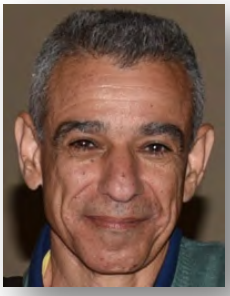
fea INFORMATION Engineering Solutions

Volume 6, Issue 03, March 2017

Yair Soffair, guest-speaker, BETA CAE Conference



Meet The Instructor Dr. Ala Tabiei

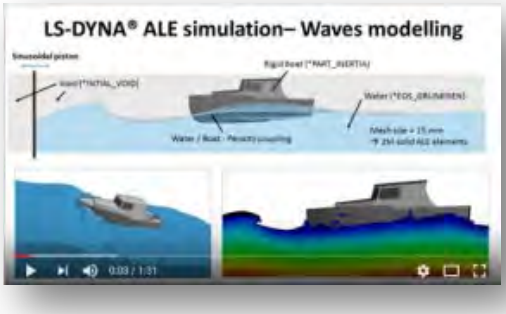
TOYOTA

Improvements to One-Step Simulation in LS-DYNA

Xinhai Zhu, Houfu Fan, Li Zhang, Yuzhong Xiao

Rescale Blog

YouTube Choice by BeenuZz



FEA Information Inc.

A publishing company founded April 2000 – published monthly since October 2000.

The publication's focus is engineering technical solutions/information.

FEA Information Inc. publishes:

FEA Information Engineering Solutions

FEA Information Engineering Journal

FEA Information China Engineering Solutions

Livermore Software Technology, Corp. (LSTC) Developer of LS-DYNA One Code Methodology.

LS-DYNA provides fully integrated, strongly coupled, solvers for extensive multiphysics capabilities. Integrated, at no additional cost. Optimized for shared and distributed memory for Unix, Linux, & Windows Based platforms.

DYNAmore GmbH – LSTC's Master Distributor in the EU

DYNAmore is dedicated to sales, support, training engineers with LS-DYNA to solve non-linear mechanical problems numerically. Employs 85 engineers in Europe. Co-develops the LSTC software and provide engineering services.

logo courtesy - Lancemore

logo courtesy - Lancemore

BETA SIMULATION SOLUTIONS

MSC Materials Sciences Corporation — Engineering the Future of Materials.® — ISO 9001:2008 CERTIFIED

eta

esi

JSOL

恒士达科技 Hengstar Tech.

Oasys The Software House of Arup

rescale

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Articles – Blogs – News

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China FEA News –Events – Participants **Editor – Yahua Zhao**

Solutions

Participants	Distribution & Consulting	Cloud/On Demand/Subscription
ATD – Barrier - THUMS		

News Classes – Social Media **Editor - Aleta Hays**
Conferences – Events

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

Announcements

NAFEMS World Congress & Int. SPDM Conference, 22 June 11-14, 2017, Stockholm, Sweden, *www.nafems.org/congress*

Below is the up-to-date information from Strela.
Limited Liability Company Strela (Russia)
Contact: Olga Voikina : o.v.voikina@mail.vega-int.ru
URL: www.lsdyna.ru
Limited Liability Company Strela is the direct LSTC distributor for LS-DYNA

New section: - Apps and Software specific to LS-DYNA

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

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

Kaizenat Technologies Pvt. Ltd. is glad to announce the launch of a program called:

Refer and Earn Program (REP).

LS-DYNA along with other LSTC products may be used to simulate almost all types of real world engineering problems. In India LS-DYNA is still mainly used for crash/drop simulations. In order to widen the usage of LS-DYNA in India, REP has been introduced to generate new leads who are in real need of a true solution to optimize product and process design.

How REP Works:

- Enter the organization official website name (You will be allowed to go to next step if that organization website is not in our database).
- Enter contact person details
- Kaizenat Team will contact that particular person and provide required technical details.
- If they are convinced on LS-DYNA benefits & the contact culminates in a PO to Kaizenat, you will get notification
- Upon payment receipt, you will get 10% of the PO value as referral bonus (excluding taxes).
- You may be contacted for your preferred mode to receive referral bonus.

Some of the Terms & Conditions

- This program is applicable only to leads from India, Srilanka, UAE & Bangladesh
- This is valid only for a few months
- Kaizenat has all the rights to change the terms time to time without prior notification

Upcoming Classes Not To Miss Register Today

contact aleta@lstc.com

April 12-13, 2017	***NVH & Frequency Domain Analysis – Troy - MI***	
April 20-21, 2017	***ICFD***	***Troy - MI***

Parts of the following information were made available by Wikipedia.org

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including works like roads, bridges, canals, dams, buildings, wastewater and sanitation systems. LS-DYNA for the March showcase brings publications from out conferences on this application.

In the November 2016 FEA Newsletter we discussed the drought here in Northern California and the importance of dams and water conservation. Since that time, California has received an epic amount of rain and snow in the higher elevations in California, leading to more than one problem with the water system here.

Due to this impressive rainfall, in February 2017, the Oroville Dam's main and emergency spillways were compromised, leading to the evacuation of 188,000 people near the dam. After deterioration of the main spillway largely stabilized and the water level of the dam's reservoir dropped below the top of the emergency spillway, the evacuation order was lifted.

March Showcase:

1. YouTube

   LS-DYNA CFD: Dam break and impact on square shape, posted on May 10, 2016, Test Problem using the ICFD solver in LS-DYNA

March Showcase, courtesy of ARUP:

VISTULA RIVER DAM

- Environmental impact assessment of dam at risk of failure in protected habitat.
- Design concept of possible second dam and hydropower plant downstream.
- Employing Arup's expertise in sustainable development in water management

Founder: Ove Arup

Browse ARUP's Projects

Many of Arup's projects leave a legacy to subsequent generations: a legacy that outlasts any one individual. With 10,000 projects going on at any one time, Arup is doing the best possible job for current and future generations. Putting sustainability at the heart of its work is one of the ways in which Arup exerts a positive influence on the wider world. Put simply, Arup people are driven to find a better way.

State-of-the-art applications of LS-DYNA on civil projects

7th International LS-DYNA Conference Session 2

Recent Developments in LS-DYNA for Civil Engineering

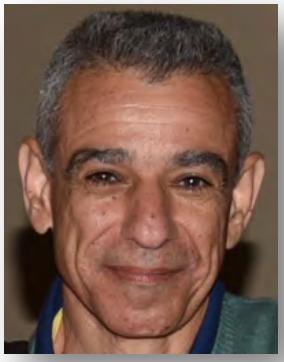
14th International LS-DYNA Conference

Robust Modeling and Validation Analysis on the Raffles City Chongqing Project

Validating Innovative Design Solutions – Analysis of the Gerald Desmond Bridge Replacement

BETA CAE Systems In the 7th Before Reality Conference

Our 7th International Conference is now the new BEFORE REALITY CONFERENCE.
Experience the world through Simulation and predict the future. Live BEFORE REALITY!



Our honored guest-speaker this year is Yair Soffair, Mechanical Analysis Manager, Elbit Systems Electro-Optics Elop., Israel.

Join Mr. Soffair in his journey through the challenges and solutions in the simulation process for the most advanced electro-optics technology.

Over the past 12 years, our conference has been a premium gathering for CAE Professionals. Every two years, the international simulation community gathers together and exchanges the latest concepts, knowledge, and development requirements on our software products.

Join us this year at our conference that will be held from May 30 to June 1 2017, at the MET Hotel, Thessaloniki, Greece.

During the event, technical papers outlining the latest advances in CAE Strategy, methodology, techniques and applications related to our products will be presented.

The stage offers a unique opportunity for the presenters to lead and inspire by presenting their ideas, demonstrating their achievements, and sharing new development requirements. Moreover, the participants will be informed about the latest software trends, implementation concepts and deployment methods.

The close technical communication with our software development team, within the framework of a technical forum, is also among the main features of this three-day conference.

Further discussion sessions, meetings and other events are set to allow the interaction between participants and organizers. Senior executives of our company, our engineers from the development and services teams and our business agents from around the world will be glad to meet with you, to discuss the applications, the existing functionality as well as the latest enhancements and future

development plans of our software products. We expect that this will be a unique opportunity for you to share your success and for us to share our vision.

- The attire of the event is business casual.
- The language of the event is English.
- There is no participation fee.
- Speakers will receive free accommodation.

SUBMIT YOUR ABSTRACT

Submit your abstract on time and contribute to the success of the event.

All those who wish to share recent advances and future trends in the analyses technologies, methods and practices for solving the problems of the modern Industry, using our software products, are welcome to contribute to the success of this conference.

One of the authors of each paper will receive free accommodation for the duration of the event, as a speaker, courtesy of BETA CAE Systems.

For details, visit the event's web page.

IMPORTANT DATES

- Abstracts submission:
  EXTENDED to March 31, 2017
- Acceptance notification:
  EXTENDED to April 7, 2017
- Speakers' registration until:
  April 28, 2017
- Final papers submission before:
  April 28, 2017
- Delegates Registration:
  April 28, 2017
- Presentations files submission before: May 12, 2017
- Event:
  May 30 to June 1, 2017

BETA CAE Systems International AG
D4 Business Village Luzern, Platz 4, 6039 Root D4, Switzerland
t: +41-41-545-3650 | e: ansa@beta-cae.com | www.beta-cae.com

Material Minds Software - The Mechanics of Composites Collection

www.materials-sciences.com/matlMinds/index.html

A Product of Materials Sciences Corporation: Build a system that continually grows. Build a community of users. Make the tools that the experts at Materials Sciences Corporation use available to everyone

The Materials Minds Philosophy

Engineers are smart people that want the building blocks and tools to get a job done. Their tasks require creativity. Therefore, it is impossible to anticipate all of their needs in a rigid point-and-click environment. The engineering work-flow is more like a language. The engineer needs to be able to manipulate nouns and verbs to get the precise results needed. Our goal is to provide a rich language for performing analyses and design using advanced composite materials. Imagine a building block approach in which the output from one operation feeds naturally into the next operation. Integrating user extensions should be natural; not requiring specialized programming skills.

There is a rich history in elasticity of heterogeneous, anisotropic materials. Take full advantage of that history. There is no need to default to an approximate numerical method when an analytic solution exists. Use the computer to handle complex solutions and make it practical to have the classic solutions available for everyday use. Don't make any unnecessary approximations. Keep the solutions as general as possible.

Take advantage of the best possible programming and mathematical environment. Our codes are built using the world-class Mathematica system by Wolfram Research. Wolfram has already made sophisticated numerical algorithms, graphics, and symbolic manipulation available.

Build a system that continually grows. Build a community of users. Make the tools that the experts at Materials Sciences Corporation use available to everyone.
If you have questions, or are ready to start using Material Minds, please contact us at software@materials-sciences.com

Who are we? Material Minds is a brand name for commercial software developed by Materials Sciences Corporation (MSC). MSC is a leader in structural engineering with composite materials, with an emphasis on computer simulation and analyses. It is a goal of MSC to make portions of our valuable proprietary software available to the public. The name Material Minds is used to distinguish the commercial side of our software technology, and the special care and attention required to support these product

Meet The Instructor/Class (LS-DYNA Implicit) On Line offered by Dr. Al Tabiei

Dr. Al Tabiei - a consultant on the use of large scale finite element simulation for more than 20 years to more than 70 large and small companies and government labs in the US and abroad. He was one of the directors of the 5 Centers of Excellence in DYNA3D Analysis for the FHWA (1997-2001).

Dr. Tabiei lectures on more than ten different short courses to many government and industrial research centers and companies nationally and internationally on the use of LS-DYNA for various applications (he is one of the instructors, at LSTC for many different LS-DYNA courses). As a consultant, he also does code development for LSTC. He had 4 materials models for composites and others in LS-DYNA. He was consultant to the US government (DOS) on the use of simulation for home land security problems. He was also on a NASA team for the return to the moon program to investigate different landing scenarios (2006-2010).

LS-DYNA On-Line, owned/operated by Dr. Al Tabiei is pleased to offer: LS-DYNA IMPLICIT - April 13-14, 2017

For LS-DYNA users to get started on Implicit problems - Instructed by Al Tabiei - Implicit Online Class $1000

- Get started with the IMPLICIT solver with minimal effort.
- Presenting the most important elements to start using LS-DYNA Implicit successfully.
- Certificate of Completion by: LSDYNA-ONLINE

Sections covered during the course

1. Implicit versus Explicit
2. Equilibrium, Nonlinearity, and Linearization
3. Activating the Implicit Solver
4. Material Models and Element Types
5. Contact for Implicit
6. Eigenvalue Analysis
7. Dynamic Analysis using Modal Results
8. Springback
9. Additional Implicit Features
   * Explicit-Implicit Switch
   * Buckling Analysis
   * Control Implicit Termination
   * Inertia Relief
   * Consistent Mass
   * Condensation
10. Implicit in MPP
11. Linear Equation Solver
12. Practical Guidelines
13. Trouble Shooting and Ways to Battle Divergence
14. Summary

Eastern Standard Time

Class:	9:00 - 10:15
Break:	10:15 - 10:30
Class:	10:30 - 12:00
Lunch:	12:00 - 1:00
Class:	1:00 - 2:30
Break:	2:30 - 3:00
Class:	3:00 – 4:00
Break:	4:00 – 4:15
Summary:	4:15 - 4:30

FOR COMPLETE INFORMATION:
www.LSDYNA-ONLINE.com

https://blog.rescale.com Rescale - March 9, 2017

EXCERPT – https://blog.rescale.com

Automotive Enterprise Finds Efficiency with Rescale and STAR-CCM+ Power-on-Demand: Customer Interview with American Axle & Manufacturing

How does a large automotive manufacturer leverage the elasticity of the cloud, and what do they look for in a provider?

To find out, we asked a CAE manager at American Axle & Manufacturing, a Tier 1 automotive supplier of driveline and drivetrain systems that operates in 13 countries globally with annual revenues of $3.9 billion. Read below for his take on how Rescale has added value to his organization.

Rescale: Alexy, can you start off by introducing yourself and American Axle & Manufacturing?

Alexy: My name is Alexy Kolesnikov. I manage computational fluid dynamics and thermal projects for American Axle & Manufacturing. American Axle & Manufacturing is a leading global Tier 1 automotive supplier. Our clients are all the major automotive companies. We supply driveline and drivetrain systems, for example front axles, rear axles, PTUs, and eDrive units.

Rescale: Tell us more about your role.

Alexy: I work in a CAE department, and we simulate all these components. In our products, we simulate oil flows, heating and cooling, those kinds of things. Simulation is like a design tool; instead of testing any given product 20 times and ordering parts, you pick an advanced optimizer to run simulations.

Rescale: Could you give us an overview of how you use Rescale? Has Rescale changed the way you approach simulation?

Alexy: It has allowed us to efficiently deliver answers to internal or external clients. All clients and all problems and all projects are different. Sometimes you have weeks or months to deliver results, but sometimes all of a sudden an issue comes up and you have to have the answers tomorrow.

Rescale gives us the flexibility to satisfy both needs. It fits into the structure of how we run our analysis. For example, we use Rescale anytime we need to run five jobs at the same time to deliver results in two days. We can run them in parallel on Rescale, which would require us otherwise to have five servers in-house. This on-demand scalability enables us to deliver results that are urgently needed.

Recent Posts:

- 3 Ways IBM Bluemix and Rescale are Opening the Door to HPC in the Cloud March 22, 2017
- EDEM Brings GPU-Optimized Solver Engine to the Cloud with Rescale March 22, 2017
- Deep Learning with Multiple GPUs on Rescale: TensorFlow Tutorial March 13, 2017
- Automotive Enterprise Finds Efficiency with Rescale and STAR-CCM+ Power-on-Demand: Customer Interview with American Axle & Manufacturing March 9, 2017
- How to Control Usage and Cost with the ScaleX Enterprise Admin Portal February 27, 2017

We're going to attend the following:

* SAE World Congress, Detroit April 4-6
* Engineering Simulation Show, UK April 27
* NAFEMS conference Michigan Apr 27

Date 7 Mar 2017 Location Paris, France

Adam Opel AG Introduces New Lightweight Design Strategy benefiting from ESI PAM-STAMP

ESI's Simulation Software Enables Accurate Prediction of Distortion of Advanced High Strength Steel, from Early Design Stages

Paris, France – March 7, 2017 – ESI Group, leading innovator in Virtual Prototyping software and services for manufacturing industries, supports Adam Opel's new lightweight design strategy with its stamping simulation software ESI PAM-STAMP. By detecting part distortion early in the design process, Opel is now able to efficiently counteract distortion of stamped parts made of Advanced High Strength Steel (AHSS). The new process, supported by PAM-STAMP, leads to improved part quality, while delivering important weight reductions that translate into a lower carbon footprint for Opel's vehicles.

Subject to new regulations around CO2 emissions, the automotive industry must come up with innovative solutions to produce lighter weight vehicles that require less fuel while maintaining, and preferably improving, occupant safety levels. Replacing existing steel grades with thinner Advanced High Strength Steel (AHSS) grades is a promising option as these offer performance flexibility, lower cost and reduced weight. However, AHSS presents a major disadvantage in the manufacturing process as the high yield strength can be associated with considerable springback and twisting after forming.

To overcome this manufacturing challenge, German automotive manufacturer Adam Opel AG recently ran an engineering project in collaboration with Thyssen Krupp System Engineering and ESI Group. The team developed a design approach in which a geometrical stiffness was induced through a double-S profile in the punch radius of metal forming tools. Replacing the original punch radius with a double-S profile, the team proceeded to precisely determine the influence of the size and shape of the punch on the wall opening, springback and twisting behavior of the final part.

The Opel team then investigated the influence of blankholder pressure using PAM-STAMP, and determined the combination of punch radii and blankholder pressure, that delivered the smallest possible deviation from the nominal part shape. Contrary to initial expectations, the team discovered that a decrease in blankholder pressure reduced the deviations.

To verify the results, Adam Opel AG produced the actual tools and compared the physical try-out test data with the results obtained using PAM-STAMP simulation. The results were in excellent agreement, for both trimmed and untrimmed geometries, and clearly showed the impact of geometrical modifications on wall opening, bending springback and twisting. Based on these results, Opel decided to proceed with further investigation of the use of AHSS grades in their manufacturing processes.

"This project was a major success due to the close collaboration between Opel, Thyssen Krupp System Engineering and ESI. It helped us predict and control the distortions, resulting in an efficient compensation of stamped parts using Advanced High Strength Steels (AHSS). We were able to tackle the challenges related to the model's geometry and its use within an intensive context, such as optimization," - said Dr. Niels Koch, Project Leader for Advanced Manufacturing Technologies, at Adam Opel AG.

For more information about ESI PAM-STAMP, please visit www.esi-group.com/pam-stamp .

Oasys LS-DYNA 10th Annual Update Meetings in India:

- Pune – Tuesday, 25th April 2017 – The Sheraton Grand Pune (formerly Le Méridien), Raja Bahadur Mill Road, Pune- 411001
- Bangalore – Thursday, 27th April 2017 – The Zuri Whitefield, ITPL Road, Whitefield, Bangalore- 560 048.

Oasys Ltd and Arup India Pvt Ltd are pleased to announce the 10th Oasys LS-DYNA Update meetings in India for the year 2017. First meeting shall be held at Pune on Tuesday 25th April 2017 at The Sheraton Grand Pune (formerly Le Méridien)and second meeting shall be held at Bangalore on Thursday 27th April 2017 at The Zuri Whitefield.

Each of these is a full day free of charge event covering both LS-DYNA and Oasys software and is a perfect opportunity to find out about current and future developments and how the software are being used in the engineering community.

The presentations will mainly cover LS-DYNA updates by LSTC, Oasys suite updates by Arup & technical lectures by Arup, LSTC and Industry.
Detailed agenda is available on our website http://www.oasys-software.com/dyna/en/events/ .

Registration: Please send your registration to this event by email to india.support@arup.com with your name (First Name, Last Name), company/affiliation, telephone number and your choice for the location of event.
Last date for registration is 18th April,2017.

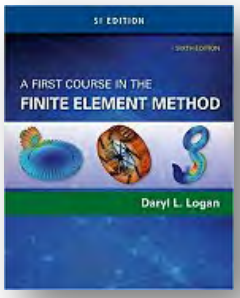
Venue

The event in Pune will be held at The Sheraton Grand Pune hotel, which is situated in the heart of the city. The Sheraton Grand Pune (Formerly Le Méridien) Raja Bahadur Mill Road, Sangamvadi, Pune, Maharashtra-411001 India Tel: 91-20- 6641 1111	The event in Bangalore will be held at The Zuri, Whitefield, which is quite close to international Tech park, Bangalore. The Zuri Whitefield ITPL Road, Whitefield Bangalore - 560 048 India Tel: +91-806-665-7272

If you plan to stay over before or after the event, we are pleased to confirm that we have negotiated a special rate for attendees of the Oasys LS-DYNA Update meeting. Please contact us for assistance.

Contact Details - If you have any queries regarding this event you can contact:
Mr. Asif Ali - Arup India Pvt Ltd
Plot No. 39, Ananth Info Park, HiTec City-Phase 2
Madhapur, Hyderabad-500081,India
Tel: +91 (0) 40 44369797/8 Email: india.support@arup.com

BOOKS – Engineering for the current and young

	**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

DYNAmore Nordic AB

We have published "Implicit Guidelines", which is a great start to assist you setting up implicit LS-DYNA simulations. If you're interested you should register (free of charge) for the WEBinar "LS-DYNA Implicit Guidelines", which takes place March 28 between 10.00-11.00. The guidelines covers all kind of linear and non-linear applications ranging from basic stress analyses to advanced models including e.g. contacts, plasticity and geometrical non-linearities. Register here: https://lnkd.in/gXcvSJS

Hazel McDonald - Marketing Mgr. for the Advanced Technology and Research group at Arup

It's pretty exciting to have our first licensee of the Arup GFRP post-tensioned modular bridge!
www.arup.com/news/2017_03_march/16_march_arup_and_mabey_deliver_first_rapid_assembly_polymer_modular_bridge#.WMvwId1k5B0.linkedin

Scott Berkey - CEO, Dassault Systèmes SIMULIA

Our flagship conference, Science in the Age of Experience, is less than two months away. At SIMULIA we recognize the changes that are happening in the simulation world and that together with science and technology we can simulate a better world and future. Be inspired and join us. You can register at 3ds.com/science .

Kiran Kumar - Business Consultant at Dassault Systemes

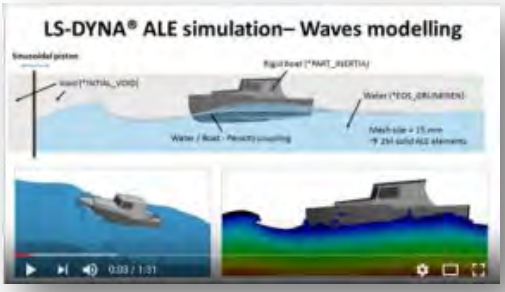
Living Heart - Revolutionizing Human Health from Dassault Systemes.

Georg Scheuerer - Managing Director at ISimQ GmbH

There is much talk about the application of harmonic-based methods to turbomachinery CFD analysis. Harmonic methods are used to accelerate CFD simulations of unsteady-state rotor-stator interaction and blade flutter.

YouTube Choice of the Month

Author: Marsha Victory mv@feainformation.com



https://www.youtube.com/watch?v=pObcA85SrmY

Published on Mar 2, 2017 BeenuZz

This video presents one of many ALE solutions for wave modelling in LS-DYNA.

The system I built is a simple piston-like behavior of the water domain. I used non slip boundary conditions on all sides of the domain. For more realism, either the domain should be enlarged, or pressure BC should be applied. The current modelling contains about 2M solid elements, and takes about 20 hours to compute on 24 CPUs Intel. Renderings are made with LS-PrePost.

https://www.youtube.com/watch?v=GvShD3nnM2c

Published on Feb 24, 2017 – LS-DYNA Multiphysics
References for the theoretical work:

[1] An accelerated, convergent, and stable nodal integration in Galerkin meshfree methods for linear and nonlinear mechanics
[2] A quasi-linear reproducing kernel particle method

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

May 12th	**The 2017 THUMS European Users' Meeting** - Salzburg, Austria **Participation**: THUMS users. Customers who are interested in THUMS. **Registration Fee:** Free	http://ls-dyna.jsol.co.jp/en/thums/thums_um2017.html JSOL is delighted to announce The 2017 THUMS European Users' Meeting. THUMS, the Total Human Model for Safety for use with LS-DYNA® is being rapidly adopted by users worldwide. We invite you to join us and share in THUMS technical information.
Oct 31st – Nov 1st	**LS-DYNA & JSTAMP Forum 2017** Tokyo, Japan	http://ls-dyna.jsol.co.jp/en/event/uf/

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.

Toyota Injects Style and Technology in 2017 Toyota 860 Special Edition

March 13, 2017

Torrance, Calif., March 13, 2017 –

The 2017 Toyota 86 will turn more heads than ever with the new 860 Special Edition that adds stand-out styling, premium features and performance technology.

"The 86 is recognized by enthusiasts for its impressive driving performance and its value-oriented price tag," said John Myers, Toyota national manager vehicle marketing and communications. "The 860 Special Edition will amplify these core elements with an added dose of premium styling mixed with performance technology."

On the outside, the 860 Special Edition will command attention with its exclusive Supernova Orange paint that is contrasted by its black body stripes, rear spoiler, heated outside mirrors and 17-inch alloy wheels. Topping it off, the special edition gets LED fog lights and a unique aerodynamic underbody panel for added style and function. The special edition will also be available in Halo White, and only 860 units of each color will be made.

The interior features the perfect combination of luxury and performance with heated front seats in black leather with orange stitching. The same contrasting black and orange theme continues to the leather-trimmed steering wheel, shift boot and parking brake lever. Each 860 Special Edition features a unique center console placard that signifies its exclusivity.

Additional premium features include Smart key with push-button start and touch-activated door unlock, as well as dual-zone automatic climate control.

The 86 is all about driving performance, and the 860 comes with new performance technology that driving enthusiasts will appreciate. Each special edition will come with a 4.2-inch multi-information display that features a G-force meter and stop watch, and displays vital information such as horsepower and torque curves, engine coolant and oil temperatures and MPG.

The 2017 860 Special Edition will be available in dealerships later this March, and is available with either a six-speed manual transmission or a six-speed automatic transmission with paddle shifters and Dynamic Rev Management® technology. The manufacturer's suggested retail price (MSRP) will be $29,155 for the manual transmission and $29,875 for the automatic transmission, excluding the delivery, processing and handling (DPH) fee of $885. The DPH fee for vehicles distributed by Southeast Toyota (SET) and Gulf States Toyota (GST) may vary.

Limited Warranty and Toyota Care

Toyota's 36-month/36,000 mile basic new-vehicle warranty applies to all components other than normal wear and maintenance items. Additional 60-month warranties cover the powertrain for 60,000 miles and corrosion with no mileage limitation. The 86 also comes standard with Toyota Care, a complimentary plan covering normal factory-scheduled maintenance and 24-hour roadside assistance for two years or 25,000 miles, whichever comes first.

Media Contacts
Sam Butto
(310) 468-7728
sam.butto@toyota.com

Nate Martinez
(310) 468-5134
nate.martinez@toyota.com

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 Upgrades Flying Intelligence Testbed

(Source: Lockheed Martin; issued March 13, 2017)

The AML configuration includes the airborne platform and a corresponding ground station, both of which can be integrated into customer enterprise intelligence networks. (LM photo)

DENVER --- Lockheed Martin's manned airborne testbed, the Airborne Multi-INT Lab (AML), has been enhanced to expedite its ability to deliver decision-quality intelligence. The AML is utilized to experiment with combinations of sensors, systems and technologies to help customers develop ways to support a diverse range of contingency operations.

To accelerate its ability to transform "data" into "intelligence," updates were recently made to the AML's on-board processing capability, which collects and correlates disparate types of sensor data. The AML now has an autonomous sensor control mode that can coordinate operations between the testbed's various onboard sensors. This mode allows operators to focus on mission planning and operational issues while detailed execution is handled autonomously.

Also integrated into the testbed's mission system was a cognitive processing capability that enables rapid adaptation to a changing target environment. In addition, the AML's open, "plug-and-play" architecture was upgraded to extend the system's ability to integrate with existing ground architectures. This open architecture allows additional new software and hardware to be integrated in a matter of hours.

"Getting the right intelligence to those who need it is critical for any mission to succeed," said Dr. Rob Smith, vice president of C4ISR for Lockheed Martin. "The AML has furthered our ability to expedite solution delivery, reduce the risk of those solutions, and help us deliver differentiated capabilities affordably to our customers."

The AML, a modified Gulfstream III business jet, provides a readily reconfigurable platform to rapidly explore how multiple sensors and onboard systems interact, and how to best apply them for use in military and non-military markets.

A variety of features onboard the aircraft enable this experimentation. Equipped with a multitude of sensors (electro-optical/ infrared systems, synthetic aperture radar, electronic intelligence and communications intelligence) and various communications apertures, the AML also has an open architecture that eases sensor interchangeability, a radome on the belly of the aircraft with ample volume for a mix of sensors, four onboard workstations and a computing capability that supports most commercial operating systems.

Beyond traditional uses such as development and evaluation support, this robust intelligence, surveillance, and reconnaissance (ISR) lab can be deployed anywhere in the world with a minimal support footprint. Since its introduction in 2009, the AML has more than 4,000 mission hours providing "ISR as a Service" supporting real-world customer missions.

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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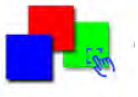

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主办：美国FEAINFORMATION.com
编辑：Marsha Victory, 赵艳华/Yanhua Zhao 特邀编辑：苏 敏/Grace Su

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
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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

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			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	
	eta/DYNAFORM	INVENTIUM/PreSys		
Mexico	**COMPLX** Armando Toledo **www.complx.com.mx /** armando.toledo@complx.com.mx			
	LS-DYNA LS-OPT		LS-PrePost LS-TAsc Barrier/Dummy Models	
United States	**CAE Associates Inc.** info@caeai.com www.caeai.com			
	ANSYS Products	CivilFem	Consulting ANSYS Consulting LS-DYNA	
United States	**DYNAMAX** sales@dynamax-inc.com www.dynamax-inc.com			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models		LSTC Barrier Models	

United States	**ESI Group N.A** **info@esi-group.com** www.esi-group.com			
	PAM-STAMP			
	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**		LS-OPT	
	LS-DYNA	LS-TaSC	LSTC Barrier Models	LS-PrePost
	LSTC Dummy Models			

Sweden	**DYNAmore Nordic**		marcus.redhe@dynamore.se	
	www.dynamore.se		Oasys Suite	
	ANSA	µETA	LS-DYNA	LS-OPT
	LS-PrePost	LS-TaSC	FastFORM	DYNAform
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Switzerland	**DYNAmoreSwiss GmbH**		info@dynamore.ch	
	www.dynamore.ch			
	LS-DYNA		LS-OPT	LS-PrePost
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			LSTC Barrier Models	
UK	**Ove Arup & Partners**		dyna.sales@arup.com	
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	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
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	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			
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			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
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Japan	**JSOL**			
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	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

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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

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

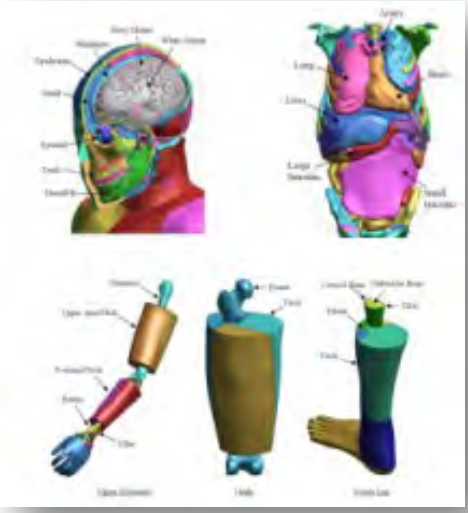
Collaboration

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

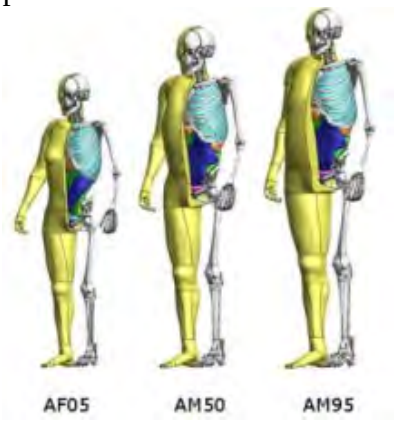
TOYOTA - Total Human Model for Safety – THUMS



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

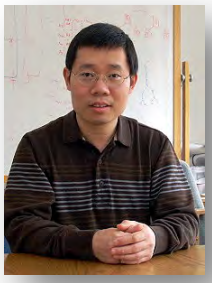
if you have a new event to be listed please send to agiac99@aol.com

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	
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	chinaconf@lstc.com http://www.lsdyna.cn
Oct 31st – Nov 1st	**LS-DYNA&JSTAMP Forum 2017** Tokyo, Japan	http://ls-dyna.jsol.co.jp/en/event/uf/

European Conference - NVH Class

Aleta Hays aleta@lstc.com



Yun Huang

Yun is a developer at LSTC and instructs classes in NVH

Sign up now for Yun's class at the 11th European LS-DYNA Conference, May 9-11, 2017 in Salzburg Austria. Contents will be taken from his 2 day class

The class he instructs at LSTC is a 2 day course.
Description: This two day class will provide introduction to the frequency domain vibration, fatigue and acoustic features of LS-DYNA to users, and give a detailed look at the application of these features in vehicle NVH simulation.

2 day Course contents

- **Introduction**: NVH theory and lab testing technology; overview of LS-DYNA frequency domain features and applications; Frequency domain vs. time domain; Fourier transforms;
- **FRF**: Modal superposition method; Damping; Nodal force / Resultant force FRF
- **SSD with harmonic loading:** Large mass method for enforced motion; ERP (Equivalent Radiated Power); Mode expansion with LS-PrePost
- **Random vibration with PSD loading: Correlated and uncorrelated multiple PSD excitations;** Shaker table testing; Acoustic waves; Pre-stress condition
- **Acoustics:** BEM, FEM; Vibro-acoustic problems; Acoustic panel contribution analysis; Muffler transmission loss analysis; ATV and MATV; Acoustic eigenvalue analysis; Incident waves
- **Response spectrum analysis:** Input earthquake spectrum; Modal combination methods (SRSS, CQC, etc.); Multi input spectra
- **Fatigue:** Fatigue analysis in harmonic / random vibration environment; Miner's rule; S-N curves; Dirlik method
- **Advanced topics**: SEA (Statistical Energy Analysis); Brake Squeal Analysis; NVH based on IGA
- **Workshop:** Hands-on exercise, post-processing of results

Author: Nils Karajan nik@dynamore.de Conference Contact: conference@dynamore.de

Agenda published for the
11th European LS-DYNA® Conference 2017
9 - 11 May 2017, Salzburg, Austria
Conference Website: www.dynamore.de/conf2017

With this agenda we would like to cordially inviteyou to the beautiful city of Salzburg, Austria, to attend the 11th European LS-DYNA Conference from 9 - 11 May 2017, which is again taking place on two and a half days. The conference starts on Tuesday after lunch and will end on Thursday early afternoon. On the first evening we will meet in the accompanying exhibition for dinner, drinks and live music. There will also be an official conference gala dinner on the second evening.

This year you can expect keynote lectures from Daimler, Honda, IWC Schaffhausen, LSTC, Porsche and Volvo as well as more than 180 user presentations and 9 workshops. It is remarkable to see how the user community has grown in the past years and a look into the agenda reveals, how wide spread the application fields are of LS-DYNA and LS-OPT.

Following this, the conference is an ideal place to exchange your experiences and findings with other users of LS-DYNA.

Additionally, we are pleased to offer you 10 advanced seminars on LS-DYNA, which need to be booked separately. Conference participants receive a 10% discount on the seminar fees.

Conference Agenda
www.dynamore.de/conf2017-agenda-pdf

Venue / Hotel
Salzburg Congress
Auerspergstr. 6, A-5020 Salzburg, Austria
www.dynamore.de/conf2017-venue
Hotel room booking please use this bookingform

Conference language - English

Participant fees
Industry: € 590* / € 640
Academic: € 440* / € 490
*early bird until 1 April 2017
All prices excluding VAT.

Exhibiting and sponsoring
More information

Registration and Contact
Registration form: online
Registration form: pdf
DYNAmore GmbH
Industriestr. 2, D-70565 Stuttgart, Germany
Tel. +49 (0) 7 11 - 45 96 00 – 0
E-Mail: conference@dynamore.de
www.dynamore.de/conf2017

Review of the 2015 Conference
Get an impression of the 10th European LS-DYNA Conference 2015 in our review on YouTube https://youtu.be/Mw5Dm-SXcWo

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	
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: Nils Karajan nik@dynamore.de

DYNAmore Visit the website for complete overview and registration
www.dynamore.de/seminars

Seminar dates offered by DYNAmore –April / May 2017

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

Selection of trainings from March to May

Crash and passive safety:	
Joining Techniques for Crash Analysis with LS-DYNA	4-5 April (G)
Crash Analysis with LS-DYNA	2-5 May (G)
Optimization:	
LS-OPT – Optimization and Robustness	4-6 April (L)
Parameter Identification with LS-OPT	8 May (Sb – Europ. LS-DYNA Conf.)
Material modelling:	
Damage and Failure Modeling of Metals	4-5 May
Material Modeling for Metals	2-3 May
Implicit classes:	
Implicit Analysis using LS-DYNA	4-5 April
Introduction to Nonlinear Implicit Analyses	8 May (Sb – Europ. LS-DYNA Conf.)
NVH, Frequency Domain Analysis and Fatigue	12 May (Sb – Europ. LS-DYNA Conf.)
Multiphysics:	
ALE and Fluid-Structure Interaction in LS-DYNA	15-16 May
Electromagnetism in LS-DYNA	12 May (Sb – Europ. LS-DYNA Conf.)
ICFD – Incompressible Fluid Solver in LS-DYNA	17-18 May
Particle methods:	
Meshfree EFG, SPG and advanced FE Methods	8 May (Sb – Europ. LS-DYNA Conf.)
Smoothed Particle Hydrodynamics (SPH) in LS-DYNA	12 May (Sb – Europ. LS-DYNA Conf.)
Process simulation:	
Metal Forming with LS-DYNA	29-31 May

Information days (free of charge)

New Features in LS-DYNA and LS-OPT	23 May (T)

ICFD Webinar series (free of charge) – Registration via www.dynamore.se

How to model conjugate heat transfer in LS-DYNA	4 April
How to model flow through porous media in LS-DYNA	25 April
Coupling between DEM particles and ICFD solver	15 May
How to model sloshing using the ICFD solver	23 May

If not otherwise stated, the event location is Stuttgart, Germany. Other event locations are:
G = Göteborg, 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.

Author: Nils Karajan nik@dynamore.de

Webinar series on the Incompressible Fluid Solver (ICFD)
Marcus Timgren (DYNAmore Nordic)

Watch past episodes on YouTube:

- ICFD how to set up a 2D FSI case: https://youtu.be/jB36LWzJW7I
- ICFD how to set up a 3D CFD case: https://youtu.be/egJ2dsekUHQ

Introduction – Recently, the input decks that can be downloaded from www.dynaexamples.com/icfd have been updated by 42 new application cases. To give the users even more help in getting started with the ICFD solver, Marcus Timgren from DYAmore Nordic has started a webinar series to provide the users with background information on the examples.

The incompressible fluid solver ICFD is one of the most rapidly progressing solvers in LS-DYNA. For more and more LS-DYNA users, the ICFD solver is the method of choice when it comes to solving standard problems in computational fluid dynamics (CFD) as well as more sophisticated problems such as fluid-structure interaction (FSI) and conjugate heat transfer. Moreover, the ICFD solver exhibits also a good parallel scalability which leads to short turnaround times for the user.

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Webinar topics, dates and registration

- How to model conjugate heat transfer in LS-DYNA
  4 April, 10-11 AM CET
  Registration
- How to model flow through porous media in LS-DYNA
  25 April, 10-11 AM CET
  Registration
- Coupling between DEM particles and ICFD solver in LS-DYNA
  15 May, 10-11 AM CET
  Registration
- How to model sloshing using the ICFD solver in LS-DYNA
  23 May, 10-11 AM CET
  Registration

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

May
4-5 LS-DYNA NVH & Analyses
15-16 LS-DYNA Intro to GeoMaterial
15 – 18 LS-DYNA Crash & Impact
29-31 Intro to both Explicit and Implicit

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

Basic PAM-STAMP
26 Apr 2017 to 27 Apr 2017
Sheet Metal Forming

Basic PAM-STAMP
17 May 2017 to 18 May 2017
21 Jun 2017 to 22 Jun 2017
Sheet Metal Forming

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

May

***Composite Seminar**

Date: At the end of May (to be announced)

Lecturer: Prof. Kim Chang-Wan (Konkuk University)

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

For Pricing Please visit www.lstc.com

Date	Location	Class	Instructor(s)
April			
6-7	MI	Intro to LS-OPT	I. Gandikota
10-11	MI	Airbag Folding	R. Chivukula
12-13	MI	NVH and Frequency Domain Analysis	Y. Huang
17-18	MI	LS-DYNA Advanced Class	S. Bala
19	MI	Electromagnetics	I. Caldichoury
20-21	MI	ICFD	I. Caldichoury
May			
2-3	MI	Composite LS-DYNA	A. Tabiei
4-5	MI	Rubber, Foam, & Viscoelastic Materials	A. Tabiei
8-9	MI	Fracture, Failure & Damage	A. Tabiei
10-11	MI	Plasticity, Plastics, Visco-plastic Materials	A. Tabiei
15	CA	Intro to LS-PrePost	P. Ho / Q. Yan
16-19	CA	Intro to LS-DYNA	A. Nair
16-18	MI	Advanced ALE Applications	I. Do / H. Chen
22-23	CA	Blast in LS-DYNA	A. Tabiei
24-25	CA	Penetration Using LS-DYNA	A. Tabiei
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

LSTC 2017 Training

For Pricing Please visit www.lstc.com

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
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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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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

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LS-DYNA EXAMPLES

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ATD –DUMMY MODELS

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

Applications - Information for LS-DYNA

	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
	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

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Improvements to One-Step Simulation in LS-DYNA

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

INTRODUCTION

The followings are new additions and improvements for the keyword *CONTROL_FORMING_ONESTEP since our last update:

1) Damage accumulation,
2) Maximum thickness scale factor,
3) New options QUAD and QUAD2.

DAMAGE ACCUMULATION:

Damage accumulation *D* is calculated based on (refer to manual section *MAT_ADD_EROSION):

$$D = \left(\frac{\varepsilon_p}{\varepsilon_f}\right)^{\text{DMGEXP}}$$

A new load curve LCSDG and a new variable DMGEXP is added in the keyword. In the example below, load curve #500 provides plastic failure strain vs. stress triaxiality and DMGEXP is assumed to be 1.254. Since the damage accumulation is written into the file onestepresult as history variable #6, the variable NEIP in *DATABASE_EXTENT_BINARY should be set to at least ‘6”.

```
*CONTROL_FORMING_ONESTEP
$   OPTION              AUTODB   TSCLMIN    EPSMAX              LCSDG    DMGEXP
         7                            0.8       0.3                500     1.254
*DEFINE_CURVE
500
-0.3,0.6
-0.2,0.3
0.0,0.2
0.2,0.25
0.4,0.46
0.65,0.28
0.9,0.18
*DATABASE_EXTENT_BINARY
$    NEIPH     NEIPS    MAXINT    STRFLG    SIGFLG    EPSFLG    RLTFLG    ENGFLG
                   6         7         1
$   CMPFLG    IEVERP    BEAMIP     DCOMP      SHGE     STSSZ
                   1                   2
```

The damage accumulation contour map from the file onestepresult can be plotted in LS-PrePost, as in Figure 1.

New variable TSCLMAX:

During the early stage of product design, the initial product specifications may lead to large strains and excessive thinning on the formed panel. The ensuing one-step results would not be suitable to be used in a crashworthiness simulation. However, these kinds of forming issues are certain to be fixed as a natural part of the design and stamping engineering process. A new variable TSCLMAX (just like variables TSCLMIN and EPSMAX) is thus created to impose artificial limits on the upper bound thickening (indication of wrinkles). The variables provide convenient way to run a crash simulation with approximate and reasonable forming effects before the design is finalized. In the keyword below (which is a part of the firewall model with original thickness of 0.75mm), TSCLMAX is set 1.1 to limit the max thickening in the part to 0.825mm:

```
*CONTROL_FORMING_ONESTEP
$   OPTION   TSCLMAX    AUTODB   TSCLMIN    EPSMAX
         7       1.1                 0.9       0.3
```

The upper-bound truncated thickness contour map is shown in Figure 2(bottom), while Figure 2(top) shows thickness contour map with no TSCLMAX.

NEW OPTIONS FOR *CONTROL_FORMING_ONESTEP- QUAD2, TRIA, AND QUAD:

When one-step forming method (with keyword *CONTROL_FORMING_ONESTEP) was first introduced back in 2011, all quadrilateral elements in the model were split into two triangular elements internally for calculation. As of Revision 112682, this original formulation (with no option) is set as option TRIA. A new option QUAD (Revision 112071) is now available supporting quadrilateral elements with improved algorithm in various areas, which leads to better results (Figure 4). In addition, this option greatly improves calculation speed under multiple CPUs in SMP mode. Another new option QUAD2 is yet one more improvement over the option QUAD with enhanced element formulation, which further improves results in terms of thinning and plastic strain (Figure 3) with slightly longer CPU times. The option QUAD2 is set as the default for this keyword as of Revision 112682 and is the recommended option. Comparing Figures 3, 4 and 5, QUAD2 gives the best results, with expected higher thinning around the round shaped corners and smoothed thickness contour. Plastic strain contour distribution is also more reasonable without some of the noises observable in QUAD and TRIA options.

The following partial keyword input is an example of using the option QUAD2. Note the draw bead force parameter AUTOBD is set at 0.5. Calculation speed comparison among options QUAD, QUAD2 and TRIA can be found in `Table 0-1`.

```
*KEYWORD
*include
model.k
*CONTROL_TERMINATION
1.0
*CONTROL_FORMING_ONESTEP_QUAD2
$#  option  maxthick    autobd   thinmin    epsmax
         7                 0.5
```

```
*CONTROL_FORMING_ONESTEP_AUTO_CONSTRAINT
         1
*CONTROL_IMPLICIT_GENERAL
$#  imflag       dt0    imform      nsbs       igs     cnstn      form    zero_v
         1    0.2500         2         1         0         0         0         0
*CONTROL_IMPLICIT_TERMINATION
$#  deltau    delta1     ketol     ietol     tetol     nstep
  0.001000     0.000     0.000     0.000     0.000         0
*CONTROL_IMPLICIT_NONLINEAR
$#  nsolvr    ilimit    maxref     dctol     ectol  not used     lstol      rssf
        12        11       200  0.010000  0.100000     0.000     0.000     0.000
$#   dnorm    diverg     istif   nlprint
         0         0         0         2
$#  arcctl    arcdir    arclen    arcmth    arcdmp
         0         0     0.000         1         2
*CONTROL_IMPLICIT_SOLVER
5
*PART

   5000000   5000000   5000000
*SECTION_SHELL
   5000000        16        1.        5.        1.
      0.72      0.72      0.72      0.72
...
```

Calculation speed comparisons among the three options can be found in Table 1.

Table 0-1 Calculation speed improvement with and without option _QUAD.

	Number of elements	Calculation speed (D.P. SMP Rev.112720, 8 CPUs)		
		Option TRIA	Option QUAD	Option QUAD2
A hat shape part	71000	21.0 min	14.1 min	16.6 min
A upper dash panel	61700	24.5 min	11.5 min	17.2 min

ACKNOWLEDGEMENT:

The features and improvements in this article were requested by Amit Nair and Dilip Balsod of LSTC. Their valuable feedback during the development is highly appreciated.

REVISION INFORMATION:

1) Revision 108229: variables LCSDG and DMGEXP are available.
2) Revision 111311: variable TSCLMAX is available.
3) Revision 112071: option QUAD is available.
4) Revision 112682: original formulation is designated as option TRIA. A new option QUAD2 is available.

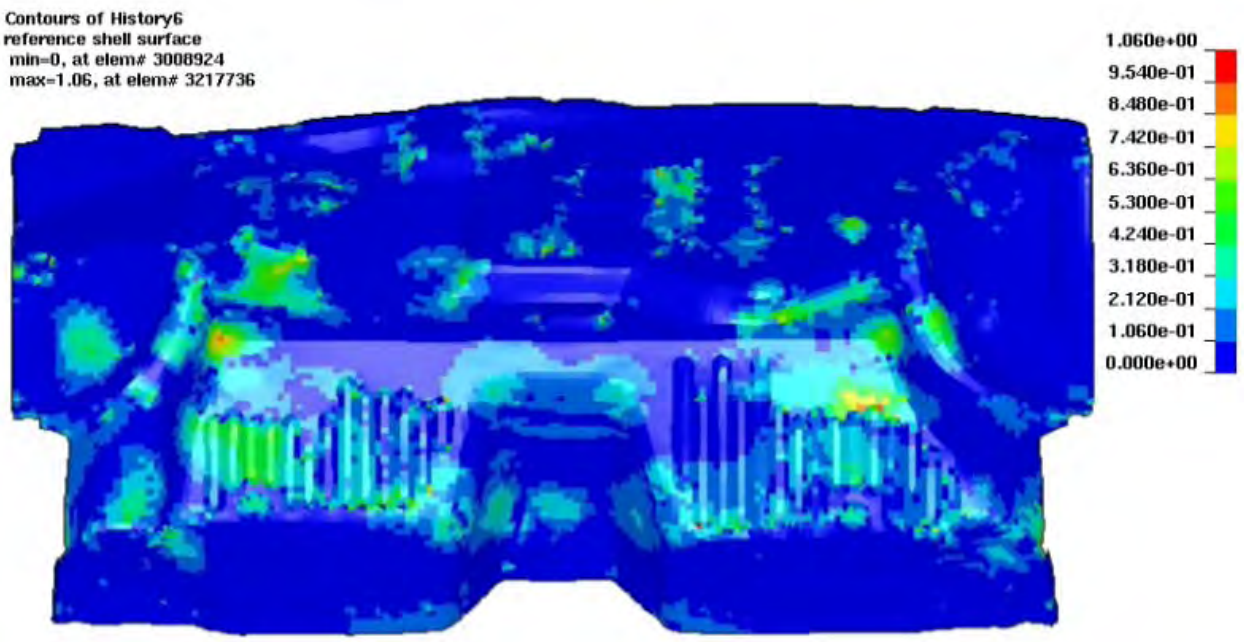

Figure 1. Damage accumulation in one-step simulation.

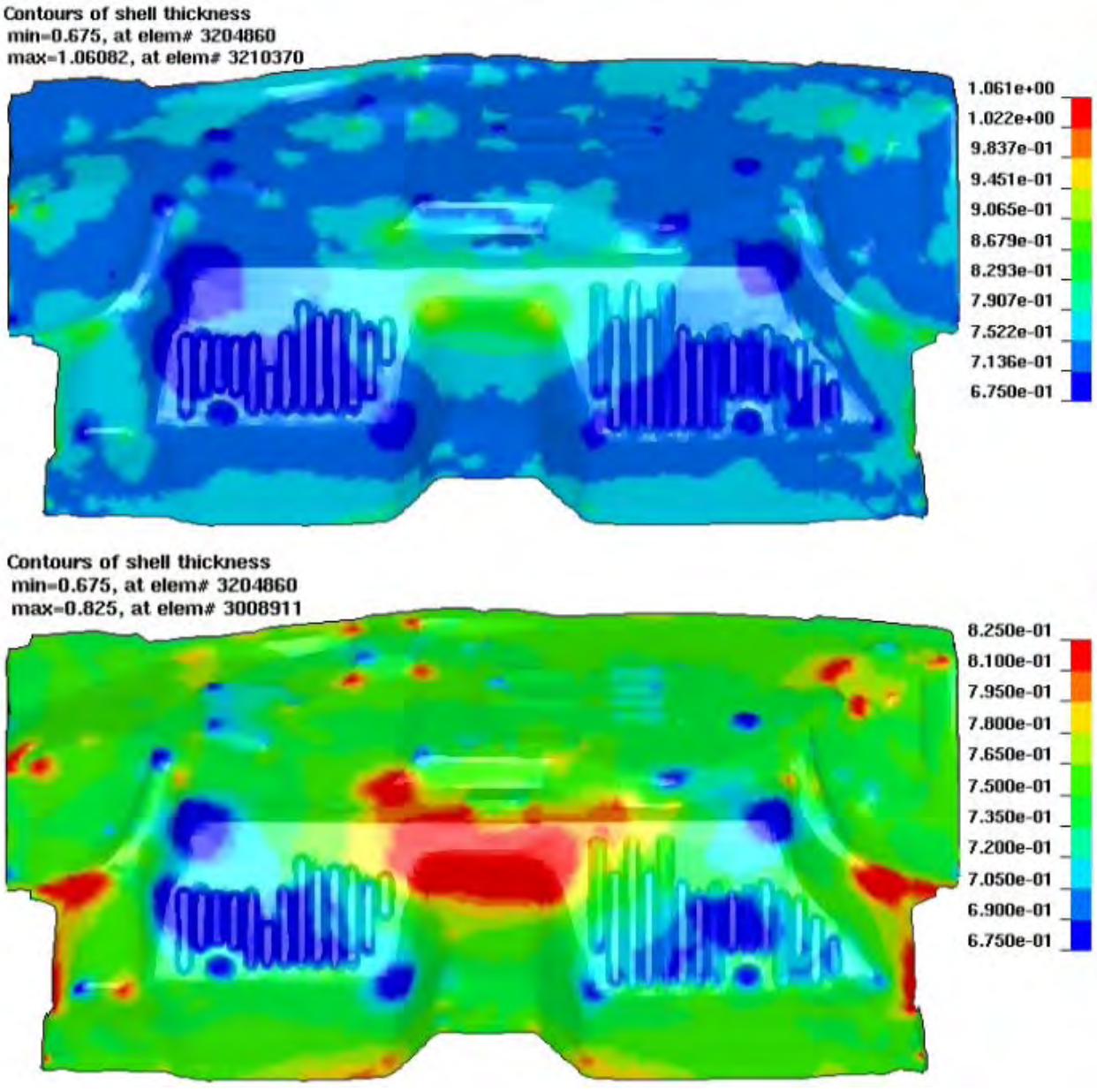

Figure 2. Maximum thickness scale factor (TSCLMAX) to limit the upperbound thickness values – top: no TSCLMAX; bottom: TSCLMAX=1.1); original thickness 0.75mm.

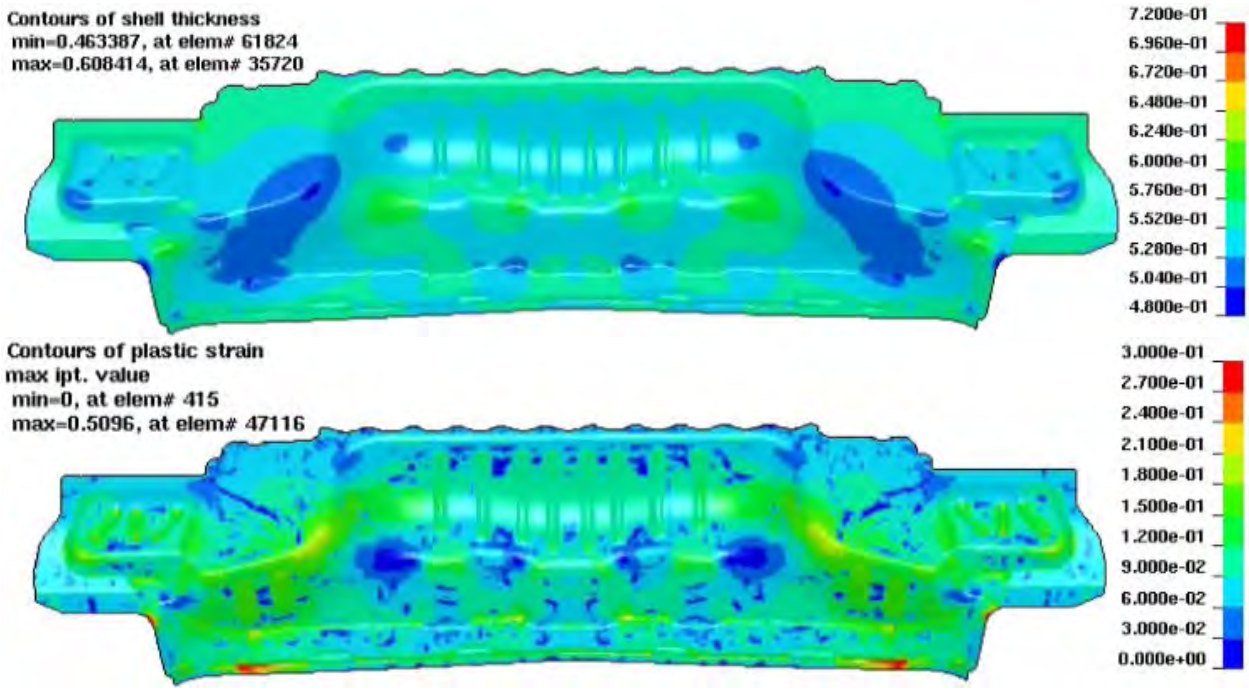

Figure 3. Option QUAD2 (default, recommended) – thickness (top) and plastic strain (bottom) contours.

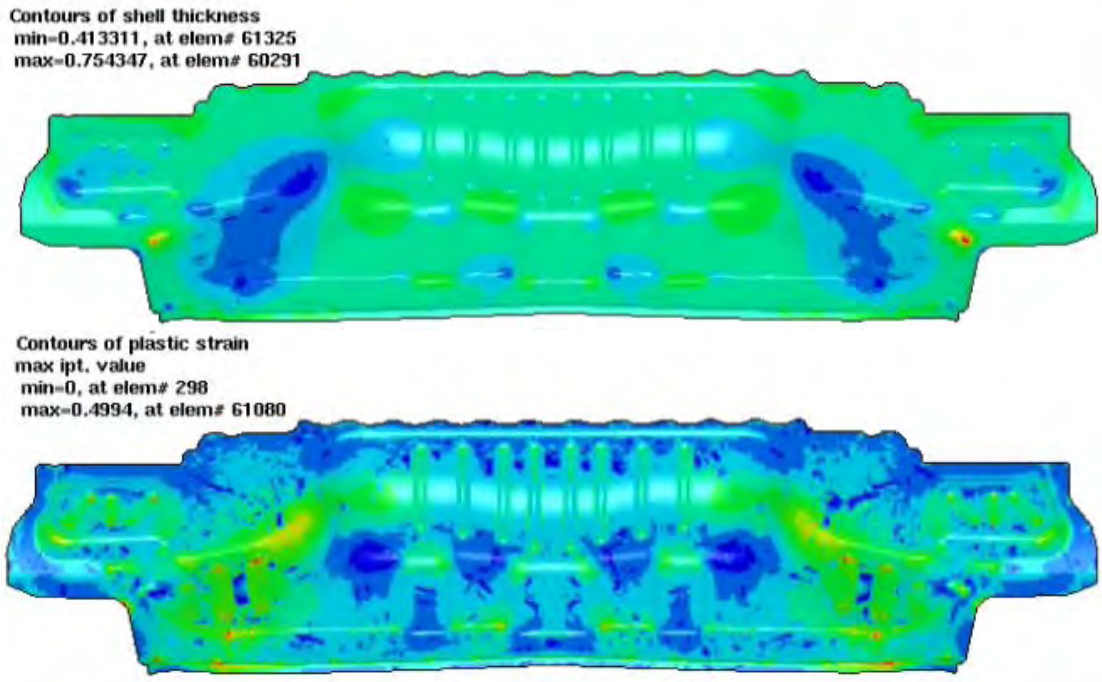

Figure 4. Option QUAD – Thickness (top) and plastic strain (bottom) contours.

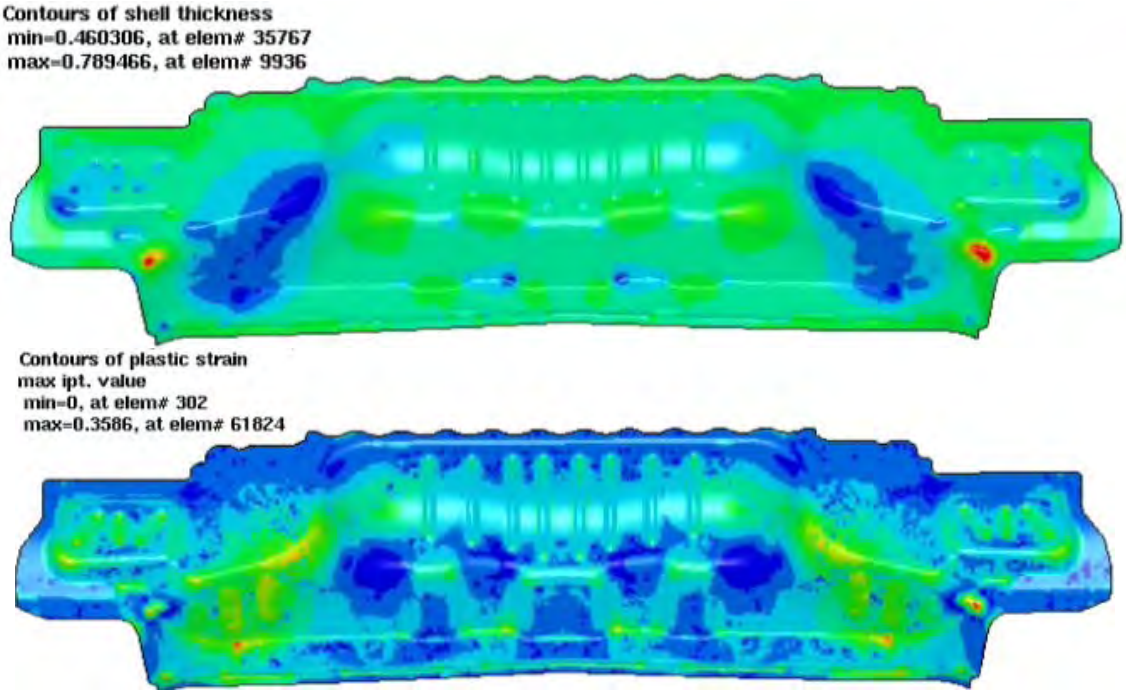

Figure 5. Option TRIA – Thickness (top) and plastic strain (bottom) contours.