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Volume 4, Issue 05, May 2015

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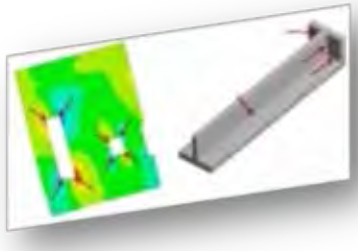

ESI Group

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FEA Information Inc. is a publishing company founded April 2000, incorporated in the State of California July 2000, and first published October 2000. The initial publication, FEA Information News continues today as FEA Information Engineering Solutions. The publication's aim and scope is to continue publishing technical solutions and information, for the engineering community.

FEA Information Inc. Publishes:

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FEA Information China Engineering Solutions

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A monthly publication in pdf format sent via e-mail, additionally archived on the website FEA Publications. www.feapublications.com

FEA Information China Engineering Solutions

The first edition was published February 2012. It is published in Simplified and Traditional Chinese in pdf format.

To sign up for the Traditional, or Simplified edition write to yanhua@feainformation.com

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Upcoming Conferences:

June 10th - 12th	BETA CAE 6th International Conference
June 15th – 17th	10th European LS-DYNA Conference
June 21-24, 2015	NAFEMS World Congress in San Diego,
June 24th and 26th	Numerical Simulation Conference 33rd CADFEM Users' Meeting

Special thanks to Dennis for event reminder.

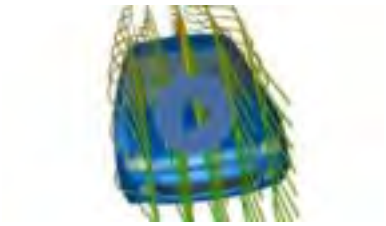
BeyondCAE, through its Principal, Dennis Nagy, provides global business development and strategy services to engineering software vendor companies, end-user enterprises, and private equity/VC firms looking to better understand and invest in the CAE market segment.

Burke Ritchie. After his retirement from Lawrence Livermore National Laboratory, LSTC was home for him to continue his scientific research, the passion of his life. His life of research left a legacy of over 100 publications in refereed journals. A book of edited publications devoted chapter 3 to his publication in "Electromagnetic-wave Contribution to the Quantum Structure of matter"

We join his wife Martha W. Ritchie in missing a wonderful man, and the scientific community a researcher.

Sincerely, Marsha Victory – Trent Eggleston – Suri Bala
FEA Information Engineering Solutions US Edition

Webinars and Videos on BETA Site and more On BETA CAE YouTube Channel:
https://www.youtube.com/betacae



Webinar on µETA for CFD

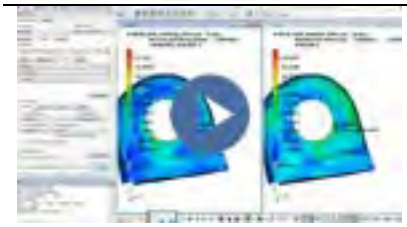
Introduction to the use of µETA for CFD post-processing through a live demonstration

ANSA/µETA features for CFD pre- and post-processing

Overview presentation of the functionality of ANSA/µETA for CFD pre- and post-processing

Introductory webinar on ANSA for CFD pre-processing

Introduction of the use of ANSA for CFD pre-processing through a live demonstration



µETA Tutorials - How To Guides Playlist

Step-by-step tutorials - for post-processing tasks with µETA

Introduction to the ANSA Kinetics Tool

Introductory presentation of the capabilities of the new ANSA Kinetics Tool

www.beta-cae.gr/conference06_announcement.htm

Senior Cloud Admin, Massimo Malagoli

http://www.penguincomputing.com/running-ls-dyna-efficiently-on-hpc-cloud-mpp-vs-hybrid/

One of the applications most widely used on the Penguin Computing on Demand (POD) HPC cloud service is LS-DYNA

Running LS-DYNA Efficiently on HPC Cloud: MPP vs. Hybrid

One of the applications most widely used on the Penguin Computing on Demand (POD) HPC cloud service is LS-DYNA, a general-purpose multiphysics finite element analysis software that can simulate complex real word problems. LS-DYNA is commonly used by engineers in the automotive, aerospace, construction, military, manufacturing, and bioengineering industries.

Two parallel versions of the LS-DYNA solver are available: one implementing shared memory parallelism (SMP) via multiple threads, and one exploiting message passing parallelism (MPP) using the MPI library. More recently a hybrid solver has been developed that combines the two paradigms: SMP can be used within a compute node while processes running on different compute nodes communicate with MPP.

The hybrid approach has some attractive features that can, in principle, make it preferable to a pure MPP model in the case of large jobs: with a mixture of MPI processes and threads one can deploy a computational profile tailored for the NUMA architecture of modern HPC hardware: one MPI process per NUMA node (typically a CPU socket) using threads to exploit the multiple cores of the processor. Another advantage is the reduction in the number of MPI processes with respect to a pure MPP job of the same size, which can decrease the overall communication overhead. Finally, since the MPP solver is based on the domain decomposition method, the use of threads allows to scale the simulation without changing the number of domains, thus preserving the numerical profile of the solution.

Here I compare the performance of MPP and hybrid LS-DYNA on the POD HPC cloud platform. The jobs were run on the H30 cluster, which features compute nodes with dual Intel® E5-2670 Sandy Bridge processors (hyperthreading off) and 64GB of memory. An Intel® True Scale QDR Fabric provides low-latency connections, and the nodes are connected to a Ceph and NFS storage infrastructure via 10 GbE Ethernet. The runs were performed with LS-DYNA version 7.0.0, using the MPP and hybrid distribution binaries for Linux x64, CentOS, Intel® Fortran Compiler (IFORT), and

Open MPI. The run time Open MPI libraries used are our custom build of Open MPI 1.5.5 which is tailored for POD's InfiniBand interconnect and supports the Performance Scaled Messaging (PSM) communication interface. For the test I chose the car2car benchmark, a 2 car crash simulation model with 2.4 million elements.

In a previous post we have already discussed the importance of binding the compute processes to a particular CPU socket, in order to improve memory access and reduce cache misses. This is particularly relevant for the hybrid solver, which is designed to closely mimic the physical architecture of the processor. For this reason, in both the MPP and hybrid runs I used the openmpi command line options for process binding. The MPP runs were thus started using the following command line:

mpirun -npernode 16 -bysocket -bind-to-socket mpp971

while the hybrid solver was launched as follows:

export OMP_NUM_THREADS=8
mpirun -npernode 2 -bysocket -bind-to-socket hyb971 ncpu=-8 …

Thus the pure MPP run uses 16 MPI processes per compute node, while in the hybrid solver only 2 MPI processes per node are started (one for each CPU socket), each process spawning 8 threads.

The results of the runs are collected in the following table. Here the second column lists the total number of processes for the run. In the case of the MPP solver this corresponds to the number of MPI processes, while for the hybrid solver the number of MPI processes is obtained dividing the total number of processes by 8.

Table 1. Execution time for the car2car LSDYNA benchmark on the POD HPC cloud

Processor Grid	Total Processes	Compute Time	
		MPP	Hybrid
4 x 16	64	279	330
6 x 16	96	202	230
8 x 16	128	166	178
12 x 16	192	129	131
16 x 16	256	112	107

We can see that for this benchmark the pure MPP solver performs better than the hybrid for lower processor counts. Here the number of MPI processes is not large enough for the communication overhead to dominate the compute time of the pure MPP version. In this case the different type of overhead incurred by the multi threaded run, together with the different parallelization model, make the hybrid solver less efficient.

For larger jobs the performance of the two solvers becomes virtually the same, with perhaps a little advantage for the hybrid solver in the 256 processors run. For these jobs the communication overhead takes a larger share of the total time, which gives a relative advantage to the hybrid solver. On the other hand, the fast InfiniBand hardware and the optimized Open MPI stack used by POD ensure that the MPP DYNA implementation remains fairly efficient at these job sizes too.

In conclusion, the MPP LS-DYNA solver exhibits optimal performance for both small and medium-large jobs on the Penguin HPC cloud. The hybrid solver may be appealing for large jobs, especially if one wants to further speed up the calculation without changing the domain decomposition properties of the simulation

By: Martin Feyereisen

Striking the Right Balance for LS-DYNA simulations

The Lenovo Solution for Engineering Analysis

By: Martin Feyereisen

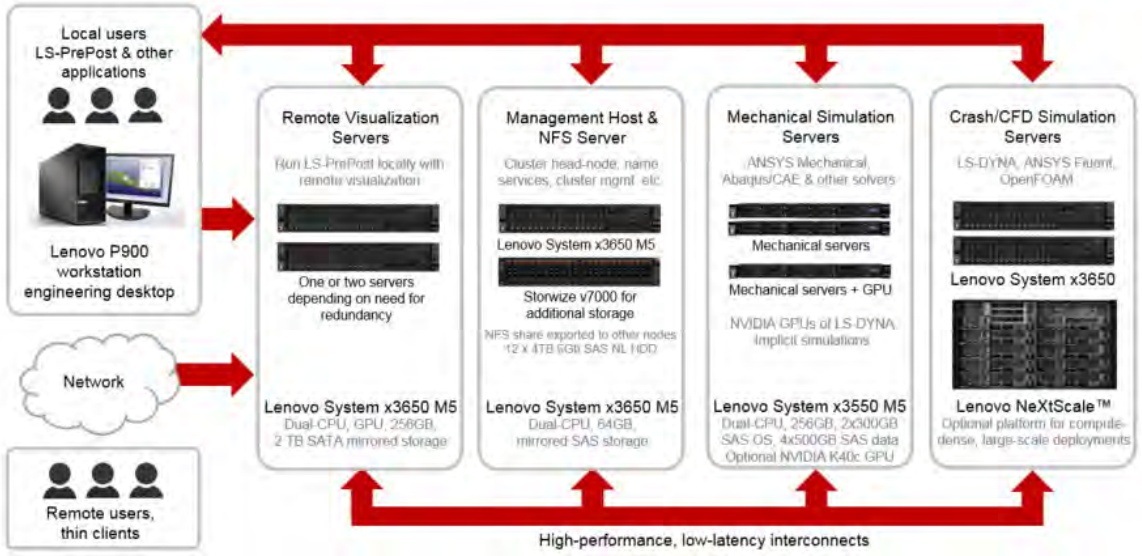
The Lenovo Solution for Engineering Analysis was built with engineers in mind.

Striking the Right Balance for LS-DYNA simulations

Engineering simulation and analysis are essential technologies in modern manufacturing. Whether in automotive, aerospace or a variety of other industries, tools like LS-DYNA and LS-OPT simulate engineering designs under a variety of conditions avoiding costly prototyping, streamlining operations, and boosting productivity to help the bottom line.

Despite the benefits, for small and medium sized firms, deploying an analysis infrastructure can be challenging. Engineers are busy with their day jobs, and few have the time to deal with the myriad of technologies that comprise an HPC cluster including high-speed switches, workload managers, MPIs, OFED drivers and more.

Engineers are nothing if not pragmatists, and the Lenovo Solution for Engineering Analysis was built with engineers in mind. It was created to get the job done – quickly, efficiently and cost effectively. It takes a building-block approach, addressing infrastructure needs for the most common workloads in automotive and aerospace environments including structural analysis, non-linear, transient dynamic analysis applications such as LS-DYNA, and computational fluid dynamics packages employing the right processor, storage and software technologies for each type of workload.



In addition to providing a cost-effective infrastructure for LS-DYNA, the Lenovo solution has other advantages making it ideal for small and medium-sized engineering firms:

- **Delivers** the latest state-of-the-art processors, switches and high-performance adapter technologies and GPUs leveraging Lenovo's global supply chain efficiencies to deliver an HPC environment that is ready to perform
- **Provides** 3D remote visualization nodes supporting LS-PrePost and other graphical tools, optionally extending access to users outside the corporate firewall
- **Incorporates** storage technologies optimized to specific workloads using storage technologies and RAID levels appropriate to the workload and fast efficient, scratch storage for crash, CFD and other types of simulations
- **Includes**, but does not require IBM Platform HPC cluster and workload management technology, making the cluster easy to deploy and manage for LS-DYNA users
- **Offers** the ThinkStation P900 option for extreme workstation performance and flexibility

By striking just the right balance between performance, cost and flexibility, the Lenovo Solution for Engineering Analysis helps LS-DYNA users achieve optimal performance at a reduced TCO while providing the flexibility to grow as requirements evolve.

Download the solution brief, learn more about other Lenovo HPC solutions or come visit the Lenovo booth at the European LS-Dyna Conference in Würzburg, Germany June 15th to 17th.

http://investors.cray.com/phoenix.zhtml?c=98390&p=irol-newsArticle&ID=2046283

Cray Installs India's First Petaflop Supercomputer at the Indian Institute of Science

The Supercomputing Education and Research Center (SERC) at the Indian Institute of Science (IISc) in Bangalore, India has put a new Cray® XC40™ supercomputer into production.

SEATTLE, WA -- (Marketwired) -- 05/11/15 -- Global supercomputer leader Cray Inc. (NASDAQ: CRAY) today announced that the Supercomputing Education and Research Center (SERC) at the Indian Institute of Science (IISc) in Bangalore, India has put a new Cray® XC40™ supercomputer into production. With more than 1.4 petaflops of compute performance, the Cray supercomputer nick-named "SahasraT" at SERC is the first petaflop system in India.

Located at the IISc, a premier research institution for advanced scientific and technological research and education in India, SERC is the country's leading computing center with state-of-the art facilities that cater to the ever-increasing demands of high performance computing (HPC) for scientific and engineering research in India. The Center leads several national initiatives on HPC, and is actively involved in research projects and consultancy in collaboration with government agencies and private companies. The Cray XC40 supercomputer at SERC serves as the primary system for cutting-edge research in science and engineering at the IISc.

"We are proud that SERC is now home to India's first petaflop supercomputing system, which will power the Center's important computational science initiatives," said Nick Gorga, Cray's vice president of sales, Asia Pacific. "The IISc is India's premier institution for advanced scientific and technological research and education, and we are honored that a Cray XC40 supercomputer is the Center's primary computing resource for the IISc user community. Our customer base in India continues to grow, and we look forward to our new partnership with the IISc and its researchers and engineers."

The Cray XC40 supercomputer at SERC features Intel® Xeon® processors, and includes Intel® Xeon Phi™ coprocessors and NVIDIA® Tesla® GPU accelerators.

Cray XC40 supercomputers are engineered to meet the performance challenges of today's most demanding HPC users. Special features of the Cray XC40 supercomputer include: the industry-leading Aries system interconnect; a Dragonfly network topology that frees applications from locality constraints; optional DataWarp applications I/O flash SSD accelerator technology; innovative cooling systems to lower customers' total cost of ownership; the next-generation of the scalable, high performance Cray Linux Environment supporting a wide range of applications; Cray's HPC optimized programming environment for improved performance and programmability, and the ability to handle a wide variety of processor types in a tightly-integrated system infrastructure.

For more information on the Cray XC series of supercomputers, please visit the Cray website at www.cray.com.

About Cray Inc.: Global supercomputing leader Cray Inc. (NASDAQ: CRAY) provides innovative systems and solutions enabling scientists and engineers in industry, academia and government to meet existing and future simulation and analytics challenges. Leveraging more than 40 years of experience in developing and servicing the world's most advanced supercomputers, Cray offers a comprehensive portfolio of supercomputers and big data storage and analytics solutions delivering unrivaled performance, efficiency and scalability. Cray's Adaptive Supercomputing vision is focused on delivering innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to meet the market's continued demand for realized performance. Go to www.cray.com for more information.

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Blog by Steven Hale, CAE Associates

For High Resolution: https://caeai.com/blog/why-worry-about-sharp-corners-and-point-loads

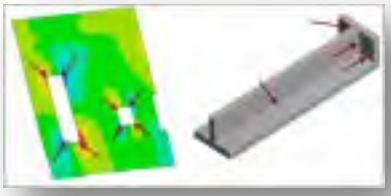


Figure 1

Why Worry About Sharp Corners and Point Loads?

May 22, 2015 By: Steven Hale

We teach a lot of FEA training classes here at CAE Associates, and one of the issues that we emphasize is the need for quality geometry, loads, material data, and boundary conditions. Beyond the obvious need for accuracy, there are some specific characteristics of geometry and loading in FEA that require special consideration: most notably sharp corners and point loads. Engineers are often given geometry that contains sharp corners and loads that include forces at discrete points or edges. So why not use this information as supplied? What's the big deal with sharp corners and point loads? The problem with sharp internal corners/edges and point loads is that they are sources of numerical singularities. This means that these locations are incapable of predicting accurate results even with accurate input data and a very fine mesh. Two examples of sharp internal corners are shown in Figure 1 above.

These regions represent stress concentrations with an infinitely small radius. Numerically, finite element analysis calculates stress in these corners based on the local element size, with smaller elements yielding higher stresses. As a consequence, increasing mesh refinement only serves to increase the stress without limit. An example of this is shown in Figure 2 for a stiffened panel subjected to a bending load.

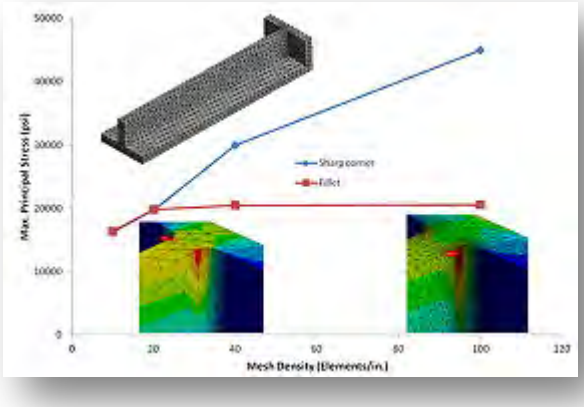


Figure 2:

Stress vs. Mesh Density for a Stiffened Panel in Bending - Stress Convergence Behavior

The top (blue) line shows that the stress does not converge to a solution with increasing mesh refinement as it should. The best way to resolve this problem is to replace the sharp corners/edges with fillets. The effect of this change is shown by the bottom (red) line in Figure 2 where the sharp corner was replaced by a small fillet. This eliminates the singularity and allows for the stress solution to converge as the mesh is refined.

Applying loads directly to edges or points presents a similar problem. In theory, the area over which the load is applied is infinitely small, resulting in an infinitely high stress. In such cases, FEA calculates stress based on the sizes of the elements attached to the edge or point to which this load is applied. As such, increasing mesh refinement reduces the element size, causing stresses to increase without limit. This effect is shown in Figure 3 (top blue line) for the same stiffened panel but with a load applied to an edge near the free end.

In this case, the local stress directly beneath the applied load is very high and increases significantly as the local element size decreases. The best way to resolve this problem is to simply distribute the load over an area. This effect is shown by the bottom (red) line in Figure 3 where the same load was distributed over a small area instead of an edge. As expected, this eliminates the singularity and dramatically reduces the local stress.

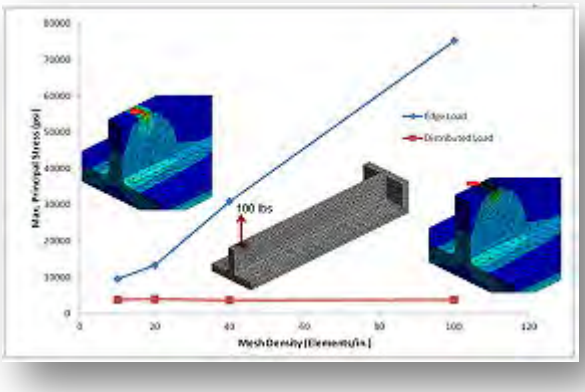


Figure 3:

Stress vs. Mesh Density for a Stiffened Panel with an Edge Load and a Distributed Load - Stress Convergence Behavior

Blog by Steven Hale, CAE Associates

For High Resolution: https://caeai.com/blog/why-worry-about-sharp-corners-and-point-loads

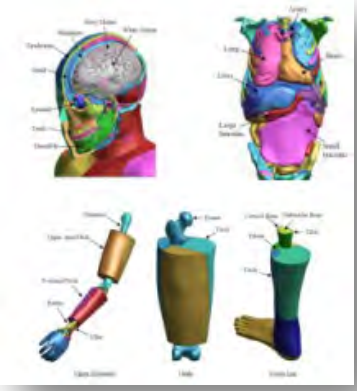
In many cases, eliminating sharp corner and point load singularities as suggested would be difficult to accomplish without some time and effort. Leaving these features in your model is certainly an option, but only if they are located away from all critical regions where accurate results are required. Even if they are left in a model, you need to be aware that these singularities exist and will adversely affect your results in these locations. When reviewing stress results, you should always be aware of all sources of singularities and recognize that stresses in these locations should not be presented as real or accurate.

There are other sources of numerical singularities such as point constraints or "cracks" in the mesh, however sharp internal corners and point loads are often the most commonly encountered ones. Being able to recognize and deal with them is a critical part of the finite element modeling process!

I am very interested to hear about any experience you have in dealing with numerical singularities. How have they affected your critical results? Do you always remove them or do you have other ways of dealing with them?
https://caeai.com/blog/why-worry-about-sharp-corners-and-point-loads ,

Steven Hale, CAE Associates, M.S.M.E, Senior

Mie Yanagihashi



The 2015 THUMS European Users' Meeting

Hosted by: **JSOL**

Date: **June 18th(Thu), 2015**
After European LS-DYNA Conference

Participation: **THUMS users.**

The 2015 THUMS European Users' Meeting.
Registration Fee: Free Expected number of participants: Approximately 50

- JSOL is delighted to announce The 2015 THUMS European Users' Meeting.
- THUMS, the Total Human Model for Safety for use with LS-DYNA® is being rapidly adopted by users worldwide.
- JSOL invites you to join us and share in THUMS technical information.

Development and application of THUMS at Toyota
Dr. Tsuyoshi Yasuki,
Toyota Motor Corporation

Development and Validation of THUMS Version 5 and Its Application for Vehicle Safety Research
Dr. Masami Iwamoto,
Toyota Central R&D Labs., Inc.

Latest developments and applications of THUMS-D within Daimler AG
Mr. Christian Mayer,
DAIMLER AG

THUMS User Community . Challenges in Validating THUMS in Different Crash Codes
Ms. Therese Fuchs,
University of Munich

Rib fracture prediction with THUMS in frontal impacts
Dr. Damien Subit,
Arts et Metiers ParisTech, France
(University of Virginia, USA)

A generic Geometry Modification Method for Positioning and Scaling of Human Models
Dr. Dirk Fressmann,
DYNAmore GmbH

Simulation based THUMS positioning on J- SEATdesigner
Dr. Noriyo Ichinose,
JSOL Corporation

For more details about the meeting, please visit: http://ls-dyna.jsol.co.jp/en/thums/thums_um2015.html Brochure: http://ls-dyna.jsol.co.jp/en/event/data/THUMS2015_Invitation150514.pdf

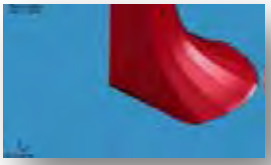
For further information contact: courses@lsdyna-online.com or 513-3319139

Available On Line or On Site - WWW.LSDYNA-ONLINE.COM

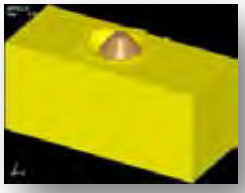
Fluid Structures Interaction Using LS-DYNA (June 29-30)

This course will allow LS-DYNA users to get started on using LSDYNA for Fluid Structure Interaction (FSI) problems. The most important elements to start using LS-DYNA for such problems will be presented in the 8 hours. Workshops will be presented as part of this course.

- **Introduction**
  - When to use Eulerian and ALE
  - Sample applications



- **Eulerian capabilities**
  - Euler and ALE element library
  - Boundary conditions
  - Initial conditions



- **Basic concepts of arbitrary Langrange-Euler (ALE)**
  - Advantages of ALE formulation
  - How it works
- **Basic concepts of Multi-Material**
  - When to use multi-material
  - Advantages of multi-material formulation

- **Basic concepts of fluid/structure coupling**
  - Different coupling methodologies
  - When to use them
- **Modeling techniques**
  - Mesh design
  - Problem initialization
  - Post-processing

E-Mail: forum@dynamore.de

www.dynamore.de/ls-dyna2015

June 15th – 17th 2015, Würzburg, Germany

Agenda online:
www.dynamore.de/15agenda
Agenda flyer (pdf):
www.dynamore.de/15agenda-pdf

REGISTER NOW - Online registration
www.dynamore.de/15reg
Conference website:
www.dynamore.de/15dyna

NEW: The user community has grown and we are pleased to announce that this is the first year that the conference will be two and a half days.

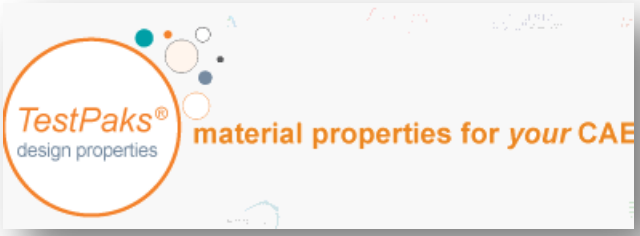
The conference starts on Monday after lunch. It is an ideal place to exchange your experiences and findings with other users of LS-DYNA and the associated products.

- More than 170 technical presentations
- 13 keynote presentations of reknown speakers
- 13 workshops on various topics related to LS-DYNA
- 17 accompanying seminars with a 10% discount for conference participants
- Comprehensive hardware and software exhibition

Venue:

- Würzburg is a beautiful historical city and a UNESCO World Cultural Heritage site.
- Easily accessible from Frankfurt International Airport by train or by car.
- The Congress Centrum at the Maritim Hotel Würzburg is centrally located directly on the banks of the river Main, offering a splendid view of the Marienberg fortress.
- Visitors can comfortably explore the baroque inner city with its numerous sights by foot

Contact and registration - DYNAmore GmbH
Industriestr. 2 - D-70565 Stuttgart, Germany
Tel. +49 (0) 7 11 - 45 96 00 – 0 Fax. +49 (0) 7 11 - 45 96 00 – 29



Test Catalog

www.datapointlabs.com/Catalog.asp

Mechanical Testing: Mechanical properties include stress-strain curves, modulus and Poisson's Ratio, strength, hyperelastic data, high strain-rate properties, multi-axial impact, Charpy, Izod, creep, stress relaxation and fatigue

Rheology: Flow Properties of materials including non-Newtonian viscosity, capillary and slit-die rheology, steady and dynamic parallel plate rheology, visco-elastic behavior, time and temperature based effects

Thermal Testing: Tests such as thermal conductivity, thermal diffusivity, specific heat, thermal expansion and thermogravimetry to characterize the response of materials to heat. Melting and crystallization phenomena can be quantified

Density: These tests range from simple density measurements to complex studies of volumetric changes with temperature and pressures ranging from a 1 to 2000 MPa

TestPaks: TestPaks give you the ability to order groups of tests, often at discounted prices, that result in complete material models for your CAE programs

Custom Tests: If the test you need is not listed here, please contact us with a complete description of your needs. We will respond within 24 hours

Among the conferences we will be at:

- **ANSYS Conference & 33rd CADFEM Users' Meeting:**
  - June 24-26, 2015
  - Messe Bremen, Germany
- **10th European LS-DYNA Conference**:
  - June 15-17, 2015
  - Wuerzburg, Germany
- **"Challenges in the Modeling of Plastics in Computer Simulation."**
  - Hubert Lobo. SPE Fellows Fundamentals Forum, ANTEC 2015.

2015 2nd China LS-DYNA User's conference

The 2nd conference will echo the success of the well-participated 1st China User's Conference , 2013.

The conference aims to prompt the interaction and communication between developers and end users.

Hosts:

Livermore Software Technology Corp.
Dalian Fukun Technology Development Corp.

Date: Nov. 9th -11th , 2015
Training: Nov. 12th -13th , 2015

Location:

InterContinental Shanghai Pudong,
Shanghai, China

The conference organizers wholeheartedly welcome your paper submission and attendance.

Paper submission:

Please send your one to two page abstract or full paper to chinaconf@lstc.com .

- Submission can be in Chinese or English.
- Submission of both Chinese and English versions are greatly appreciated but not mandatory.
- Include email address.

Abstract submission deadline:
Aug.10th , 2015
Notice of acceptance deadline:
Sept. 10th , 2015
Full paper submission deadline:
Oct. 10th , 2015
Conference website: http://www.lsdyna.cn
Contact us: chinaconf@lstc.com

In association with:

- ETA, Shanghai, China
- ARUP, Shanghai, China
- Hengstar Technology, Shanghai, China

Participation – Exhibits

Reserve your participation at the 2nd China LS-DYNA Users' Conference.
Contact: chinaconf@lstc.com

www.esi-group.com/sites/default/files/resource/customer_success/3521/esi_comil_ss_2014_lq01.pdf

Comil Ônibus Reduces Distortion by 75% Using Weld Planner Simulation Software

Simulating the steel welding sequence using Weld Planner software significantly reduced manufacturing cost and time. The simulation results allowed us to control the dimensions of critical parts and avoid rework in our assembly line.

André Luis Petry,
Engineering Supervisor - Comil

Challenge:

Comil needed to reduce geometrical distortions of a bus door frame induced by welded assembly.

When the traditional trial-and-error method, and consequential mechanical rework, failed to reach the required quality, Comil turned to ESI simulation software Weld Planner to enable them to meet specifications and cut development time and spending.

Process

- In the first phase, ESI developed a benchmark for Comil to demonstrate Weld Planner capabilities and show the correlation between numerical and test results.
- In the second phase, Comil became familiar with the software through a formal training program and launched their first project and the task of integrating CAE simulations into their welding process development workflow
- The third and most significant phase required full integration of Weld Planner in Comil's workflow, and consistent use throughout their welding process development.

Story:

One particular Comil bus design incorporated a front door with an inner structure made of steel; a configuration intended to be compliant with the ABNT NBR 7008 standard. The different components of the door were to be assembled and welded by Gas Metal Arc Welding (GMAW). Comil's prototyping department was in charge of developing the welding device and the welding sequence. In order to develop the welding process, the prototyping team had to perform physical tests and use trial-and-error to optimize the welding device and welding sequence.

Benefits

- Meeting tolerance requirements of welded assemblies without tedious trial and error on the shop floor
- Improved product quality, with a favorable customer perception
- Drop in development time, rework activities, and costs previously related to multiple physical trials
- A new cost-reducing workflow that integrates simulation early in the design process

www.gompute.com/services

Gompute offers a wide range of services enabling our customers to get the most out their HPC investments, enabling higher productivity. With our background and portfolio, we are well prepared to deliver true end to end solutions for you HPC environment.

Managed hosting: Gompute delivers managed hosting services for you infrastructure. We have long experience of managing demanding environments, and with our own Datacenter, have thorough control of the facilities.

HPC Advisory services: We are working closely with your team, to investigate, plan and propose action for your HPC environment. Gompute has large understanding of the needs and facts that needs to be targeted to ensure a successful project, taking into account key metrics for IT Dep, C-level exec and most importantly: the final users - the engineers

Training & Education: Gompute offers traning on several HPC and Engineering topics.

COMPREHENSIVE HIGH PERFORMANCE COMPUTING

Gompute is designed and developed to provide all the nuts, bolts and pre-fabricated solutions required to make your HPC a success.

Gompute provides cost effective solutions for a wide variety of problems experienced in enterprise HPC environments.

Enterprise HPC involves extensive planning, implementation and operation costs. Lot of these costs are incurred trying to make sure you have all the components required for a successful HPC environment and finally, hoping that the choices you made integrate seamlessly with each other to form a united HPC environment.

Gompute is the answer to tackle this problem, by providing all the solutions required to make your HPC a success, in one pre-integrated package. This will tremendously increase the ROI for your HPC resources.

The Numerical Simulation Conference
33rd CADFEM Users' Meeting
June 24th and 26th, 2015.

When it comes to numerical simulation in product development, the place to be is the city of Bremen, Germany.

CADFEM GmbH & ANSYS Germany GmbH would like to invite you to the Numerical Simulation Conference between June 24th and 26th, 2015. As a simulation expert, beginner or simply an interested party, you can experience the complete range of simulation technology as a tool for quality, innovation and time-saving in product developments of today and the future.

You can expect a packed and varied agenda at our ANSYS Conference & 33rd CADFEM Users' Meeting – from ANSYS, from CADFEM and from the world of simulation: Technology updates, contributions from users from various sectors and fields of simulation, as well as compact seminars on topical subjects. You can also look forward to the big CAE exhibition, the intensive exchange and dialog with like-minded people and as always an attractive supporting program. Let the conference inspire you to new ideas. Or why not inspire others by making your own contribution to one of the biggest conferences on numerical simulation in Europe. We would like to invite you to send us your papers on the named topics for Thursday, June 25th. If you register before February 2nd, 2015, you will profit from an early-bird discount of 10% either as a speaker or participant. We are looking forward to some great papers, curious trade visitors and exhibitors with some interesting special offers.

Find out everything you need to know about the event at www.usersmeeting.com/en

www.dynasupport.com/ **LS-DYNA Support**	Answers to basic and advanced questions that might occur while using LS-DYNA. New releases/ongoing developments.
www.dynalook.com/ **Papers**	Papers from LS-DYNA User Conferences with search option.
www.lsoptsupport.com/ **LS-OPT**	LS-OPT, developed by LSTC to interface with LS-DYNA
www.dummymodels.com/ **Dummy Models**	Detailed information on dummy models for LS-DYNA
www.topcrunch.org/ **Benchmarks**	Track the aggregate performance trends of high performance computer systems, with real data
www.dynaexamples.com/keyword-search **LS-DYNA Examples**	Examples for specific LS-DYNA keywords, with search option

BETA CAE Systems S.A. **www.beta-cae.gr**

BETA CAE Systems S.A.– 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 S.A.– μETA

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

Solutions for:

Process Automation - Data Management – Meshing – Durability - Crash & Safety NVH - CFD - Thermal analysis - Optimization - Powertrain Products made of composite materials - Analysis Tools -

Maritime and Offshore Design - Aerospace engineering - Biomechanics

CRAY **www.cray.com**

THE CRAY® XC™ SERIES: ADAPTIVE SUPERCOMPUTING ARCHITECTURE

The Cray® XC™ series delivers on Cray's commitment to an adaptive supercomputing architecture that provides both extreme scalability and sustained performance. The flexibility of the Cray XC platform ensures that users can precisely configure the machines that will meet their specific requirements today, and remain confident they can upgrade and enhance their systems to address the demands of the future.

Cray® XC40™ and XC40-AC™ supercomputers are enabled by a robust Intel® Xeon® processor road map, Aries high performance interconnect and flexible Dragonfly network topology, providing low latency and scalable global bandwidth to satisfy the most challenging multi-petaflops applications.

While the extreme-scaling Cray XC40 supercomputer is a transverse air-flow liquid-cooled architecture, the Cray XC40-AC air-cooled model provides slightly smaller and less dense supercomputing cabinets with no requirement for liquid coolants or extra blower cabinets. A reduced network topology lowers costs, and the system is compatible with the compute technology, OS, ISV and software stack support of high-end XC40 systems.

MAXIMIZE PRODUCTIVITY WITH CRAY CS SERIES SUPERCOMPUTERS

Understanding the need for nimble, reliable and cost-effective high performance computing (HPC), we developed the Cray® CS™ cluster supercomputer series. These systems are industry-standards-based, highly customizable, and expressly designed to handle the broadest range of medium- to large-scale simulation and data analytics workloads.

All CS components have been carefully selected, optimized and integrated to create a powerful HPC environment. Flexible node configurations featuring the latest processor and interconnect technologies mean you can tailor a system to your specific need — from an all-purpose cluster to one suited for shared memory, large memory or accelerator-based tasks.

Innovations in packaging, power, cooling and density translate to superior energy efficiency and compelling price/performance. Expertly engineered system management software instantly boosts your productivity by simplifying system administration and maintenance.

Maximize your productivity with flexible, high-performing Cray CS series cluster supercomputers.

CRAY www.cray.com

CRAY® SONEXION® SCALE-OUT LUSTRE®STORAGE SYSTEM

Brought to you by Cray, the world's leading experts in parallel storage solutions for HPC and technical enterprise, the Cray® Sonexion® 2000 system provides a Lustre®-ready solution for popular x86 Linux® clusters and supercomputers through Cray Cluster Connect™. As a leader in open systems and parallel file systems, Cray builds on open source Lustre to unlock any industry-standard x86 Linux compute cluster using InfiniBand™ or 10/40 GbE utilizing proven Cray storage architectures.

The Cray Sonexion 2000 system provides 50 percent more performance and capacity than the Sonexion 1600 system in the same footprint.

Simplify

- Through its fully-integrated and pre-configured design, Cray Sonexion storage gets customers deployed faster and reduces the total number of components to manage.
- The Sonexion system's compact design reduces the total hardware footprint of petascale systems by 50 percent over component-based solutions.

Scale

- Performance scales from 7.5 GB/s to 1.7 TB/s in a single file system.
- Capacity scales in modular increments; the Sonexion 2000 system stores over two usable petabytes in a single rack. Fewer drives and components reduce capital costs as capacity grows.

Protect

- New software-based GridRAID offers higher levels of data protection and up to 3.5 times faster rebuild times than traditional RAID6 and MD-RAID storage.
- Cray ensures quality, reliability and stability at scale through exhaustive thermal and real-world stress testing, system hardening and availability, and tight hardware and software integration.

OPEN ARCHIVE AND TIERED STORAGE SYSTEM FOR BIG DATA AND SUPERCOMPUTING

Cray Tiered Adaptive Storage (TAS), powered by Versity, is designed to meet the expansive data preservation and access needs driven by big data, where data needs to migrate fluidly from high performance storage to deep tape archives, while always being accessible to users.

CRAY www.cray.com

With Cray TAS you can:

- Deploy tiered storage and archives faster
- Feel confident preserving and protecting data into the future, using Linux®
- Simplify managing data using familiar tools for years to come

CRAY® URIKA-XA™ EXTREME ANALYTICS PLATFORM

Pre-integrated, open platform for high performance analytics delivers valuable business insights now and into the future

The flexible, multi-use Cray® Urika-XA™ extreme analytics platform addresses perhaps the most critical obstacle in data analytics today — limitation. Analytics problems are getting more varied and complex but the available solution technologies have significant constraints. Traditional analytics appliances lock you into a single approach and building a custom solution in-house is so difficult and time consuming that the business value derived from analytics fails to materialize.

In contrast, the Urika-XA platform is open, high performing and cost effective, serving a wide range of analytics tools with varying computing demands in a single environment. Pre-integrated with the Apache Hadoop® and Apache Spark™ frameworks, the Urika-XA system combines the benefits of a turnkey analytics appliance with a flexible, open platform that you can modify for future analytics workloads. This single-platform consolidation of workloads reduces your analytics footprint and total cost of ownership.

Based on pioneering work combining high-performance analytics and supercomputing technologies, the Urika-XA platform features next-generation capabilities. Optimized for compute-heavy, memory-centric analytics, it incorporates innovative use of memory-storage hierarchies and fast interconnects, which translates to excellent performance at scale on current as well as emerging analytics applications.

Additionally, the enterprise-ready Urika-XA platform eases the system management burden with a single point of support, standards-based software stack and compliance with enterprise standards so you can focus on extracting valuable business insights, not on managing your environment.

CRAY www.cray.com

THE URIKA-GD™ GRAPH DISCOVERY APPLIANCE IS A PURPOSE-BUILT SOLUTION FOR BIG DATA RELATIONSHIP ANALYTICS.

The Urika-GD™ appliance enables enterprises to:

- Discover unknown and hidden relationships and patterns in big data
- Build a relationship warehouse, supporting inferencing/deduction, pattern-based queries and intuitive visualization
- Perform real-time analytics on the largest and most complex graph problems

The Urika-GD system is a high performance graph appliance with a large shared memory and massively multithreaded custom processor designed for graph processing and scalable I/O.

With its industry-standard, open-source software stack enabling reuse of existing skill sets and no lock in, the Urika-GD appliance is easy to adopt.

The Urika-GD appliance complements an existing data warehouse or Hadoop® cluster by offloading graph workloads and interoperating within the existing enterprise analytics workflow.

Realize rapid time to powerful new insights.

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

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

Visual-Environment: An integrated suite of solutions which operate either concurrently or standalone within a common environment. It aims at delivering an open collaborative engineering framework. As such, it is constantly evolving to address various disciplines and available solvers.

Visual-Crash is a dedicated environment for crash simulation: It helps engineers get their job done in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support.

For LS-DYNA users, Visual-Crash DYNA allows to focus and rely on high quality digital models, from start to finish as it addresses the coupling with competitive finite element or rigid body based software. This very open and versatile environment simplifies the work of CAE engineers across the enterprise by facilitating collaboration and data sharing.

Further tools are integrated in Visual-Environment enhancing CAE engineers work tasks most efficiently.

Visual-Mesh generates 1D, 2D and 3D elements for any kind of simulation. Visual-Mesh provides automatic and guided surfaces clean up, application specific mesh generation and intuitive post mesh editing features..

Visual-Viewer is a complete, productive and innovative post-processing environment for CAE applications.

Visual-Viewer delivers a dedicated plotting and animation control solution. It offers a multi page, multi plot environment, allowing to group data into pages and plots. It is designed with a Windows GUI based on an intuitive and sleek user interface.

Visual-Process Executive is an advanced CAE environment for process customization and automation.

VisualDSS is an End-to-End Decision Support System for CAE. Manufacturers widely resort to Simulation-Based Design to gain a competitive edge in product development.

Gompute on demand®/ Gridcore AB Sweden

www.gompute.com **www.gridcore.se**

Gompute is owned, developed and operated by Gridcore AB in Sweden. Founded in 2002, Gridcore is active in three areas: Systems Integration, Research & Development and HPC as a service.

Gridcore has wide experience of different industries and applications, developed a stable product portfolio to simplify an engineer/scientist's use of computers, and has established a large network of partners and collaborations, where we together solve the most demanding computing tasks for our customers. Gridcore has offices in Gothenburg (Sweden), Stuttgart (Germany), Durham NC (USA) and sales operations in The Netherlands and Norway.

The Gridcore developed E-Gompute software for internal HPC resources gives end users (the engineers) an easy-to-use and complete environment when using HPC resources in their daily work, and enables collaboration, advanced application integrations, remote pre/post, accounting/billing of multiple teams, license tracking, and more, accelerating our customers usage of virtual prototyping

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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.

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 focus 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.

www.penguincomputing.com

Penguin Computing provides customized build-to-order server solutions for enterprises and institutions with special hardware requirements. We complement our hardware and software solutions with Penguin Computing on Demand (POD)—a public HPC cloud that provides supercomputing capabilities on-demand on a pay-as-you-go basis.

Penguin is a one-stop shop for HPC and enterprise customers, providing solutions for a wide array of computing needs and user profiles:

HPC and cloud solutions optimized for industry-specific uses

High-powered workstations for individual power users

Highly power-efficient server platforms for enterprise computing

Private and public cloud solutions, including hybrid options.

Focus

Penguin Computing is strictly focused on delivering Linux-optimized enterprise solutions. We use a thorough, proven hardware qualification and testing process to ensure that our solutions deliver optimal performance and robustness.

Penguin's in-house development team is dedicated to providing a complete highly interoperable software stack that is tuned for Penguin hardware. As a result our solutions are easy-to-use and "just work." Our integrated approach even extends to our hybrid compute solutions, which combine local and cloud computing resources, taking ease-of-use and cost-effectiveness to the next level. Penguin customers can reduce capital expenditures by right-sizing clusters for average resource utilization and easily and quickly offload excess workload into the cloud.

Penguin also offers a full range of services and support that is backed by a seasoned team of Linux, HPC and application experts.

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		
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** www.esi-group.com			
	QuikCAST	SYSWELD	PAM-RTM	PAM-CEM
	VA One	CFD-ACE+	ProCAST	Visual-Process
	VisualDSS	Weld Planner	Visual-Environment	IC.IDO
United States	**Engineering Technology Associates – ETA** www.eta.com		etainfo@eta.com	
	INVENTIUM/PreSy	NISA	VPG	LS-DYNA
	LS-OPT	DYNAform		
United States	**Gompute** www.gompute.com		info@gompute.com	
	LS-DYNA Cloud Service		Additional software	
	Additional Services			
United States	**Comet Solutions**		steve.brown@cometsolutions.com	
	Comet Software			

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** www.predictiveengineering.com		george.laird@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	

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

Italy	**EnginSoft SpA**		info@enginsoft.it	
	www.enginsoft.it			
	ANSYS	MAGMA	Flowmaster	FORGE
	CADfix	LS-DYNA	Dynaform	Sculptor
	ESAComp	AnyBody	FTI Software	
	AdvantEdge	Straus7	LMS Virtual.Lab	ModeFRONTIER
Russia	**STRELA**		info@dynarussia.com	
	LS-DYNA	LS-TaSC	LS-OPT	LS-PrePost
	LSTC Dummy Models		LSTC Barrier 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
	FormingSuite		LSTC Dummy Models	
			LSTC Barrier Models	
Sweden	**GOMPUTE**		info@gridcore.com	
	www.gridcore.se		www.gompute.com	
	LS-DYNA Cloud Service		Additional software	

Switzerland	**DYNAmoreSwiss GmbH**		info@dynamore.ch	
	www.dynamore.ch			
	LS-DYNA		LS-OPT	LS-PrePost
	LS-TaSC		LSTC Dummy Models	
			LSTC Barrier Models	

UK	**Ove Arup & Partners**		dyna.sales@arup.com	
	www.oasys-software.com/dyna		TOYOTA THUMS	
	LS-DYNA		LS-OPT	LS-PrePost
	LS-TaSC	PRIMER	D3PLOT	T/HIS
	REPORTER	SHELL	FEMZIP	HYCRASH
	DIGIMAT	Simpleware	LSTC Dummy Models	
			LSTC Barrier Models	

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

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

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

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

Distribution/Consulting	Asia Pacific	Distribution/Consulting

Japan	**CTC**	LS-dyna@ctc-g.co.jp		
	www.engineering-eye.com			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	CmWAVE	
Japan	**JSOL**			
	www.jsol.co.jp/english/cae		Oasys Suite	
	JSTAMP	HYCRASH	JMAG	
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	TOYOTA THUMS	
Japan	**FUJITSU**			
	http://jp.fujitsu.com/solutions/hpc/app/lsdyna			
	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**	wschung@kornet.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	**Flotrend**	gary@flotrend.tw		
	www.flotrend.com.tw			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

Taiwan	**APIC**			
	www.apic.com.tw			
	LS-DYNA	LS-OPT	LS-PrePost	LS-TaSC
	LSTC Dummy Models	LSTC Barrier Models	eta/VPG	FCM

HPC on-demand for academic users

Run your LS-DYNA simulations and pay for what you use on a turn-key environment

- For LSTC academic customers.
- Run your simulations from 0.05 €/CCH without reservation
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- Other simulation applications also ready to use
- Global connectivity, remote graphics and collaborative environment
- Large number of cores available

For more information please visit: www.gompute.com

Price for computing-core/hour (CCH). Licenses and account set up are not included. Pricing valid only for universities, academic centers and research institutes. The following are trademarks or registered trademarks of Livermore Software Technology Corporation in the United States and/or other countries: LS-DYNA, LS-OPT, LS-PrePost, LS-TaSC. Gompute is owned and operated by Gridcore AB, 2012 All rights reserved.

POD (Penguin Computing on Demand) offers software including LSTC's LS-DYNA
www.penguincomputing.com/services/hpc-cloud

Penguin HPC clusters are optimized for engineering workloads and offer:

- Instant access to an HPC Cloud Cluster
- High performance InfiniBand bare-metal compute
- Free support from HPC experts
- No charges for network transfers
- Cost-effective, pay-per-use billing model
- Secure environment for private data
- Detailed billing reports for user groups and projects

Self Registration Portal – featuring rich--documentation, wiki, FAQ, pricing and more.
https://pod.penguincomputing.com/

POD Software Applications and Libraries (visit site for complete listing)
FEA, CFD and FDTD Modeling

- **LS-DYNA** / LS-PrePost LS-DYNA is an advanced general-purpose multiphysics simulation software package. Its core-competency lie in highly nonlinear transient dynamic finite element analysis (FEA) using explicit time integration. LS-PrePost is an advanced pre and post-processor that is delivered free with LS-DYNA.
- **OpenFoam:** OpenFOAM (Open source Field Operation And Manipulation) is a C++ toolbox for the development of customized numerical solvers, and pre-/post-processing utilities for the solution of continuum mechanics problems, including computational fluid dynamics (CFD).

- **ANSYS HFSS:** ANSYS HFSS software is the industry standard for simulating 3-D full-wave electromagnetic fields. Its gold-standard accuracy, advanced solver and compute technology have made it an essential tool for engineers designing high-frequency and high-speed electronic components.
- **ANSYS Fluent** ANSYS Fluent software contains the broad physical modeling capabilities needed to model flow, turbulence, heat transfer, and reactions for industrial applications.
- **Star-CD** and **Star-CCM+:** STAR-CCM+ is CD-adapco´s newest CFD software product. It uses the well established CFD solver technologies available in STAR-CD, and it employs a new client-server architecture and object oriented user interface to provide a highly integrated and powerful CFD analysis environment to users.
- **Convergent:** CONVERGE is a Computational Fluid Dynamics (CFD) code that completely eliminates the user time needed to generate a mesh through an innovative run-time mesh generation technique.
- **Lumerical:** Simulation tools that implement FDTD algorithms.

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 to the increase use of LS-DYNA more and more in recent years.

In calculations of optimization, robustness, statistical analysis, larger amount of LS-DYNA license in short term are required.

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

This service is offered to the customers by the additional price to existence on-premises license, which is relatively inexpensive 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

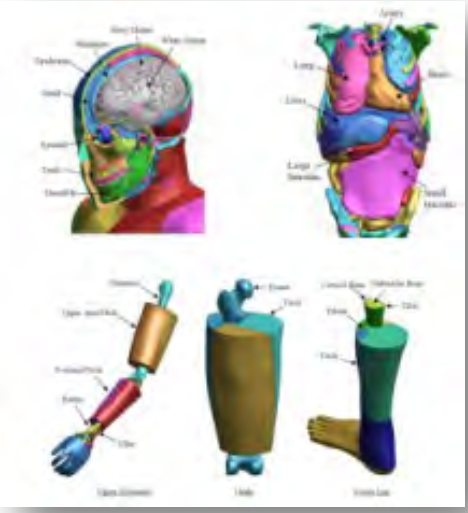
Platform Computation Cloud
CreDist.Inc.
http://www.credist.co.jp /

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

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

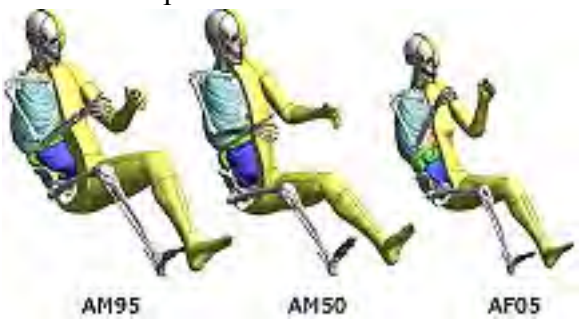
Contact; JSOL Corporation Engineering Technology Division cae-info@sci.jsol.co.jp

TOYOTA - Total Human Model for Safety – THUMS

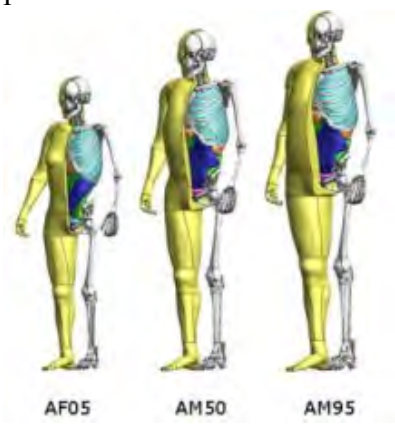


The Total Human Model for Safety, or THUMS®, is a joint development of Toyota Motor Corporation and Toyota Central R&D Labs. Unlike dummy models, which are simplified representation of humans, THUMS represents actual humans in detail, including the outer shape, but also bones, muscles, ligaments, tendons, 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.

 **FACEBOOK**

BETA CAE SYSTEMS SA | CADFEM | Cray Inc.

ESI Group | Lenovo

 **TWITTER**

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DYNAmore Nordic | ETA | Oasys

 **NEWS FEEDS** ETA:

YOUTUBE

YOUTUBE Channel	WebSite URL
BETA CAE SYSTEMS SA	www.beta-cae.gr
CADFEM	www.cadfem.de
Cray Inc.	www.cray.com
ESI Group	www.esi-group.com
ETA	www.eta.com
Lancemore	www.lancemore.jp/index_en.html
Lenovo	

Fracture, Damage and Failure Using LS-DYNA - NEW COURSE OFFERING

This course will allow LS-DYNA users to model Fracture, Damage, and Failure. The different methodology to model failure and fracture in LS-DYNA will be presented and discussed. All formulation in LS-DYNA including Lagrangian, Eulerian, SPH, SPG, XFEM, EFG, and the DEM methods etc. will be discussed. Various examples will be presented.

Course Outline

- Chapter-1
  Introduction & Historical Review
  - Brittle Failure
  - Ductile Failure
- Chapter-2
  Fundamental Theoretical Concepts
  - Failure Theories
  - Damage Models
  - Fracture Mechanics
- Chapter-3
  Material Models with Failure & Damage
- Chapter-4
  Fracture & Computational Methods
- Chapter-5 Element Erosion; Advantages & Short Comings
- Chapter-6
  Current Capabilities to Model Failure & Damage
  - Lagrangian
  - Eulerian & ALE
  - SPH
  - SPG
  - XFEM
  - EFG
  - DEM
- Chapter-7
  Current Capabilities to Model Fracture
- Chapter-8
  Damage Verification Examples
- Chapter-9
  Fracture Verification Examples

- Chapter-10
  Other Capabilities
- Chapter-11
  Modeling Delamination and Debonding
  - Cohesive Elements
  - Tied Contact with Failure
- Chapter-12
  Summary and Concluding Remark
- Chapter-13
  References and Other Courses
- Chapter-Appendix-1
  - Failure Strain Versus Tri-axiality for Some Material (will not be discussed)
- Chapter-Appendix-2
  - Finite Element in Fracture Mechanics (will not be discussed)

Workshop

There will be several examples, which are designed to understand and reinforce the lectures and the concepts presented in the course.

Additional Courses Offered On-Line

- Advance Impact Using LS-DYNA
- Blast and Penetration In LS-DYNA
- Fluid Structure Interaction In LS-DYNA
- Implicit In LS-DYNA
- Material Models In LS-DYNA
- User Defined Material In LS-DYNA

Tutorials On the Website

- LS-PRE Tutorial
- LS-POST Tutorial
- Running LS-DYNA Tutorial

Kaizenat is glad to announce 2015 schedule of LS-DYNA classes presented in Bangalore and Pune.

The details about the trainings offered are given below

LS-DYNA Training Schedule	
Topic	**Date**
LS-DYNA Software Training	**Jun 10-12**
Advanced Material Forming Analysis	**Jun 18-19**

Information & Agenda:

Classes generally start at 9:30 a.m. and end at 5:00 p.m. Access to computer for workshop exercises and lunch each day are included with the registration. For details on agenda please Click Here and to register for the training please Click Here. For any queries/clarification please contact us @ support@kaizenat.com

LS-DYNA Advanced FEM and Meshfree Methods In Solid and Structural Analyses
MI June 3-4

Intro to LS-PrePost
MI June 22

Intro to LS-DYNA
MI June 23-26

Implicit
CA July 9-10

Composite LS-DYNA
CA July 7-8

Blast in LS-DYNA
CA July 28-29

Penetration in LS-DYNA
CA July 30-31

Germany	**CADFEM GmbH**	www.cadfem.de
Germany	**DYNAmore**	www.dynamore.de/en
US	**LSTC**	www.lstc.com
US	**ETA**	www.eta.com
US	**Cae Associates**	www.caeai.com
Sweden	**DYNAMORE Nordic**	www.dynamore.se
France	**DynAS+**	www.dynasplus.com
Thailand	**DFE-Tech**	www.dfe-tech.com/training.html
UK	**ARUP**	www.oasys-software.com/dyna/en/training

On the Application of a Response Surface Technique to Analyze Roll-Over Stability of Capsules with Airbags Using LS-Dyna Paperback – July 23, 2013

Link to Amazon For Above Title
(opens to new window)

by Nasa Technical Reports Server (Ntrs)

As NASA moves towards developing technologies needed to implement its new Exploration program, studies conducted for Apollo in the 1960's to understand the rollover stability of capsules landing are being revisited. Although rigid body kinematics analyses of the roll-over behavior of capsules on impact provided critical insight to the Apollo problem, extensive ground test programs were also used. For the new Orion spacecraft being developed to implement today's Exploration program, new air-bag designs have improved sufficiently for NASA to consider their use to mitigate landing loads to ensure crew safety and to enable re-usability of the capsule. Simple kinematics models provide only limited understanding of the behavior of these air bag systems, and more sophisticated tools must be used. In particular, NASA and its contractors are using the LS-Dyna nonlinear simulation code for impact response predictions of the full Orion vehicle with air bags by leveraging the extensive air bag prediction work previously done by the automotive industry.

However, even in today's computational environment, these analyses are still high-dimensional, time consuming, and computationally intensive. To alleviate the computational burden, this paper presents an approach that uses deterministic sampling techniques and an adaptive response surface method to not only use existing LS-Dyna solutions but also to interpolate from LS-Dyna solutions to predict the stability boundaries for a capsule on airbags.

Results for the stability boundary in terms of impact velocities, capsule attitude, impact plane orientation, and impact surface friction are discussed.

Engineering Design and Analysis Series: LS-DYNA finite element analysis and simulation (with DVD discs 1)(Chinese Edition) Paperback February 1, 2014

Link to Amazon For Above Title
(opens to new window)

by TANG CHANG GANG (Author)

Publisher: Electronic Industry Press (February 1, 2014)
ISBN-10: 7121221543 ISBN-13: 978-7121221545
Paperback. Pub Date :2014-02-01
Pages: 336 Language: Chinese
Publisher: Electronic Industry Press

LS-DYNA software is widely used in the engineering field. It is very suitable for analysis of structural shocks. explosions and other problems.

Engineering Design and Analysis Series:

LS-DYNA finite element analysis and simulation. is divided into 10 chapters. introduces the basic functions and useLS-DYNA software. including the establishment of the geometric model. meshing. contact load. rigid. restart. post-processing and engineering application examples.

For each knowledge point Engineering Design and Analysis Series: LS-DYNA finite element analysis and simulation. explained by examples and concise narrative and examples demonstrate adequate picture.

Alpha Car – Watch the new Mercedes-Benz GLE Coupé in Jurassic World.
In theaters June 12th.

Mercedes-Benz Launches Campaign to Support Universal Pictures and Amblin Entertainment's Jurassic World: The dinosaurs are back

Stuttgart. This summer, when the long-awaited next installment of the groundbreaking Jurassic Park series, Jurassic World, arrives in theaters, an entire fleet of Mercedes-Benz vehicles will share the spotlight.

Alongside the iconic G-Class, Unimog, Sprinter models and the all-new GLE Coupé will play a leading role in the epic action-adventure. Mercedes-Benz will accompany the release of the film with a comprehensive co-promotional package that includes a television commercial, print and online advertising, dedicated microsites and social-media activities. The commercial, starring the Mercedes-Benz vehicles from the film, launches today in the U.S. and Europe. Additionally, a custom key visual was developed for all communication in which the all-new GLE Coupé is seen eye-to-eye with the film's fearsome Indominus rex.

"In 1997 the Mercedes-Benz M-Class made its first official appearance in the Hollywood Blockbuster 'The Lost World: Jurassic Park'. Today, 18 years later, another Mercedes-Benz car will debut in a significant role in the latest installment of the groundbreaking Jurassic Park series named Jurassic World: the new GLE Coupé", says Dr. Jens Thiemer, Vice President Marketing Mercedes-Benz Cars. "We are delighted to continue our partnership with a multitude of Mercedes-Benz vehicles and will promote the film and our cars with many exciting global marketing activities."

The Mercedes-Benz GLE 450 AMG Coupé makes its film debut as the official car of Jurassic World operations manager Claire, played by Bryce Dallas Howard. When Claire must confront a crisis well beyond what she can handle alone, she takes the new Mercedes-Benz GLE Coupé (showcasing its off-road capabilities) and joins behavioral researcher Owen (Chris Pratt) on a mission in the lush jungle of Isla Nublar.

In addition we see Owen piloting the G-Class, the patriarch of all Mercedes-Benz SUVs. The film also features the Unimog, cast as a dinosaur ambulance, as well as a G 63 AMG 6x6 and various Sprinter models. "The fleet of Mercedes Benz vehicles fit perfectly into Jurassic World. They are classy, sophisticated, and sexy - exactly what would exist in a modern international theme park", says producer Frank Marshall. Global promotion via all channels of communication

The Mercedes-Benz promotional campaign kicks off prior to the June 12th release of the film. Starting May 18th, Mercedes-Benz will launch a TV commercial showcasing footage of all the Mercedes-Benz vehicles appearing in the film. But it is the all-new GLE 450 AMG Coupé which will captivate viewers as the "Alpha Car". The ad is supplemented by extensive print, online and out-of-home publicity measures. In Germany, for instance, the key visual will be featured in advertisements, on posters and flyers.

Movie fans can discover more about the film and the featured Mercedes-Benz vehicles on a special Jurassic World microsite (www.mercedes-benz.com/jurassicworld) that will show exclusive behind-the-scenes material and a selection of additional images of the set, which explain how the film was created and the roles of the Mercedes-Benz vehicles. Exclusive content will be released and discussed with fans on Mercedes-Benz social media platforms. Jurassic World model vehicles of the G-Class and G 6x6 will be available at the Mercedes-Benz Accessories online store as well as in toy retailers. Mercedes-Benz will also support the US premiere in Hollywood on June 9th and French premiere in Paris on May 29th.

About Universal Pictures: Universal Pictures is a division of Universal Studios (www.universalstudios.com). Universal Studios is part of NBCUniversal. NBCUniversal is one of the world's leading media and entertainment companies in the development, production and marketing of entertainment, news and information to a global audience. NBCUniversal owns and operates a valuable portfolio of news and entertainment networks, a premier motion picture company, significant television production operations, a leading television stations group and world-renowned theme parks. NBCUniversal is a subsidiary of Comcast Corporation.

About Jurassic World: Steven Spielberg returns to executive produce the long-awaited next installment of his groundbreaking Jurassic Park series, Jurassic World. Colin Trevorrow directs the epic action-adventure based on characters created by Michael Crichton. The screenplay is by Rick Jaffa & Amanda Silver and Trevorrow & Derek Connolly, and the story is by Rick Jaffa & Amanda Silver. Frank Marshall and Patrick Crowley join the team as producers.

Jurassic World will be released in 3D by Universal Pictures on June 12th, 2015. www.jurassicworld.com

China’s naval air force is slowly expanding its capabilities for long-range missions, and a group of H-6 bombers have, for the first time, flown beyond Okinawa into the Western Pacific on a training flight. (PRC MoD photo)

The Chinese air force completed a military drill in the airspace above the West Pacific Ocean on Thursday, crossing the Miyako Strait for the first time, a military spokesperson said on Thursday.

According to Shen Jinke, spokesman for the People's Liberation Army (PLA) Air Force, PLA aircraft flew over the West Pacific via the Miyako Strait.

The Miyako Strait is an international waterway lying between Japan's Miyako Island and Okinawa Island.

They returned to their base later the same day, having successfully completed the drill which aims to improve the PLA Air Force's mobility and combat readiness over the high seas.

Shen stressed that the drill is a routine exercise of the air force's annual training plans and is "in line with international laws and practices."

"The drill is not targeted at any country and carries no threat against other countries and regions," he said, adding that similar drills in airspace far offshore from coastlines were a common practice among countries on the coast.

It was carried out in international airspace without flying at the altitude of main civil aviation aircraft, Shen said.

He noted that none of the international flights were affected by the drill.

The spokesman said future exercises involving PLA aircraft flying across the "first island chain blockade" in the high seas will be conducted under certain circumstances and in accordance with international laws and practices.

The "first island chain" refers to the first major archipelagos off the East Asian continental mainland, including the Japanese archipelago, Ryukyu Islands, China's Taiwan and northern Philippines, according to the Xinhua News Agency.

In the 1950s, Washington came to regard the chain as an important barrier to contain China and other communist countries, and the US and its allies provided a strong military presence and advanced weapons at bases along the line, Xinhua said.

"Crossing the first island chain shows the Chinese armed forces are determined to ignore the so-called blockade by familiarizing themselves with the maritime conditions outside the chain," said Song Zhongping, a military affairs commentator.

In March, the PLA Air Force conducted its first military drill above the West Pacific Ocean, flying across the Bashi Channel south of Taiwan.

"The international airspace above the Miyako Strait is narrower than that above the Bashi Channel, which requires more precise positioning and greater expertise of pilots to avoid intruding into other countries' territorial airspace," Fu Qianshao, an air-defense expert, told the Global Times.

Fu said he expects the navy, which conducted several separate drills, and the air force to conduct joint training exercises in the high seas in order to gain more competence in combined air-sea battles.

2015-05-21

Chevrolet Corvette Plant Gets $439 Million in Upgrades

New, environment-friendly paint shop drives efficient production, retains 150 jobs

BOWLING GREEN, Ky. – Torch Red, Shark Gray Metallic and Laguna Blue Tintcoat, three popular palate choices on the 2015 Corvette, kept the marketers who make up names working late. Now they can dream about more painstakingly precise pigments, thanks to a new paint shop that is among $439 million being invested at the only plant in the world that builds Chevrolet's iconic sports car.

General Motors announced the moves today that include retaining 150 jobs and building the 450,000 square-foot paint shop that is almost half the size of the entire current production facility. The investment builds on approximately $135 million GM has invested in the plant over the last four years for the new Corvette Stingray and Performance Build Center. The announcement was followed by a groundbreaking event for the new paint shop.

"The Corvette is one of Kentucky's most-cherished icons," said. Lt. Gov. Crit Luallen. "Such a significant expansion of the Bowling Green Assembly Plant will help the company remain competitive in the region and around the world."

Construction of the new paint shop, which includes substantial technology upgrades, is planned to begin this summer and take approximately two years to complete. Corvette production schedules will be unaffected by the construction.

Along with new tooling and robots, the paint shop's state-of-the-art environmental and efficiency enhancements include:

- Dry Scrubber Booth Technology with Limestone Handling System designed to eliminate sludge water and waste
- Light-emitting diode, or LED, lighting for process decks for improved visual inspection as well as energy savings
- State-of-the-art FANUC robots with Versa-bell 3 electrostatic applicators for an extremely smooth finish and maximum transfer efficiency, saving 25 percent of the paint material used, which also benefits the environment
- Longer, high-efficiency baking ovens for exceptional paint finish and lower energy use.

"With this major technology investment, we can continue to exceed the expectations of sports car buyers for years to come," said North American Manufacturing Manager Arvin Jones. "These types of investments are evidence that the customer is at the center of every decision we make."

Said UAW Vice President Cindy Estrada: "This new paint shop will mirror the efficiencies and technologies of the new body shop, installed with the launch of the Stingray. Hardworking UAW members have proudly built vehicles in Bowling Green for more than 30 years, and we are pleased to be a part of such a significant facility upgrade."

Corvette production began in 1981 in Bowling Green following assembly in Flint, Mich., and St. Louis. Each has been an exclusive home of the Corvette, contributing to its distinction as the world's longest-running, continuously produced passenger car. More than 1.6 million have been produced in 62 years.

Since the launch of the all-new 2014 Stingray, the Corvette has won more awards than any other car in the industry, including the 2014 American Car of the Year, Car & Driver's 10 Best and Automobile Magazine's Automobile of the Year.

Building on that recognition, Corvette sales reached an eight-year high in 2014 with almost 38,000 cars sold globally. The plant welcomed a record 56,000 tourists last year.

The new Performance Build Center opened last year and in March began hosting customers in the Build Your Own Engine program. More information about Bowling Green Assembly is available at corvetteassembly.com

The investments in Bowling Green are part of the $5.4 billion that GM said April 30 it would invest in U.S. facilities over the next three years.

Founded in 1911 in Detroit, Chevrolet is now one of the world's largest car brands, doing business in more than 115 countries and selling around 4.8 million cars and trucks a year. Chevrolet provides customers with fuel-efficient vehicles that feature engaging performance, design that makes the heart beat, passive and active safety features and easy-to-use technology, all at a value. More information on Chevrolet models can be found at www.chevrolet.com.

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