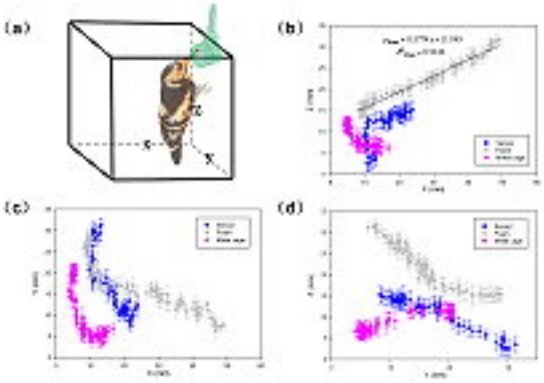


Figure 1. The 3D pecking trajectory during woodpecker's pecking.

Abstract

Head injury is a leading cause of morbidity and death in both industrialized and developing countries. It is estimated that brain injuries account for 15% of the burden of fatalities and disabilities, and represent the leading cause of death in young adults. Brain injury may be caused by an impact or a sudden change in the linear and/or angular velocity of the head. However, the woodpecker does not experience any head injury at the high speed of 6–7 m/s with a deceleration of 1000 g when it drums a tree trunk. It is still not known how woodpeckers protect their brain from impact injury. In order to investigate this, two synchronous high-speed video systems were used to observe the pecking process, and the force sensor was used to measure the peck force. The mechanical properties and macro/micro morphological structure in woodpecker's head were investigated using a mechanical testing system and micro-CT scanning. Finite element (FE) models of the woodpecker's head were established to study the dynamic intracranial responses. The result showed that macro/micro morphology of cranial bone and beak can be recognized as a major contributor to non-impact-injuries. This biomechanical analysis makes it possible to visualize events during woodpecker pecking and may inspire new approaches to prevention and treatment of human head injury

Why Do Woodpeckers Resist Head Impact Injury: A Biomechanical Investigation

Introduction

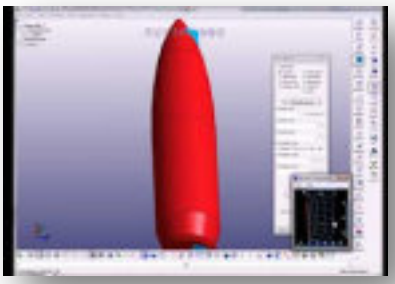
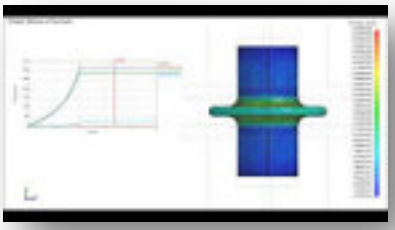
Head injuries remain as an increasingly common cause of death and severe disabilities around the world [1]–[3]. Considering the competitive team sports at the 2004 Olympic Games, it was shown that 24% of all the injuries reported were head injuries [4]. According to European Brain Injury Consortium (EBIC) survey, 51% of head injuries were from car-crash accident or sports related to fall [5], [6]. Yet an intriguing example from nature is the case of woodpeckers (Picoides), who drum tree trunks at a speed of 6–7 m/s with a deceleration of approximately 1000 g, but no head injuries [7]–[9]. Indeed, woodpecker drums about 10–20 bouts continuously, and every bout takes about 50 milliseconds. It drums about 12,000 times per day on average. Woodpeckers perform rhythmic drumming with their beaks on surfaces such as dead tree limbs to catch and feed themselves with worms, or attract a mate and announce their territorial boundaries [9]. In view of biomechanics it is not well understood why woodpeckers resist head impact injuries.

Several research groups have studied the mechanism of resist impact injuries in woodpecker's head [7]–[15]. Earlier classic ornithological studies suggested two principal factors. The unique anatomical structures of woodpecker's head have been thought as one of factors. The unique anatomical structures included stout sharply pointed beaks [10]; A long tongue called hyoid bone which originates from the dorsum of the maxilla, passes through the right nostril, divides into two parts between the eyes, and the dividends then arch over the superior portion of the skull and around the occiput by passing on either side of the neck, coming forward through the lower mandible, and uniting into one again below the forehead [7], [9], [11]; Narrow subdural space and little cerebrospinal fluid (CSF), relatively small and smooth brain specially oriented to allow larger contact areas within the skull [7], [12], [13]. Meanwhile, the straight-line pecking trajectory in the sagittal plane was suggested to be against rotational forces as the protective mechanism that rotational, rather than translational, accelerations produce concussion [8], [14], [15]. However, little attention has been paid to the three-dimensional (3D) kinematic/kinetic features and quantitative estimation of macro/micro morphology and histology on woodpecker's head such as beak and cranial bone. There is overwhelming evidence that bone mass and micro-architecture are sensitive to the mechanical stimuli, such that make its mechanical behavior both in microstructure and strength adapt to the environmental changes [16]–[20]. Here, we investigated 3D kinematics, mechanical properties, macro/micro morphological structure and dynamic response of woodpecker's head quantitatively. The purpose of this study was to investigate the role of 3D kinematics, macro/micro structures of beak and cranial bone in avoiding impact injury of woodpecker's head.

YouTube Choices for the Month

Author: Marsha Victory mv@feainformation.com

My personal pics for this month

	**Sheng Zhang** **Using LS-PrePost Block Mesher to create Hexahedron Solid Mesh** https://www.youtube.com/channel/UCloVmS8QQ_a28fvp1fvq_Wg
	**BeenuZz Cylinder forging with LS-DYNA** https://www.youtube.com/watch?v=C9VwjR9f-X0 This is a purely numerical comparison of results between remeshing / non remeshing procedures, for a cylinder forging simulation. EFG have been usedfor local / global remeshing. …
	**Predictive Engineering - A Roadmap to Linear and Nonlinear Implicit Analysis in LS DYNA Presentation at the 11th Intl LS DYNA** . https://www.youtube.com/watch?v=ochbGO_KNf8 A condensed presentation of our paper "A Roadmap to Linear and Nonlinear Implicit Analysis in LS-DYNA" that we presented at the 11th International LS-DYNA User's Conference in Salzburg, Austria on May 9-11, 2017. Here's the Abstract: The default LS-DYNA settings are tailored for running large explicit analyses.

http://lsdyna-tutorials.com/

Preparation of LS-DYNA video tutorials, including detailed explanations in accordance to customers' topics.

Tutorials may cover specific topics (metalworking processes, explosions, flow dynamics and so on), and individual LS-DYNA segments (grid modeling, contact, material models, etc.)

Tutorials on topics include a task setting, modeling stages, finite element mesh, parameter entry, calculation in LS-DYNA and output analysis. LS-PREPOST software is used as a preprocessor.

Video tutorials are created both for new LS-DYNA users (students, postgraduates, engineering employees), and for experienced users.

Tutorial time may vary, depending on complexity of a topic, from 15 to 60 minutes, and they include detailed text explanations or vocal instructions.

Video tutorials are to be delivered to the customer in AVI format with a k-file (a complete file to run in LS-DYNA).

For complete information and pricing visit:

http://lsdyna-tutorials.com/

RESCALE On-Demand LS-DYNA Licenses Now Available in Europe on Rescale™ Cloud HPC Platform

San Francisco, CA — Rescale and DYNAmore are excited to announce that hourly, on-demand licenses of the popular finite element analysis (FEA) software LS-DYNA are now available in Europe on ScaleX™ Enterprise, Rescale's enterprise cloud platform for big compute. The joint launch builds on the success of on-demand licensing in the United States, which accounts for 99% of LS-DYNA jobs on ScaleX in that country. DYNAmore, LS-DYNA's European distributor, will take care of orders and billing, while Rescale will deliver the software on its cloud platform.

Rescale provides ScaleX, a cloud computing platform for simulation and other software that require high-performance computing (HPC). Over 200 third-party software packages, including LS-DYNA, are integrated onto the ScaleX platform, which users can leverage on the cloud via an intuitive SaaS graphical user interface. Rescale partners with major public cloud providers, including AWS and Microsoft Azure, to allow users to run simulations on a global network of the latest HPC hardware.

LS-DYNA, one of the most popular software packages on the ScaleX platform, was previously available to European customers under a "bring-your-own-license (BYOL)" model that permitted customers to use their annual or paid-up licenses on the Rescale platform. With the addition of on-demand licensing, European LS-DYNA customers can now instantly purchase hourly licenses on the cloud to meet their variable simulation requirements and pay by the hour for the licenses they use. In conjunction with Rescale's multi-cloud network of on-demand HPC hardware, on-demand licenses will allow European LS-DYNA customers to fully leverage the elasticity of the cloud. "Engineers at European enterprises now have the freedom to scale out their LS-DYNA simulations in the blink of an eye, giving their organizations the IT agility that directly corresponds with ROI," said Joris Poort, Rescale's CEO.

DYNAmore's Software Solutions Manager Uli Göhner anticipates the news will boost LS-DYNA sales in Europe as the software licenses become more accessible and easy to purchase. "We already have a lot of requests from our existing customer base for short term HPC resources. Our flexible licensing strategy allows customers to lease additional licenses for a short term or to purchase licenses on a pay-per-use basis. This new licensing option was implemented especially for our LS-DYNA cloud offering and allows our customers to use their HPC resources effectively."

Rescale is a Gold Sponsor of the 11th European LS-DYNA Conference in Salzburg, Austria on May 9-11, 2017. Visit the Rescale booth for a live demo of how to buy on-demand licenses on ScaleX.

About Rescale: Rescale is the global leader for high-performance computing simulations and deep learning in the cloud. Trusted by the Global Fortune 500, Rescale empowers the world's top scientists and engineers to develop the most innovative new products and perform groundbreaking research and development faster and at lower cost. Rescale's ScaleX platform transforms traditional fixed IT resources into flexible hybrid, private, and public cloud resources—built on the largest and most powerful high-performance computing network in the world. For more information on Rescale's ScaleX platform, visit www.rescale.com.

About DYNAmore: DYNAmore is the main partner for consulting, training, support and sales services concerning the finite element software LS-DYNA. The product portfolio consists of LS-DYNA, LS-OPT, LS-PrePost, GENESIS, additional complementary programs as well as numerous FE models for crash simulation.

DYNAmore is the first choice for pilot and development projects dealing with the simulation of nonlinear dynamic problems. Secured and qualified support for all application fields, FEM calculation services and general consulting on the subject of structural dynamics are among the services. The educational offering covers a wide range of seminars, info days and conferences. The services provided also include software development for finite element solver technology and simulation data management as well as consulting and support for modern, massively parallel computer systems.

This article was written by Rescale

Engineering Advantage Blog

Tap into the thinking of some of the world's leading simulation experts.

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May 2, 2017
By Michael Kuron,
Ph.D., CFD Manager
Thermo-Mechanical Analysis Methods for Printed Circuit Boards: Part 2

May 9, 2017
By Michael Bak,
Ph.D., Senior Engineering Manager
Thermo-Mechanical Analysis Methods for Printed Circuit Boards Part 3: Vibration Analysis

May 16, 2017
By Peter Barrett,
M.S.C.E., P.E. - VP
Do I Need to Hire an FEA Expert?

May 22, 2017 :
By Steven Hale,
M.S.M.E, Senior Engineering Manager
What is Topology Optimization and Why Use It?

http://www.jsol.co.jp/english/cae/

Oct 31st – Nov 1st **LS-DYNA & JSTAMP Forum 2017** http://ls-dyna.jsol.co.jp/en/event/uf/

Tokyo, Japan

Website Month Showcase – Sites to Visit for Information

AUTOMOTIVE NEWS & EVENTS

Editor: Dilip Bhalsod

The purpose of this section is to provide a place, for our automotive readers, to share news and events relative to their company and/or products.

The criteria for submitting information is as follows:

- It has to be public information
- Published on the Internet
- Be automotive informational, or human interest.
- We do not accept financial quarterly information

We would welcome the opportunity to share information about your company with our readership.

You may send Title to your information and the accompanying URL to agiac99@aol.com - Subject Line please use " Automotive News"

Submissions should be received by the 15th of each month, of the month you want your article placed

Submission publications is at the sole discretion of FEA Information Inc.

GM Works to Set Sustainable Natural Rubber Tires into Motion

First automaker to collaborate with suppliers to improve global rubber supply

2017-05-15

DETROIT — Transforming the global rubber and tire supply chain to create lasting, environmentally sound sustainable rubber production requires a collaborative approach. Through an industry-first commitment to sourcing sustainable natural rubber in its tires, General Motors is helping drive the industry toward net-zero deforestation and uphold human and labor rights.

"Our supplier partners are an extension of our company," said Steve Kiefer, GM senior vice president of Global Purchasing and Supply Chain. "We want to encourage affordable, safer and cleaner options for our customers that drive value to both our organization and the communities in which we work."

GM believes that sourcing tires produced using sustainable natural rubber has a number of community, business and environmental benefits, including:

- Preserving and restoring primary forests and high conservation value and high carbon stock areas that are critical to addressing climate change and protecting wildlife
- Improving yield and quality for natural rubber farmers, further supporting the small businesses that contribute 85 percent of this material
- Mitigating business risk related to supply chain sourcing and performance and helping assure long-term availability of a key commodity

As tire manufacturers develop sustainable natural rubber policies, automaker demand will help fuel results. GM will be working with tire suppliers, governments, rubber industry associations and environmental NGOs to drive alignment and reduce supply chain complexity.

GM is also working with suppliers such as Bridgestone, Continental, Goodyear and Michelin to develop appropriate transparency into natural rubber and ensure its traceability throughout the supply chain. The company encourages other automakers and suppliers to join in the effort to accelerate progress.

GM Works to Set Sustainable Natural Rubber Tires into Motion

GM is committed to developing safer, simpler and better solutions that move humanity forward. For more information, visit its sustainability report or environmental blog.

General Motors Co. (NYSE:GM, TSX: GMM) and its partners produce vehicles in 30 countries, and the company has leadership positions in the world's largest and fastest-growing automotive markets. GM, its subsidiaries and joint venture entities sell vehicles under the Chevrolet, Cadillac, Baojun, Buick, GMC, Holden, Jiefang, Opel, Vauxhall and Wuling brands. More information on the company and its subsidiaries, including OnStar, a global leader in vehicle safety, security and information services, can be found at http://www.gm.com.

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AEROSPACE NEWS & EVENTS

Editor: Marnie Azadian

The purpose of this section is to provide a place, for our aerospace readers, to share news and events relative to their company and/or products.

The criteria for submitting information is as follows:

- It has to be public information
- An internet URL
- Be technical, informational, or human interest.
- We do not accept financial quarterly information

We would welcome the opportunity to share information about your company with our readership.

You may send Title to your information and the accompanying URL to agiac99@aol.com - Subject Line please use "Aerospace News"

Submissions should be received by the 15th of each month, of the month you want your article placed. For example: We would need the title of the news or event by December 15th, 2015 to be featured in the December 2015 FEA newsletter.

Submission publications is at the sole discretion of FEA Information Inc.

Lockheed Martin's LM-100J Commercial Freighter Makes Successful First Flight

MARIETTA, Ga., May 25, 2017 /PRNewswire/ -- The first Lockheed Martin (NYSE: LMT) LM-100J commercial freighter aircraft achieved a critical milestone with the completion of its first flight here today.

Lockheed Martin’s LM-100J commercial freighter had a successful first flight, May 25, 2017. by Todd R. McQueen

"I was proud to fly the first flight of our LM-100J. It performed flawlessly, as is typical of our military C-130J new production aircraft," said Wayne Roberts, chief test pilot for the LM-100J Program. "This new model will perform many commercial roles in the decades to come, like humanitarian service following natural disasters and others like nuclear accident response, oil spill containment, and firefighting. This aircraft will also enable remote area development such as mining and oil and gas exploration. This day marks the beginning of a tremendous commercial capability that only the LM-100J can deliver."

This first flight followed the same test flight route over North Georgia and Alabama that is used for all C-130J Super Hercules aircraft. The LM-100J will complete initial production flight tests and then begin Federal Aviation Administration (FAA) type certificate update flight test requirements.

"This first flight is a source of pride for Lockheed Martin and serves as a proof-point to the ongoing versatility of the Super Hercules aircraft," said George Shultz, vice president and general manager, Air Mobility & Maritime Missions, and Marietta site general manager. "I'm continually impressed by the commitment to quality and relevance that our employees, industry partners and customers have invested into the LM-100J. Like its military counterpart, the LM-100J is exceeding all expectations in terms of performance and capabilities."

The LM-100J is the 17th different mission capability developed for the C-130J Super Hercules and it is an updated version of the L-100 cargo aircraft, which Lockheed Martin produced from 1964-1992. Lockheed Martin officials submitted a Program Notification Letter to the FAA on Jan. 21, 2014, for a type design update to this aircraft, a civil-certified variant of the C-130J Super Hercules to be marketed as the LM-100J.

Lockheed Martin's LM-100J Commercial Freighter Makes Successful First Flight

Through select design innovations, the LM-100J will perform as a commercial multi-purpose air freighter capable of rapid and efficient cargo transport. The LM-100J is an ideal airlift solution for delivering bulk and oversize cargo, particularly to austere locations worldwide. Like its military counterpart, the LM-100J will be able to support multiple missions, ranging from firefighting to medevac to VIP transport.

The LM-100J incorporates technological developments and improvements over the existing L-100s that result from years of C-130J operational experience, including more than 1.5 million fleetwide flight hours. The result of this experience and advancement translates to an aircraft that will deliver reliable service in a multi-role platform for decades to come.

More information about the LM-100J is available at www.lockheedmartin.com/lm100j

About Lockheed Martin

Headquartered in Bethesda, Maryland, Lockheed Martin is a global security and aerospace company that employs approximately 97,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services.

Editor: Yanhua Zhao – China FEA Information Engineering Solutions

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BETA CAE Systems. www.beta-cae.com

BETA CAE Systems - ANSA

An advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment. ANSA is a full product modeler for LS-DYNA, with integrated Data Management and Process Automation. ANSA can also be directly coupled with LS-OPT of LSTC to provide an integrated solution in the field of optimization.

BETA CAE Systems μETA

Is a multi-purpose post-processor meeting diverging needs from various CAE disciplines. It owes its success to its impressive performance, innovative features and capabilities of interaction between animations, plots, videos, reports and other objects. It offers extensive support and handling of LS-DYNA 2D and 3D results, including those compressed with SCAI's FEMZIP software

Solutions for:

Process Automation - Data Management – Meshing – Durability - Crash & Safety NVH - CFD - Thermal analysis - Optimization - Powertrain
Products made of composite materials - Analysis Tools -
Maritime and Offshore Design - Aerospace engineering - Biomechanics

DatapointLabs **www.datapointlabs.com**

Testing over 1000 materials per year for a wide range of physical properties, DatapointLabs is a center of excellence providing global support to industries engaged in new product development and R&D.

The compary meets the material property needs of CAE/FEA analysts, with a specialized product line, TestPaks®, which allow CAE analysts to easily order material testing for the calibration of over 100 different material models.

DatapointLabs maintains a world-class testing facility with expertise in physical properties of plastics, rubber, food, ceramics, and metals.

Core competencies include mechanical, thermal and flow properties of materials with a focus on precision properties for use in product development and R&D.

Engineering Design Data including material model calibrations for CAE Research Support Services, your personal expert testing laboratory Lab Facilities gives you a glimpse of our extensive test facilities Test Catalog gets you instant quotes for over 200 physical properties.

ETA – Engineering Technology Associates **www.eta.com**

etainfo@eta.com

Inventium Suite™

Inventium Suite™ is an enterprise-level CAE software solution, enabling concept to product. Inventium's first set of tools will be released soon, in the form of an advanced Pre & Post processor, called PreSys.

Inventium's unified and streamlined product architecture will provide users access to all of the suite's software tools. By design, its products will offer a high performance modeling and post-processing system, while providing a robust path for the integration of new tools and third party applications.

PreSys

Inventium's core FE modeling toolset. It is the successor to ETA's VPG/PrePost and FEMB products. PreSys offers an easy to use interface, with drop-down menus and toolbars, increased graphics speed and detailed graphics capabilities. These types of capabilities are combined with powerful, robust and accurate modeling functions.

VPG

Advanced systems analysis package. VPG delivers a unique set of tools which allow engineers to create and visualize, through its modules--structure, safety, drop test, and blast analyses.

DYNAFORM

Complete Die System Simulation Solution. The most accurate die analysis solution available today. Its formability simulation creates a "virtual tryout", predicting forming problems such as cracking, wrinkling, thinning and spring-back before any physical tooling is produced

Latest Release is ESI Visual-Environment 12.0

ESI Group **www.esi-group.com**

Visual-Environment is an integrative simulation platform for simulation tools operating either concurrently or standalone for various solver. Comprehensive and integrated solutions for meshing, pre/post processing, process automation and simulation data management are available within same environment enabling seamless execution and automation of tedious workflows. This very open and versatile environment simplifies the work of CAE engineers across the enterprise by facilitating collaboration and data sharing leading to increase of productivity.

Visual-Crash DYNA provides advanced preprocessing functionality for LS-DYNA users, e.g. fast iteration and rapid model revision processes, from data input to visualization for crashworthiness simulation and design. It ensures quick model browsing, advanced mesh editing capabilities and rapid graphical assembly of system models. Visual-Crash DYNA allows graphical creation, modification and deletion of LS-DYNA entities. It comprises tools for checking model quality and simulation parameters prior to launching calculations with the solver. These tools help in correcting errors and fine-tuning the model and simulation before submitting it to the solver, thus saving time and resources.
Several high productivity tools such as advanced dummy positioning, seat morphing, belt fitting and airbag folder are provided in **Visual-Safe,** a dedicated application to safety utilities.

Visual-Mesh is a complete meshing tool supporting CAD import, 1D/2D/3D meshing and editing for linear and quadratic meshes. It supports all meshing capabilities, like shell and solid automesh, batch meshing, topo mesh, layer mesh, etc. A convenient Meshing Process guides you to mesh the given CAD component or full vehicle automatically.

Visual-Viewer built on a multi-page/multi-plot environment, enables data grouping into pages and plots. The application allows creation of any number of pages with up to 16 windows on a single page. These windows can be plot, animation, video, model or drawing block windows. Visual-Viewer performs automated tasks and generates customized reports and thereby increasing engineers' productivity.

Latest Release is ESI Visual-Environment 12.0

ESI Group **www.esi-group.com**

Visual-Process provides a whole suite of generic templates based on LS-DYNA solver (et altera). It enables seamless and interactive process automation through customizable LS-DYNA based templates for automated CAE workflows.

All generic process templates are easily accessible within the unique framework of Visual-Environment and can be customized upon request and based on customer's needs.

Visual*DSS* is a framework for Simulation Data and Process Management which connects with Visual-Environment and supports product engineering teams, irrespective of their geographic location, to make correct and realistic decisions throughout the virtual prototyping phase. Visual*DSS* supports seamless connection with various CAD/PLM systems to extract the data required for building virtual tests as well as building and chaining several virtual tests upstream and downstream to achieve an integrated process. It enables the capture, storage and reuse of enterprise knowledge and best practices, as well as the automation of repetitive and cumbersome tasks in a virtual prototyping process, the propagation of engineering changes or design changes from one domain to another.

JSOL Corporation **www.jsol.co.jp/english/cae/**

HYCRASH

Easy-to-use one step solver, for Stamping-Crash Coupled Analysis. HYCRASH only requires the panels' geometry to calculate manufacturing process effect, geometry of die are not necessary. Additionally, as this is target to usage of crash/strength analysis, even forming analysis data is not needed. If only crash/strength analysis data exists and panel ids is defined. HYCRASH extract panels to calculate it's strain, thickness, and map them to the original data.

JSTAMP/NV

As an integrated press forming simulation system for virtual tool shop the JSTAMP/NV meets the various industrial needs from the areas of automobile, electronics, iron and steel, etc. The JSTAMP/NV gives satisfaction to engineers, reliability to products, and robustness to tool shop via the advanced technology of the JSOL Corporation.

JMAG

JMAG uses the latest techniques to accurately model complex geometries, material properties, and thermal and structural phenomena associated with electromagnetic fields. With its excellent analysis capabilities, JMAG assists your manufacturing process

Livermore Software Technology Corp. **www.lstc.com**

LS-DYNA

A general-purpose finite element program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries. LS-DYNA is optimized for shared and distributed memory Unix, Linux, and Windows based, platforms, and it is fully QA'd by LSTC. The code's origins lie in highly nonlinear, transient dynamic finite element analysis using explicit time integration.

LS-PrePost: An advanced pre and post-processor that is delivered free with LS-DYNA. The user interface is designed to be both efficient and intuitive. LS-PrePost runs on Windows, Linux, and Macs utilizing OpenGL graphics to achieve fast rendering and XY plotting.

LS-OPT: LS-OPT is a standalone Design Optimization and Probabilistic Analysis package with an interface to LS-DYNA. The graphical preprocessor LS-OPTui facilitates definition of the design input and the creation of a command file while the postprocessor provides output such as approximation accuracy, optimization convergence, tradeoff curves, anthill plots and the relative importance of design variables.

LS-TaSC: A Topology and Shape Computation tool. Developed for engineering analysts who need to optimize structures, LS-TaSC works with both the implicit and explicit solvers of LS-DYNA. LS-TaSC handles topology optimization of large non-linear problems, involving dynamic loads and contact conditions.

LSTC Dummy Models:

Anthropomorphic Test Devices (ATDs), as known as "crash test dummies", are life-size mannequins equipped with sensors that measure forces, moments, displacements, and accelerations.

LSTC Barrier Models: LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) model.

Material Sciences Corporation **info@materials-sciences.com**

Materials Sciences Corporation has provided engineering services to the composites industry since 1970. During this time, we have participated in numerous programs that demonstrate our ability to: perform advanced composite design, analysis and testing; provide overall program management; work in a team environment; and transition new product development to the military and commercial sectors. MSC's corporate mission has expanded beyond basic research and development now to include transitioning its proprietary technologies from the research lab into innovative new products. This commitment is demonstrated through increased staffing and a more than 3-fold expansion of facilities to allow in-house manufacturing and testing of advanced composite materials and structures

Materials Sciences Corporation (MSC) MAT161/162 - enhanced features have been added to the Dynamic Composite Simulator module of LS-DYNA.

This enhancement to LS-DYNA, known as MAT161/162, enables the most effective and accurate dynamic progressive failure modeling of composite structures to enable the most effective and accurate dynamic progressive failure modeling of composite structures currently available.

MSC/LS-DYNA Composite Software and Database -

Fact Sheet: http://www.materials-sciences.com/dyna-factsheet.pdf

- MSC and LSTC have joined forces in developing this powerful composite dynamic analysis code.
- For the first time, users will have the enhanced ability to simulate explicit dynamic engineering problems for composite structures.
- The integration of this module, known as 'MAT 161', into LS-DYNA allows users to account for progressive damage of various fiber, matrix and interply delamination failure modes.
- Implementing this code will result in the ability to optimize the design of composite structures, with significantly improved survivability under various blast and ballistic threats.

MSC's LS-DYNA module can be used to characterize a variety of composite structures in numerous applications—such as this composite hull under blast

Oasys Ltd. LS-DYNA Environment **www.oasys-software.com/dyna**

The Oasys Suite of software is exclusively written for LS-DYNA® and is used worldwide by many of the largest LS-DYNA® customers. The suite comprises of:

Oasys PRIMER

Key benefits:

- Pre-Processor created specifically for LS-DYNA®
- Compatible with the latest version of LS-DYNA®
- Maintains the integrity of data
- Over 6000 checks and warnings – many auto-fixable
- Specialist tools for occupant positioning, seatbelt fitting and seat squashing (including setting up pre-simulations)
- Many features for model modification, such as part replace
- Ability to position and depenetrate impactors at multiple locations and produce many input decks automatically (e.g. pedestrian impact, interior head impact)
- Contact penetration checking and fixing
- Connection feature for creation and management of connection entities.
- Support for Volume III keywords and large format/long labels
- Powerful scripting capabilities allowing the user to create custom features and processes

www.oasys-software.com/dyna

Oasys D3PLOT

Key benefits:

- Powerful 3D visualization post-processor created specifically for LS-DYNA®
- Fast, high quality graphics
- Easy, in-depth access to LS-DYNA® results
- Scripting capabilities allowing the user to speed up post-processing, as well as creating user defined data components

Oasys T/HIS

Key benefits:

- Graphical post-processor created specifically for LS-DYNA®
- Automatically reads all LS-DYNA® results
- Wide range of functions and injury criteria
- Easy handling of data from multiple models
- Scripting capabilities for fast post-processing

Oasys REPORTER

Key benefits:

- Automatic report generation tool created specifically for LS-DYNA®
- Automatically post-process and summarize multiple analyses
- Built-in report templates for easy automatic post-processing of many standard impact tests

恒士达科技
Hengstar Tech.

Shanghai Hengstar

www.hengstar.com

Center of Excellence: Hengstar Technology is the first LS-DYNA training center of excellence in China. As part of its expanding commitment to helping CAE engineers in China, Hengstar Technology will continue to organize high level training courses, seminars, workshops, forums etc., and will also continue to support CAE events such as: China CAE Annual Conference; China Conference of Automotive Safety Technology; International Forum of Automotive Traffic Safety in China; LS-DYNA China users conference etc.

On Site Training: Hengstar Technology also provides customer customized training programs on-site at the company facility. Training is tailored for customer needs using LS-DYNA such as material test and input keyword preparing; CAE process automation with customized script program; Simulation result correlation with the test result; Special topics with new LS-DYNA features etc..

Distribution & Support: Hengstar distributes and supports LS-DYNA, LS-OPT, LS-Prepost, LS-TaSC, LSTC FEA Models; Hongsheng Lu, previously was directly employed by LSTC before opening his distributorship in China for LSTC software. Hongsheng visits LSTC often to keep update on the latest software features.

Hengstar also distributes and supports d3View; Genesis, Visual DOC, ELSDYNA; Visual-Crash Dyna, Visual-Process, Visual-Environment; EnkiBonnet; and DynaX & MadyX etc.

Consulting

As a consulting company, Hengstar focuses on LS-DYNA applications such as crash and safety, durability, bird strike, stamping, forging, concrete structures, drop analysis, blast response, penetration etc with using LS-DYNA's advanced methods: FEA, ALE, SPH, EFG, DEM, ICFD, EM, CSEC..

Lenovo www.lenovo.com

Lenovo is a USD39 billion personal and enterprise technology company, serving customers in more than 160 countries.

Dedicated to building exceptionally engineered PCs, mobile Internet devices and servers spanning entry through supercomputers, Lenovo has built its business on product innovation, a highly efficient global supply chain and strong strategic execution. The company develops, manufactures and markets reliable, high-quality, secure and easy-to-use technology products and services.

Lenovo acquired IBM's x86 server business in 2014. With this acquisition, Lenovo added award-winning System x enterprise server portfolio along with HPC and CAE expertise.

Canada	**Metal Forming Analysis Corp MFAC** galb@mfac.com www.mfac.com			
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	eta/DYNAFORM	INVENTIUM/PreSys		
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	LS-DYNA LS-OPT		LS-PrePost LS-TAsc Barrier/Dummy Models	
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	LSTC Dummy Models		LSTC Barrier Models	

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	QuikCAST	SYSWELD	PAM-COMPOSITES	CEM One
	VA One	CFD-ACE+	ProCAST	
		Weld Planner	Visual-Environment	IC.IDO

United States	**Engineering Technology Associates – ETA** etainfo@eta.com www.eta.com			
	INVENTIUM/PreSy	NISA	VPG	LS-DYNA
	LS-OPT	DYNAform		

United States	**Livermore Software Technology Corp** sales@lstc.com **LSTC** www.lstc.com			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	TOYOTA THUMS	

United States	**Predictive Engineering** george.laird@predictiveengineering.com www.predictiveengineering.com			
	FEMAP	NX Nastran	LS-DYNA	LS-OPT
	LS-PrePost	LS-TaSC	LSTC Dummy Models	
			LSTC Barrier Models	

France	**DynaS+**		v.lapoujade@dynasplus.com	
	www.dynasplus.com		Oasys Suite	
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	DYNAFORM	VPG	MEDINA	
	LSTC Dummy Models		LSTC Barrier Models	

France	**DYNAmore France SAS**		sales@dynamore.eu	
	www.dynamore.eu			
	LS-DYNA, LS-PrePost	LS-OPT	Primer	DYNAFORM
	DSDM Products		LSTC Dummy Models	FEMZIP
	LSTC Barrier Models		DIGIMAT	

Germany	**CADFEM GmbH**		lsdyna@cadfem.de	
	www.cadfem.de			
	ANSYS	LS-DYNA	optiSLang	
	ESAComp	AnyBody		
	ANSYS/LS-DYNA			

Germany	**DYNAmore GmbH**		uli.franz@dynamore.de	
	www.dynamore.de			
	PRIMER	LS-DYNA	FTSS	VisualDoc
	LS-OPT	LS-PrePost	LS-TaSC	DYNAFORM
	Primer	FEMZIP	GENESIS	Oasys Suite
	TOYOTA THUMS		LSTC Dummy & Barrier Models	

The Netherlands	**Infinite Simulation Systems B.V**		j.mathijssen@infinite.nl	
	www.infinite.nl			
	ANSYS Products	CivilFem	CFX	Fluent
	LS-DYNA	LS-PrePost	LS-OPT	LS-TaSC

Russia	**STRELA**		info@dynarussia.com	
	LS-DYNA	LS-TaSC	LS-OPT	LS-PrePost
	LSTC Dummy Models		LSTC Barrier Models	

Spain	**DYNAmore France SAS**		sales@dynamore.eu		
	www.dynamore.eu				
	LS-DYNA, LS-OPT	LS-PrePost	Primer	DYNAFORM	
	DSDM Products		LSTC Dummy Models	FEMZIP	
	LSTC Barrier Models		DIGIMAT		
Sweden	**DYNAmore Nordic**		marcus.redhe@dynamore.se		
	www.dynamore.se		Oasys Suite		
	ANSA	µETA	LS-DYNA	LS-OPT	
	LS-PrePost	LS-TaSC	FastFORM	DYNAform	
	FormingSuite		LSTC Dummy Models		
			LSTC Barrier Models		
Switzerland	**DYNAmoreSwiss GmbH**		info@dynamore.ch		
	www.dynamore.ch				
	LS-DYNA		LS-OPT	LS-PrePost	
	LS-TaSC		LSTC Dummy Models &	Barrier Models	
UK	**Ove Arup & Partners**	dyna.sales@arup.com			
	www.oasys-software.com/dyna		TOYOTA THUMS		
	LS-DYNA		LS-OPT	LS-PrePost	
	LS-TaSC		PRIMER	D3PLOT	T/HIS
	REPORTER	SHELL	FEMZIP	HYCRASH	
	DIGIMAT	Simpleware	LSTC Dummy Models		
			LSTC Barrier Models		

China	**ETA – China**		lma@eta.com.cn	
	www.eta.com/cn			
	Inventium	VPG	DYNAFORM	NISA
	LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost
			LSTC Barrier Models	LS-TaSC
China	**Oasys Ltd. China**		de-long.ge@arup.com	
	www.oasys-software.com/dyna			
	PRIMER D3PLOT	HYCRASH	T/HIS REPORTER	SHELL
	LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost
	DIGIMAT	FEMZIP	LSTC Barrier Models	LS-TaSC
China	**Shanghai Hengstar Technology**		info@hengstar.com	
	www.hengstar.com			
	LS-DYNA	LS-TaSC	LSTC Barrier Models	D3VIEW
	LS-PrePOST	LS-OPT	LSTC Dummy Models	
	Genesis	VisualDoc		ELSDYNA
	Visual-Crahs DYNA	Visual-Proeces		DynaX & MadyX
	Enki Bonnet	Visual Environement		

India	**Oasys Ltd. India**		lavendra.singh@arup.com	
	www.oasys-software.com/dyna			
	PRIMER	D3PLOT	T/HIS	
			LS-OPT	LSTC Dummy Models	LS-PrePost
			LS-DYNA	LSTC Barrier Models	LS-TaSC

India	**CADFEM Eng. Svce**		info@cadfem.in	
	www.cadfem.in			
	ANSYS	VPS	ESAComp	optiSLang
	LS-DYNA	LS-OPT	LS-PrePost	

India	**Kaizenat Technologies Pvt. Ltd**		support@kaizenat.com	
	http://kaizenat.com /			
	LS-DYNA	LS-OPT	LSTC Dummy Models	LS-PrePost
	Complete LS-DYNA suite of products		LSTC Barrier Models	LS-TaSC

Japan	**CTC**	LS-dyna@ctc-g.co.jp		
	www.engineering-eye.com			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	CmWAVE	
Japan	**JSOL**			
	www.jsol.co.jp/english/cae		Oasys Suite	
	JSTAMP	HYCRASH	JMAG	
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	TOYOTA THUMS	
Japan	**FUJITSU**			
	http://www.fujitsu.com/jp/solutions/business-technology/tc/sol/			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	CLOUD Services	
Japan	**LANCEMORE**	info@lancemore.jp		
	www.lancemore.jp/index_en.html			
	Consulting			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models		
Japan	**Terrabyte**	**English:**		
	www.terrabyte.co.jp	www.terrabyte.co.jp/english/index.htm		
	Consulting			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	AnyBody	

Korea	**THEME**	wschung7@gmail.com		
	www.lsdyna.co.kr		Oasys Suite	
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	Planets
	eta/DYNAFORM	FormingSuite	Simblow	TrueGRID
	JSTAMP/NV	Scan IP	Scan FE	Scan CAD
	FEMZIP			

Korea	**KOSTECH**	young@kostech.co.kr		
	www.kostech.co.kr			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM
	eta/DYNAFORM	DIGIMAT	Simuform	Simpack
	AxStream	TrueGrid	FEMZIP	

Taiwan **AgileSim Technology Corp.**

www.agilesim.com.tw

LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

Taiwan **Flotrend**

www.flotrend.com.tw

LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

Taiwan **SiMWARE Inc..**

www.simware.com.tw

LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

Contact: JSOL Corporation Engineering Technology Division cae-info@sci.jsol.co.jp

Cloud computing services
for
JSOL Corporation LS-DYNA users in Japan

JSOL Corporation is cooperating with chosen cloud computing services

JSOL Corporation, a Japanese LS-DYNA distributor for Japanese LS-DYNA customers.

LS-DYNA customers in industries / academia / consultancies are facing increased needs for additional LS-DYNA cores

In calculations of optimization, robustness, statistical analysis, we find that an increase in cores of LS-DYNA are needed, for short term extra projects or cores.

JSOL Corporation is cooperating with some cloud computing services for JSOL's LS-DYNA users and willing to provide short term license.

This service is offered to customers using Cloud License fee schedule, the additional fee is less epensive than purchasing yearly license.

The following services are available (only in Japanese). HPC OnLine:

NEC Solution Innovators, Ltd.
http://jpn.nec.com/manufacture/machinery/hpc_online/

Focus
Foundation for Computational Science
http://www.j-focus.or.jp

Platform Computation Cloud
CreDist.Inc.

PLEXUS CAE
Information Services International-Dentsu, Ltd. (ISID) https://portal.plexusplm.com/plexus-cae/

SCSK Corporation
http://www.scsk.jp/product/keyword/keyword07.html

Rescale Cloud Simulation Platform

www.rescale.com

Rescale: Cloud Simulation Platform

The Power of Simulation Innovation
We believe in the power of innovation. Engineering and science designs and ideas are limitless. So why should your hardware and software be limited? You shouldn't have to choose between expanding your simulations or saving time and budget.

Using the power of cloud technology combined with LS-DYNA allows you to:
· Accelerate complex simulations and fully explore the design space
· Optimize the analysis process with hourly software and hardware resources
· Leverage agile IT resources to provide flexibility and scalability

True On-Demand, Global Infrastructure
Teams are no longer in one location, country, or even continent. However, company data centers are often in one place, and everyone must connect in, regardless of office. For engineers across different regions, this can cause connection issues, wasted time, and product delays.

Rescale has strategic/technology partnerships with infrastructure and software providers to offer the following:
· Largest global hardware footprint – GPUs, Xeon Phi, InfiniBand
· Customizable configurations to meet every simulation demand
· Worldwide resource access provides industry-leading tools to every team
· Pay-per-use business model means you only pay for the resources you use
· True on-demand resources – no more queues

ScaleX Enterprise: Transform IT, Empower Engineers, Unleash Innovation
The ScaleX Enterprise simulation platform provides scalability and flexibility to companies while offering enterprise IT and management teams the opportunity to expand and empower their organizations.

ScaleX Enterprise allows enterprise companies to stay at the leading edge of computing technology while maximizing product design and accelerating the time to market by providing:

- Collaboration tools
- Administrative control
- API/Scheduler integration
- On-premise HPC integration

Industry-Leading Security

Rescale has built proprietary, industry-leading security solutions into the platform, meeting the needs of customers in the most demanding and competitive industries and markets.

- Manage engineering teams with user authentication and administrative controls
- Data is secure every step of the way with end-to-end data encryption
- Jobs run on isolated, kernel-encrypted, private clusters
- Data centers include biometric entry authentication
- Platforms routinely submit to independent external security audits

Rescale maintains key relationships to provide LS-DYNA on demand on a global scale. If you have a need to accelerate the simulation process and be an innovative leader, contact Rescale or the following partners to begin running LS-DYNA on Rescale's industry-leading cloud simulation platform.

LSTC - DYNAmore GmbH JSOL Corporation

Rescale, Inc. - 1-855-737-2253 (1-855-RESCALE) - info@rescale.com

944 Market St. #300, San Francisco, CA 94102 USA

ESI Cloud Based Virtual Engineering Solutions

www.esi-group.com

ESI Cloud offers designers and engineers cloud-based computer aided engineering (CAE) solutions across physics and engineering disciplines.

ESI Cloud combines ESI's industry tested virtual engineering solutions integrated onto ESI's Cloud Platform with browser based modeling,

With ESI Cloud users can choose from two basic usage models:

- An end-to-end SaaS model: Where modeling, multi-physics solving, results visualization and collaboration are conducted in the cloud through a web browser.
- A Hybrid model: Where modeling is done on desktop with solve, visualization and collaboration done in the cloud through a web browser.

Virtual Performance Solution:

ESI Cloud offers ESI's flagship Virtual Performance Solution (VPS) for multi-domain performance simulation as a hybrid offering on its cloud platform. With this offering, users can harness the power of Virtual Performance Solution, leading multi-domain CAE solution for virtual engineering of crash, safety, comfort, NVH (noise, vibration and harshness), acoustics, stiffness and durability.

In this hybrid model, users utilize VPS on their desktop for modeling including geometry, meshing and simulation set up. ESI Cloud is then used for high performance computing with an integrated visualization and real time collaboration offering through a web browser.

The benefits of VPS hybrid on ESI Cloud include:

- Running large concurrent simulations on demand
- On demand access to scalable and secured cloud HPC resources
- Three tiered security strategy for your data
- Visualization of large simulation data sets
- Real-time browser based visualization and collaboration
- Time and cost reduction for data transfer between cloud and desktop environments
- Support, consulting and training services with ESI's engineering teams

ESI Cloud Based Virtual Engineering Solutions

www.esi-group.com

VPS On Demand

ESI Cloud features the Virtual Performance Solution (VPS) enabling engineers to analyze and test products, components, parts or material used in different engineering domains including crash and high velocity impact, occupant safety, NVH and interior acoustics, static and dynamic load cases. The solution enables VPS users to overcome hardware limitations and to drastically reduce their simulation time by running on demand very large concurrent simulations that take advantage of the flexible nature of cloud computing.

Key solution capabilities:

- Access to various physics for multi-domain optimization
- Flexible hybrid model from desktop to cloud computing
- On demand provisioning of hardware resources
- Distributed parallel processing using MPI (Message Passing Interface) protocol
- Distributed parallel computing with 10 Gb/s high speed interconnects

Result visualization

ESI Cloud deploys both client-side and server-side rendering technologies. This enables the full interactivity needed during the simulation workflow along with the ability to handle large data generated for 3D result visualization in the browser, removing the need for time consuming data transfers. Additionally ESI Cloud visualization engine enables the comparisons of different results through a multiple window user interface design.

Key result visualization capabilities:

- CPU or GPU based client and server side rendering
- Mobility with desktop like performance through the browser
- 2D/3D VPS contour plots and animations
- Custom multi-window system for 2D plots and 3D contours
- Zooming, panning, rotating, and sectioning of multiple windows

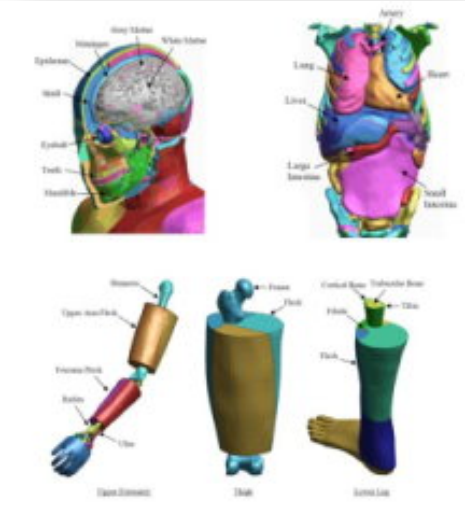
Collaboration

To enable real time multi-user and multi company collaboration, ESI Cloud offers extensive synchronous and asynchronous collaboration capabilities. Several users can view the same project, interact with the same model results, pass control from one to another. Any markups, discussions or annotations can be archived for future reference or be assigned as tasks to other members of the team.

Key collaboration capabilities:

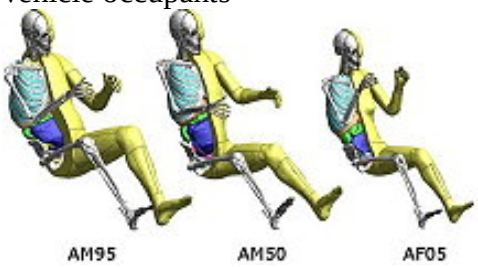
- Data, workflow or project asynchronous collaboration
- Multi-user, browser based collaboration for CAD, geometry, mesh and results models
- Real-time design review with notes, annotations and images archiving and retrieval
- Email invite to non ESI Cloud users for real time collaboration

TOYOTA - Total Human Model for Safety – THUMS

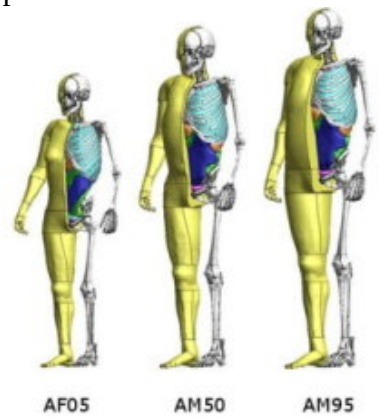


The Total Human Model for Safety, or THUMS®, is a joint development of Toyota Motor Corporation and Toyota Central R&D Labs. Unlike dummy models, which are simplified representation of humans, THUMS represents actual humans in detail, including the outer shape, but also bones, muscles, ligaments, tendons, and internal organs. Therefore, THUMS can be used in automotive crash simulations to identify safety problems and find their solutions.

Each of the different sized models is available as sitting model to represent vehicle occupants



and as standing model to represent pedestrians.



The internal organs were modeled based on high resolution CT-scans.

THUMS is limited to civilian use and may under no circumstances be used in military applications.

LSTC is the US distributor for THUMS. Commercial and academic licenses are available.

For information please contact: THUMS@lstc.com

THUMS®, is a registered trademark of Toyota Central R&D Labs.

LSTC – Dummy Models

LSTC Crash Test Dummies (ATD)

Meeting the need of their LS-DYNA users for an affordable crash test dummy (ATD), LSTC offers the LSTC developed dummies at no cost to LS-DYNA users.

LSTC continues development on the LSTC Dummy models with the help and support of their customers. Some of the models are joint developments with their partners.

e-mail to: atds@lstc.com

Models completed and available (in at least an alpha version)

- Hybrid III Rigid-FE Adults
- Hybrid III 50th percentile FAST
- Hybrid III 5th percentile detailed
- Hybrid III 50th percentile detailed
- Hybrid III 50th percentile standing
- EuroSID 2
- EuroSID 2re
- SID-IIs Revision D
- USSID
- Free Motion Headform
- Pedestrian Legform Impactors

Models In Development

- Hybrid III 95th percentile detailed
- Hybrid III 3-year-old
- Hybrid II
- WorldSID 50th percentile
- THOR NT FAST
- Ejection Mitigation Headform

Planned Models

- FAA Hybrid III
- FAST version of THOR NT
- FAST version of EuroSID 2
- FAST version of EuroSID 2re
- Pedestrian Headforms
- Q-Series Child Dummies
- FLEX-PLI

LSTC – Barrier Models

Meeting the need of their LS-DYNA users for affordable barrier models, LSTC offers the LSTC developed barrier models at no cost to LS-DYNA users.

LSTC offers several Offset Deformable Barrier (ODB) and Movable Deformable Barrier (MDB) models:

- ODB modeled with shell elements
- ODB modeled with solid elements
- ODB modeled with a combination of shell and solid elements

- MDB according to FMVSS 214 modeled with shell elements
- MDB according to FMVSS 214 modeled with solid elements
- MDB according to ECE R-95 modeled with shell elements
- AE-MDB modeled with shell elements

- IIHS MDB modeled with shell elements
- IIHS MDB modeled with solid elements
- RCAR bumper barrier

- RMDB modeled with shell and solid elements

e-mail to: atds@lstc.com.

Conference – Events – Users Meetings

Keep up to date on upcoming

Conferences

Meetings

Events

if you have a new event to be listed please send to agiac99@aol.com

Conference/Events

May 9th – 11th	**11th European LS-DYNA Conf.** Salzburg, Austria	https://lnkd.in/gUHtHZN
May 12th	**The 2017 THUMS European Users' Meeting** - Salzburg, Austria	http://ls-dyna.jsol.co.jp/en/thums/thums_um2017.html
May 30th - June 1st	**7th BETA CAE International Conf.** Thessaloniki, Greece	www.beta-cae.com/
June 11th – 14th	**NAFEMS World Congress & Int. SPDM Conf.** Stockholm, Sweden	www.nafems.org/congress
Oct. 23rd-25th	**3rd China LS-DYNA User's conference** Shanghai, China	http://www.lsdyna.cn
Oct 31st – Nov 1st	**LS-DYNA&JSTAMP Forum 2017** Tokyo, Japan	http://ls-dyna.jsol.co.jp/en/event/uf/

2017 3rd China LS-DYNA User's conference Oct. 23rd-25th, Shanghai, China

Yanhua Zhao & China Conference Team - chinaconf@lstc.com

The 3rd China LS-DYNA conference will echo the success of the well-participated 1st and 2nd China User's Conference, in 2013 and 2015.

Accompanied by the rapid growth of CAE applications in China, LS-DYNA is highly recognized as one of the most widely used finite element analysis software by Chinese users.

China is gaining momentum and recognition in Finite Element Analysis. In the past years, the continuing expansion of application areas has been gaining more users in automotive, die and mold, aerospace and aeronautics industries in China.

In China LS-DYNA is fast becoming the software of choice, by all engineers, students, professors and consulting companies. It is recognized that LS-DYNA, LS-PrePost, LS-OPT and the LSTC ATD and Barrier Models, developed by LSTC, are setting standards for the finite element simulation industry. At the conference LSTC software new features will be introduced and helpful techniques will be shared.

The conference will be attended by experienced users from different industries, LSTC technical support engineers and software developers. Additionally, it will be attended by academic researchers, hardware vendors and software vendors.

With the popularity and attendance of the 1st and 2nd conference and demand from users it has been decided that the conference will be held regularly. One of the goals is to serve as a convenient platform for people in this field to exchange their ideas, share their findings and explore new software functions.

Hosts: Livermore Software Technology Corp. & Dalian Fukun Technology Development Corp.
Date: Oct. 23rd -25th, 2017
Location: InterContinental Shanghai Pudong, Shanghai, China
Website: http://www.lsdyna.cn
Contact: chinaconf@lstc.com

NAFEMS World Congress & Int. SPDM Conference, 11 – 14 June 2017,

Stockholm, Sweden, www.nafems.org/congress

The 2017 NAFEMS World Congress will take place from the 11th to 14th of June in Stockholm, Sweden, and will focus entirely on engineering analysis, modelling and simulation and its impact on industry and beyond.

NAFEMS is the only independent voice of the CAE community, representing over 1300 member organisations worldwide from OEM's to suppliers, leading academic institutions, international research and development bodies, and prominent software vendors.

Engineering analysis, modelling, simulation, and systems engineering are becoming ever more embedded in the product development process across all industries in every part of the world. The technology is no longer seen as niche – we are moving into the mainstream at a rapid pace.

As manufacturing techniques and product lifecycle management processes develop and grow, the use of Finite Element Analysis (FEA),Computational Fluid Dynamics (CFD), Multibody Simulation (MBS) and all of the associated technologies is increasing exponentially. As a result, your community is expanding and evolving with the technology into a truly cross-industry, multi-skilled, global society, with its own unique perspectives, problems, and solutions.

We stand at a crossroad. In order for the technology to progress further and for us, the users, to keep pace with this development, collaboration and sharing of experience and knowledge is vital.

Among the exhibitors our participants

- Beta CAE Systems
- DYNAmore Nordic
- ESI Group
- Courtesy listing: Desktop Engineering

Not to miss dates:

- PowerPoint submission deadline: May 22nd 2017
- Conference dates: June 11th - 14th 2017

Training and Social Media Section

Aleta Hays

Training

Classes

Webinars

On Site – On Line

We will be adding to this section monthly – if you have a new event to be listed please send to Aleta ayh225@aol.com and cc Anthony agiac99@aol.com

Participant's Training Classes

Webinars

Info Days

Class Directory

Participant Class Directory

Arup **(corporate)**	www.oasys-software.com/dyna/en/training
BETA CAE Systems **(corporate)**	www.beta-cae.com/training.htm
DYNAmore **(corporate)**	www.dynamore.de/en/training/seminars
ESI-Group **(corporate)**	https://myesi.esi-group.com/trainings/schedules
ETA **(corporate)**	www.eta.com/support2/training-calendar
KOSTECH	www.kostech.co.kr/
LSTC - (corporate)	www.lstc.com/training
LS-DYNA OnLine - (Al Tabiei)	www.LSDYNA-ONLINE.COM

ARUP Visit the website for complete listings/changes/locations

www.oasys-software.com/dyna/en/training

Arup offers a wide range of training for new and existing users of the Oasys LS-DYNA Environment software who are seeking to improve their understanding and application of these powerful analysis tools. New users will benefit from our introductory courses and can quickly become effective in other areas of application through the range of courses on offer. The courses will also provide existing users with knowledge of how to use the latest features in Oasys and LS-DYNA.

BETA CAE SYSTEMS Visit the website for complete listings/changes/locations

www.beta-cae.com/training.htm

Basic and advanced training courses can be scheduled upon request. A variety of standard or tailored training schedules, per product or per discipline, are being offered to meet customers needs.

A number of recommended training courses offered are described below. The list is not exhaustive and more courses can be designed according to your needs.
Please, contact ansa@beta-cae.com for further details.

Recommended Training Courses (Complete information on website)

- SPDRM
- ANSA / μETA Basics
- ANSA / μETA for CFD
- ANSA / μETA for Crash & Safety simulation
- ANSA / μETA for Durability simulation
- ANSA / μETA for NVH analyses
- Multi-Body Dynamics
- Laminated Composites
- Morphing and Optimization
- Automation
- Additional special sessions

Author: Christian Frech christian.frech@dynamore.de

DYNAmore Visit the website for complete overview and registration

www.dynamore.de/seminars

Seminar dates offered by DYNAmore – June / July 2017

Download full seminar brochure (pdf): www.dynamore.de/seminars2017

Selection of trainings from June and July

Introduction	
Introduction to LS-PrePost	19 June
Introduction to LS-DYNA	20-22 June/11-13 July
Basics/Theory	
Element Types and Nonlinear Aspects	2 June (V)/14 July
Crash and passive safety	
Crash Analysis with LS-DYNA	27-30 June
Metal Forming/Process Simulation	
Introduction to Welding Simulation with LS-DYNA	23 June
Applied Forming Simulation with eta/DYNAFORM	3-4 July
Hot Forming with LS-DYNA	6-7 July
Particle methods:	
Smoothed Particle Hydrodynamics (SPH) in LS-DYNA	20-21 June (V)
Optimization	
Structural Optimization with GENESIS	18-19 July
CAE Processes/SDM/IT :	
Introduction to SDM and Process Management with LoCo	1-2 June

Information days (free of charge)

New Features in LS-DYNA and LS-OPT	22 June (V)
Simulation of Drop Test with LS-DYNA	26 June
Verification and Validation	17 July
LS-DYNA for Civil Engineering Applications	20 July

Support/Webinar series (free of charge) – Registration via www.dynamore.de

Support day: LS-DYNA	16 June
Support day: Occupant Safety	21 July

If not otherwise stated, the event location is Stuttgart, Germany. Other event locations are:
G = Gothenburg, Sweden; L = Linköping, Sweden V = Versailles, France; T = Turin, Italy, Sb = Salzburg, Austria

We hope that our offer will meet your needs and are looking forward to welcoming you at one of the events.

Among the many classes held during the year are the following:

June

Intro to both Explicit and Implicit
15-16 LS-DYNA Modeling and Validation

September

11-12 LS-DYNA ALE/Euler
18-19 Intro LS-OPT – Funcunality & Standard
20 LS-DYNA Discrete Element Method
25-17Intro to LS-DYNA Explicit

https://myesi.esi-group.com/trainings/schedules

Please visit the website for complete information on all the classes and locations

https://myesi.esi-group.com/trainings/schedules

KOrea Simulation TECHnology Co., Ltd. Training

www.kostech.co.kr/

Anna Choi, Assistant Manager - choian@kostech.co.kr
KOrea Simulation TECHnology Co.,Ltd [Kostech]
Rm. 804 Nam-Jung City Plaza 1th, 760 Janghang-dong
Ilsandong-gu, Goyang-si, Gyeonggi-do, 410-380, Korea

August

***Concrete and Geomaterial Modelling in LS-DYNA**

Date: August 17~18

Lecturer: Dr. Len Schwer(We invited him as a guest speaker)

LSTC 2017 Training

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Date	Location	Class	Instructor(s)
June			
1-2	CA	User Materials in LS-DYNA (UMAT)	A. Tabiei
1-2	MI	Contact	S. Bala
9	MI	Material Characteristics for Metals Plastics and Polymers - Test Data to Material Model	S. Bala
15-16	MI	Introduction to Metal Forming	L. Zhang / Q Yan
19	MI	Intro to LS-PrePost	P. Ho / Q. Yan
20-23	MI	Intro to LS-DYNA	J. Reid
July			
10-11	MI	Occupant Simulation	S. Guha
24	MI	Intro to LS-PrePost	P. Ho / Q. Yan
25-29	MI	Intro to LS-DYNA	A. Tabiei

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August				
1-2	CA	Rubber, Foam & Viscoelastic Materials	A. Tabiei	
3-4	CA	Plasticity, Plastics, Visco-plastic Materials	A. Tabiei	
8-9	CA	Fracture, Failure, Damage	A. Tabiei	
10-11	CA	Composite LS-DYNA	A. Tabiei	
14-15	CA	Implicit LS-DYNA	A. Tabiei	
21-23	CA	ALE/Eulerian & FSI Interaction in LS-DYNA	M. Souli	
24-25	CA	Smoothed Particle Hydrodynamics (SPH)	M. Souli	
28	CA	Intro to LS-PrePost	P. Ho / Q. Yan	
Aug29-Sep1	CA	Intro to LS-DYNA	A. Nair	
September				
12-13	MI	Airbag Modeling	A. Nair	
13	CA	Material Characteristics for Metals, Plastics, and Polymers - Test Data to Material Model	S. Bala	
14-15	CA	Contact	S. Bala	
October				
10-13	MI	Optimization and Probalistic Analysis using LS-OPT	A. Basudhar	$750
16	MI	Intro to LS-PrePost	P. Ho / Q. Yan	$100
17-20	MI	Intro to LS-DYNA	A. Nair	$750
17-18	CA	NVH and Frequency Domain Analysis	Y. Huang	$400
November				
6	CA	Intro to LS-PrePost	P. Ho / Q. Yan	$100
7-10	CA	Intro to LS-DYNA	A. Nair	$750
13-14	CA	LS-DYNA Advanced	S. Bala	$400
Nov 30-Dec 1	CA	Advanced Metal Forming	L. Zhang / X.Zhu	$400
December				
11	MI	Intro to LS-PrePost	P. Ho / Q. Yan	$100
12-15	MI	Intro to LS-DYNA	A. Nair	$750

LS-DYNA On Line Visit the website for complete listings/changes/locations

www.LSDYNA-ONLINE.COM

For Information contact: courses@lsdyna-online.com or 513-331-9139

Composite Materials In LS-DYNA

This course will allow first time LS-DYNA users to use composite materials. The most important elements to start using all the composite material models in LS-DYNA will be presented in the 8 hours.

Foam & Viscoelastic Materials in LS-DYNA

Objective of the course: Learn about several foam material models in LS-DYNA to solve engineering problems. Detailed descriptions are given of the data required to use such material in analysis. Examples are used to illustrate the points made in the lectures

Plasticity, Plastics, and Viscoplastics Materials in LS-DYNA

Objective of the course: Learn about several plasticity based material models in LS-DYNA to solve engineering problems. Detailed descriptions are given of the data required to use such material in analysis. Examples are used to illustrate the points made in the lectures.

Rubber Materials in LS-DYNA

Objective of the course: Learn about several rubber material models in LS-DYNA to solve engineering problems. Detailed descriptions are given of the data required to use such material in analysis. Examples are used to illustrate the points made in the lectures.

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Lancemore	www.lancemore.jp/index_en.html
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LS-DYNA Resource Links

LS-DYNA Multiphysics YouTube Facundo Del Pin

https://www.youtube.com/user/980LsDyna

FAQ LSTC Jim Day

ftp.lstc.com/outgoing/support/FAQ

LS-DYNA Support Site

www.dynasupport.com

LS-OPT & LS-TaSC

www.lsoptsupport.com

LS-DYNA EXAMPLES

www.dynaexamples.com

LS-DYNA CONFERENCE PUBLICATIONS

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ATD –DUMMY MODELS

www.dummymodels.com

LSTC ATD MODELS

www.lstc.com/models www.lstc.com/products/models/mailinglist

AEROSPACE WORKING GROUP

http://awg.lstc.com/tiki/tiki-index.php

LSTC Learning Version	**LS-DYNA®, LS-OPT®, LS-PrePost, LS-TASC®, LSTC ATD and Barrier Models** · 12 – 6 - 3 months/1 or 2 core license available · Students, Engineers. · NON-COMMERICAL USE For Information contact: sales@lstc.com
	**LS-Run – A standalone application** - a new graphical control center to start LS-DYNA simulations with either SMP or MPP - LS-Run has a parametric LS-DYNA command line builder making it easy to create the command and change the most common arguments such as ”memory”, ”ncpu” and the solver executable. For information contact: nik@dynamore.de
KAIZEN-DYNA	A mobile & web application which is built to help LS-DYNA Users to get instant answers for technical query from global experts. For information contact: ramesh@kaizenat.com

LS-DYNA at the Computer History Museum

www.computerhistory.org/

The world's leading institution exploring the history of computing and its

CAR CRASH SIMULATION - SIMULATING SAFETY

Would you volunteer to drive into a brick wall? Probably not. Which is why computer simulations are crucial to auto safety.

Software lets engineers run crash tests inside computers rather than on roads. It also allows them to compare the performance of different designs early in the process while cars are still on the drawing board, saving money and injuries.

www.computerhistory.org/makesoftware/exhibit/

Dag Spicer - Senior Curator

Dag Spicer is CHM's "Chief Content Officer", and is responsible for creating the intellectual frameworks and interpretive schema of the Museum's various programs and exhibitions

LSTC Recent Developments, Features, Updates, News, Presentations

Editor: Yanhua Zhao

Improvement of Mesh Fusion in LS-DYNA
Houfu Fan, Xinhai Zhu, Li Zhang and Yuzhong Xiao
LSTC

Representative Volume Element (RVE) analysis using LS-DYNA
C.T. Wu, W. Hu LSTC

Previously Presented: **For a copy write to yanhua@feainformation.com**

April

New features of 3D adaptivity in LS-DYNA -
W. Hu LSTC
New Feature: Defining Hardening Curve in LS-DYNA® -
X. Zhu, L. Zhang, Y. Xiao

March

Improvements toOne-Step Simulation in LS-DYNA
Xinhai Zhu, Houfu Fan, Li Zhang,

February

LS-DYNA Smooth Particle Galerkin (SPG) Method
C.T. Wu, Y. Guo, W. Hu - LSTC

January

Lancing features in LS-DYNA
Quanqing Yan, Li Zhang, Yuzhong Xiao, Xinhai Zhu, Philip Ho - LSTC

December

Thermal Coupling Method Between SPH Particles and Solid Elements
in LS-DYNA
Jingxiao Xu, Jason Wang, LSTC

November

Introduction to second order Lagrangian elements in LS-DYNA
Hailong Teng - Livermore Software Technology Corp.

October

*An Introduction to *CONSTRAINED_BEAM_IN_SOLID*
Hao Chen - Livermore Software Technology Corp

September:

Introduction to the new framework for User Subroutine Development of LS-DYNA
Zhidong Han and Brian Wainscott

*New Features in *ELEMENT_LANCING*
Xinhai Zhu, Li Zhang, Yuzhong Xiao

August :

Equivalent Radiated Power calculation with LS-DYNA
Yun Huang, Zhe Cui - Livermore Software Technology Corporation

July:

Recent Developments for Laminates and TSHELL Forming
Xinhai Zhu, Li Zhang, Yuzhong Xiao - LSTC

Improvement of Mesh Fusion in LS-DYNA

Houfu Fan, Xinhai Zhu, Li Zhang and Yuzhong Xiao
LSTC

INTRODUCTION

To improve simulation efficiency, mesh fusion has been implemented in LS-DYNA® for a while. However, the implementation was only available in SMP, and its usage was very limited. Recently, mesh fusion has been successfully extended to MPP, and it can be activated with the existing keyword *CONTROL_ADAPTIVE through appropriate parameters NCFREQ, ADPCTL, CBIRTH and CDEATH.

In this work, it is demonstrated through benchmark examples that mesh fusion in MPP can reduce the simulation time, and maintain the accuracy of the forming process and the corresponding springback analysis.

The Keyword *CONTROL_ADAPTIVE

Originally, adaptive fusion was implemented in SMP version. The adaptive fusion feature was turned off with a warning message displayed at the beginning of any simulations that require fusion in MPP. As of Revision 113867, mesh fusion in MPP is fully incorporated into the system.

The following keyword is the input to use the adaptive mesh fusion feature.

```
*CONTROL_ADAPTIVE
$  ADPFREQ    ADPTOL    ADPOPT    MAXLVL    TBIRTH    TDEATH     LCADP    IOFLAG
    2.00      4.0         2         3         0.0        70.0       0         1
$  ADPSIZE    ADPASS    IREFLG    ADPENE    ADPTH     MEMORY     ORIENT   MAXEL
 0.0000000         1         0    5.000     0.0
$  IADPN90    IADPGH    NCFREQ    IADPCL    ADPCTL    CBIRTH     CDEATH   LCLVL
      -1         0         2         0        8.0      0.00       70.0
```

In the keyword, NCFREQ defines the fusion frequency, ADPCTL defines the fusion criterion, CBIRTH and CDEATH defines when the fusion starts and ends.

Numerical Investigation

To test the performance of the new feature, a number of simulations were carried out using the NUMISHEET'93 Benchmark, as shown in Figure 1. For each case, a forming process is first conducted, followed by the corresponding springback analysis. The simulations are first carried out in MPP with the number of CPUs being 10. The performance comparison of the code with and without fusion is conducted. Specifically, we would like to check the differences in the simulation CPU time in the forming process, results in final springback angle, maximum effective plastic strain and minimum shell thickness in the workpiece with different number of CPUs running in MPP for cases with and without mesh fusion. As an illustration, the final mesh

sizes and shapes of the springback angles running with 10 CPUs in MPP with and without mesh fusion are given in Figure 2. The differences of the two final springback angles are calculated to be 8.1%. In addition, the contours of the final shell thickness and effective plastic strains are provided in Figures 3 and 4, respectively. The difference in the minimum shell thickness is 1.4% and in the maximum effective plastic strain is 1.7%. The simulation time reduction is around 25% (not shown in the Figure).

To have a better view on the performances of the feature over different number of CPUs running in MPP, the forming process and springback analysis were carried out with the number of CPUs ranging from 1 to 35. Time costs of the cases with and without mesh fusion are shown in Figure 5(a), and the corresponding springback angles are given in Figure 5(b). Time reduction, differences in springback angle, minimum shell thickness and maximum effective plastic strain are shown in Figures 6(a), 6(b), 7(a) and 7(b), respectively. One can see that the overall time reductions in the forming processes are in general greater than or equal to 25%. The differences in springback angles are kept within 10%; the differences in the minimum shell thicknesses and maximum effective plastic strains are always kept within 2%, which means they are not affected significantly by the mesh fusion.

CONCLUSION:

The mesh fusion feature is successfully implemented in MPP and available for use. The fusion feature reduces the computation time notably (around 25%) and has little effects on formability analysis, such as thinning and effective plastic strain predictions. The difference in the corresponding springback results is also found to be smaller than 10%. The performance and accuracy studies can guide users in applying this new technology to a production simulation environment. Generally speaking, we should feel comfortable to use the fusion feature extensively in all formability related simulations since the leading indicators (shell thickness and effective plastic strain) affecting formability is hardly affected, but one can achieve a speed-up factor of 25% in simulation turnaround. In springback simulation, however, one should approach it with caution. One can apply the feature if the springback results are to be used for a quick and rough estimation. If the results are to be used for compensating dies and in deciding how much tools are going to be re-machined, then it may not be appropriate. The factor that people have higher expectation for springback simulation accuracy, now in the sub-millimeter when compared with physical scanned panel, should be taken into consideration when applying the feature in different scenarios.

In addition, the CPU time reduction can be affected by model of different sizes.

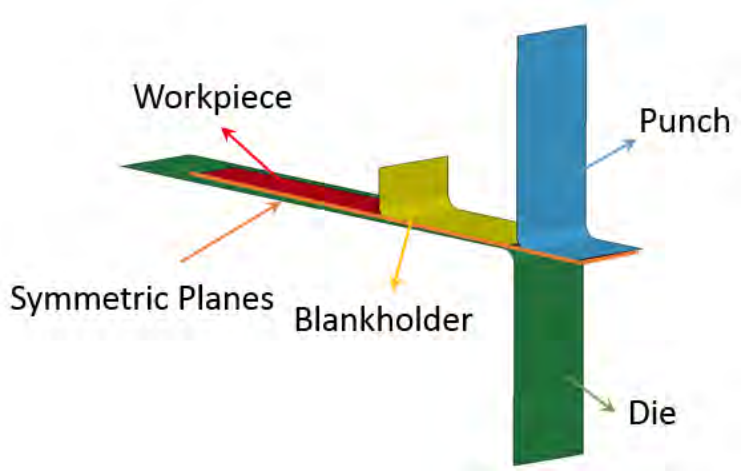
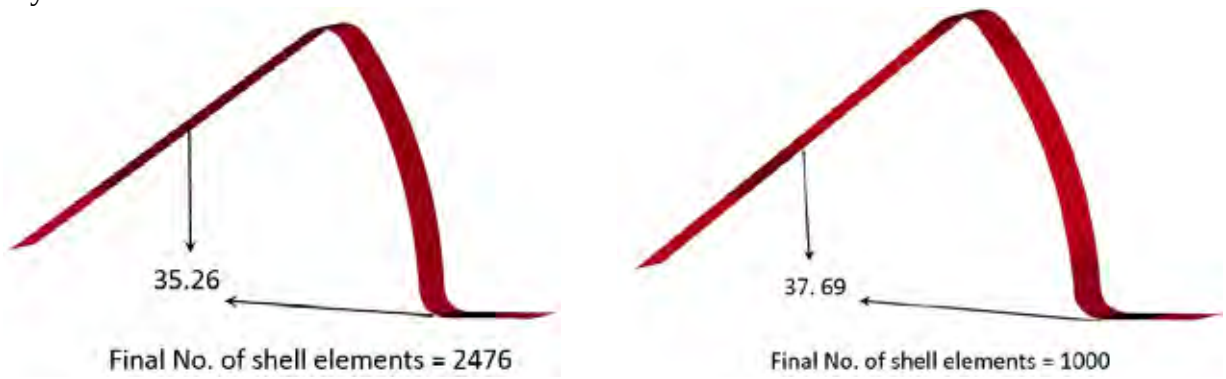
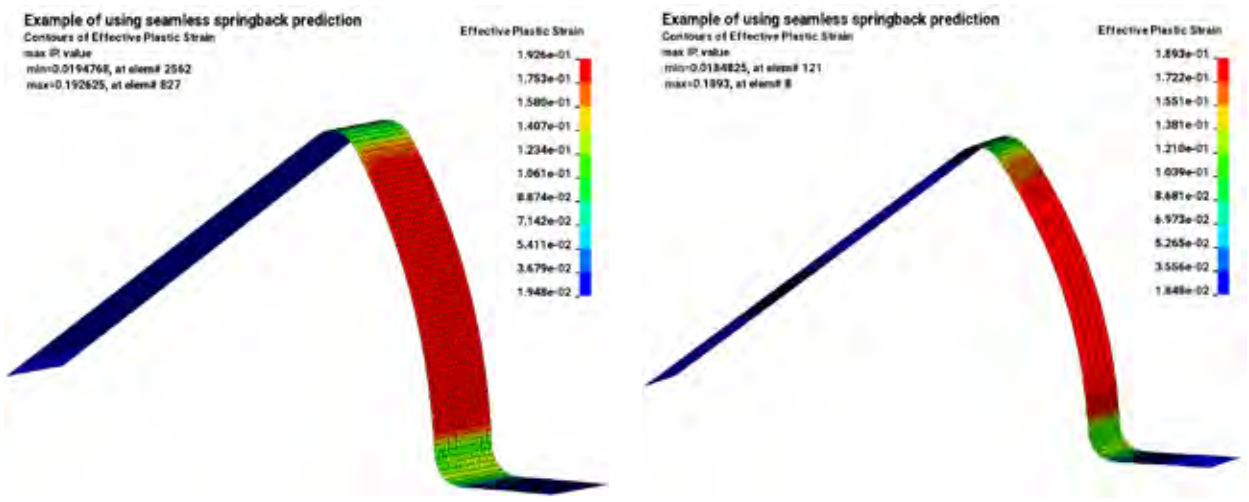


Figure 1. NUMISHEET'93 Benchmark: The punch, die and blankholder are rigid; the workpiece is discretized into shell elements. A forming process is conducted, followed by a springback analysis.



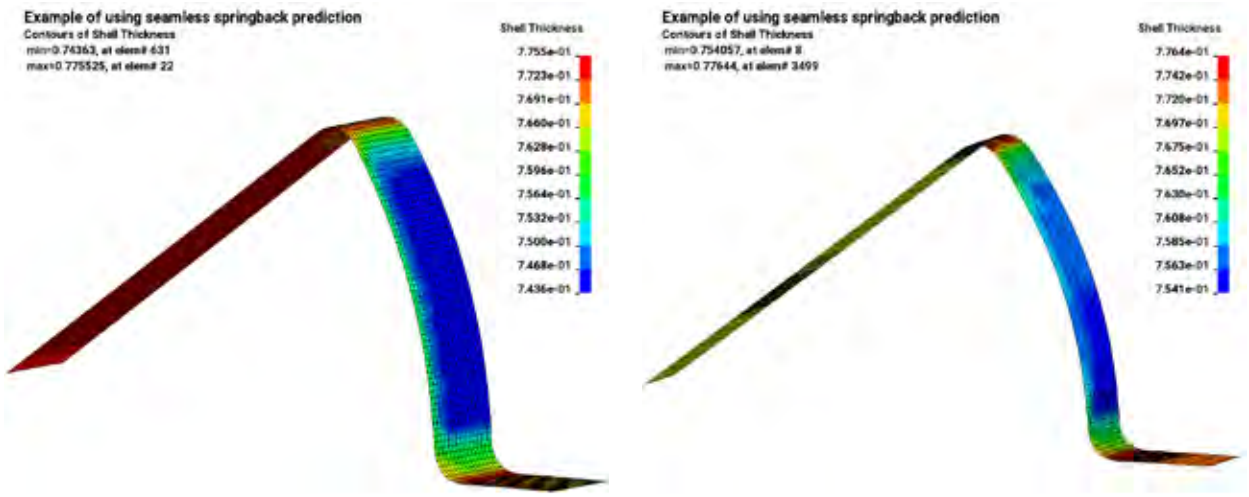
(a) No Fusion (b) With Fusion

Figure 2. The final number of elements and springback angles of the workpiece running with 10 CPUs in MPP.



(a) No Fusion (b) With Fusion

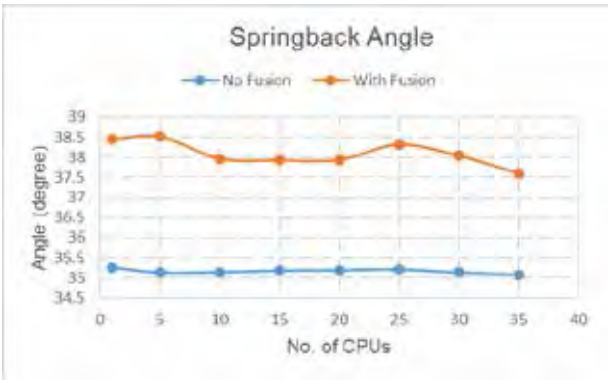
Figure 3. The final effective plastic strain contours of the workpiece running with 10 CPUs in MPP.



(a) No Fusion (b) With Fusion

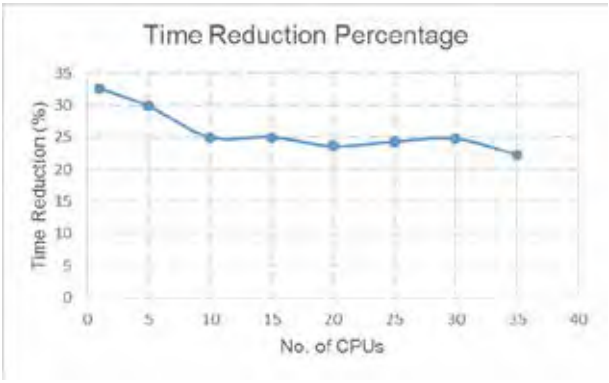
Figure 4. The final shell thickness contours of the workpiece running with 10 CPUs in MPP.

(a) Simulation Time

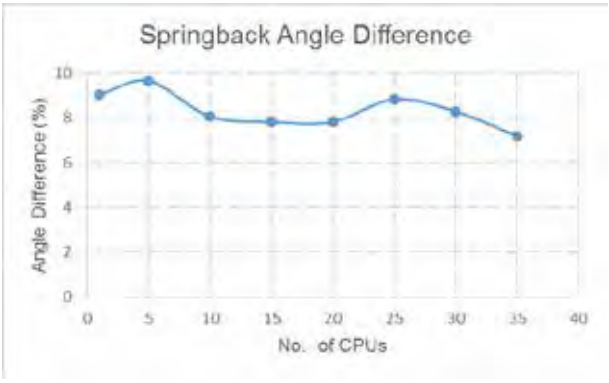


(b) Springback Angle

Figure 5. Comparisons of the simulation CPU time and springback angles in MPP with different number of CPUs, with and without mesh fusion.

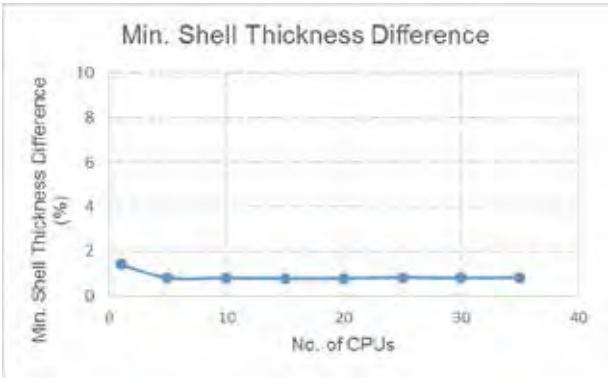


(a) Time Reduction

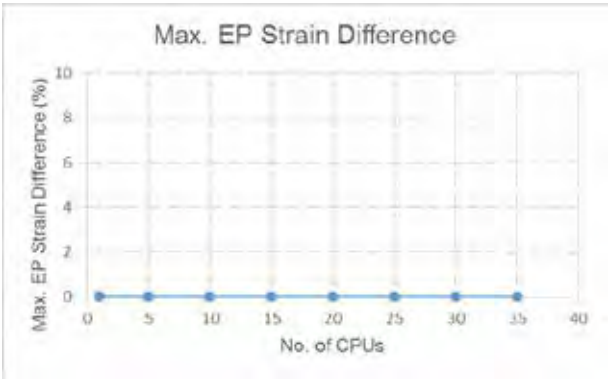


(b) Springback Angle Difference

Figure 6. Time reduction and springback angle differences in MPP with different number of CPUs, with and without mesh fusion.



(a) Min. Shell Thickness Difference



(b) Max. EP Strain Difference

Figure 7. Min. shell thickness and max. effective plastic strain differences in MPP with different number of CPUs, with and without mesh fusion.

ACKNOWLEDGEMENT:

The feature in this article was requested by BMW. Their valuable feedback during the development is highly appreciated.

REVISION INFORMATION:

Mesh fusion feature in MPP is available starting in Revision 113867.

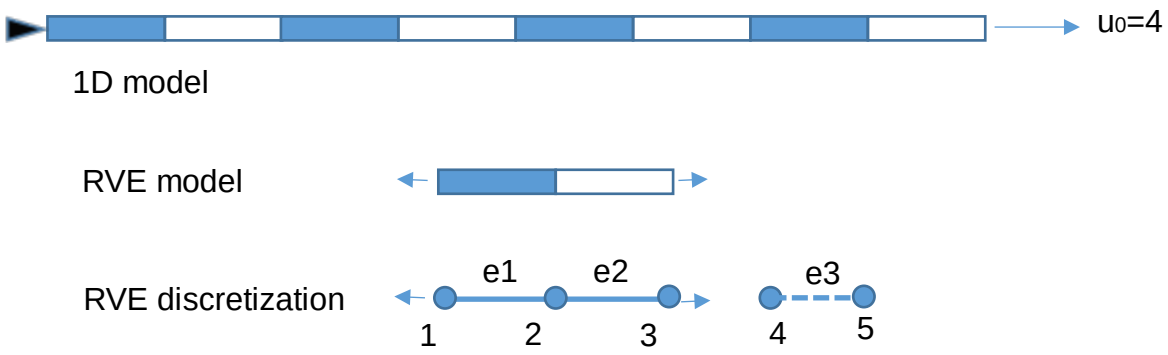
Representative Volume Element (RVE) analysis using LS-DYNA

C.T. Wu, W. Hu LSTC

With the emerging of new materials and novel manufacturing techniques, periodic structures in different scales are increasingly important in the real application, for example, battery arrays in cars, sub-scale structures in 3D printing products and all kinds of microstructures in material design analyses shown in the following pictures.

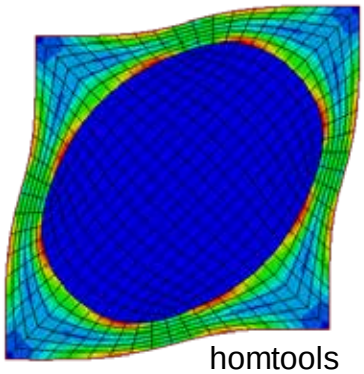
In the numerical simulation, it is very expensive to model the whole structure with a decent resolution for capturing fine details. For instance, when studying microstructure response under the macro level loading, the mesh size in the fine scale is orders of magnitude smaller than that of the macro structure. By introducing the assumption of periodicity, the large scale model can be simplified by RVE (Representative Volume Element) with periodic boundary conditions (PBC). In LS-DYNA, these PBC equations can be defined through *CONSTRAINED_MULTIPLE_GLOBAL. This short paper will focus on its use in RVE analysis and another keyword *INCLUDE_UNITCELL that simplifies the procedure of PBC definition。

First, let's talk about PBC equations using the following 1D model.

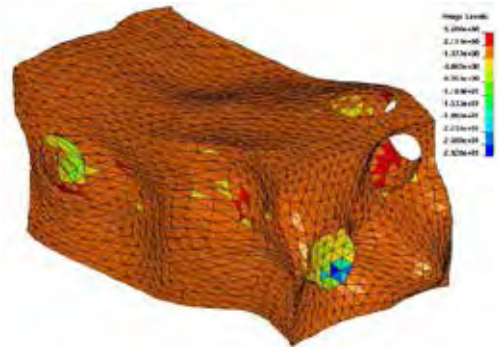


In this model, the left end is fixed and a prescribed displacement is imposed on the right end. By introducing periodic assumption and element discretization, we obtain the FEM

model with 3 nodes and two elements. The corresponding PBC is u_3-u_1=u_4, where the node 4 is the control point. It is required by *CONSTRAINED_MULTIPLE_GLOBAL to define PBC by only nodal IDs and the coefficients. Since the node 4 is involved in PBC, we have to define a control element e3 with much higher stiffness and prescribe the displacement on the node 5 to indirectly impose the prescribed displacement boundary on RVE. You may have a question why not to define the conditions in a simple way like u_1=0, u_3=1. This works in 1D but generally not in 2D and 3D. In the following figures, we can see that the deformation along RVE boundaries is not homogeneous so that we have to define PBC equations to enforce periodicity along with prescribed loading conditions.



homtools



The PBC equation u_3-u_1-u_4=0 can be defined as follows:

*CONSTRAINED_MULTIPLE_GLOBAL

1			Group ID of PBC equations
3			The number of nodes in the current PBC equation
1	1	-1	In every line, we need to list the nodal ID, the degree of freedom (DOF, 1:x; 2:y; 3:z), and the corresponding coefficient
3	1	1	
4	1	-1	

Here are two remarks：

(1) Multiple PBC equations in the same degree of freedom should be defined under the same group ID. For example, all PBC equations in x direction are defined in the keyword *CONSTRAINED_MULTIPLE_GLOBAL using group ID 1.

(2) LS-DYNA supports user-define element type, where there can be more than 3 nodal DOFs. In this case, the DOF of RVE nodes in PBC definition should be -(i-3), where i is the global one. The control nodes are usually standard with only three DOFs in 3D. We recommend to define unique control node for the PBC equation on every global DOF. For

example, when using standard solid elements in RVE, we define three control nodes for PBC equations in x, y and z directions, respectively; when using user-defined element type with 7 nodal DOFs, we define 7 control nodes accordingly.

In practice, RVE often contains large number of elements and nodes for modeling the fine details of microstructure. For example, a RVE in material design analysis may have 100x100x100 elements where the number of PBC equations is more than 10 thousand. We developed the keyword *INCLUDE_UNITCELL to automatically define PBC equations in LS-DYNA:

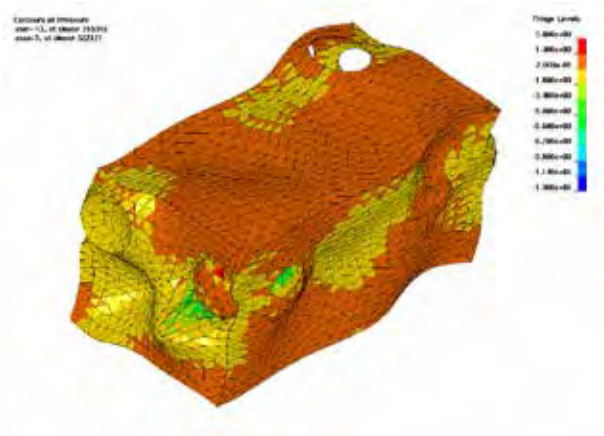
(1) Prepare the RVE mesh in a separated keyword file, e.g. mesh.k

(2) Include mesh.k through *INCLUDE_UNITCELL in the main keyword file

(3) Define the control nodes starting from card 5 in *INCLUDE_UNITCELL

(4) Run LS-DYNA to generate a new include file, called uc_mesh.k, where all the PBC equations are automatically defined using *CONSTRAINED_MULTIPLE_GLOBAL

Here is an example of particle-reinforced rubber design analysis. The left figure below shows the demo model, where the matrix is rubber material and the spherical parts are the inclusions with much higher stiffness. By imposing PBC and prescribed displacement field, the rubber matrix deforms severely shown in the right figure below, where there is strong stress concentration near the interface between the matrix and inclusions. Based on the periodic assumption, the force-displacement result using RVE can well represent the material behavior and be applied to structure analysis in macro scale.



* Dr. C.T.Wu graduated from the department of mechanical engineering in University of Iowa in 1999. His expertise is in advanced FEM and meshless methods. He joined LSTC in 2001, and has been working on the research and development for the solid and structure

analysis.

* Dr. W. Hu graduated from the department of civil engineering in UCLA in 2007, and joined LSTC in 2009. He has been working on the research and development of adaptivity and meshless methods.