

JUNE
2008

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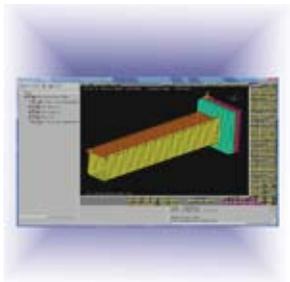
Panasas Parallel Storage
Powers Newest Record-Setting
Hybrid Supercomputer
at Los Alamos National Lab



APTEK's
Material
Model Driver



Coupling ANSA to LS-OPT®
for optimization applications





FEA Information Announcements

We are pleased to announce Trent Eggleston will be handling our Sales & Marketing. If anyone has questions about FEA Information Inc. or participation, please contact Trent Eggleston at trent@feainfo.com.

We welcome new participants:

Professor John D. Reid - [Mechanical Engineering – University of Nebraska](#)

ROI Engineering Inc. www.roieng.com

ROI Engineering Inc. is the Canadian ANSYS channel partner designated to serve the local market and to respond to the needs of both new and existing ANSYS customers in Canada and around the world.

CAE Associates, Inc. www.caeai.com

CAE Associates is a full service provider for ANSYS sales, CFD analysis, tech support, training and code customization serving CT, NJ, NY, MA, VT, and NH.

LSTC Class Announcement: LSTC CA and LSTC MI will offer no fee LS-PrePost training the day prior to scheduled Intro to LS-DYNA training classes

Intro to LS-DYNA® LS-PrePost® (no fee)	LS-PrePost July 21 July 22-25	LS-PrePost Sept 08 Sept 09-12
	LS-PrePost Nov 10 Nov 11-14	LS-PrePost Dec 08 Dec 09-12

Sincerely,

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Table of Contents

	Announcements
2	Table of Contents
3	Panasas Parallel Storage Powers newest Record-Setting Hybrid Supercomputer at Los Alamos National Lab
5	BETA CAE Systems, S.A- Coupling ANSA to LS-OPT for Optimization Applications
7	APTEK - Getting Started with APTEK's Material Model Driver
12	ANSYS Design Space
14	MSC Software Press Release
16	LS-DYNA® Support: Negative Volume in Brick Elements
18	LS-PrePost® update
19	Participant LS-DYNA® Resource Page SMP and MPP
20	Participant LS-DYNA® Resource Page MPP and Interconnect MPI
21	LS-DYNA® Resource Page Participant Software
23	FEA Information Participants
25	LS-DYNA® Software Distributors
26	Consulting and Engineering Services
27	Educational and Contributing Participants
28	Informational Websites
29	LSTC Training Classes – CA and MI
30	1 st International Conference on Hot Sheet Metal Forming...

Panasas Parallel Storage Powers Newest Record-Setting Hybrid Supercomputer at Los Alamos National Lab

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The press release can be viewed on [PANASAS Website Press Release](#)

New Roadrunner Supercomputer, the World's Most Powerful Computer, Deploys over 2 Petabytes of Panasas Parallel Storage to Improve Simulation Performance.

FREMONT, CA. — June 9, 2008 — Panasas, Inc., the global leader in parallel storage solutions, today announced that the Los Alamos National Lab (LANL) plans to utilize Panasas® Parallel Storage for its newest record-setting Roadrunner computer system which is the most powerful supercomputer in the world. The new 1 Petaflop system is designed to run complex, scientific calculations solving problems related to defense, energy, environment, infrastructure and national security concerns. The Panasas ActiveStor parallel storage system with its embedded parallel file system is an essential component in the Roadrunner deployment that maximizes I/O performance for simulation and modeling applications. Roadrunner will become a critical national security resource for some of the most important scientists in the United States and has the potential to fundamentally change scientific innovation.

LANL is one of the world's leading supercomputer facilities and part of the National Nuclear Security Administration (NNSA). The newest Roadrunner supercomputer, supplied by IBM, is a 3000 node hybrid Linux Cluster with over 12,900 processors, comprised of a combination of x86 and Cell microprocessors.

"We will be connecting the new system to our site-wide file system solution to enable global parallel access to our existing Panasas storage. Additionally,

we will be adding significant Panasas storage resources to the global file system service to handle the additional parallel I/O load Roadrunner will generate. Panasas has been our production global parallel file system solution used concurrently by all our supercomputers for a number of years and Roadrunner will take advantage of the production Panasas storage system to make the new supercomputer useful quickly for scientists," said Gary Grider, Deputy Division Leader of the Los Alamos High Performance Computing Division.

Panasas has installed its products in more than 30 countries across six continents as parallel storage is being adopted globally as the preferred solution for high-performance computing environments. All Panasas ActiveStor parallel storage systems include the award-winning object-based PanFS™ parallel file system. PanFS, which solves performance and scalability issues through direct parallel data paths, is the foundation of the emerging pNFS (Parallel NFS) industry standard endorsed by every major storage and system provider.

"Panasas has a deep history of meeting the demanding storage requirements of large-scale clustered computing environments at both commercial and government research organizations, said Victor Perez, chief executive officer at Panasas. "Our commitment to high performance storage, superior reliability,

and simple manageability sets Panasas apart from alternative storage solutions as evidenced by organizations such as LANL who are solving major global issues."

The Panasas ActiveStor 5200 and ActiveStor 3200 deliver 20 TBs of storage capacity per 4U shelf, and up to 200 TBs in a single-rack system which can be easily installed in as little as 15 minutes.

About Los Alamos National Laboratory

Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission. Los Alamos enhances global security by ensuring the safety and reliability of the U.S. nuclear deterrent, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to defense, energy, environment, infrastructure, health and national

security concerns. For more information about Los Alamos, please www.lanl.gov.

About Panasas

Panasas, Inc., the global leader in parallel storage solutions, helps commercial, government and academic organizations accelerate their time to results leading to real world breakthroughs that improve people's lives. Panasas' high-performance storage systems enable customers to maximize the benefits of Linux clusters by eliminating the storage bottleneck created with legacy network storage technologies. Panasas ActiveStor Parallel Storage Clusters, in conjunction with the ActiveScale® Operating Environment and PanFS™ parallel file system, offer the most comprehensive portfolio of storage solutions for High Performance Computing (HPC) environments. Panasas is headquartered in Fremont, California. For more information, please visit www.panasas.com.

Panasas, ActiveScale, DirectFLOW and PanFS are trademarks or registered trademarks of Panasas, Inc. All other trademarks are the property of their respective owners.

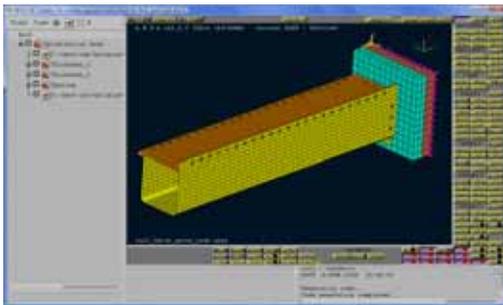
Coupling ANSA to LS-OPT® for Optimization Applications

© Copyright, BETA CAE Systems S.A. 2008
Kato Scholari,
Thessaloniki, GR 57500, Espanomi, Greece
tel: +30-2392-021828
www.beta-cae.gr

ANSA of BETA CAE Systems S.A. is a complete CAE pre-processing solution, a modeling environment that meets the needs of numerous solvers. Starting with ANSA v12.1.3 powerful features for the definition of optimization scenarios are integrated. Latest ANSA releases offer the capability to set up shape, parameter, spotweld and composite optimization problems. Through a special tool, the *Optimization Task*, the user is able to prescribe the shape and parameter modifications of the model that will take place during the optimization and set up the Design Variables that will control the model.

ANSA can be directly coupled with LS-OPT 3.3. of LSTC to provide an integrated solution in the field of optimization. LS-OPT 3.3. is able to control the ANSA *Optimization Task* without the need of any scripting job. This makes the coupling of the two programs flexible and easy to use.

The ANSA *Optimization Task*



The *Optimization Task* handles the FE-model in the many ways:

Shaping

The Optimization Task can control the shape of the model using the ANSA Morphing Tool. Any action for model morphing can be defined parametrically and then be driven by the Design Variables.

Model parameters

Design Variables that are defined in the Optimization Task are able to drive any entity or parameter of the ANSA model.

Parameters like shell thickness, material properties and meshing parameters can be easily controlled by Design Variables.

Spotweld Optimization

The Design Variables can control the parameters of the connections in an assembly model for the definition of a spotweld optimization problem. Such parameters can be the spotweld distance, the number of the applied connections or the spotweld properties.

Composites optimization

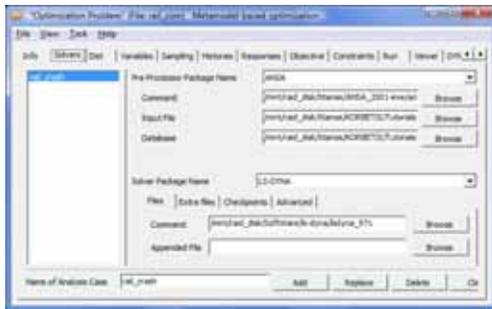
Composite material optimization is achieved through the use of the ANSA Laminate Tool. Fabric orientation layer thickness and material properties can be assigned as Design Variables.

Coupling ANSA to LS-OPT

Pre-Processing

The information defined in ANSA *Optimization Task* for the Design Variables can be transferred to LS-OPT through a simple ASCII file.

LS-OPT enhance ANSA as a Pre-Processor Package in its Solver tab. Through special entries, the user can define the ANSA command, the ANSA file and the ASCII file that contains the Design Variables definition. As a result the Design Variables, their name, type and bounds are recognized automatically and listed in the relative LS-OPT tab. Hence, there is no need of redefining the Design Variables in LS-OPT.



Running

When the optimization process runs, LS-OPT invokes ANSA in batch mode and executes all the actions that have already been defined in the *Optimization Task*.

Benefits

Complicated tasks such as batch meshing, mesh quality improvement and model assembling can be driven by the *Optimization Task*. Furthermore, using the *ANSA Scripting Language*, in combination with the *Optimization Task*, it is possible to parameterize any ANSA operation. Consequently, the coupling of ANSA and LS-OPT not only provides a tool for typical optimization problems solving, but also is a vehicle for the improvement and the acceleration of the overall CAE process.

For more information contact us at ansa@beta-cae.gr

Getting Started with APTEK's Material Model Driver

Yvonne D. Murray and Carrie M. Yeager

APTEK Inc

1257 Lake Plaza Driver, Colorado Springs, CO 80906

www.aptek.com, mmcd@aptek.com, yvonne@aptek.com, carrie@aptek.com

Selection of an appropriate set of parameter values to represent the behavior of each material modeled in an LS-DYNA simulation is a necessary part of the user-supplied input. Although a few material models supply default sets of parameter values (such as concrete model 159 and wood model 143), these default sets may not be appropriate for every application the user wishes to analyze. The majority of material models in LS-DYNA require the user to explicitly identify the parameter values, and many users have found parameter identification to be an intimidating process. Parameter identification is the process of selecting and adjusting material model parameter values to provide good comparisons (fits) of the model's constitutive response with laboratory test data.

One way to quickly and easily evaluate the behavior of a material model and to fit the model parameters to laboratory test data is through use of APTEK's material model driver, called the Mixed Mode Constitutive Driver (MMCD). The MMCD helps the user to:

1. Evaluate and graphically display the stress versus strain behavior of the material model in a quick and easy manner via a Graphical User Interface.
2. Fit (select and adjust) the material model parameters to laboratory test data either manually or using LS-OPT.
3. Graphically display the fitted model compared with test data in a printable report-quality graph.

4. Store and organize the parameters values, load histories, graphs, and corresponding test data.
5. Print out the fitted material model parameters in LS-DYNA format (*MAT).

Use of the MMCD saves the user time and money by facilitating the parameter identification process, with the goal of improving LS-DYNA simulation results via improved fits to test data.

Free 30-Day Trial Version

Go to the APTEK website at www.aptek.com and select Mixed Mode Constitutive Driver under Software Products followed by Download MMCD under MMCD Software (<http://www.aptek.com/software/MMCD/download/download.htm>).

Follow the website instructions:

1. Download all prerequisites necessary for your computer system.
2. Click Demo License then follow the instructions and fill in the license request form. Make sure the completed form is emailed to mmcd@aptek.com to request the free license. APTEK will respond by email within about 24 hours with a license key.
3. Click MMCD to download and install the MMCD executable.

A successful set-up will culminate with a desktop icon for the MMCD. Execute the MMCD via the desktop icon. Enter the

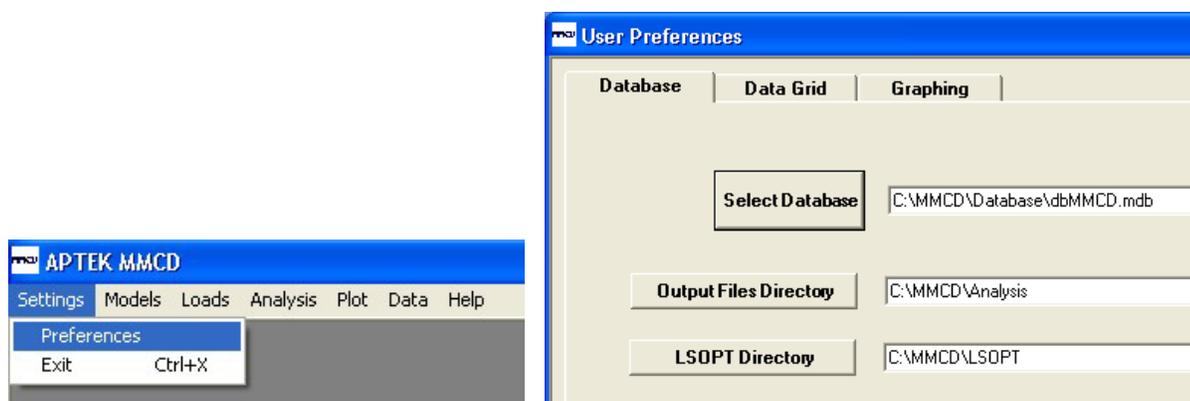
license key upon first execution of the MMCD.

Execution and Settings

For first time use, press Settings Preferences to pop up the User Preferences window.

A sample database will automatically be loaded under C:\MMCD\Database\dbMMCD.mdb for first time users or

C:\MMCD\Database\dbMMCDSample.mdb for existing users. Recommended output file directories will also be listed that may be changed (type in or browse for the desired directory). The Output Files Directory is the directory where output from the MMCD analyses will be placed. The LSOPT Directory is the directory where output from the LS-OPT analyses will be placed. Please note that the LSOPT Directory is not (and should not be) the same as the path of the executable LS-OPT code.



Getting Started with a Manual Fit

The Getting Started tutorial under the Introduction of the Help files is a good starting point. The database provided includes numerous example problems, including Model and Loads definitions for six material models: Concrete (159), Linear Plasticity (24), Plastic Kinematic (3), Soil (147), Wood (143), and User Defined (41). Review graphical results of the example Analysis under the PLOT 2D Plot 2D Plot Setup Window. To view graphs, place check marks under Display and then press Build Graph on the lower right graphics window.

Automated Fit with LS-OPT

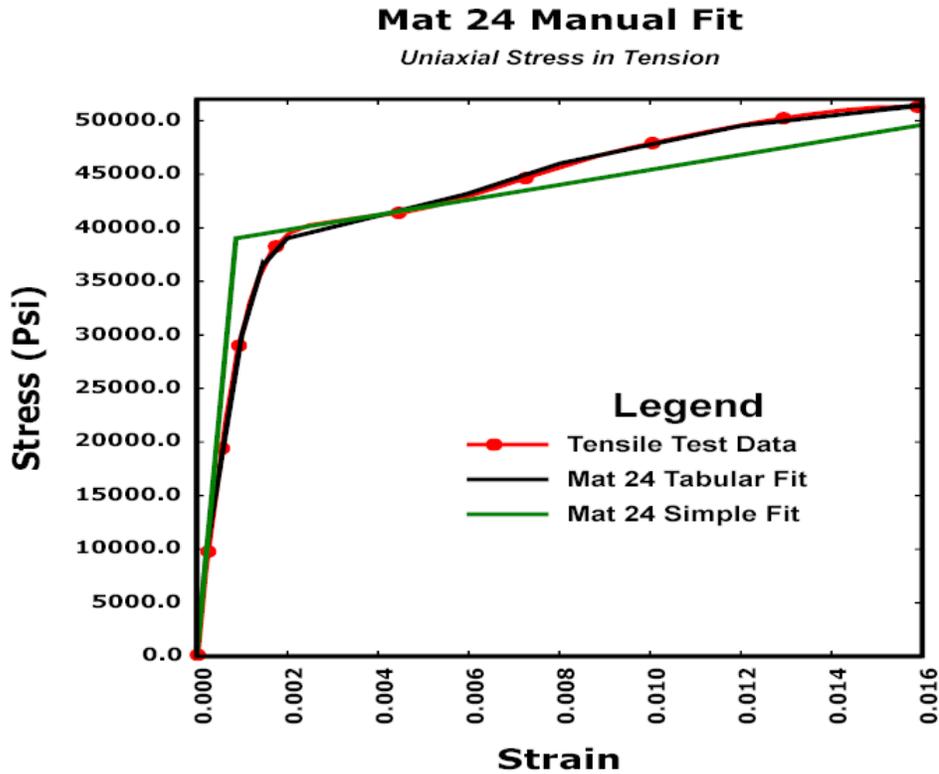
LS-OPT is not distributed with the MMCD. Each user must obtain the LS-OPT executable from LSTC. Follow the LS-OPT installation instructions to add LS-OPT to the Path of the System Variables under Control Panel System Advanced Tab Environment Variables. Also place a copy of APTEK's modeldriver.exe in the directory where the LS-OPT executable resides. Modeldriver.exe is typically located under C:\Program Files\APTEK\MMCD. One example problem is provided under Analysis LSOPT Fit Optimization Title Pine Fit.

User Defined Material Model

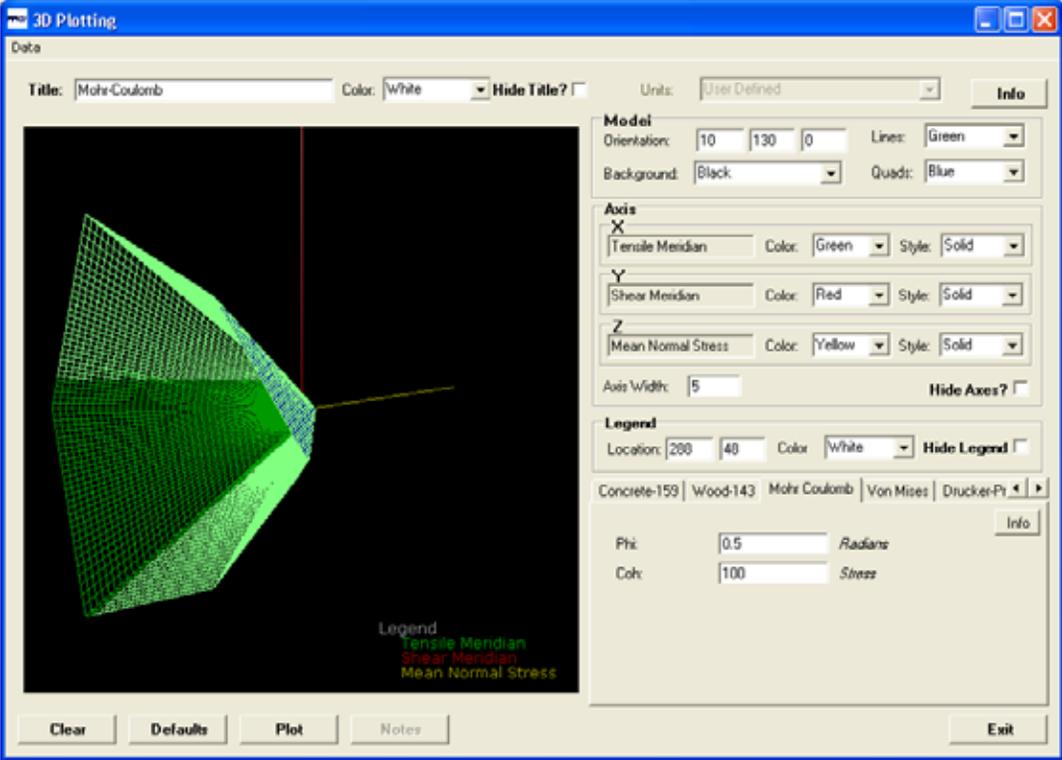
The MMCD may be interfaced with user-proprietary material models (called user defined material models). The user compiles the user-defined model and links it with the MMCDLIB.lib file and the

LS-DYNA libraries to create a new modeldriver.exe. After requesting a license, users who wish to interface a user-defined model should email their request to APTEK at mmcd@aptek.com to obtain MMCDLIB.lib and all associated files and instructions.

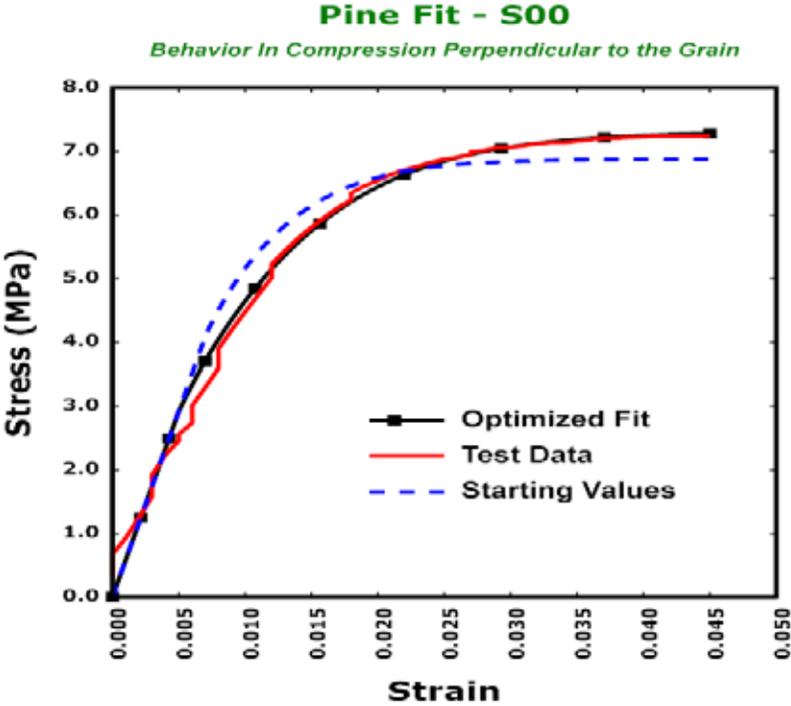
Example 2D Graphics



Example 3D Yield Surface

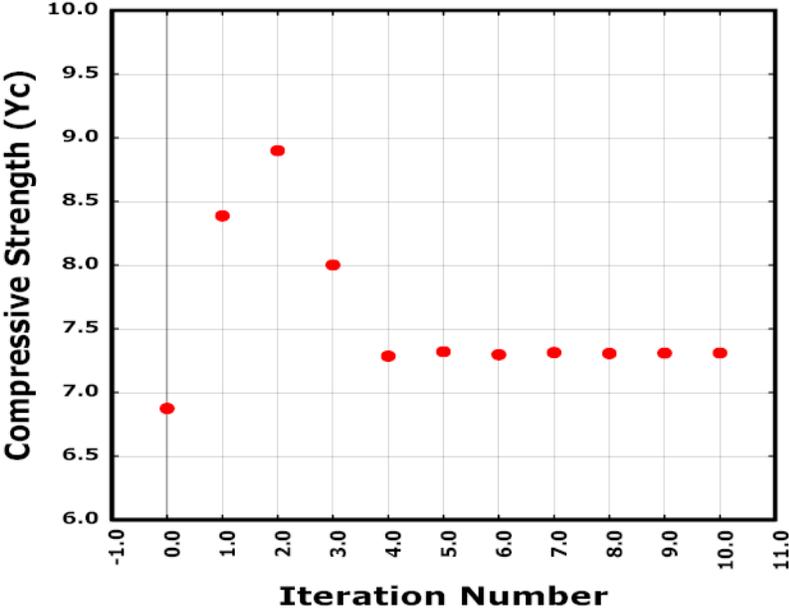


Automated Fit to Pine Test Data using LS-OPT



Iterations of Compressive Strength Parameter Value using LS-OPT

Pine Fit - Variable Yc
Yc vs. Number of Iterations



ANSYS DESIGN SPACE

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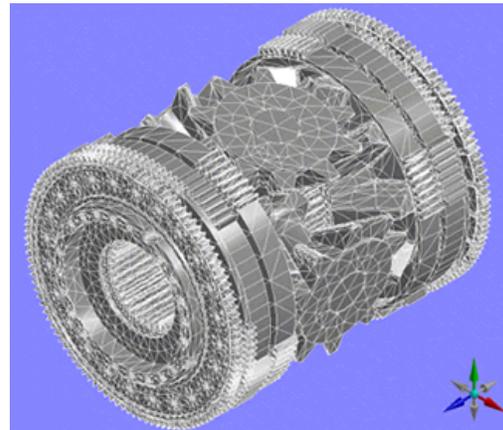
www.ansys.com/products/designspace.asp

ANSYS DesignSpace is a powerful, yet easy-to-use simulation software package that gives product designers and engineers the power to conceptualize, design and validate all their ideas right on their desktops. Using Knowledge-Based Automation™, this streamlined, user-friendly simulation tool is based on the same powerful ANSYS technology that has been resolving challenging design issues for more than 32 years.

Using DesignSpace, product design teams will produce better products in less time with fewer field failures. DesignSpace gives designers and engineers the ability to easily perform real-world, step-by-step structural, thermal, dynamic, weight optimization, performance optimization, vibration mode and safety factor simulations on all their designs. DesignSpace also includes the industry's best Web-based Report Generator.

DesignSpace is fully associative with the latest versions of major three-dimensional CAD packages, including: Autodesk Inventor, Solid Edge, Unigraphics, SolidWorks, Pro/ENGINEER, and Autodesk Mechanical Desktop. Plus, DesignSpace reads data from CATIA and common file geometry file formats like SAT, and Parasolid.

From single parts to complex and large assemblies, and even through to complete systems, DesignSpace turns 3-D CAD environments into a complete virtual product development system.



ANSYS – DesignSpace Product Guide

DesignSpace simulation functionality is organized into four different functionality bundles, additional Modules, CAD Plug-ins, and Kinematics connections that have been designed to meet the needs of particular groups of users. Below is a description of these bundles and a profile of the applications that these are best suited. You can click the hyperlink product name to see the feature detail of each bundle below.

DesignSpace - Includes all of the functionality in DesignSpace Entra and adds simulation capability for assemblies utilizing automatic contact capability for rigid and sliding assemblies.

- Automatic assembly setup with surface contact
- Linear assembly contact
- Manual contact properties manipulation
- Assembly/part feature accuracy

- Advanced assembly visualization
- Nonlinear contact

Advanced Functionality - With the ANSYS Workbench environment, DesignSpace users can benefit from seamless interoperability between up-front and full-scale simulation. Once projects are started in DesignSpace, they can easily be saved and opened by a more advanced ANSYS product that contains the required simulation functionality like: nonlinear materials, harmonics, large deformation or advanced contact.

Add-on Modules

DesignXplorer - The DesignXplorer is an application for understanding the analysis response of parts and/or assemblies. By understanding the analysis response, DesignXplorer can be used to:

- Create design and analysis charts
- Design new members of a family of parts
- Optimize a part for new conditions

DesignXplorer uses parameters as its basic language. These parameters can come from various CAD Systems or from the analysis. Structural and thermal responses can be studied, quantified, and graphed. A multiplicity of robust designs may also be obtained by means of a Goals-Driven method of optimization.

DM (DesignModeler) - DM is a geometry tool that allows basic geometry to be created, but most importantly enables models to be modified for simulation purposes. These modification features include, surface creation from solids, spot

weld applications, surface dividing and more.

Fatigue Module - Most parts fail over time due to fatigue. The DesignSpace fatigue module allows you extend your simulation to include the performance over the required product life. Innovative result tools make this module very easy to use and, the results are easy to interpret.

CAE Templates - To meet the need of the advanced users, CAE Templates allows engineers to leverage their design work and, through the use of its templating capabilities, easily advance their design investigation to ANSYS, MSC/NASTRAN, ABAQUS, or in-house codes. CAE Templates also assists engineers in automating the set-up and posting of results from advanced analysis studies.

Multiple Geometry Interfaces - If your company uses multiple CAD systems, multiple geometry interfaces may be used with your DesignSpace products and will provide you with associative simulation for most major CAD packages. Most importantly, when working in a multi-CAD environment, DesignSpace maintains the same operational look, feel and capability. This will minimize your training effort and establish common simulation methods that will permit confident results

Kinematics Connections:

- Autodesk
- Autodesk® Inventor™ Professional
- Autodesk Inventor® Professional™ for Simulation
- Dynamic Designer

MSC Software Announces Upcoming R3 Releases of SimXpert and SimDesigner to Allow Analysts, Designers, and Suppliers to Simulate More Efficiently in Collaborative Desktop Simulation Environments

Excerpt – for full press release link to

http://www.mscsoftware.com/press/press.cfm?pid=1071&Div_ID=1&non=1

Upcoming Releases Enable Companies to Capture, Automate, and Disseminate Simulation Methods Upstream in the Design Process

SANTA ANA, Calif., June 16, 2008

MSC.Software (NASDAQ: MSCS)... today announced the upcoming R3 releases of SimXpert and SimDesigner. These two solutions are core components of the company's SimEnterprise offering that together allow analysts, designers, and suppliers to simulate more collaboratively across the extended engineering enterprise by enabling simulation methods and procedures to be captured, automated and reused across design teams.

SimXpert R3 enhances the ability for analysts to capture and automate simulation methods and procedures via templates - within a completely integrated simulation workspace environment. Once methods are captured, simulation best practices can then be disseminated across the extended enterprise. Companies can create repeatable simulation processes so analysts can now focus on other high-value product validation requirements during product development. It also creates gold standard simulation methods for suppliers and others involved in design and analysis to follow. The result is more accurate analysis across the enterprise, better use of resources, and more confidence in simulation results.

Through improved integration with SimXpert and expanded CAD platform

support in SimDesigner R3, designers and suppliers working in the CAD environment gain direct access to easy-to-use simulation templates. Thus they can perform first pass analysis with higher degrees of confidence, better comprehend and use analysis results to drive smarter design decisions, innovate more by exploring more "what-if" scenarios, and expedite time to market by identifying design flaws earlier in the design process.

"SimXpert and SimDesigner are integral components of MSC.Software's SimEnterprise," said Bill Weyand, chief executive officer, MSC.Software. "Through these solutions, engineers become more efficient with simulation best practice capture and reuse, thereby saving both time and money. MSC.Software is committed to enhancing our core technology to meet customer needs and evolving the solution set to help customers increase business value and innovation by taking the path forward to enterprise simulation with SimEnterprise."

"The template process automation capabilities available within SimXpert are superior to any other solution on the market," explained Glenn Wienkoop, President of MSC.Software. "The ability to retrieve, execute, and post process templates in the CAD environment using

SimDesigner is unique in the industry. Giving designers the ability to accurately perform simulation means specialists are free to focus on more advanced simulation requirements or high value projects, more resources are available to validate design performance, so more concepts can be checked during the design process, and more new products can be developed concurrently with the same number of resources. This adds significant value by moving validation earlier on in the design process, reducing time to market and positively impacting the bottom line."

About MSC.Software Corporation

MSC.Software (NASDAQ: MSCS) is the global leader of enterprise simulation solutions, that help companies make money, save time and reduce costs associated with designing and testing manufactured products. MSC.Software works with thousands of companies in hundreds of industries to develop better products faster by utilizing information technology, software, services and systems. MSC.Software employs more than 1200 people in 23 countries. For additional information about MSC.Software's products and services, please visit www.mscsoftware.com.

Safe Harbor Language

This press release contains forward-looking statements, including all statements relating to the features, benefits, capabilities and performance of MSC.Software products. These statements are subject to risks and uncertainties that could cause actual results to be materially different than expectations. Such risks and uncertainties include, but are not limited to, changes in technology, the end-user computing and analysis environment, implementation and support that meet evolving customer requirements, general

industry trends and the impact of competitive products.

Furthermore, information provided herein, which is not historical in nature, are forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. All such forward-looking statements are based largely on management's expectations and are subject to and qualified by risks and uncertainties that could cause actual results to differ materially from those expressed or implied by such statements. The Company undertakes no duty to update any forward-looking statement to conform the statement to actual results or changes in the Company's expectations.

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LS-DYNA® Support Site Technical Update

For Complete information visit www.dynasupport.com

Negative Volume in Brick Elements

Brick elements and foam materials (or other soft materials)

Comments regarding these notes can be directed to jday@lstc.com

In materials that undergo extremely large deformations, such as soft foams, an element may become so distorted that the volume of the element is calculated as negative. This may occur without the material reaching a failure criterion. There is an inherent limit to how much deformation a Lagrangian mesh can accommodate without some sort of mesh smoothing or remeshing taking place. A negative volume calculation in LS-DYNA will cause the calculation to terminate unless **ERODE** in ***CONTROL_TIMESTEP** is set to 1 and **DTMIN** in ***CONTROL_TERMINATION** is set to any nonzero value in which case the offending element is deleted and the calculation continues (in most cases). Even with **ERODE** and **DTMIN** set as described, a negative volume may still occur and cause a premature termination.

Some approaches that can help to overcome negative volumes include the following.

Simply stiffen up the material stress-strain curve at large strains. This approach can be quite effective.

Sometimes tailoring the initial mesh to accommodate a particular deformation field will prevent formation of negative volumes. Again, negative volumes are generally only an issue for very severe deformation problems and typically occur only in soft materials like foam.

Reduce the timestep scale factor. The default of 0.9 may not be sufficient to prevent numerical instabilities.

Avoid fully-integrated solids (formulations 2 and 3) which tend to be less stable in situations involving large deformation or distortion. (The fully integrated element is less robust than a 1-point element when deformation is large because a negative Jacobian can occur at one of the integration points while the element as a whole maintains a positive volume. The calculation with fully integrated element will therefore terminate with a negative Jacobian much sooner than will a 1-point element.)

Use the default element formulation (1 point solid) with type 4 or 5 hourglass control (will stiffen response). Preferred hourglass formulations for foams are:

type 6 with coef. = 1.0 if low velocity impact

types 2 or 3 if high velocity impact

Model the foam with tetrahedral elements using solid element formulation 10.

Increase the **DAMP** parameter (foam model 57) to the maximum recommended value of 0.5.

Use optional card B of `*CONTACT` to turn shooting node logic off for contacts involving foam.

Use `*CONTACT_INTERIOR`. A part set defines the parts to be treated by `*CONTACT_INTERIOR`. Attribute 4 (`DA4` = 5th field of Card 1) of the part set defines the `TYPE` of `*CONTACT_INTERIOR` used. The default `TYPE` is 1 which is recommended for uniform compression. In version 970, solid formulation 1 elements can be assigned `TYPE=2` which treats

combined modes of shear and compression.

If `*MAT_126` is used, try `ELFORM=0`.

Try `EFG` formulation (`*SECTION_SOLID_EFG`). Use only where deformations are severe as this formulation is very expensive. Use only with hex elements.

See also: [external-linkinstability.tips](#) on support site

LS-PrePost® UPDATE 2008

<http://www.lstc.com/lsp>

LS-PrePost® was designed to provide the following core functionalities:

- ▶ Full LS-DYNA® keyword support
- ▶ LS-DYNA model visualization
- ▶ LS-DYNA model creation and editing
- ▶ Advanced post-processing

LS-PrePost's main post-processing capabilities include states result animation, fringe component plotting, and XY history plotting.

LS-PrePost is also capable of importing and exporting data in a number of common formats. The figure on the right illustrates a sampling of those that a typical user might find most useful.

29-May
Added Metal Forming Application tutorial

26-May
Added Mass Tr Interface

26-Mar
Added visualization of *AIRBAG_REFERENCE_GEOMETRY on Page D

18-Mar
Updated the Trace Interface to make use of the General Selection panel

12-Mar
Updated the Toggle Menu with a more intuitive "check" system

29-Feb
Added coincident node picking and made node/element picking significantly faster and easier. More details...

23-Jan
Added *Split Solid* option to the EEdit Interface to allow splitting of hex and penta elements

01-Jan
Started work on LS-PrePost 2.3. Version 2.2 will be updated with bug fixes, but new features will be added to 2.3 only.

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		
HP IA64	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 having 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*Environment 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. Joint solution can also be used in conjunction with a full suite of Virtual Product Development tools via a flexible, cost-effective MSC.MasterKey License System.

MSC.Software - MSC.Nastran/SOL 700

The MSC.Nastran™ 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. Gateway for LS-DYNA supports explicit nonlinear analysis such as crash, drop test, and rigid wall analysis.

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.

EASi-CRASH DYNA

EASi-CRASH DYNA is the first fully integrated environment for crashworthiness and occupant safety simulations with LS-DYNA, and covers the complete CAE-process from model building and dataset preparation to result evaluation and design comparisons.

EASi-CRASH DYNA can be used for concept crash, FE crash and coupled rigid body/FE crash simulations in conjunction with MADYMO.

Full capability to handle IGES, CATIA V4, CATIA V5, UG and NASTRAN files.

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.

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.

Hewlett Packard: Personal computing, mobile computing, network management, 3-D graphics and information 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

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.

Microsoft: For customers solving complex computational problems, Microsoft Windows Compute Cluster Server 2003 accelerates time-to-insight.

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

FEA Information Participants – **Company name takes you directly to Website**

Detroit Engineered Products: A Michigan based engineering consulting and software products firm specializing in the area of Product Development products and solutions.

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 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

LS-DYNA® Software Distributors - Alphabetical order by Country

Australia	<u>Leading Engineering Analysis Providers</u>
Canada	<u>Metal Forming Analysis Corporation</u>
China	<u>Arup</u>
Germany	<u>CAD-FEM</u>
Germany	<u>DynaMore</u>
India	<u>Oasys, Ltd.</u>
Italy	<u>DynaMore</u>
Japan	<u>The Japan Research Institute</u>
Japan	<u>ITOCHU Techno-Solutions Corporation</u>
Korea	<u>Theme Engineering</u>
Russia	<u>State Unitary Enterprise - STRELA</u>
Sweden	<u>Engineering Research AB</u>
Taiwan	<u>Flotrend Corporation</u>
USA	<u>Engineering Technology Associates, Inc.</u>
USA	<u>Dynamax</u>
USA	<u>Livermore Software Technology Corp.</u>
UK	<u>ARUP</u>

Consulting and Engineering Services

Australia Manly, NSW	<u>Leading Engineering Analysis Providers (LEAP)</u> Greg Horner info@leapaust.com.au 02 8966 7888
Canada Kingston, Ontario	<u>Metal Forming Analysis Corp. - (613) 547-5395</u> Chris Galbraith galb@mfac.com
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USA Windsor, CA	<u>SE&CS - (707) 837-0559</u> Len Schwer len@schwer.net
USA Troy, MI	<u>Engineering Technology Associates, Inc:</u> (248) 729-3010
USA Corvallis, OR	<u>Predictive Engineering - (1-800) 345-4671</u> George Laird george.laird@predictiveengineering.com
USA Troy, MI	<u>Detroit Engineered Products</u> (248) 269-7130
USA Austin, TX	<u>Friedman Research Corporation</u> (805) 683-1300
USA Neenah, WI	<u>Structure Technology</u> (920).722.7060
USA Waterbury, CT	<u>CAE Associates, Inc</u> (203) 758-2914

Educational & Contributing Participants

Alphabetical Order By Country

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Italy	Professor Gennaro Monacelli	Prode – Elasis & Univ. of Napoli, Federico 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

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

LSTC Training Classes in California & Michigan

	California	Michigan
Advanced Impact	Aug 5-8	
Advanced Option		Dec 15-16
ALE/Eulerian & FSI	July 16 - 18	
Blast & Penetration	Aug 18-19	
Composite Materials	June 25-26	
Concrete & Geomaterial Modeling	Sept 25-26	
Contact	Aug 14-15	Sept 16-17
Heat Transfer & Thermal-Stress		
Implicit	Aug 12-13	
Intro to LS-DYNA [®] LS-PrePost [®] (no fee)	LS-PrePost July 21 July 22-25 LS-PrePost Nov 10 Nov 11-14	LS-PrePost Sept 08 Sept 09-12 LS-PrePost Dec 08 Dec 09-12
Intro to LS-OPT [®]	Sept 09-14	
Material Modeling Using User Defined Options	June 30-July 01	
Mesh Free Methods (SPH & EFG)		

The "1st International Conference on Hot Sheet Metal Forming of High performance Steel, October 22-24, 2008, Kassel, Germany"

The ongoing demand towards the application of high-performance steel and, beyond that, towards steel parts with tailored properties leads inevitably to a demand for improved metal forming technologies. Among these technologies hot sheet metal forming is gaining increasing importance. The technological reason for that can be seen in the ability not only to improve formability at elevated temperatures but especially in the potential of simultaneous control of complex micro structures during thermo-mechanical processing. This of course involves challenges in terms of tailored properties through optimization of varying microstructure over the overall part geometry. As the first in a series of international conferences, to be

alternatively held in Kassel and in Luleå, will highlight these multiple aspects from a scientific as well as from an industrial viewpoint.

[Website](#) [Conference Invitation - pdf](#)

Conference Secretary Contact Information

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