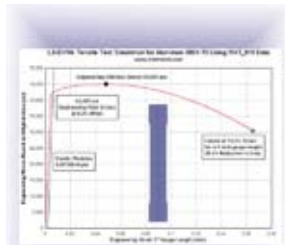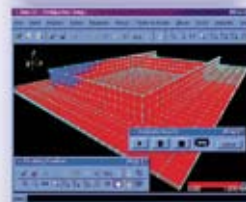# *fea*INFORMATION

WWW.FEAINFORMATION.COM

**HP
High Performance
CAE computing
in a container!**

**Varmint Al's
Engineering
Update**

**University of Delaware Center
for Composite Materials**

FEA INFORMATION RESOURCE MAGAZINE

FEA Information Announcements:

As we end 2008 we'd like to share exciting changes we have for 2009.

- All websites are being upgraded – Our web-team has started this process with www.feainformation.com, our master site. All participants are asked to please check their information for upgrading e-mail addresses, url's. All changes send to webmaster@feainformation.com - this e-mail address is now covered by our web-team for immediate updating.

- The next sites for upgrading with complete information, and/or design are www.ls-dynaconsulting.com - www.ls-dynadistributors.com - These two sites will be completed by January 31st. We will then proceed to the application sites.
- With the welcomed additional staff members, we are committed to all sites being upgraded by the end Q2-2009.
- Two new areas starting with the January 2009 publication.

  1. Area one will contain worldwide classes for LS-DYNA by date/country/company with the URL for complete information. The list will be by quarter with our first listing for January-March 2009

  2. Area two will chart previous articles we feel you will be interested in if you missed reading them. The Magazines are archived on www.feapublications.com. This will give a quick reference for articles you have missed and what month issue to review.

Participation:

Participation is open January 2009 – if you wish information on becoming a participant of the websites and news contact: Art art@feainformation.com

Sincerely,

Art Shapiro	Editor	art@feainformation.com
Marsha Victory	President	mv@feainformation.com
Trent Eggleston	Business Manager	feaanswer@aol.com
Wayne Mindle	Graphics	wlm@lstc.com
Anthony Giaccana	Website Manager	agiac99@aol.com

Table of Contents

LSTC – Limited Version
Available for US Unemployed LS-DYNA Engineers

LSTC has added a new Limited LS-DYNA Version available through 2009. This new limited License A is to assist US unemployed LS-DYNA engineers during the economic difficulty

Both versions include LS-DYNA, LS-PrePost and LS-OPT with manuals on CD.

Limited License A

LS-DYNA engineers that have had discontinued employment.

No fee
Elements are limited to 5,000
Capabilities are not limited
Manuals provided by download or CD
Class in MI: will be announced
Term: 01/01/09 – 12/31/09

Limited License B

Continues to be available for anyone needing a limited version to practice, keep pace, learn new options.

Annual fee of US $100.00
Elements are limited to 10,000
Manuals provided by download or CD
Capabilities are not limited

For additional information or to request the license agreement for Limited License A or B please contact:

Noi Sims – LSTC Sales
noi@lstc.com

Varmint AI's Engineering Update:

http://www.varmintal.com/aengr.htm

LS-DYNA USERS.... I have also calculated the material properties for the complete materials data base to be used in LS-DYNA as MAT_018 (*MAT_POWER_LAW_PLASTICITY). Click on mat18.zip (69Kb) to download the file. Once the file is downloaded and unzipped you can use your text editor to search for the material of interest. Comment cards are included for each material that give the properties data plus the calculated strain hardening power law values. Each material entry is formatted so that it can be copied from the text file and pasted directly into the LS-DYNA Keyword input file. I have made the MID (material number xx) and it will need to be changed to the correct value.

Aluminum 6061-T6 Tensile Test Simulation with MAT_018 Power Law Plasticity
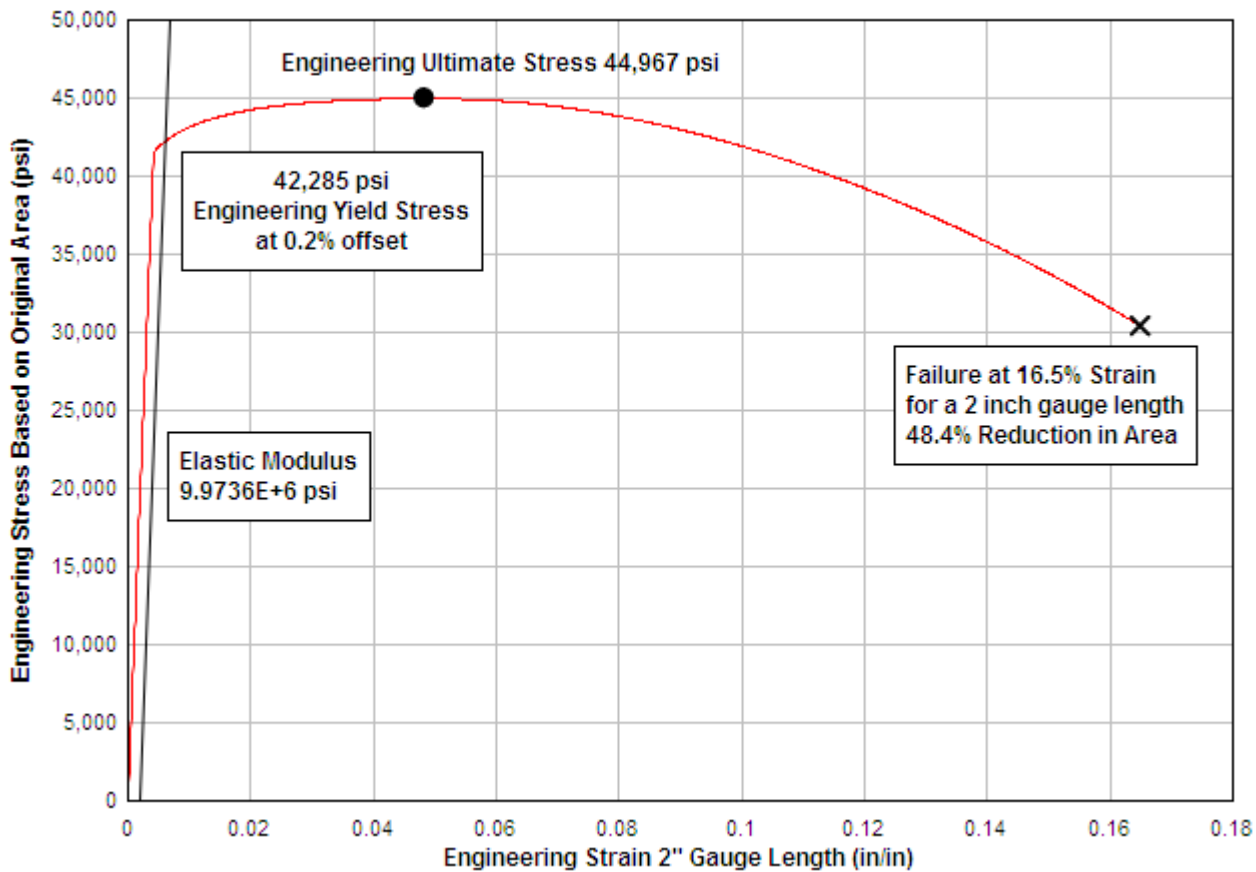
VERIFYING MAT_018....

The object of this calculation was to verify that MAT_018 would reproduce the input material data from a simulation of a Tensile Test. The FEA geometry is that of the actual 1/2" Standard Tensile Test that measures the material's mechanical properties. The calculation runs in the 2D implicit mode with the load applied as an extension in 0.0001 inch increments. The load was then calculated with LS-PrePost using the bndout ASCII file. The mesh consists of 3,171 nodes and 2960 2D elements. The run time is about 10 minutes on my 2.6 GHz Athlon XP 64 computer. If you would like to run the calculation yourself here is the LS-DYNA Keyword input file: Download mat_018-keyword-input-files.zip (53Kb) It is setup to run with aluminum 6061-T6 but it is very easy to change the MAT_018.k file to a material of interest.

The chart shows the calculated Engineering Stress vs Strain in a two inch gauge length of the 2D LS-DYNA simulation. The Power Law Plasticity material model reproduces the input properties with good accuracy. The largest error is in the Reduction in Area. In an actual tensile test specimen measuring the diameter at the fracture location is difficult to do accurately. The tensile test simulation was also done for steel 4140.

Table 1: Comparison of the Aluminum 6061-T6 Results to the Input Material Properties

Material Property	Input From the MAT_018 Data Base	LS-DYNA Calculated Property from the FEA Simulated Tensile Test	Error
Modulus of Elasticity	10,000,000 psi	9,973,600 psi	2.65%
Engineering Yield Stress	42,200 psi	42,285 psi	0.20%
Engineering Ultimate Stress	44,900 psi	44,967 psi	0.15%
Elongation at Failure	16.5%	16.5%	-
Reduction in Area	50%	48.43%	3.14%

FEA Mesh and Animation of the Tensile Test for Aluminum 6060-T6

Standard 1/2 diameter Tensile Test Specimen

Mesh Density used in the Calculation

Fringe Levels

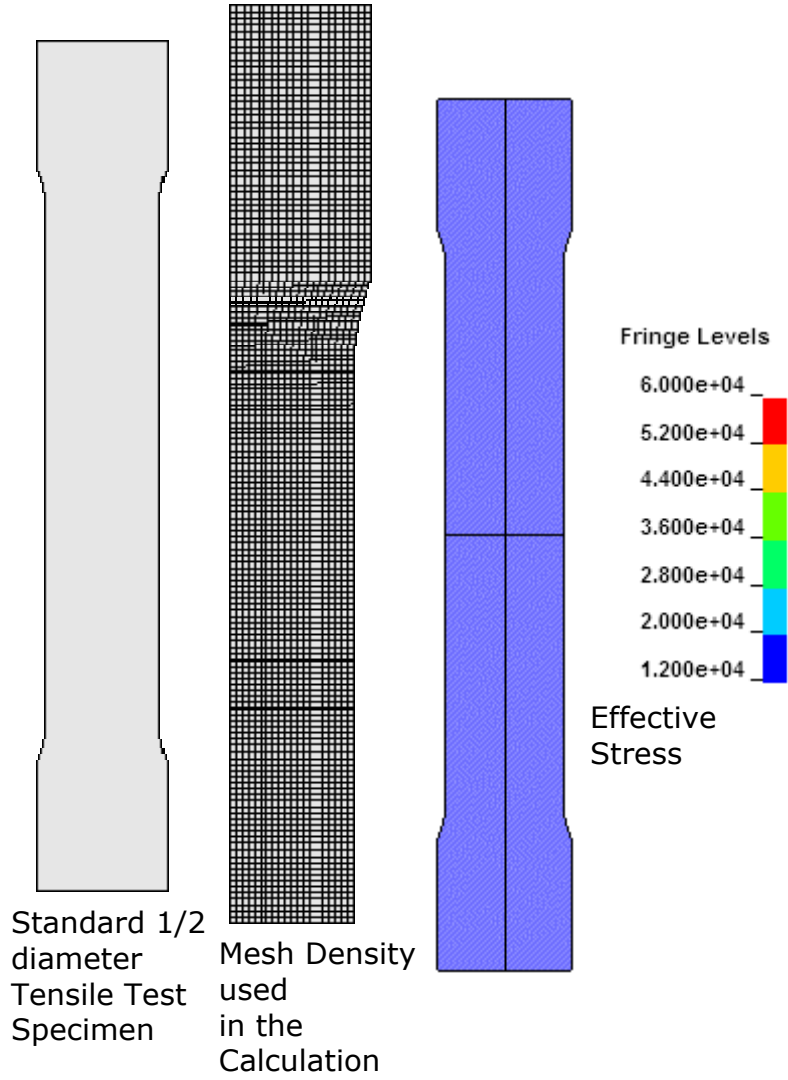|	
6.000e+04	
5.200e+04	
4.400e+04	
3.600e+04	
2.800e+04	
2.000e+04	
1.200e+04	

Effective Stress

Table 2: Material Property input in the Tensile Test Simulation

```
*MAT_POWER_LAW_PLASTICITY
$#    ****** Strain-Hardening Equation Material (Mat 18) ******
$# Material . . . . ALUMINUM 6061-t6
$# Material density . . . . . .    0.09800   lb/in^3
$# Young's Modulus. . . . . . .    1.000E+07 psi
$# Shear Modulus. . . . . . . .    3.759E+06 psi
$# Bulk Modulus . . . . . . . .    9.804E+06 psi
$# Poisson's ratio. . . . . . .    0.3300
$# Yield stress at offset . . . 42200.0      psi
$# Engineering ultimate stress.  44900.0      psi
$# Elongation at failure. . . .    16.50      %
$# Reduction in area. . . . . .    50.00      %
$# CTE. . . . . . . . . . . .     1.310E-05 1/F
$# Yield offset . . . . . . . .    0.20000   %
$# ------------------ Calculated values ----------------------
$# Strain Hardening equation      s = s0 * e^m
$# Equation constants        s0 =   54943.  m  = 0.050692
$# Yield point            SY =   41613.  EY = 0.004161
$# Ultimate (Engineering)     SU =   44900.  EU = 0.051999
$# Ultimate (True)         sut =   47235.  eut = 0.050692
$# Failure  (True)         sft =   53931.  eft = 0.693147
$#    MID     RHO        E        PR        K        N      src      srp
      xx 0.0002539 1.0000E+7  0.330000    54943. 0.0506919
$#    sigy       vp
    0.000     0.000
```

Steel 4140 Tensile Test Simulation with MAT_018 Power Law Plasticity

LS-DYNA Tensile Test Simulation - STEEL wrought 4140 1 in. bar oq+1200f
www.VarmintAl.com

Engineering Ultimate Stress 110,147 psi

95,085 psi
Engineering Yield Stress
at 0.2% Offset

Failure at 18% Strain
for a 2 inch Gauge Length
55.1% Reduction in Area

Elastic Modulus
2.9941E+7

Engineering Stress Based on Original Area (psi)

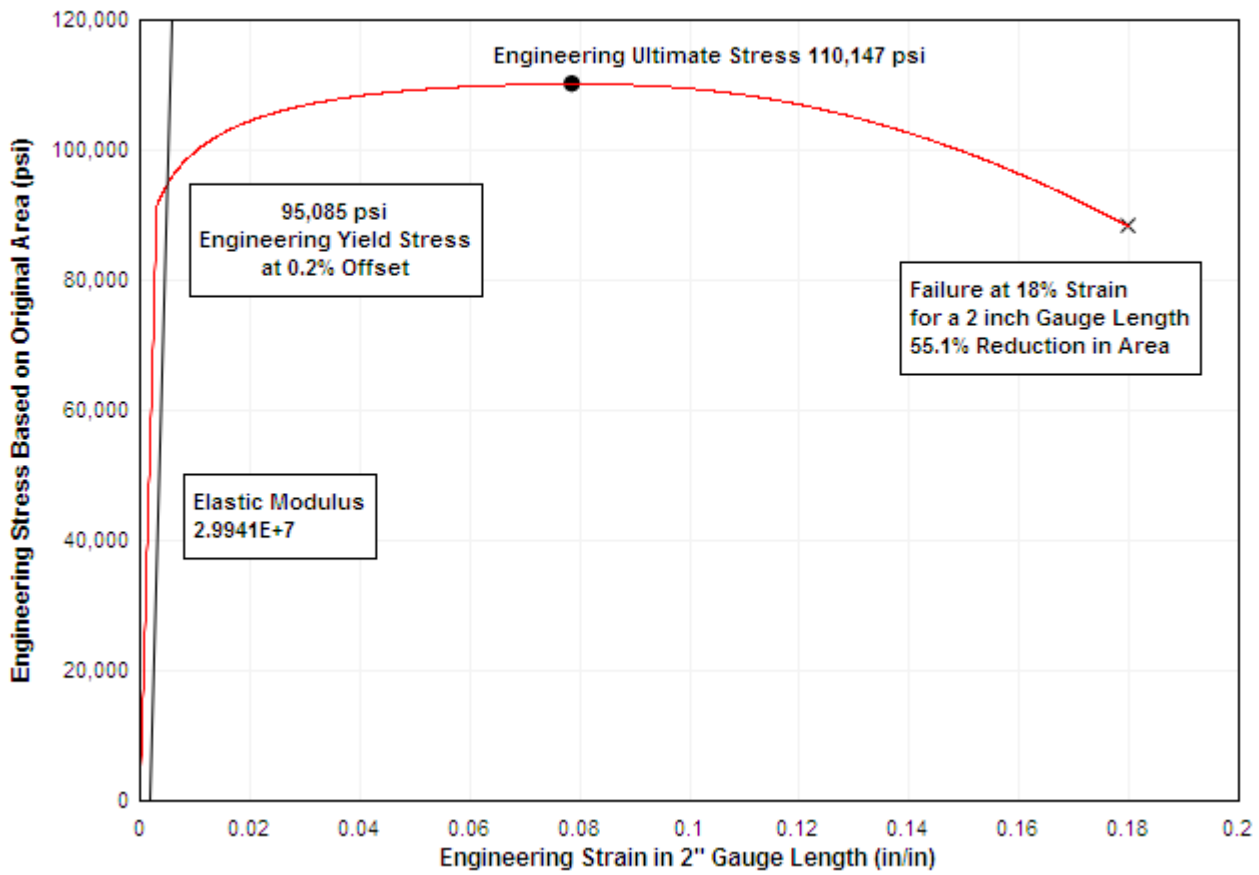Engineering Strain in 2" Gauge Length (in/in)

Table 3: Comparison of the Steel 4140 Results to the Input Material Properties

Material Property	Input From the MAT_018 Data Base	LS-DYNA Calculated Property from the FEA Simulated Tensile Test	Error
Modulus of Elasticity	30,000,000 psi	29,941,040 psi	0.20%
Engineering Yield Stress	95,000 psi	95,085 psi	0.09%
Engineering Ultimate Stress	110,000 psi	110,147 psi	0.13%
Elongation at Failure	18.0%	18.0%	-
Reduction in Area	53%	55.1%	3.96%

Table 4: Steel 4140 Material Property input in the Tensile Test Simulation

```
*MAT_POWER_LAW_PLASTICITY
$#    ****** Strain-Hardening Equation Material (Mat 18) ******
$# Material . . . . STEEL wrought 4140 1 in. bar oq+1200f
$# Material density . . . . . .    0.28300  lb/in^3
$# Young's Modulus. . . . . . .    3.000E+07 psi
$# Shear Modulus. . . . . . .     1.163E+07 psi
$# Bulk Modulus . . . . . . . .    2.381E+07 psi
$# Poisson's ratio. . . . . . .    0.2900
$# Yield stress at offset . . . 95000.0      psi
$# Engineering ultimate stress. 110000.0      psi
$# Elongation at failure. . . .   18.00      %
$# Reduction in area. . . . . .   53.00      %
$# CTE. . . . . . . . . . . .    6.200E-06 1/F
$# Yield offset . . . . . . . .    0.20000   %
$# ------------------ Calculated values ----------------------
$# Strain Hardening equation      s = s0 * e^m
$# Equation constants        s0 =  146120.  m  = 0.080750
$# Yield point             SY =   91534.  EY = 0.003051
$# Ultimate (Engineering)     SU =  110000.  EU = 0.084100
$# Ultimate (True)           sut =  119251.  eut = 0.080750
$# Failure (True)           sft =  142842.  eft = 0.755023
$#    MID     RHO      E       PR       K       N       src       srp
       1 0.0007332 3.0000E+7  0.290000   146120. 0.0807499
$#    sigy       vp
   0.000     0.000
```

Good Hunting... from Varmint Al

High Performance CAE computing in a container!

> **The HP POD is a 40 foot shipping container-based datacenter offering for a variety of computing and storage requirements, including running CAE applications such as LS-DYNA.**

Introducing the HP Performance-Optimized Datacenter (POD):

Keeping pace with the demands of technology growth in the data center and rising energy costs is a constant challenge as companies seek to deploy the latest technologies. The extended time and significant costs required to update or expand data centers make these challenges even more complex.

Perhaps you have multiple data centers scattered around the country, some acquired through mergers or acquisitions. Based on published statistics, half of them will run out of power or cooling in the next three years. And some are probably in high energy-cost areas, with limited or expensive real estate available for expansion. You may be going through a hurried budgeting exercise to plan for building or expanding a new data center for current and future capacity. You are likely to expand one or more of your existing sites and are looking forward to completion in one to two years.

With the HP POD, you can do something different - have the right amount of capacity shipping from HP six weeks after your order…instead of building out space for current and future needs. Place the capacity in the least expensive energy area, closest to your computing need. In short, customize your data center growth exactly when and where you need it.

Or – consider a temporary expansion site while you build out your new data center.

Perhaps you have your new data center strategy and plans all laid out ready to go. Except that your new state-of-the-art data center will take over two years to build, and in the meantime you can't expand your IT footprint – which will frustrate your CAE designers anxious to begin new projects. You could co-locate, but your strategy is based on your own resources. So you load additional air handlers into your existing data center, aggressively start managing their system power and hope for the best.

Again, the HP Performance Optimized Datacenter can be the solution to manage growth and expansion.

In your HP POD, your IT equipment is configured ready for the new data center space, in full-depth, industry-standard 50U racks. The HP POD rolls into your facility, and is switched on and operating in a matter of days. And when the new data center opens, the racks will roll right into the new space.

The HP POD delivers:
CAE computing solutions such as the latest industry standard blades and servers to run all your CAE software applications. Capacity is the equivalent of 4,000 square feet of typical data center space, capacity for over 3,500 compute nodes, or 12,000 hot plug hard drives, or a combination thereof.

Postponement of large capital expenses:
You now buy data center space as you need it. For large data centers, this can mean tens of millions of dollars in deferred expenses.

Less risk and reliance on accurate forecasting:
In a brick-and-mortar environment you must accurately forecast the economy and your market, resulting business growth and your data center growth curve. With the HP POD, capacity is added as required. This means best-in-class technology to provide flexible, dense and energy-efficient data centers that can be deployed in weeks rather than months or years.

Industry-Standard Flexibility:
Don't sacrifice your data center flexibility; the HP POD is designed to support almost all of the technology found in the typical data center environment. Using standard 19" racks, front-to-back cooling and design

flexibility, you can deploy your HP and/or competitive technology with minimal constraints. Your HP POD will arrive fully integrated for your heterogeneous CAE IT computing environment.

The HP POD can also lower data center operation and power costs, putting more of your power into your IT, not your infrastructure – the HP POD is 50% more efficient than typical data center build-outs, reducing energy cost and carbon emissions. Designed for multiple work loads, future technology density, thermal and power needs, the HP POD provides the critical infrastructure components required to run a wide range of CAE compute, storage and application functions.

Learn more:

www.hp.com/go/pod

www.hp.com/go/cae

University of Delaware Center for Composite Materials

www.ccm.udel.edu

The Center for Composite Materials at the University of Delaware was established in 1974 to educate engineers, conduct basic research, and provide prompt technology transfer for the composites community. Dedicated to advancing composites technology through lower costs, higher quality, and reduced risk, the Center attracts some of the best and brightest students and researchers in the field. During the past two decades, CCM has been home to a National Science Foundation Engineering Research Center in manufacturing science, as well as four Department of Defense Centers of Excellence.

CCM's industrial consortium, *Applications of Composite Materials to Industrial Products*, currently includes some 60 companies representing materials suppliers and end users in the aerospace, automotive, and durable goods industries. Over the past 35 years, CCM has collaborated with well over 250 international companies through consortium membership or contracts and grants. Benefits of consortium membership include the following:

- Consultation and access to UD-CCM's laboratory facilities and UD-CCM expertise, including leveraging of ongoing programs with other industrial and government sponsors, totaling more than $11 million annually.
- The opportunity to partner with UD-CCM in initiating and preparing proposals for research funding in areas of common interest.
- Affiliation with UD-CCM recognized on our web site.
- Informal consulting with UD-CCM faculty and research staff.
- Advance invitations to UD-CCM conferences, symposia, and seminars.
- Research papers, reports, and other publications of UD-CCM, including the Center's annual report/poster book and online newsletter.

- Opportunity to advertise technical positions on website and in newsletter
- The use of UD-CCM libraries and software.

UD-CCM has been creating design and analysis software for composite structures, as well as manufacturing process simulations, for more than two decades. The software is continuously upgraded to reflect new research findings as well as to capitalize on advances in computing technology.

The following provides an overview of four programs: Liquid Injection Molding Simulation (LIMS), Penetration Mechanics Modeling Capabilities, Composite Design Software (CDS), and Textile Composite Modeling Capabilities:

Liquid Injection Molding Simulation (LIMS)
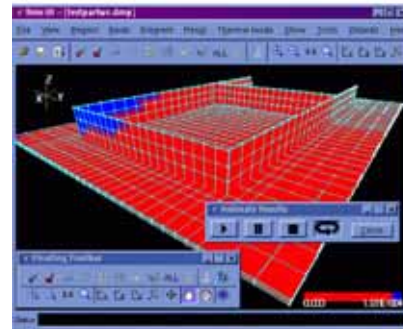
LIMS is a software tool that simulates the mold filling stage of liquid composite molding processes such as resin transfer molding (RTM), vacuum-assisted resin transfer molding (VARTM), and related processes by modeling flow through porous media via a finite element/control volume method. It provides a cost-effective way to verify and optimize mold design by providing a "virtual" mold filling process to reduce or eliminate time- and resource-consuming trial-and-error manufacturing approaches. In addition, LIMS has been successfully used to design and simulate intelligent or adaptive filling

process that utilizes sensors mounted on the part and controllable injection hardware, either as a stand-alone program or as a simulation engine for other programs.

The simulation allows the user to monitor flow progression, pressure distribution, and inflow rates during the mold filling process. Various inlet parameters including injection and vent locations can be changed during the filling simulation. A number of other effects, such as "race-tracking" (the tendency for resin to flow much faster around corners), and placement of the distribution media in VARTM-like processes can be easily modeled via an included user-friendly graphical interface called LimsUI. By point and click, LimsUI allows the user to effortlessly modify the material and injection parameters, run simulations, view the simulation results, create racetracking channels and distribution media layers, and change or add injection and vent locations.

LIMS also has a built-in scripting function, which allows the user to tailor the simulation to address many special issues. Scripts can access the parameters during the simulation and modify the parameters as needed. It is even possible to modify the material data during the simulation. This allows the user to simulate complex filling schemes such as those using adaptive controls. For example, the evaluation of fiber tow saturation through a set of scripts is available with LIMS distribution. This feature allows the user access to the full power of the simulation engine, which can enable external modifications of boundary conditions to address any variants of the RTM and VARTM processes. Finally, for those interested in utilizing the simulation engine in their own program—for example, for the purpose of optimization—there is a slave version and a dynamically linkable library that can be included in the user program.

Currently, the program is being developed mainly for the Windows environment. It is actively tested on Windows XP (32- and 64-bit) and Windows Vista (32 bit). However, the simulation engine ports for UNIX are available. For most applications, any Windows XP computer is sufficient. Good OpenGL support is needed for LimsUI. For large 3D problems, at least 2GB of RAM is recommended, as the program uses direct solver. Flow in a mesh with 5000 nodes on a current PC can be completed in less than one minute.

## Penetration Mechanics Modeling Capabilities
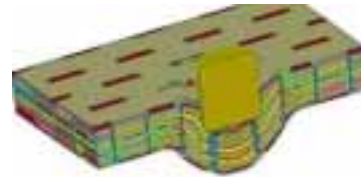
UD-CCM has developed state-of-the-art penetration mechanics capabilities that include quasi-static and dynamic punch shear testing methodologies for composites; finite element modeling of impact, damage and penetration of composites using the LS-DYNA MAT162 progressive composite damage model; and physics-based theoretical penetration models for both ceramics and composites. CCM is the technical contact for support and consultation of MAT162, originally developed by Materials Sciences Corporation, and is developing new damage mechanics and penetration-erosion algorithms in MAT162. In addition, the modeling capabilities include stress wave propagation in layered and discontinuous structures, blast and ballistic loading on structures, fluid-structure interaction, high-velocity impact and penetration, and multi-scale modeling of composites and soft laminates.

## Composite Design and Simulation Software (CDS)

The latest CDS package consolidates all existing applications into a single environment that incorporates effective property prediction, structural mechanics and failure analysis for composite laminates with integrated material property management, process simulation and real time design features.

The new CDS software offers a menu-based interface that enables the user to work in an intuitive environment for design and optimization of the entire range of composite structures from thin laminates to thick sections to cylinders. Each section builds upon data generated in the previous hierarchy, thus ensuring continuity and ease of use in the analysis environment. At the heart of this environment is a new materials database structure that captures all of the features of the original database software while adding such new attributes as material tracking, property locking features, and real-time design. The materials database tree also allows creation of sub-databases that can be used to store fiber and matrix properties. Users can create and manipulate material databases that store a wide range of material information. For each material, 170 material property values, each of which also contains source, date, and unit information, are currently stored. Properties include mechanical and physical properties, micromechanics parameters, cure kinetics, and damage and failure properties, as well as non-linear properties. A custom units section is also available for users to add their own material fields. The user can modify properties "on the fly" and see laminate effective properties, stresses, strains, and progressive failure in real time. Material property sources and units are tracked to ensure validity during analysis and can be exported to third-party FEA packages for further design and analysis.
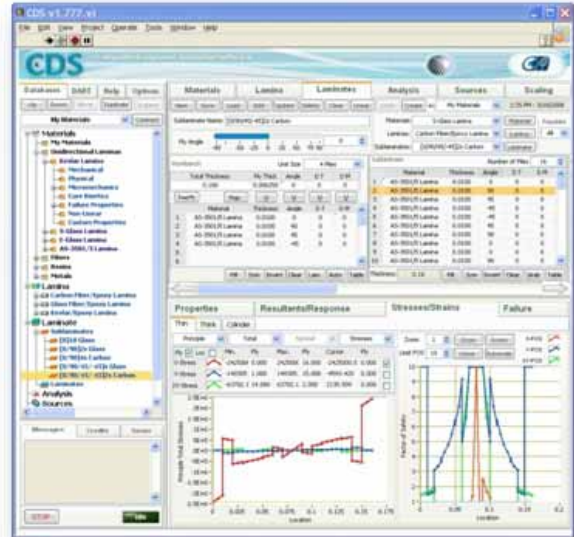
The CDS Suite is available to industrial consortium members through consortium agreements tailored to program requirements and duration of contracts. A demonstration version of the CDS suite can be made available to potential members with training workshops at CCM or online through web meetings. An online comprehensive guide and software support will also be made available to allow consortium members to use CDS both independently and to encourage future partnerships on new projects.

Textile Composite Modeling Capabilities
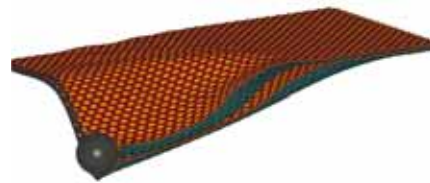
UD-CCM textile composite modeling capabilities include developing finite element models of unidirectional, 2-d (e.g. plain weave) and 3-d (e.g. with z-tows) fabrics for impact simulations with LS-DYNA. A yarn level of resolution that represents the actual yarn geometry, undulations, and architecture is used in the models. Other efforts include probabilistic based simulations to address the effect of statistical material properties on

the fabric performance under impact, multiscale modeling, developing new material models and implementing as a UMAT in LS-DYNA, and experimental characterization of material properties on a micro and macro scale. UD-CCM is currently developing a series of finite element preprocessors with easy to use GUIs to automatically generate textile fabric FE models for use in impact simulations. The user can easily customize the yarn geometry, undulations, architecture, and choose from a variety of mesh schemes that use only regular shaped hexahedral elements.

Contact: Dr. John W. Gillespie Jr., Director +1(302)831-8149 Gillespie@ccm.udel.edu	Center for Composite Materials University of Delaware Academy St and Delaware Ave Newark, DE 19711 www.ccm.udel.edu Ph: +1(302)831-8149 Fax: +1(302)831-8525

D3 VIEW - Tracking Developments in LS-DYNA®

d3VIEW is a web-based tool that extracts information from LS-DYNA generated "d3hsp" files and presents it in a concise, user-friendly format.

Background

The tool was developed as a hobby project by Suri Bala to ease the review of user provided input and result files in a concise and efficient manner. Suri Bala works full-time at Livermore Software Technology Corporation.

Dec 13th - LSTC

LSTC has introduced a free limited LS-DYNA version for U.S. unemployed LS-DYNA users as a result of the current poor economic conditions. A free LS-DYNA course will be introduced in the coming months for these engineers

. Please contact Marsha Victory at 925 449 2500 or send her an email at marsha at lstc dot com.

Previously:

Multi Solver Run in LS-OPT

Published by Suri Bala November 11th, 2008

In LS-OPT, one can run a multi-disciplinary optimiztion or a multi-solver type optimization problem, where the variables can be shared among the different solvers. In performing DOE or any optimization using LS-OPT, it is important that consistent experimental points are used in the evaluations. To ensure this, one can use solver experiment duplicate solver_1 [...]

Packing LS-DYNA Input Files for Easy Distribution (v1.1a)
Published by Suri Bala October 15th, 2008

In a previous post about a simple Python script that scans a LS-DYNA input file to package all INCLUDED files recursively so the entire model can be compressed and sent to the recipient.

Based on some new suggestions, largely by Brian Wainscott, I have attached a revised script that handles the included files [...]

Damage modeling using GURSON
Published by Suri Bala October 13th, 2008

Material parameter identification of GURSON material requires a process of fitting using an optimization package such as LS-OPT to match against a measured response such as a test. Following is a stress-strain curve that is achieved as a process of parameter identification using LS-OPT and LS-DYNA.

Characterizing plasticity material models using data from test
Published by Suri Bala October 9th, 2008

It is common to perform a uni-axial tensile test on a material sample to generate stress-strain curve for use in numerical models in LS-DYNA. The problem frequently encountered by analysts is the cleaning of the test data that is usually noisy. I recently wrote a small Python utility that takes any test generated force-deflection curve

LS-PrePost® Update - December 2008

LS-PrePost® Internet Update

December

08-Dec

Updated the Ident Interface to make use of the General Selection panel

08-Dec

Updated the Blank Interface to make use of the General Selection panel

November

21-Nov

Added support for multiple integration points per layer for *ELEMENT_SHELL

21-Nov

Added ability to display section force vectors on a model while plotting *SECFORC* data using the ASCII Interface (with *D3PLOT* files loaded)

21-Nov

Added ability to write relative *BOUNDARY_PRESCRIBED_MOTION curves using the Trace Interface while a Follow point/plane is set

LS-DYNA® Support Site: New Items &Updates –

At this site you will find answers to basic and advanced questions that might occur while using LS-DYNA.

- It will provide information about new releases and ongoing developments.
- The content will be regularly updated with answers to frequent questions related to LS-DYNA.
- LS-DYNA support does not provide information on activities of your local LS-DYNA distributor. Please check your local distributor's site for information.

Answers:

STRAIN RATE

Edge to Edge Contact

Gravity Load

Preload-General

Updated:

Mass Scaling

Simpleware version 3.2 ready for release

www.simpleware.com

A new version of ScanIP/+ScanFE/+ScanCAD will be ready and available in the New Year.

ScanIP/+ScanFE/+ScanCAD Version 3.2 comes with many new and exciting features that will help you accelerating the process of segmenting and meshing 3D data. New and improved features of Version 3.2 include:

Enhanced user interface & usability

- Support for a wider range of import formats
- Improved feedback between 2D slice position and 3D view
- Cropping/downsampling on import for extremely large datasets
- Register (rotate & align) images
- Log history
- 2D/3D measuring tools
- Surface and volume statistics
- One-click mask generation when the imported data is pre-segmented

New CAD export formats in ScanIP

- IGES (*.igs)
- ACIS (*.sat)
- ABAQUS surface (*.inp)
- ANSYS surface (*.ans)
- Point Cloud (*.pc)

New mesh refinement

Zones of high / low element density can be user defined according to analysis needs and geometric features

New export option in +ScanFE

- Comsol (*.mphtxt)

New +ScanCAD version 1.1 Release

Upcoming Events

If you would like to meet a Simpleware representative, please visit us at any of the following events:

- February 4, 2009 - GTMA Emerging Technologies:
  Delcam, Birmingham, UK.

- February 6, 2009 - XMT Network Meeting:
  Queen Mary University, London, UK.

- February 15 - 19, 2009 - TMS 2009 Annual Meeting & Exhibition:
  San Francisco, USA.
  Visit us at booth #132, and download a free Exhibition Show Pass.

- February 21, 2009 - pre-ORS: Annual Symposium on Computational Methods in Orthopaedic Biomechanics
  Las Vegas, USA.

- February 22 - 25, 2009 - ORS:
  Las Vegas, USA.
  Visit us at booth #6217.

Further events for 2008 are also available on our events page

Cranes - India LS-DYNA® User's Conference 2009

Date: Friday, 23rd Jan' 2009
Venue: Hotel Grand Ashok, Kumara Krupa Road, Bangalore 560 001, India

Description

Cranes Software International Limited (CSIL) takes pleasure in inviting you to the "**Cranes - India LS-DYNA® User's Conference 2009**". The conference is being organized by CSIL for the first time and is an effort to bring together the FEA community of India into a single forum to discuss CAE centric approach to product design which is fast becoming the mantra of most engineers involved in product design and development across the world.

Scope

At the LS-DYNA® Users' Conference - design engineers, like you, will be able to learn latest industry trends from your American counterparts and from thought leaders in the Indian automobile and aerospace industry.

It will provide you with an opportunity to network with your peers and share your thoughts and views on CAE centric approach to product design. Additionally, you will learn how CAE products like LS-DYNA®, eta/VPG and eta/DYNAFORM are changing how engineers look at design problems of tomorrow.

This daylong event is sure going to be one of learning, networking and ideation.

Invited Speakers

Luminaries from the world of Computer Aided Engineering will present their thoughts in this event.

If you are a user of LS-DYNA® and wish to present a paper on your work, please get in touch with us at lsdyna@cranessoftware.com This e-mail address is being protected from spam bots, you need JavaScript enabled to view it

Who should attend?

- Past & Present Users of LS-DYNA®, HyperMesh®, Pam-Stamp®, AutoForm®, Radioss®, eta/VPG & eta/Dynaform

- Engineers & Scientists involved in linear & non-linear FEA

- College Faculty involved in teaching of linear & non-linear FEA

- Graduate Students

  Registration Deadline: 31st Dec'08
  Deadline for Paper Abstracts: 31st Dec'08

To learn more, register, please visit:
http://www.cranessoftware.com/company/events/ls-dyna-uc2009.html

7th European LS-DYNA® Conference

Uli Franz, DYNAmore

The 7th European LS-DYNA® Conference, May 14-15, will provide an ideal forum for LS-DYNA users from all over the world to share and discuss experiences, to obtain information on upcoming features of LS-DYNA, and to learn more about new application areas. The conference will be accompanied by an exhibition area featuring the latest software and hardware developments related to LS-DYNA.

It will take place at "one of the most beautiful regions on earth", as Alexander von Humboldt described Salzburg. The Old Town of Salzburg is a splendid example of baroque architecture and awarded by UNESCO as world heritage. Salzburg is also known as the birthplace of the famous composer Wolfgang Amadeus Mozart. Some may know Salzburg as the scenery of the film "The Sound of Music".

The conference venue is located in the old town of Salzburg. Salzburg can be reached easily via freeway, the high speed train ICE, and the international airports of Salzburg or Munich.

The Conference will be organized by DYNAmore with assistance from LSTC, Alyotech, Arup, and ERAB. We kindly encourage all users to present their work with LS-DYNA or LS-OPT at the conference.

General information:

Included in the applications being covered are:

- Crash
- Occupant safety
- Metalforming
- Optimization
- Robustness
- Spotwelding, bonding
- Implicit
- Pedestrian safety
- Impact, drop test
- Plastics
- Composites
- Ballistics and penetration
- Fluid structure interaction, CFD
- CAE processes integration

Accompanying Classes May 11-13th
Classes will be on various applications such as crash, optimization, metalforming, occupant safety and others. Information will be provided soon.

Conference Paper Submission
Abstract Deadline: January 12, 2009
Acceptance: January 30, 2009
Final Paper: April 03, 2009

Form to submit a paper:

Pre Post Processing Software

Livermore Software Technology Corporation

LS-PrePost is an advanced interactive program for preparing input data for LS-DYNA and processing the results from LS-DYNA analyses

Engineering Technology Associates, Inc

FEMB Engineering Technology Associates' Finite Element Model Builder (FEMB) is a finite element pre- and post-processor for use with all major analysis codes and CAD Software.

Japanese Research Institute, Ltd

JVISION is a general purpose pre-post processor for FEM software. Designed to prepare data for, as well as support, various types of analyses, and to facilitate the display of the subsequent results

Intelligent Light

FieldView provides LS-DYNA users powerful post-processing to quickly identify important characteristics in large and complex data and and allows interactive exploration to develop a thorough understanding. Examine and compare cases, extract critical values, and make compelling presentations that make an impact.

Oasys, Ltd

Oasys Primer is a model editor for preparation of LS-DYNA input decks.

Oasys D3Plot is a 3D visualization package for post-processing LS-DYNA analyses using OpenGL® (SGI) graphics.

BETA CAE Systems S.A.

Provides complete CAE pre- and post-processing solutions. ANSA, the world wide standard pre-processor and full product modeler for LS-DYNA, with integrated Data Management and Task Automation. μETA, a thriving innovative software with special features for the high performance and effortless 3D & 2D post-processing of LS-DYNA results.

Simpleware

Provides software solutions for robust, fast, and easy conversion of 3D images into high quality meshes which can be used for FEA, CFD, CAD, RP.

Participant LS-DYNA® Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

SMP and MPP Hardware and OS

FUJITSU

FUJITSU Prime Power	SUN OS 5.8
FUJITSU VPP	Unix_System_V

HP

HP PA-8X00	HP-UX 11.11. and above
HP IA-64	HP-UX 11.22 and above
HP Opteron	Linux CP4000/XC
HP Alpha	True 64

INTEL

INTEL IA32	Linux, Windows
INTEL IA64	Linux
INTEL Xeon EMT64	Linux, Windows 64

NEC

NEX SX6	Super-UX

SGI

SGI Mips	IRIX 6.5X
SGI IA64	SUSE 9 w/Propack 4 Red Hat w/ Propak 3

Participant LS-DYNA® Resource Page (alpha order)

Fully QA'd by Livermore Software Technology Corporation

MPP and Interconnect MPI

FUJITSU

	O/S	HPC Interconnect	MPI Software
FUJITSU Prime Power	SUN OS 5.8		
FUJITSU VPP	Unix_System_V		

HP

	O/S	HPC Interconnect	MPI Software
HP PA8000	HPUX		
HPIA64	HPUX		
HP Alpha	True 64		

INTEL

	O/S	HPC Interconnect	MPI Software
INTEL IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	LAM/MPI, MPICH, HP MPI, SCALI
INTEL IA64	Linux		LAM/MPI, MPICH, HP MPI
INTEL Xeon EMT 64	Linux	InfiniBand(Topspin, Voltaire), MyriCom, PathScale InfiniPath	LAM/NPI, MPICH, HP MPI, INTEL MPI, SCALI

NEC

	O/S	HPC Interconnect	MPI Software
NEX SX6	Super-UX		

SGI

SGI Mips	IRIX 6.5 X	NUMAlink	MPT
SGI IA 64	SUSE 9 w/Propack 4 RedHat w/Propack 3	Numalink, InfiniBand(Voltaire)	MPT, Intel MPI, MPICH

LS-DYNA® Resource Page - Participant Software

Interfacing or Embedding LS-DYNA - Each software program can interface to all, or a very specific and limited segment of the other software program. The following list are software programs interfacing to, or have the LS-DYNA solver embedded within their product. For complete information on the software products visit the corporate website.

ANSYS - ANSYS/LS-DYNA
ANSYS/LS-DYNA

Built upon the successful ANSYS interface, ANSYS/LS-DYNA is an integrated pre and postprocessor for the worlds most respected explicit dynamics solver, LS-DYNA. The combination makes it possible to solve combined explicit/implicit simulations in a very efficient manner, as well as perform extensive coupled simulations in Robust Design by using mature structural, thermal, electromagnetic and CFD technologies.

AI*Environment:

A high end pre and post processor for LS-DYNA, AI*Environment is a powerful tool for advanced modeling of complex structures found in automotive, aerospace, electronic and medical fields. Solid, Shell, Beam, Fluid and Electromagnetic meshing and mesh editing tools are included under a single interface, making AI*Environement highly capable, yet easy to use for advanced modeling needs.

ETA — DYNAFORM

Includes a complete CAD interface capable of importing, modeling and analyzing, any die design. Available for PC, LINUX and UNIX, DYNAFORM couples affordable software with today's high-end, low-cost hardware for a complete and affordable metal forming solution.

ETA — VPG

Streamlined CAE software package provides an event-based simulation solution of nonlinear, dynamic problems. eta/VPG's single software package overcomes the limitations of existing CAE analysis methods. It is designed to analyze the behavior of mechanical and structural systems as simple as linkages, and as complex as full vehicles.

MSC.Software - MSC.Dytran LS-DYNA

Tightly-integrated solution that combines MSC.Dytran's advanced fluid-structure interaction capabilities with LS-DYNA's high-performance structural DMP within a common simulation environment. Innovative explicit nonlinear technology enables extreme, short-duration dynamic events to be simulated for a variety of industrial and commercial applications on UNIX, Linux, and Windows platforms.

MSC.Software - MSC.Nastran/SOL 700

The MSC.NastranTM Explicit Nonlinear product module (SOL 700) provides MSC.Nastran users the ability access the explicit nonlinear structural simulation capabilities of the MSC.Dytran LS-DYNA solver using the MSC.Nastran Bulk Data input format. This product module offers unprecedented capabilities to analyze a variety of problems involving short duration, highly dynamic events with severe geometric and material nonlinearities.

MSC.Nastran

Explicit Nonlinear will allow users to work within one common modeling environment using the same Bulk Data interface. NVH, linear, and nonlinear models can be used for explicit applications such as crash, crush, and drop test simulations. This reduces the time required to build additional models for another analysis programs, lowers risk due to information transfer or translation issues, and eliminates the need for additional software training.

MSC.Software — Gateway for LS-DYNA

Gateway for LS-DYNA provides you with the ability to access basic LS-

DYNA simulation capabilities in a fully integrated and generative way. Accessed via a specific Crash workbench on the GPS workspace, the application enhances CATIA V5 to allow finite element analysis models to be output to LS-DYNA and then results to be displayed back in CATIA.

Oasys software for LS-DYNA

Oasys software is custom-written for 100% compatibility with LS-DYNA. Oasys PRIMER offers model creation, editing and error removal, together with many specialist functions for rapid generation of error-free models. Oasys also offers post-processing software for in-depth analysis of results and automatic report generation.

Visual-CRASH For DYNA

Visual-Crash for DYNA helps engineers perform crash and safety simulations in the smoothest and fastest possible way by offering an intuitive windows-based graphical interface with customizable toolbars and complete session support. Being integrated in ESI Group's Open VTOS, an open collaborative multi-disciplinary engineering framework, Visual-Crash for DYNA allows users to focus and rely on high quality digital models from start to finish. Leveraging this state of the art environment, Visual Viewer, visualization and plotting solution, helps analyze LS-DYNA results within a single user interface. Visual Viewer performs automated tasks and generates customized reports therefore increasing engineers productivity..

APTEK

The MMCD is a graphics-based and menu-driven program that interfaces with the LS-DYNA library of material models and the LS-OPT optimization code. The core of the MMCD is the driver, which calculates the stress-strain behavior of material models driven by combinations of strain increments and stress boundary conditions, i.e. pure shear stress, and combinations of uniaxial, biaxial, and triaxial compression and tension. MMCD input and output is accessed via pre- and post-processors; graphical user interfaces (GUIs) for easily selecting the material model parameters and load histories, and for plotting the output in both two (stress-strain curves) and three (yield surfaces) dimensions. The pre-processor, driver, and post-processor are combined into a web downloadable software package that operates seamlessly as a single code.

BETA CAE Systems - ANSA

Is 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.

FEA Information Participants –
Company name takes you directly to Website

OASYS Ltd: Markets engineering software products. Consulting engineers, planners and project managers working in all areas of the built environment.

JRI Solutions Ltd.: Specializing in Research & Consulting; System Consulting, Frontier Business, System Integration and Science Consulting.

HP: Leading provider of high performance computing solutions for CAE, including workstations, servers, blades and storage..

ANSYS Inc.: Develops, markets, supports and delivers collaborative analysis optimization software tools.

SGI: Silicon Graphics, Inc., is a leader in high-performance computing, visualization, and storage.

MSC.Software: Information technology software and services provider.. Products & services used to enhance & automate the product design/manufacturing process.

NEC: A history of more than 100 years of leadership/innovation in the core high-technology sectors of communications, computers/electronic components

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INTEL: For more than three decades, Intel Corporation has developed technology enabling the computer and Internet revolution that has changed the world.

Engineering Technology Associates, Inc.: Provides engineering & IT services & has created the streamlined simulation software packages DYNAFORM and VPG

ESI Group: A software editor for the numerical simulation of prototype and manufacturing process engineering in applied mechanics.

BETA CAE Systems S.A.: Specialized in the development of state of the art CAE pre- and post-processing software systems.

APTEK: Among the software developed APTEK develops and licenses an interactive program for driving LS-DYNA material models - the Mixed Mode Constitutive Driver (MMCD).

PANASAS: High performing Parallel Storage for scalable Linux clusters. Delivering exceptional scaling in capacity and performance for High Performance Computing (HPC) organizations.

Intelligent Light: A a world leader in the development and delivery of software for computational fluid dynamics (CFD) users. We help the world's best engineering and research organizations maximize the productivity and impact of their CFD capabilities

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LS-DYNA® Software Distributors - Alphabetical order by Country

Australia	**Leading Engineering Analysis Providers**
Canada	**Metal Forming Analysis Corporation**
China	**Arup**
China	**ETA China**
France	**Alyotech**
France	**AS+**
Germany	**CAD-FEM**
Germany	**DYNAmore**
India	**Oasys, Ltd.**
India	**Cranes Software Ltd.**
India	**EASi Engineering**
Italy	**DynaMore**
Italy	**ENGINSOFT**
Japan	**The Japan Research Institute**
Japan	**ITOCHU Techno-Solutions Corporation**
Japan	**Fujitsu**
Korea	**Theme Engineering**
Netherlands	**Infinite Simulation Systems BV**
Russia	**State Unitary Enterprise - STRELA**
Sweden	**Engineering Research AB**
Taiwan	**Flotrend Corporation**
USA	**Engineering Technology Associates, Inc.**
USA	**Dynamax**
USA	**Livermore Software Technology Corp.**
UK	**ARUP**

Consulting and Engineering Services

Australia	**Leading Engineering Analysis Providers (LEAP)** **Greg Horner info@leapaust.com.au** **02 8966 7888**
Canada	**Metal Forming Analysis Corp. - (613) 547-5395** **Chris Galbraith galb@mfac.com**
Canada	**ROI Engineering Inc.** **(416)249-1471**
France	**Alyotech 33 (0)1 30 67 23 44** **Nima Edjtemai nima.edjtemai@alyotech.fr**
Netherlands	**Infinite Simulation Systems BV** **Jurgen Mathijssen j.mathijssen@infinite.nl**
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UK	**GRM +44 (0) 1926 889300** **info@grm-consulting.co.uk**
USA	**KBEC L.C - (512) 363-2739** **Khanh Bui kdbui@sbcglobal.net**
USA	**SE&CS - (707) 837-0559** **Len Schwer len@schwer.net**
USA	**Engineering Technology Associates, Inc:** **(248) 729-3010**
USA	**Predictive Engineering - (1-800) 345-4671** **George Laird george.laird@predictiveengineering.com**
USA	**Friedman Research Corporation** **(805) 683-1300**
USA	**Structure Technology** **(920).722.7060**
USA	**CAE Associates, Inc** **(203) 758-2914**

Educational & Contributing Participants
Alphabetical Order By Country

China	Dr. Qing Zhou	Tsinghua University
India	Dr. Anindya Deb	Indian Institute of Science
Italy	Professor Gennaro Monacelli	Prode – Elasis & Univ. of Napoli, Frederico II
Russia	Dr. Alexey I. Borovkov	St. Petersburg State Tech. University
USA	Dr. Ted Belytschko	Northwestern University
USA	Dr. David Benson	University of California – San Diego
USA	Dr. Bhavin V. Mehta	Ohio University
USA	Dr. Taylan Altan	The Ohio State U – ERC/NSM
USA	Dr. Ala Tabiei	University of Cincinnati
USA	Prof. John D. Reid	University of Nebraska
USA	Professor Thomas Vasko	Connecticut State University

Informational Websites

The LSTC LS-DYNA Support site: www.dynasupport.com

LS-DYNA Support Site	FEA Informationwebsites
LS-DYNA Examples (more than 100 Examples)	LS-DYNA Conference Site
TopCrunch – Benchmarks	LS-DYNA Publications to Download On Line
LS-DYNA Publications	LSTC LS-PrePost Tutorials
CADFEM GmbH Portal	LS-OPT Support Site
LS-DYNA Distributors	LS-DYNA Consulting