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COVER STORY

ENGINEERING AT ITS BEST

PRODUCT SPOTLIGHT

PERSONAL ROBOT

CONFERENCE SPOTLIGHT

THE 9TH INTERNATIONAL LS-DYNA

USERS CONFERENCE

JUNE 4-6, 2006

FEA Information Worldwide Participants

Contents

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FEA Information Announcements

We welcome a new Particpant:

Predictive Engineering: A mechanical engineering consulting company specializing in finite element analysis (FEA). Under this banner, a broad range of capabilities are brought to bear in developing predictive engineering models via expertise in thermal/fluids (CFdesign), drop-testing and impact analysis (LS-DYNA), and static/dynamic/nonlinear/thermal structural analysis (FEMAP / NX.Nastran). Headquartered in Corvalis, Oregon, USA

LSTC 9th International LS-DYNA Users Conference 2006:

www.ls-dynaconferences.com

Call for Papers on Page and can be downloaded from our conference site:

FEA Information New Developments in LS-DYNA series Continued:

LS-DYNA NEWS – Part 3. Each month, for those readers that have missed LS-DYNA conferences, we will be providing information directly from the Power Point slides at the conferences.

Two new participants have been added to our China sites:

www.feainformation.cn

- Oaysis Software in China
- Zhong Guo ESI Co., Ltd in China

Sincerely,
Trent Eggleston & Marsha Victory

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LS-DYNA News – Part 3
Version 971 Developments

***MAT_viscoelastic_thermal**

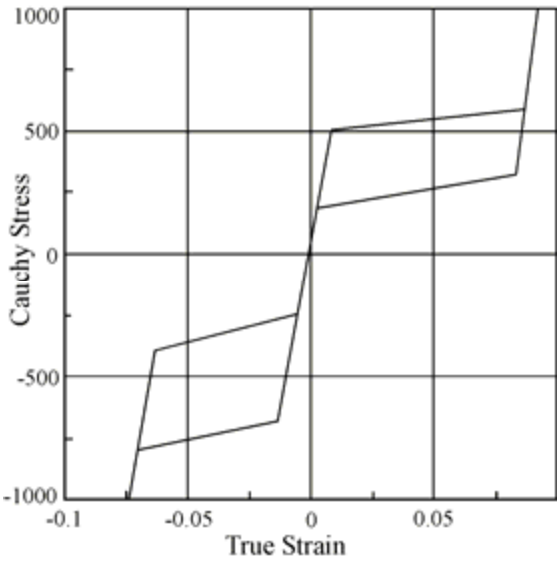
- Viscoelastic model with up to 12 terms in the prony series expansion
- The Arrhenius and Williams-Landau-Ferry shift functions account for the effects of the temperature on the stress relaxation

$$\Phi(T) = \exp(-A\{\frac{1}{T} - \frac{1}{T_{REF}}\}) \qquad \Phi(T) = \exp(-A\frac{T - T_{REF}}{B + T - T_{REF}})$$

- Material type 175

***MAT_shape_memory**

- Shape-memory alloys undergo large deformations with a full recovery in loading-unloading cycles
- Now implemented for shell elements for use in new European side impact dummy



Orthotropic viscoplastic & Damage

- Now available for solid elements:
  - *MAT_SIMPLIFIED_JOHNSON_COOK
  - *MAT_PLASTICITY_WITH_DAMAGE
- Damage evolves monotonically in principle strain directions in tension only. Orthotropic behavior after failure (prior to rupture).
  - Better correlation with experimental data
  - Failure occurs in tensile regions, not compressive regions
  - Consistent results with minor input change

***Mat_3=parameter_barlat**

- Three new hardening options have been added
  - The Voce equation:

    $$\sigma_Y(\varepsilon_p) = a - be^{-c\varepsilon_p}$$

  - The Gosh equation

    $$\sigma_Y(\varepsilon_p) = k(\varepsilon_0 + \varepsilon_p)^n - p$$

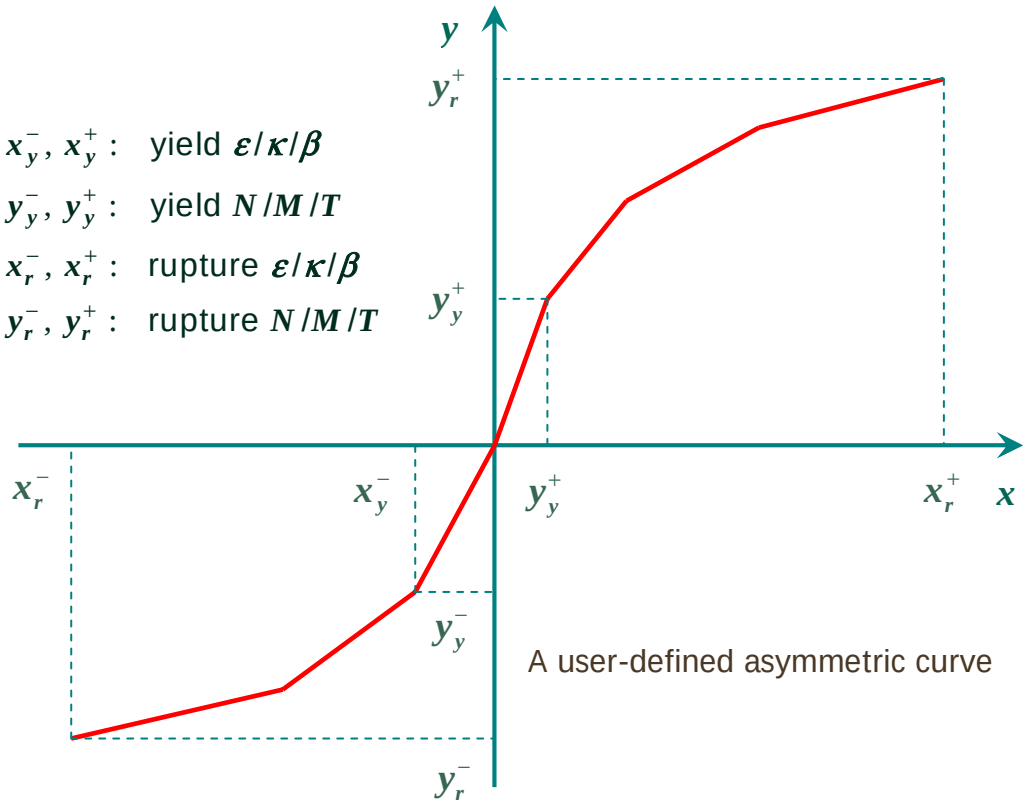
  - The Hocket-Sherby equation

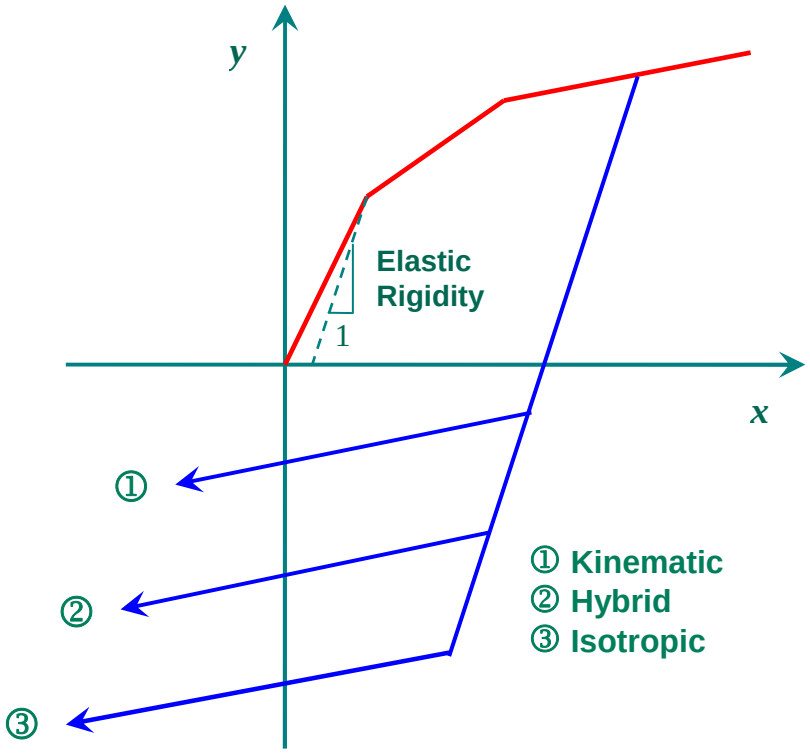
    $$\sigma_Y(\varepsilon_p) = a - be^{-c\varepsilon_p^n}$$

***Mat_moment_curvature_beam**

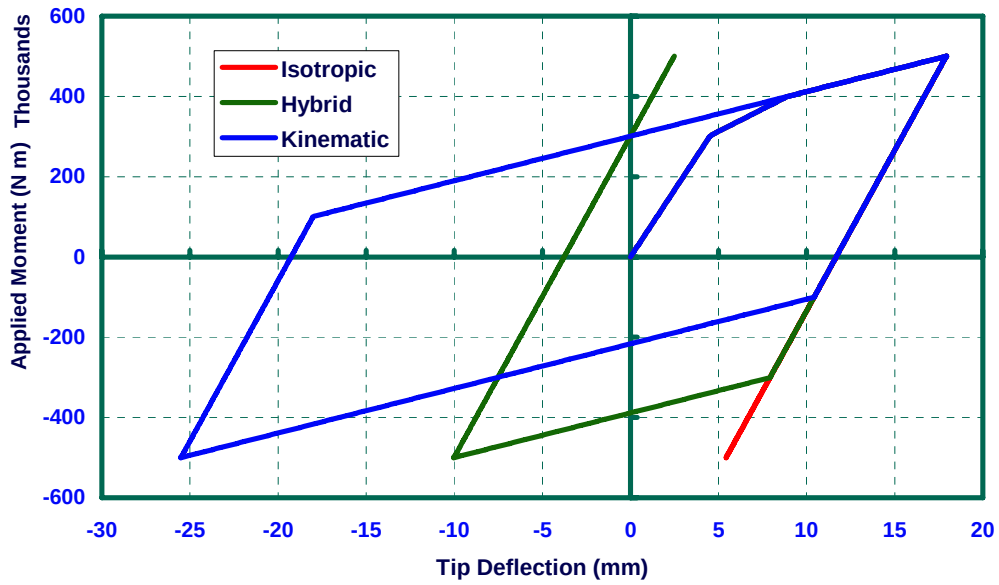
- Perform nonlinear elastic or plastic analysis for Belytschko-Schwer beams. Material type 166
- User-defined axial force-strain, moment-curvature, torque-twist rate curves or yield surfaces.
- The curves must be strictly increasing; are treated in LS-DYNA as linear piecewise functions.
- Material hardening rule can be either isotropic, kinematic, or hybrid.
- All hardening rules work for multi-linear yield curves.
- To predict rupture effective plastic strains, curvatures, or twist rate are used to control failure.
- The points closest to the origin also serve as first-yield points.
- In case strain/curvature/twist is out of range, use extrapolation.
- Cyclic hardening behavior of beams or frames

***Mat_moment_curvature_beam**





***Mat_moment_curvature_beam**

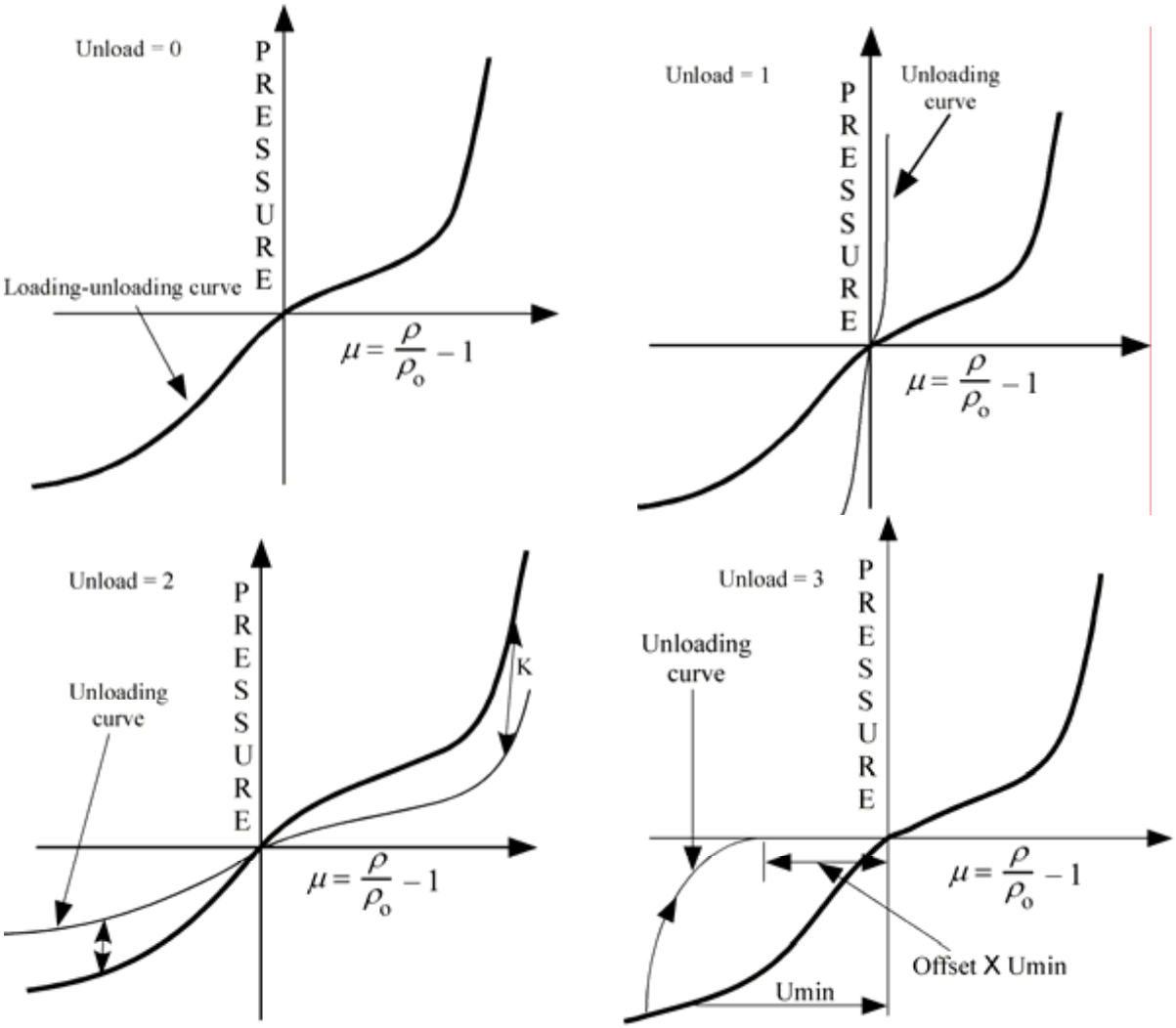


***EOS_gasket**

- For modeling the response of thick shells where the through thickness, normal stress is nonlinear under compression and tension.
- The normal stress is completely decoupled from the shell material in the local co-ordinate system of the shell, this model defines the normal stress, s_{zz}
- In plane stress components are determined from the shell constitutive model
- Use with the thick shell with selective-reduced integration (ELFORM=2 on SECTION_TSHELL)
- May also be used with solid elements as an equation-of-state to determine pressure

***Eos_gasket**

Loading and unload behaviors for normal stress



***Section-beam**

- Additional built in sections are now available

Type01: I-shape	Type12: Cross
Type02: Channel	Type13: H-shape
Type03: L-shape	Type14: T-shape1
Type04: T-shape	Type15: I-shape2
Type05: Tubular box	Type16: Channel1
Type06: Z-shape	Type17: Channel2
Type07: Trapezoidal	Type18: T-shape2
Type08: Circular	Type19: Box-shape1
Type09: Tubular	Type20: Hexagon
Type10: I-shape1	Type21: Hat-shape
Type11: Solid box	Type22: Hat-shape1

***Integration_beam**

Built-in integration rules are also available for all 22 sections. Before, the first 7 were supported.

Type 01: I-shape	Type 12: Cross
Type 02: Channel	Type 13: H-shape
Type 03: L-shape	Type 14: T-shape1
Type 04: T-shape	Type 15: I-shape2
Type 05: Tubular box	Type 16: Channel1
Type 06: Z-shape	Type 17: Channel2
Type 07: Trapezoidal	Type 18: T-shape2
Type 08: Circular	Type 19: Box-shape1
Type 09: Tubular	Type 20: Hexagon
Type 10: I-shape1	Type 21: Hat-shape
Type 11: Solid box	Type 22: Hat-shape1

Engineering At Its Best

The complete article with many more inventions can be read on the website of Varmint Al **http://www.varmintal.com/apopt.htm**

Al worked for 30 years at the Lawrence Livermore National Laboratory. For most of that time, he worked performing engineering structural analysis on complex systems.

A Tribute to my Dad - POP IS A WELDER....

Pop learned how to weld in about 1938. He had a small welding shop in Oildale, CA for a couple of years. During the WWII years he was classified as "Essential" and worked in the oil fields welding pipe lines used to supply oil for the war effort. During this period everything was rationed and Pop learned that if you needed something it was best to build it your self. Pop became an artist with an acetylene torch and an arc welding machine. The pictures on this page of the hardware were taken in 2002 and all of the hardware is still there in Bakersfield, CA.

POP'S 4WD WELDING TRUCK....

After WWII, Pop bought an surplus military 4WD truck and converted it into his welding truck. It could go almost anywhere. When school was out, he would often take me out on jobs in the oil fields with him. He had a big two-trumpet air horn on top and on the way home, he would toot it about a block away and we would know he was coming home. I still have dreams about him letting me drive the truck and letting me use the 4WD.

NEEDED A TRACTOR.... We had 5 acres and Pop needed a tractor, so we made one. It had a '39 Plymouth 6 cylinder L-head engine, a Dodge truck transmission, a Studebaker front axle, 6" heavy wall pipe frame and the rear end was out of a White truck. Pop got two tires about 5 feet in diameter from a motor grader for the rear wheels (one had a bald spot where part of the tread was ripped off). Well, when it was all put together, we fired it up and it would go about 15 MPH in first and 40 MPH in second gear (making the whole tractor bounce from the flat spot on one tire) and you couldn't begin to get it into third or fourth gear.

GEAR REDUCTION BOX....

Not to be discouraged, Pop got some big gears and we built a gear reduction box between the transmission and the rear end. I did the machine work on the 10" Atlas lathe, making the hubs that were welded into the box to hold the ball bearings and seals. When it came time to put a cover on the gear box, Pop just welded the cover on. It had half inch thick end plates, a fill plug in the top (right side of the picture) and a drain hole in the bottom and welded on cover and it was strong. It didn't leak and you could hoist the tractor in the air by the transmission if you wanted. It was positioned just right for the foot rest while driving the tractor.

WE DISCOVERED MOLY GEAR OIL....

With the new gear box, the tractor would go so slow in first gear that you had to almost reach out and feel the top of the tires to see if it was moving. But it was just right for plowing in 3rd gear with plenty of pulling power. When we built the gear box, we meshed the gears a tad too close, center-to-center and it made a lot of noise and after about 15 minutes of plowing, it got so hot, you couldn't put your feet on it. That is when I learned about molybdenum disulfide as a lubricant. Pop got some used Moly transmission oil and put it in the gear box and what a change!. The noise was greatly reduced and the gear box would keep your feet comfortably warm.

MY FIRST CAR.... I got to drive this 39 Plymouth Sedan when I was about 12 years old. No, I didn't get to drive in on the road, but there are a lot of places to drive on 5 acres. I did get a drivers license when I was 16. This was my pride and joy. Later in high school, I got to drive it to school. I completely rebuilt the engine a couple of times. I bet the reader doesn't know where his first car is located. It is still sitting there on the 5 acres. I still had it when I started to college and went to Berkeley for my Freshman year. It would do 40 mph without any problem, but any faster than that would cause engine trouble. On the Christmas break, I was driving back to Bakersfield from Berkeley and about Madera, on HW-99, I followed a guy for a long ways that was doing about 39 mph. I got impatient and revved it up to about 45 mph and passed him. It felt so good going that fast that I just left it there.

About 5 miles of that and I burned out a connecting rod. I had to call Pop and he came up to Madera with his welding truck and towed me all the way home in the middle of the night. Pop wasn't happy about that. I spent the whole vacation time rebuilding the engine. That was not what I had planned for.

THE SHOP.... Pop built the welding and machine shop out of pipe and sucker rod from the oil wells and covered with tin. When he was building it, he made each pipe joint air tight and connected the volumes. The shop structure is also a 60 gallon compressed air tank with a quick connect air outlet at each upright. Working with iron and steel, everything of any size was heavy. Pop got the old "Mac" A-Frame truck from the old oil well worker, who had an oil well across the street from us and put a De Soto engine in it. It still runs, but the battery has to be charged before it will start.

I sure am proud of Pop. He is a good and honest man. My whole childhood was one big long father and son project.

Thank you, Pop.

NEC's Partner-Type-Personal Robot

Reprinted from http://www.nec.com/global/features/index13/index.html ©NEC

PaPeRo was named after an acronym of "Partner-type Personal Robot." It is a prototype "Personal robot" that communicates with human beings as one of the family members at home. Since 1997, NEC Multimedia Research Laboratories have been conducting research on "Personal Robots" and developed the first prototype "R100" in July 1997 and its descendant "PaPeRo" in January 2001.

In the course of in-depth evaluations with PaPeRo, we focused on the human-robot interactions in the real environment encountered at home. Based on the data and insights in the evaluations, the new PaPeRo with more sophisticated human-robot interaction capabilities has been developed

It checks your email, tunes the TV to your favorite channel, and dances with your children. This egg-shaped robot named PaPeRo knows your favorite football team and searches the Internet for the day's lineups and scores when you get home. It will also develop a personality depending on how you treat it. Speak to it nicely and stroke its head sensors and PaPeRo will learn to love you.

Communicating with PaPeRo is easy. There's no need for traditional human interfaces like keyboards, mice, or display screens. "You don't need to learn to use PaPeRo like a PC. You just need to talk to it," says Yoshihiro Fujita, senior manager at NEC's Multimedia Research Laboratories. Fujita says that PaPeRo grew out of NEC's ongoing research into better human interfaces with machines.

PaPeRo "hears" with four microphones, understands 650 phrases, and speaks more than 3,000. Its improved speech-recognition software works well in realistic environments, including noisy and hectic homes. PaPeRo's technology derives from proven NEC applications in telephone directory systems that use speech recognition, and in foreign language translation software for PCs and PDAs.

PaPeRo also identifies people it knows, using advanced face-recognition technology and two cameras for eyes. It maps faces until it achieves a match with a template in its memory, then greets the person by name. This face-recognition technology is also available as NeoFace, a software development kit for biometrics used for secure login access to office

computer networks and in airport security systems.

PaPeRo's additional strengths lie in NEC's RoboStudio, the software that powers its "brain." RoboStudio provides programming language and a virtual machine for developing robots and robot applications. By adding plug-ins, this flexible software creates a powerful and valuable robot development tool to save hardware manufacturers considerable time and money. RoboStudio software is currently available in the Japanese market.

"We envision a future with simpler interactions with technology," says Fujita. "Communication-centered robots like PaPeRo are just one example of a better designed and intelligent interface for the ubiquitous network of appliances and other digital devices that will one day be in every home."

The ways we will use technology--the interfaces of the future--hold exciting possibilities.

-- Networked appliances: Email recipes and directions for preparing dinner to a robot or computer and the "intelligent" appliances in your home cook the meal.

-- Security and safety: A home security system scans the faces of intruders to see if they are known visitors.

-- Healthcare: A personal robot that lives with the elderly or sick monitors a patient's vital signs and alerts a doctor if it detects any problems.

-- Education: Advanced and intelligent interfaces help children access the Internet for homework or creative projects. Robots talk to children about their day at school, play games, and dance.

Current interface technology limits robots to somewhat rudimentary intelligence and interactions, Fujita says. But there is plenty of room for innovation and growth. "At NEC we focus on the future by developing and refining our technology and software," he says. "We also work with respected universities and leading companies to make personal robots and other digital appliances more useful and intelligent. Our goal is to bring the best interface solutions to a ubiquitous network environment."

NEC Hardware and OS QA’d for LS-DYNA by LSTC.

NEC SX6	Super-UX

Intel: Bringing HPC to the masses

It has been more than a decade since the first 'Beowulf' cluster, built at NASA in 1994, brought high-end computational capabilities out of the glasshouse and into the computer laboratory. By linking up dozens of everyday Intel Architecture PCs and splitting up massive computational tasks between them, Beowulf clusters slashed the price of high performance computing (HPC) and set the stage for a flood of innovation that has quickly raised the bar of computing power to previously unthinkable heights.

When the first Beowulf cluster was created, the world's fastest computers were all built using RISC processors running on rarefied architectures engineered for speed and efficiency. Now, Intel-based HPC installations comprise 333 of the top 500 supercomputers in the world, as ranked by the industry-standard TOP500.org.

Architectural advantage

Intel Architecture servers aren't just on the list of Top 500, but dominate it from top to bottom.

Fully 79 of the systems on the list utilise Intel® Itanium® 2 processors: for example, NASA's 3rd-ranked Columbia system is an SGI® Altix® 3700 that uses 10,160 such processors, each running at 1.5GHz, to produce 51.87 teraFLOPs (trillion floating point operations per second).

The 26th-ranked system at the Australian Partnership for Advanced Computing (APAC), Australia's fastest supercomputer, is a SGI® Altix® 3700 Bx2 with 1536 Intel Itanium 2 processors running at 1.6GHz for a total of 8.974 teraFLOPs. And Pacific Northwest National Laboratory's 30th-ranked Mpp2 uses an HP®-designed cluster running 1936 Intel Itanium 2 processors to deliver 8.633 teraFLOPs.

"Intel's commitment to the HPC space is reflected in the increasing presence of our processors on the respected TOP500 list. The strong performance and cost-effectiveness of our processors have made them the favourite chips for desktop and server computers, and we're pleased that the scientific community has recognised their suitability for HPC applications as well". Intel is committed to providing the technology and the support needed to further strengthen our role in building the HPC systems that will solve the scientific mysteries of tomorrow."

Other Intel processors are proving equally popular within HPC circles: 32-bit Intel® Xeon™ processors power 177 of the TOP500 systems, including 25 of the top 100. For example, NCSA's 20th-ranked Tungsten is a Dell® PowerEdge™ cluster with 2500 Intel Xeon processors that delivers 9.819 teraFLOPs. The University of Southern California's 37th-ranked HPC system, built by IBM® and Sun Microsystems™, includes 2640 Intel Xeon 2.3 GHz processors in a Sun Fire™ V60 and IBM® xSeries® cluster for a total 7.291 teraFLOPs.

The scientific nature of most current HPC applications has led to many of the TOP500 systems being built on 64-bit architectures, which move data in larger chunks than 32-bit processors and can address much more memory. Intel's first entries into this space were the Itanium and Itanium 2 processors, but the HPC industry has responded well to an expansion of 64-bit computing across Intel's product line.

Just a year after their launch, 64-bit Intel Xeon processors already drive 77 of the TOP500 systems. For example, the University of Sherbrooke's 40th-ranked MP system is a Dell PowerEdge SC1425 cluster running 1152 64-bit Intel Xeon EM64T processors at 3.6GHz, for a total output of 6.888 teraFLOPs.

Ease of development

Early Beowulf clusters were built by dedicated systems engineers that orchestrated communications between dozens of standard workgroup servers. These clusters often ran highly optimised versions of the Linux operating system, which supported custom-built applications for splitting tasks between cluster nodes. Techniques for making Beowulf work were well understood, but systems required considerable customisation.

All that has changed, however after more than a decade of innovation, HPC techniques are better understood and the supporting infrastructure is no longer esoteric equipment. Myrinet, Intelliband and even standard Gigabit Ethernet interconnects are readily available to provide high-speed data backplanes, and many vendors offer HPC systems as standard elements of their product ranges.

As the innovator behind the most cost-effective processors for HPC systems, Intel now provides a full range of hardware, software and services to help organisations build and utilise such systems. That includes a complete range of compilers, debuggers, and optimising tools for single and dual-core, 32-bit and 64-bit processors with Intel Xeon and Intel Itanium based processors. Intel Solutions consultants back this technology with a broad range of consulting and collaboration services to ensure that systems are build and installed to specification.

Designs using large clusters of low-cost processors have revolutionised the HPC space, giving researchers, governments and large corporations unprecedented computational power to tackle the most complex design, engineering, simulation and analysis tasks known to mankind.

As the latest TOP500 results show, Intel's ability to innovate in this space has been critical in putting this computational power into the hands of those that need it. Intel's ongoing commitment to the market will see it delivering ever more-powerful HPC solutions that continue to set new price/performance benchmarks and advance the HPC state-of-the-art.

For more information on Intel and High Performance Computing

Intel High Performance Computing: http://www.intel.com/go/hpc

Intel Itanium 2 processor:
http://www.intel.com/business/bss/products/server/itanium2/index.htm

Intel Xeon processor:
http://www.intel.com/business/bss/products/server/xeon/index.htm

Intel based HPC Platform Options
ttp://www.intel.com/business/bss/swapps/hpc/Solution_Brief7.pdf

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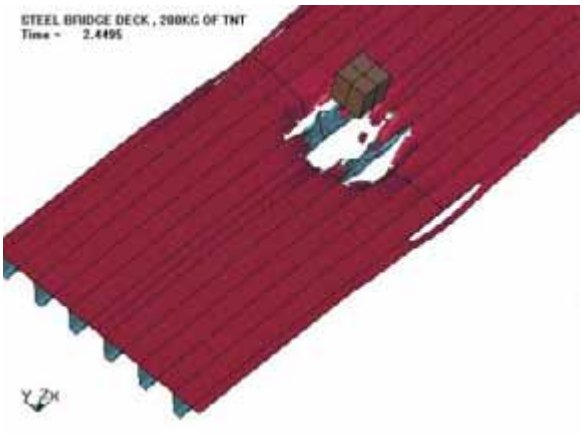
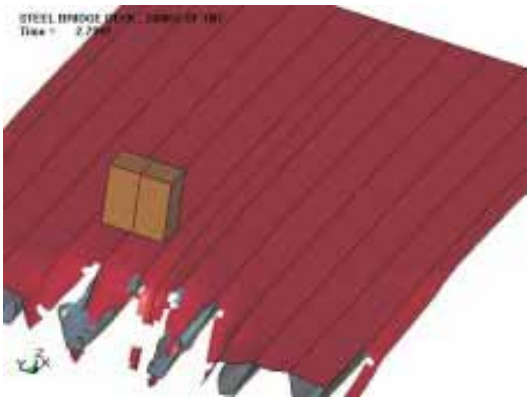
*Starting price is in U.S. dollars for an SGI Altix system with 12 Intel Itanium 2 processors, including paid-up LS-DYNA and PBS-Pro licenses. Tax and shipping not included. Bundle only available in North America through Silicon Graphics, Inc. This promotion is limited and subject to change without notice. Certain restrictions apply. Silicon Graphics, SGI, Altix and the SGI logo are registered trademarks and NUMAlink is a trademark of Silicon Graphics, Inc. in the U.S. and /or other countries worldwide. Intel and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Linux is a registered trademark of Linus Torvalds in the U.S. and other countries. Car and airbag models were developed by FHWA/NHTSA National Crash Analysis Center of the George Washington University. CH-47 Helicopter Water Impact Simulation is courtesy of The Boeing Company. Copyright © 2005 Livermore Software Technology Corporation and Silicon Graphics, Inc. All Rights Reserved.

FEA Information AVI Library

AVI 612 & 612A Fragmentation





Complete Information with technical notes can be found on our site: www.ls-dyna.com under the side bar menu link fragmentation

DECK OF A STEEL BRIDGE AND NEAR-SURFACE DETONATION
Technical Note No.50

The question of how much damage a particular explosive charge can inflict is always an interesting one. Here is a case of a 200 kg TNT charge, shaped as a cube, exploding low over a deck of a generic bridge. The base of the charge is positioned about as high as a floor of a sizeable van.

Asia Pacific News

Altair India: designs beyond the ordinary

Excerpt with permission from:
Vinutha V (c) Copyright Express Computer On line, 2005
www.expresscomputeronline.com

Altair Engineering is spreading its wings beyond the automotive sector. The company sees FMCG and consumer electronics as emerging areas of growth, says Vinutha V

The Indian automotive component industry's exports have never been quite as good as they are today. According to the Associated Chambers of Commerce and Industry of India, the global auto component industry is likely to grow to about $1.9 trillion by 2015. Of this, about 40 percent ($700 billion) will be sourced from low-cost countries such as India. Reports from Morgan Stanley and Merrill Lynch add that manufacturing capabilities for auto components involving design and multiple stages of machining and assembly can also tap into this trend—and that's where Altair is focussing heavily.

Altair Engineering, the Indian subsidiary of Altair Engineering Inc which offers computer aided engineering (CAE) products and solutions, is excited about the Indian auto component exports market. Within four years of commencing operations in India, Altair says it has a 25 percent share in the CAE space.

Nelson Dias
Managing Director
South Asia, Altair Engineering

Since safety measures and regulations are becoming mandatory, companies will be keen on impact-and-crash analysis. This gives us the confidence of our growth.

Initially though, acquiring customers was not easy for the company. Recalls Nelson Dias, the company's Managing Director for South Asia, "The penetration level and familiarity with CAE products were too low. We had to tackle business and educational challenges in convincing customers about the services and implementation of CAE." Until late 1990s, auto component manufacturers were creating physical prototypes. Additionally, for simulation and analysis, they were dependent on CAD models which were used as validation tools more than anything else. Appropriate promotional activities helped the company dust off the challenges.

Of its operations worldwide, India is the only centre with all the different divisions that exist in the US—software development, product design and development, grid computing, and an international support centre. Altair has three different types of customers for design optimisation and simulation analysis—OEMs such

as GM and Telco; captive units of tier-I suppliers including Delphi, Johnson Controls and Vistion; and engineering service providers such as Infosys and Satyam which conduct virtual prototyping tests for other clients.

Offshore development centre

Altair's Indian offshore development centre is its second largest outside the US. It contributes in developing and testing different components of the HyperWorks software suite. The centre also does customised development for customers in India, Britain, the US, Germany, Japan and South-east Asia. Three engineers of Altair India's engineering services division were also involved in designing the Airbus A380. Currently, only the software prototype is ready for the Airbus project; the physical prototype is yet to be done. Altair was also involved in the CAE/Virtual prototyping phase of the product development cycle for Scorpio, Mahindra's multi-utility vehicle.

Several global automotive OEMs such as GM and Ford are sourcing auto component design services to India, which is known for its high-end engineering and simulation projects. Says Rajneesh Shinde, Altair's Director of Marketing, "The use of simulation in manufacturing is still evolving in India. As global customers make simulation mandatory, it is driving Indian auto ancillary and component suppliers to look at upgrading their tool rooms." Altair is also taking a few industry initiatives to familiarise industry folk with the simulation process. A small supplier who cannot afford simulation tools can use and get a feel of them at Altair's industry learning centres. The company has developed joint ventures with industries to promote simulation tools. Two such centres are at Caparo Maruti, Delhi, and Electro Pneumatics & Hydraulic (India), Pune. In grid computing, Altair has a presence in education, defence and animation.

Beyond automotive and aeronautics

For an FMCG manufacturer, breakage of goods during transportation is a major problem. To avoid losses on this account, design optimisation is being looked at seriously by most companies. Altair is running a few pilot projects in India with FMCGs. Another potential area is the manufacturing of electronic goods—mobile phones, TV and PC modems, and stereos. Regulatory compliance for design and breakage is being made compulsory in this segment, and Altair sees it as an emerging area. The company already has an Indian OEM, Samtel, which supplies TV and PC modems to manufacturers.

Value engineering is a concept that refers to saving cost and improving quality. In the product design arena, capturing best practices is a major challenge. Altair therefore aims to address this by offering process automation. Explains Shinde, "Process automation enables automated best practices in the product design process without compromising on creativity."

Industrial design is a bit of an art; it requires engineering skills and creativity to make products look attractive and functional. Companies have dedicated teams to look after this aspect, but they lack the required infrastructure, which is why Altair has also been doing industrial design at its facility in Bangalore. Now it plans to set up a full-fledged industrial design studio in India to cater to domestic customers, after which design work from other countries will be outsourced to India.

On a roll

Rajneesh Shinde,
Director, Marketing,
Altair Engineering

As global customers make simulation mandatory, it is driving Indian auto ancillary and component suppliers to look at upgrading their tool rooms.

Of its total business in India, automotive contributes 60 percent, 25 percent comes from aerospace, and the rest is shared between the education and defence sectors. The Indian subsidiary of Altair contributes about 6 percent of its global business. Considering the availability of skill-sets in the country, Altair wants to expand its engineering headcount in India. From the current base of 50 people, the team in India is expected to grow to 180 by 2005-end; it plans to add another 70 by 2006-end. Meanwhile, the company has grown its Indian revenues from a small base of Rs 3 crore in 2001 to Rs 25 crore in 2004-05, and plans to double this by 2008.

In the past, product development in India was fairly restricted with only a few OEMs working on product development. Now a flurry of activity is taking place to gain customer confidence and trust. The whole mindset about simulation has changed, and Altair is all set to grab this opportunity.

According to a report from Daratech Inc, the PLM market worldwide is worth $8 billion, within which CAE has a 12 percent share. If the worldwide CAE market is growing at 25 percent, in India the trend is much the same. Concludes Dias, “From an offshore development standpoint, our aim is to file patents for intellectual property in the components space. We are confident of maintaining a steady revenue growth. Of late, India is also looking at cutting-edge technologies in manufacturing. Many MNCs and design houses are coming to India. As safety measures and regulations are becoming mandatory across automobiles, FMCGs and consumer electronics, companies will be keen on impact-and-crash analysis. This gives us the confidence to grow.”

vinutha@expresscomputeronline.com

FEA Information Posted Publications

Full papers are on line at www.feapublications.com
Side bar menu link "featured"

A Failure Criterion For Polymers and Soft Biological Materials

Authors: William W. Feng – John O. Hallquist, LSTC

Keywords: failure criterion, strain invariants, Cauchy strains, membrane tests, LS-DYNA

Abstract:

A failure criterion, for polymers and soft biological materials subjected to very large deformation, is presented in this paper. The criterion is written in terms of the strain invariants in finite elasticity. Experimental tests for determining the failure criterion of a material and some numerical results from LS-DYNA are shown.

Application of SynfiniWay Grid Platform for iterative LS-DYNA studies

Authors: E. Deguemp, Fujitsu Systems Europe – M. Adoun, V Lapoujade, CRIL Technology

Keywords: Workflow, iterative study, remote computing, ALE, ballistic

Whether end-users need to access local or remote systems, to use a batch system or to run jobs interactively, they will always raise the same questions: "Which system can I run my job on?" and "How do I get data to the machine where my job will execute?" Users should only need to know what applications they want to run and where the inputs for these applications are located. To answer these needs, Fujitsu markets a middleware product called SynfiniWay which hides all issues related to CPU location, and allows execution of complex applications via workflows.

The conclusion of this paper is that the SynfinWay middleware can solve LS-DYNA iterative problems: the search for an optimal mesh size or successive LS-DYNA calculations with modified initial conditions. SynfinWay provides an infrastructure to execute these studies automatically and transparently on remote computers (grid computing).

New Book Announcement:

Elastic and Elastoplastic Contact Analysis:
Using Boundary Elements and Mathematical Programming

Southampton, UK – This book presents a general and elegant elastic and elastoplastic analysis method for the treatment of two- and three-dimensional contact problems between two deformable bodies undergoing small displacements with and without friction. The method uses the Boundary Element Method (BEM) and Mathematical Programming (MP). Numerical results are given and compared with available results to demonstrate the efficiency and the accuracy of the method. The book will be of interest to postgraduate students, researchers and professionals involved in contact stress analysis and computational mechanics technology.

Elastic and Elastoplastic Contact Analysis: Using Boundary Elements and Mathematical Programming is Volume 45 in WIT Press's Topics In Engineering book series.

WIT Press is a major publisher of engineering research. The company prides itself on providing information by leading researchers and scientists at the cutting edge of their specialties, enabling readers to remain at the forefront of scientific developments.

Full contents details can be found at
http://www.witpress.com/acatalog/7337.html

Book Information

- **Title**: Elastic and Elastoplastic Contact Analysis: Using Boundary Elements and Mathematical Programming
- **Edited by**: ALI FARAJI, University of Tehran, Iran
- **Publisher**: WIT PRESS - **www.witpress.com**
- **Availability**: Immediate
- **ISBN**: 1-85312-733-7
- **Pages**: 144pp
- **Price**: £48.00 / Euros 72.00 / US$86.00

Available from
WIT Press, Ashurst Lodge, Ashurst, Southampton SO40 7AA, UK
Phone: 44 (0) 238 029 3223; Fax: 44 (0) 238 029 2853; E-mail: marketing@witpress.com; and in North America from Computational Mechanics, Inc., 25 Bridge Street, Billerica, MA 01821
Phone: 978-667-5841; Fax: 978-667-7582;
E-mail: marketingUSA@witpress.com

The 9th International LS-DYNA Users Conference

June 4-6, 2006

To be held at: The Hyatt Regency Dearborn Hotel & Conference Center Dearborn, MI
Hosted by: Livermore Software Technology Corporation (LSTC)

Abstract Deadline: December 5, 2005 **Notification: January 27, 2006**

email your abstract to: papers@lstc.com **Paper Deadline: March 07, 2006**

Conference Papers: The first-named author of each accepted paper will receive free admission to the conference, provided that the author registers at the Hyatt Regency Dearborn under LSTC Conference registration.

Application Areas Being Accepted for Paper Submission:

Aerospace	Occupant Safety	Impact and Drop Testing
Ballistic and Penetration	Seismic Engineering	Modeling Techniques
Civil Engineering	Transportation	Nuclear Applications
Manufacturing Processes	Metal Forming	Ship Building
Automotive Crashworthi-ness	Biomechanics	Virtual Proving Ground

Abstract Length:	Approximately 300 words, please include figures, if possible
Paper Length:	Maximum of 3000 words, single-spaced, on 8-1/2” x 11” paper
Format:	A MS Word template will be provided
Contact:	papers@lstc.com

Livermore Software Technology Corp.
(925) 449-2500
www.lstc.com
www.ls-dynaconferences.com

Cray CAE Technical Forum
"Scalable High Performance Computing for CAE"

October 11, 2005
8:30 a.m. - 5:30 p.m.
Altair Auditorium
Troy, MI

Please join us for this extraordinary workshop that provides you with the opportunity to hear directly from users and ISVs about current advancements using Cray XD1™ super-computers for scalable high performance computing with widely used CAE applications.

Featured speakers already include

- LSTC
- AMD
- CD-adapco
- Hoff and Associates
- Altair Engineering

Registration is FREE and includes lunch, a networking reception and all conference mate-rials.

All registered attendees will be entered into a drawing for a Ping G2 Driver to be pre-sented at the event.

If you have any questions:

Email: cae_techforum@cray.com
Call Cathy: 651-605-8981

Register On line at:
http://www.cray.com/forms/caetechforum_oct2005.html

2006 International ANSYS Conference May 2-4, 2006

Showcase your company and target engineering professionals from all disciplines of CAD/CAM/CAE by sponsoring and exhibiting at the 2006 International ANSYS Conference, May 2 - 4, at a new venue this year – the David L. Lawrence Convention Center, Pittsburgh, Pennsylvania, USA. Become the first to be a part of this biennial opportunity to gain visibility among our customers, educational institutions, partners and prospects from all over the world

To learn more about how you can become a part of the world's largest and most influential CAE community, visit www1.ansys.com/conf2006/sponsors.htm for information about sponsorship levels, fees and other important details.

Why participate in the 2006 International ANSYS Conference?

Showcase your solutions to hundreds of companies and meet individuals who have significant influence on purchasing decisions.

Learn industry trends, business drivers and how customers are leveraging digital solutions to improve their design processes.

Network with your peers, build relationships and gain insight that can be applied to your own business.

Learn ANSYS vision, strategy and product roadmap. Interact with ANSYS management, technical and sales staff.

Attend technical sessions and be a part of a very stimulating experience.

Benefit from shared best practices, knowledge, how-tos and effective solution strategies

You don't want to miss this unique opportunity to be associated with the world's largest and most influential engineering simulation community!

Regards,
Beth Mazurak
724-514-2994 (phone)
724-514-3115 (fax)
ANSYS Inc.
Southpointe
275 Technology Drive
Canonsburg, PA 15317

LS-DYNA at the 23rd CADFEM Users´ Meeting International Congress on FEM Technology,

November 9 – 11, 2005, Bonn Germany.

The largest annual users conference on CAE in Europe will take place in a very special place: The former building of the German Parliament (Bundestag). Delegates of the CAE Party from industry and research will report on how they achieved a vote of confidence in the quality of their products, by using state-of-the-art simulation technology.

LS-DYNA as a main software solution of the conference organizer, German CAE specialist and LS-DYNA distributor CADFEM GmbH, will be play a vital role at the conference. On all conference days, sessions or workshops dedicated to LS-DYNA applications are scheduled.

Wednesday, November 9:
Workshop on Crashworthiness Simulation, guided by Paul Du Bois

Thursday, November 10:
Session on Crash and Impact
Session on Metalforming

Friday, November 11:
Session on LS-DYNA, LS-PrePost, LS-OPT (New Applications, Recent Developments etc.), presented by delegates of LSTC and CADFEM GmbH

Detailed information on the conference agenda, containing a broad variety of additional CAE applications covering topics such as Composites, Biomechanics, Manufacturing Solutions, Multiphysics, CFD, Fluid-Structure-Interaction and many more, can be found on the conference website www.usersmeeting.com. The conference will also include a large exhibition of suppliers of hardware, software, and services, offering participants opportunities to discuss with experts. Furthermore, a series of interesting social events will complement the technical program.

23rd CADFEM Users´ Meeting
International Congress on FEM Technology
November 9 – 11, 2005
Bonn, Germany

More information: visit www.usersmeeting.com

LSTC Michigan Classes

LSTC Michigan Classes:
Jane Hallquist,
Training Coordinator
LSTC California
(jane@lstc.com)
Jane: 925-449-2500

Michigan Location:
1740 W. Big Beaver Rd.
Suite 100 , Troy , MI 48084
voice: 248-649-4728;
fax: 248-649-6328
www.lstc.com

October class in Michigan:

Oct 19 to Oct 21 - IMPLICIT & SPRINGBACK

November's classes being held in California.

	CALIFORNIA
Nov. 08-11	Introduction to LS-DYNA - US$750
Nov. 15-17	Geomaterial Modeling US$750 Early Registration US$850 After Oct. 18
Nov. 29-Dec. 02	Introduction to LS-OPT - US$750

Additional courses will be offered. Please let me know of your interest in particular topics; customized curriculum is available upon request.

Jane Hallquist - jane@lstc.com

TOP CRUNCH NEWS – Benchmarks On Line

Dr. David Benson – www.topcrunch.org
08/20/05 – 9/16/05

The number of cores has been added to Top Crunch.

Vendor /Submitter Org.	Computer/ Interconnect	Processor	#Nodes x #Processors per Node x #Cores Per Processor = Total #CPU	Time (Sec)	Benchmark Problem	Submission Date
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	12 x 2 x 1 = **24**	627	neon_refined	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	8 x 2 x 1 = **16**	822	neon_refined	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	4 x 2 x 1 = **8**	1486	neon_refined	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	2 x 2 x 1 = **4**	2853	neon_refined	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	1 x 2 x 1 = **2**	5443	neon_refined	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	12 x 2 x 1 = **24**	8131	3 Vehicle Collision	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	8 x 2 x 1 = **16**	11566	3 Vehicle Collision	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	4 x 2 x 1 = **8**	21014	3 Vehicle Collision	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	2 x 2 x 1 = **4**	40390	3 Vehicle Collision	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	1 x 2 x 1 = **2**	81810	3 Vehicle Collision	08/25/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	16 x 2 x 1 = **32**	529	neon_refined	08/29/2005
HP/HP	Opteron CP4000/Topspin InfiniBand	AMD Opteron 2.6 GHz DL145	16 x 2 x 1 = **32**	6347	3 Vehicle Collision	08/29/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	64 x 2 x 2 = **256**	1696	3 Vehicle Collision	09/02/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	32 x 2 x 2 = **128**	2416	3 Vehicle Collision	09/02/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	24 x 2 x 2 = **96**	2981	3 Vehicle Collision	09/02/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	16 x 2 x 2 = **64**	3846	3 Vehicle Collision	09/02/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2	12 x 2 x 2 = **48**	5226	3 Vehicle Collision	09/02/2005

		GHZ				
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	64 x 2 x 2 = **256**	184	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	32 x 2 x 2 = **128**	239	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	24 x 2 x 2 = **96**	280	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	16 x 2 x 2 = **64**	342	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	12 x 2 x 2 = **48**	417	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	4 x 2 x 2 = **16**	993	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	2 x 2 x 2 = **8**	1820	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	1 x 2 x 2 = **4**	3516	neon_refined	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	8 x 2 x 2 = **32**	7591	3 Vehicle Collision	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	4 x 2 x 2 = **16**	14078	3 Vehicle Collision	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	2 x 2 x 2 = **8**	26230	3 Vehicle Collision	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/RapidArray	AMD Dual Core Opteron 2.2 GHZ	1 x 2 x 2 = **4**	49460	3 Vehicle Collision	09/08/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	64 x 2 x 1 = **128**	226	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	48 x 2 x 1 = **96**	258	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	32 x 2 x 1 = **64**	315	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	24 x 2 x 1 = **48**	384	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2	16 x 2 x 1 = **32**	527	neon_refined	09/14/2005

		GHZ				
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	8 x 2 x 1 = **16**	877	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	4 x 2 x 1 = **8**	1607	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	64 x 2 x 1 = **128**	2135	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	48 x 2 x 1 = **96**	2654	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	2 x 2 x 1 = **4**	3126	neon_refined	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	32 x 2 x 1 = **64**	3393	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	24 x 2 x 1 = **48**	4586	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	16 x 2 x 1 = **32**	6652	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	8 x 2 x 1 = **16**	12222	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	4 x 2 x 1 = **8**	22475	3 Vehicle Collision	09/14/2005
CRAY Inc./CRAY Inc.	CRAY XD1/ RapidArray	AMD Dual Core Opteron 2.2 GHZ	2 x 2 x 1 = **4**	43615	3 Vehicle Collision	09/14/2005

LSTC Distribution & Consulting Channel – Sept.

FEA Participants for LS-DYNA Sales – Support –Training – Benchmark - Consulting

Australia – LEAP

LEAP stands for Leading Engineering Application Providers. Our area of expertise is the application of technology to enable efficient product development, manufacturing, and management of the whole process throughout the entire lifecycle.

India – Altair India

Altair Engineering India. Based in Bangalore. Altair Engineering India markets and supports an advanced suite of CAE Products in the Indian sub-continent

Italy –Numerica

A centre of excellence in the use of LS-DYNA in the fields of Structural Mechanics and Optimization. Expertise in advanced analysis software packages such as LS-DYNA, ANSYS, eta/DYNAFORM.

Japan – The Japan Research Institute

JRI's activities in "knowledge engineering" are elaborated through the coordinated application of its think-tank, consulting, and systems integration functions.

KOREA - THEME

Theme Engineering has its main office located in Seoul, Korea. Full sales, training and support throughout Korea.

TAIWAN – FLOTREND

Flotrend is LSTC's distributor in Taiwan for sales, training and support throughout Taiwan for LS-DYNA, LS-PrePost and LS-OPT.

CONSULTING – LS-DYNA

US – SE& CS
Engineering services to Government and commercial clients. Services include the application, and development, of computational mechanics techniques with specializations in nonlinear transient phenomena and constitutive modeling.

EVENTS

If you want your event listed please send the information to:
mv@feainformation.com

October 4 - 7, 2005,
CAT.Pro 21st International Trade Fair for Innovative Product Development, Data and Process Management
Stuttgart, Germany.

October 05-08, 2005
TCN CAE 2005 International Conference on CAE and Computational Technologies for Industry
Italy – (Numerica)

October 11, 2005
CRAY CAE Technical Forum
"Scalable High Performance Computing for CAE"
Troy, MI, US

October 20-21, 2005
German-LS-DYNA Forum (DYNAmore)
Bamberg, Germany

November 09-11, 2005
23rd CADFEM Users' Meeting – Int'l Congress on FEM Tech. W/ANSYS CFX & ICEM CFD Conference,
Bonn, Germany

November 25, 2005
Korean Users Conferece – LS-DYNA (THEME)

November 29-30, 2005
Japanese Users Conference (Nagoya) LS-DYNA (JRI)

May 02-04, 2006
2006 International ANSYS Conference, Pittsburgh, PA., US

June 04-06, 2006
LS-DYNA
9th International LS-DYNA Users Conference – Deerborn, MI, US (LSTC)

July 16 –22, 2006
7th World Congress on Computational Mechanics,
California, US.

LS-DYNA Resource Page

Interface - Hardware - OS And General Information

Participant Hardware and OS that run LS-DYNA (alpha order)
All Hardware and OS listed have been fully QA'd by Livermore Software Technology Corporation

AMD Opteron	Linux
CRAY XD1	Linux
FUJITSU Prime Power	SUN OS 5.8
FUJITSU VPP	Unix_System_V
HP PA8000	HPUX
HPIA64	HPUX or Linux
HP Alpha	True 64
IBM Power 4/5	AIX 5.1, 5.2, 5.3
IBM Power 5	SUSE 9.0
INTEL IA32	Linux, Windows
INTEL IA64	Linux
INTEL Xeon EMT64	Linux
NEC SX6	Super-UX
SGI Mips	IRIX6.5
SGI IA64	Altix/Prism

LS-DYNA Resource Page

MPP Interconnect and MPI

FEA Information Inc. Participant's (alpha order)

Fully QA'd by Livermore Software Technology Corporation

Vendor	O/S	HPC Intereconnect	MPI Software
AMD Opteron	Linux	InfiniBand (Silver-Storm), MyriCom	LAM/MPI, MPICH, HP MPI, SCALI
CRAY XD1	Linux		
FUJITSU Prime Power	SUN OS 5.8		
FUJITSU VPP	Unix_System_V		
HP PA8000	HPUX		
HPIA64	HPUX		
HP Alpha	True 64		
IBM Power 4/5	AIX 5.1, 5.2, 5.3		
IBM Power 5	SUSE 9.0		LAM/MPI
INTEL IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	LAM/MPI, MPICH, HP MPI, SCALI
INTEL IA64	Linux		LAM/MPI, MPICH, HP MPI
INTEL Xeon EMT64	Linux	InfiniBand (Topspin, Voltaire), MyriCom	LAM/MPI, MPICH, HP MPI, INTEL MPI, SCALI
NEC SX6	Super-UX		
SGI Mips	IRIX6.5		
SGI IA64	Altix/Prism		

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
www.ansys.com/products/environment.asp

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
www.eta.com

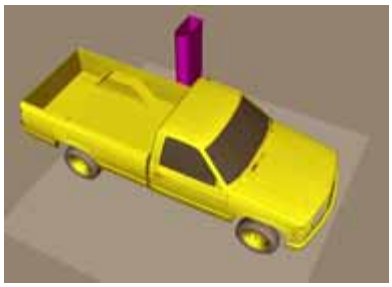
Includes a complete CAD interface capable of importing, modeling and analyzing, any die design. Available for PC, LINUX and UNIX, DYNAFORM couples affordable software with today's high-end, low-cost hardware for a complete and affordable metal forming solution.

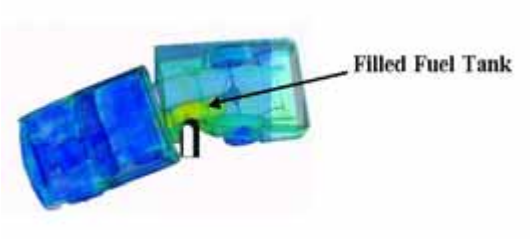
ETA – VPG
www.eta.com

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"
www.msc.software.com

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.





Side Impact With Fuel Oil Inside

MSC.Software - MSC.Nastran / SOL 700

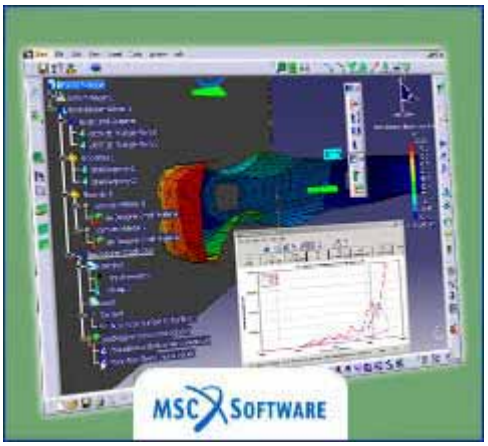
The MSC.Nastran™ Explicit Nonlinear product module (SOL 700) provides MSC.Nastran users the ability access the explicit nonlinear structural simulation capabilities of the MSC.Dytran LS-DYNA solver using the MSC.Nastran Bulk Data input format. This product module offers unprecedented capabilities to 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 transfe**r or translation issues, and eliminates** the need for additional software training.

The MSC.Nastran Sol 700 will be released in November 2005. Beta release is available now !

MSC.Software – Gateway for LS-DYNA

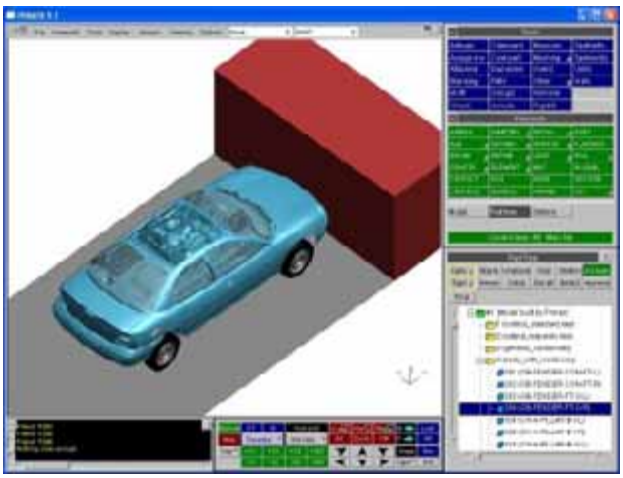
Gateway for LS-DYNA provides you with the ability to access basic LS-DYNA simulation capabilities in a fully integrated and generative way. Accessed via a specific Crash workbench on the GPS workspace, the application enhances CATIA V5 to allow finite element analysis models to be output to LS-DYNA and 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.



Gateway products provide CATIA V5 users with the ability to directly interface with their existing corporate simulation resources, and exchange and archive associated simulation data.

Oasys software for LS-DYNA
www.arup.com/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 offer post-processing software for in-depth analysis of results and automatic report generation.



EASI-CRASH DYNA
www.esi-group.com/SimulationSoftware/EASi_CRASH-DYNA

Interfaced to the latest version of LS-DYNA Easi-CRASH DYNA supports LS-DYNA Version 970. EASi-CRASH DYNA has powerful editing features, such as automesh and remesh.

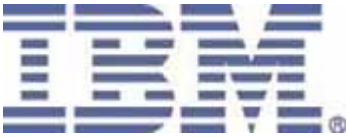
LS-DYNA/MADYMO coupling capabilities for pre- and post processing. With direct read in of LS-DYNA® data it has highly optimized loading and animation of LS-DYNA results for design

Hardware & Computing and Communication Products

www.amd.com

www.fujitsu.com

www.hp.com



www-1.ibm.com/servers/deepcomputing

www.intel.com

www.nec.com

www.sgi.com

www.cray.com

Software Distributors

Alphabetical order by Country

Australia	Leading Engineering Analysis Providers www.leapaust.com.au
Canada	Metal Forming Analysis Corporation www.mfac.com
China	**ANSYS China** www.ansys.cn
China	**MSC. Software – China** www.mscsoftware.com.cn
Germany	**CAD-FEM** www.cadfem.de
Germany	**Dyna*More*** www.dynamore.de
India	**GissETA** www.gisseta.com
India	Altair Engineering India www.altair-india.com
Italy	Altair Engineering Italy www.altairtorino.it
Italy	**Numerica SRL** www.numerica-srl.it
Japan	**Fujitsu Limited** www.fujitsu.com
Japan	The Japan Research Institute www.jri.co.jp
Japan	**CRC Solutions Corp.** www.engineering-eye.com
Korea	Korean Simulation Technologies www.kostech.co.kr
Korea	Theme Engineering www.lsdyna.co.kr

Software Distributors (cont.)
Alphabetical order by Country

Netherlands	Infinite Simulation Systems B.V www.infinite.nl
Russia	**Strela, LLC** www.ls-dynarussia.com
Sweden	Engineering Research AB www.erab.se
Taiwan	**Flotrend** www.flotrend.com.tw
Turkey	**FIGES** www.figes.com.tr
USA	Engineering Technology Associates www.eta.com
USA	**Dynamax** www.dynamax-inc.com
USA	Livermore Software Technology Corp. www.lstc.com
USA	**ANSYS Inc.** www.ansys.com
UK	**Oasys, LTD** www.arup.com/dyna/

Consulting and Engineering Services
Alphabetical Order By Country

Australia Manly, NSW www.leapaust.com.au	Leading Engineering Analysis Providers Greg Horner info@leapaust.com.au 02 8966 7888
Canada Kingston, Ontario www.mfac.com	Metal Forming Analysis Corporation Chris Galbraith galb@mfac.com (613) 547-5395
India Bangalore www.altair-india.com	Altair Engineering India Nelson Dias info-in@altair.com 91 (0)80 2658-8540
Italy Torino www.altairtorino.it	Altair Engineering Italy sales@altairtorino.it
Italy Firenze www.numerica-srl.it	Numerica SRL info@numerica-srl.it 39 055 432010
UK Solihull, West Midlands www.arup.com	ARUP Brian Walker brian.walker@arup.com 44 (0) 121 213 3317
USA Windsor, CA www.schwer.net/SECS	SE&CS Len Schwer len@schwer.net (707) 837-0559
USA Corvallis, OR www.predictiveengineering.com	Predictive Engineering George Laird (541) 752-3871 george.laird@predictiveengineering.com

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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	Tony Taylor	Irvin Aerospace Inc.

Informational Websites

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

FEA Informationwebsites	www.feainformation.com
TopCrunch – Benchmarks	www.topcrunch.org
LS-DYNA Examples (more than 100 Examples)	www.dynaexamples.com
LS-DYNA Conference Site	www.ls-dynaconferences.com
LS-DYNA Publications to Download On Line	www.dynalook.com
LS-DYNA Publications	www.feapublications.com
LS-DYNA CADFEM Portal	www.lsdyna-portal.com.

Archived News Page
New format – Current on Site Sept - 15 2005

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CRAY: Cray and LSTC Partner to Offer LS-DYNA on the Cray XD1 Supercomputer

LSTC: Conference Information

Distributors:
Flotrend – Taiwan
Strela – Russia
Korean Simulation Technologies – Korea
Dynamore - Germany

Sept 12th

HP: Processor: 900 MHz and 1 GHz PA-8800 and 1.1 GHz PA-8900 dual-core processor modules provide 2-way capability at 1-way price and 4-way performance at a 2-way price

ANSYS: Continuing what avid ANSYS users consider a CAE tradition, preparations are under way for the 2006 International ANSYS Conference to be held from May 2-4, at a new venue this year

Predictive Engineering: Predictive Engineering is a mechanical engineering consulting company specializing in finite element analysis (FEA).

Distributors:
Altair – Italy
Altair – India
FIGES – Turkey
Infinite – Netherlands

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LS-DYNA and SGI Altix System Bundle
SGI - -Intel - LSTC

Distributors/ Consulting
Numerica – Italy
Predictive Engineering – US
SE&CS – US
CADFEM - Germany