FEA Information

Engineering Journal and Website Resource

Christine Fronczak Invites you to the

HP 20th Annual CAE Symposium

The Living Bridge Analysis carried out by OASYS and the Oasys GSA software

Courtesy © Paddy Johnson

Global Features & Contributors

India
R. Jain - S. Peddi

India
S. Bala
R. Venkatesan

Noi Chusook-Sims
Thailand
Malaysia-Singapore

Ritesh Jain
Sairam Peddi
Mahindra & Mahindra Ltd

Announcements

Welcome to the August Edition with interesting articles and features among them being:

> Jain and S. Peddie "Changing Rules –Pedestrian Protection"

> A new section for Thailand, Malaysia and Singpore by Noi Chusook-Sims

> GSA software used for the Living Bridge- OASYS

A featured article of interest about Chandra X-Ray Observatory and don't miss our featured paper excerpt Crash Simulation of an F1 Racing Car Front Impact Structure to be entirely read on line.

You will notice that as of this issue we are using the full link URL inclusive of the http. This is being created since we have found it is easier to see the full link where someone is being forwarded. Additionally, we have found that many Adobe older versions do not recognize the embedded links.   If you find a link that is inaccurate, in this issue we apologize and will correct it.

Sincerely,

FEA Information Inc.

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OASYS Ltd: http://www.oasys-software.com/dyna/en/	**JSOL Corporation**: http://www.jri-sol.co.jp/english/cae	**HP**: http://www.hp.com/
ETA: http://www.eta.com	**INTEL**: http://www.intel.com	**ESI Group**: http://www.esi-group.com
BETA CAE Systems S.A.: http://www.beta-cae.com	**APTEK**: http://www.aptek.com	**PANASAS**: http://www.panasas.com
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In order to keep a low overall budget for the participants, there is no participation fee.

http://www.beta-cae.gr/3rd_conference_announcement.htm#registration

BETA CAE Systems S.A. will be honored to host as Keynote Speakers to the 3rd ANSA & μETA International Conference, two distinguished guests: Mr. Hiroo Yamaoka of TOYOTA Motor Corporation, and Mr. Toshihiro Araki of Nissan Motor Company.

Mr. Yamaoka and Mr. Araki have distinguished careers, they hold prominent positions at their organizations and they have outstanding achievements in CAE. We are specially honored by their acceptance to attend to the the 3rd ANSA & μETA International Conference as Keynote Speakers and by the unique opportunity that they will offer to the participants to benefit from their speeches.

Mr. Hiroo Yamaoka is Project General Manager at the Advanced CAE Division of TOYOTA Motor Corporation, Japan. Future Innovative CAE for Next-Generation Vehicle Development

The latest vehicle CAE applications to each discipline, fulfilling the requirements for the economical and environmental-friendly vehicles, are introduced in this presentation.

The future CAE tasks towards the resolution of remaining issues are also discussed, with examples of interactive or cosimulated trial analysis results.

Mr. Toshihiro Araki is General Manager of the Integrated CAE Department of the Vehicle Component Technology Development Division of Nissan Motor Company, Japan.

CAE contribution to vehicle development in NISSAN This presentation deals with the terms of "CAE value" and "CAE technology development way" as these are treated within a high-technology CAE environment.

It is shown how "CAE value" is evaluated by several indices based on vehicle development cost and performance achievement. "CAE technology development way" is explained on the basis of R&D technology strategy.

Free registration:

In order to keep a low overall budget for the participants, there is no participation fee.

Nevertheless, your registration is essential for the organization of the event.

Registration includes coffee breaks, dinner on September 8th, and meals on September 9th, 10th and 11th, 2009

http://www.dynalook.com/european-conf-2009/B-I-02.pdf

Crash Simulation of an F1 Racing Car Front Impact Structure

Formula 1 motorsport is a platform for maximum race car driving performance resulting from high-tech developments in the area of lightweight materials and aerodynamic design. In order to ensure the driver's safety in case of high-speed crashes, special impact structures are designed to absorb the race car's kinetic energy and limit the decelerations acting on the human body. These energy absorbing structures are made of laminated composite sandwich materials - like the whole monocoque chassis - and have to meet defined crash test requirements specified by the FIA. This study covers the crash behaviour of the nose cone as the F1 racing car front impact structure. Finite element models for dynamic simulations with the explicit solver LS-DYNA are developed with the emphasis on the composite material modelling. Numerical results are compared to crash test data in terms of deceleration levels, absorbed energy and

crushing mechanisms. The validation led to satisfying results and the overall conclusion that dynamic simulations with LS-DYNA can be a helpful tool in the design phase of an F1 racing car front impact structure.

Micromechanics analysis applied to the modeling of aluminum honeycomb and EPS foam composites

A 3D Finite Element model of an innovative composite material, configured as a layer of expanded aluminum honeycomb placed on top of a layer of expanded polystyrene foam, has been developed and validated against experimental data obtained from quasi-static tests. Ls-Prepost was used to generate the model. Ls-Dyna was used to simulate the behavior of this material under compressive loads. The full publications can be read at:

http://www.dynalook.com/european-conf-2009/B-I-02.pdf

Changing Rules –Pedestrian Protection
Courtesy: Ritesh Jain/ Sairam Peddi
(Mahindra & Mahindra Ltd, Mumbai, India)

Pedestrian casualties due to road accident are of a growing concern in most of the countries. To mitigate pedestrian injuries in Automotive impact, research has shown that the changes in the frontal portion of a vehicle, can lead to reduction in the number of fatalities and serious injuries. As a result, several pedestrian protection methods have been developed; EEVC (European Enhanced Vehicle-safety Committee), ISO (International organization for standardization), IHRA (International Harmonized Research Activity) pedestrian protection test method. The regulations and technical standards based on these test methods ("technical standards for pedestrian protection") have been examined by each organization and European, Japanese, Global (proposal) technical standards have developed. European technical standards have gone through lot of changes since the time it started. The European regulation 78/2009 was finally adopted on January 14th, 2009, and published on February 2nd, 2009. The old phase 2 will include modified test parameters and a new time schedule. The different phases of the regulation will come into effect in a total of eight stages, depending on vehicle categories and masses. According to the new regulation, the vehicles which will be launched till 2012 should comply with Phase-I regulation described in 102/2003/EC. And after the 2013 all new vehicle (M1) should meet the modified phase-II regulation which is described in ECE 78/2009.
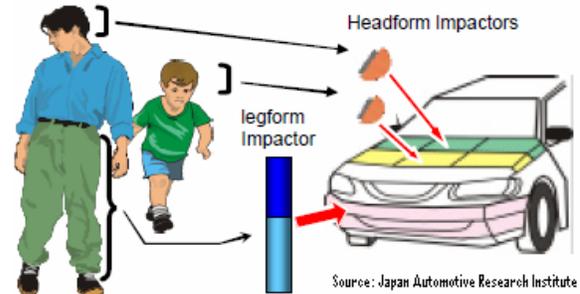

Fig:1 Pedestrian Protection Concept
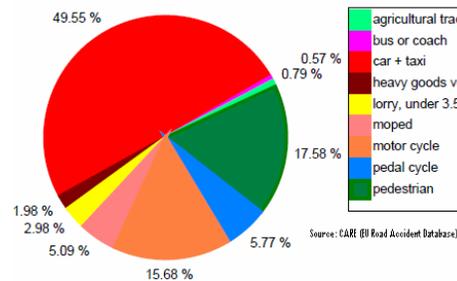
Fig:2 Fatality by Transport mode in EU countries 2007.

Moreover, for evaluating the pedestrian injuries at the time of pedestrian impact with vehicle, impactors like head-form, lower leg forms, upper leg forms have been used. Degree of severity of injury is evaluated by loading/impact levels on these impactors. These impactors require high amount of Bio-fidelity (closer representation of human body parts) and high injury evaluation ability (better correlation with human injuries).

Source: Japan Automotive Research Institute

While the pedestrian legform impactor produced by TRL which was developed in the 1990s has been used in the EEVC Pedestrian Protection Test Method, bone parts are made as a rigid body, and moreover, it is considered to be difficult to properly evaluate leg injuries due to the lack of bio-fidelity and insufficiencies in the measuring instruments incorporated. Thus, currently, ECE/WP29/GRSP ("GRSP") of the United Nations has focused its attention on "flexible pedestrian legform impactor" which has a higher level of bio-fidelity than conventional impactors, enabling more accurate injury evaluation. As a results, GRSP established the Flexible Pedestrian Legform Impactor Technical Evaluation Subgroup under GRSP/INF-GR-PS (Informal Group on Pedestrian Safety) to conduct technical evaluation activities on these impactors.

The flexible pedestrian legform impactor type GT prototype (Type GT prototype) was developed in 2006 (February). However, a validation of the bio-fidelity and a round of discussion on implementation are on the way.

Christine Fronzcak, invites you to the Exclusive
One-Day 20th Annual HP CAE Symposium

October 01, 2009

Our Event is Free, but space is limited – Register today.

http://h30463.www3.hp.com/rsvp/invitation/registration.asp

Bringing together over 20 of the industry's leading CAE experts for a one-day exclusive symposium to discuss optimizing your design through simulation.

Presentations will include keynotes and sessions from HP, Intel, Microsoft and the leading CAE software providers. Also included in the tracks will be presentations on CAE benchmarks, server and blade roadmaps, HP technology differentiators and software solutions from our CAE partners.

Starting the morning we will have keynote speaker Ed Turkel, HP, followed by the Analyst Keynote Presentation, The rise of Simulation by Keith Meintjes (CPDA) - Dr. Meintjes is an acknowledged automotive industry expert who previously worked at General Motors (GM) where he was HP CAE SYMPOSIUM

responsible for requirements for GM's global CAE High Performance Computing (HPC) systems.

Among the many presenters are:

Dilip Bhalsod, LSTC

Dr. Reza Sadeghi, MSC Software

Vela Ganesan, ESI Group

Rochard Dracott, Intel

Additional presentations at our symposium are by ANSYS, Altair, ACUSIM, EXA, CD-Adapco, Simulia, Siemens, CEI, and HP.

Our keynote Premiere sponsors are Intel and Microsoft.

http://h30463.www3.hp.com/rsvp/invitation/invitation.asp?id=/m1c9c3a7-2CL7Z0OO8KH0

India News

Suri Bala, LSTC, visits

EASi facility in India

(Note: Article from India participants can be located on page 3 "Changing Rules – Pedestrian Protection" Courtesy of Mahindra)

With the large and growing LS-DYNA commercial user base in India using LS-DYNA, and the support of customers by EASi Engineering and Nhance (Arup), LSTC engineers make regular visits for training, support and meeting the LS-DYNA customers.   In addition to commercial customers EASi and Nhance respectively sell and support the educational institutions.   Additionally, selling LS-DYNA to the educational community in India is CADFEM India. There are many software solutions that include LS-DYNA or interfaced to LS-DYNA. Among these are Cranes Software-ETA eta/DYNAFORM and VPG, sold through Cranes Software in India.   Beta CAE's ANSA (sold through EASi). Oasys Primer, D3Plot and other software by Oasys sold through Nhance.

On the recent visit in July, Suri Bala's presented New Features in LS-DYNA.

EASi arranged workshop sessions with Suri Bala, for their customers to share and learn the best practices & latest developments in LS-DYNA.   EASi customers spanned from Automotive, Aerospace, Consumer Durable, Heavy Engineering, Marine & General engineering sectors.

Suri emphasized the latest version Barriers & Dummies provided at no fee with LS-DYNA. The new dummy/barrier models provide a greatly enhanced environment for the engineers.

Ramesh and Suri exchanged ways to enhance customer use, future classes, workshops, and direct customer visits. These customer visits are specific to the applications being used.

Thailand – Singapore - Malaysia

A Growing Market for Engineering

August Introduction - Thailand

by Kanda Chusook-Sims

Kanda Chusook-Sims (Noi) has an introductory LS-DYNA program being introduced September 15th in Thailand, for education and commercial institutions. Please pass this invitation to students, professors and interested parties. Noi graduated from Chiang Mai University, with a degree in Political Science and Public Administration.   Currently employed by LSTC and located in Livermore, CA., Noi, among her other interests is now concentrating on promoting LS-DYNA in Thailand. Noi will have articles on Thailand, Singapore and Malaysia. You can reach her at noi@lstc.com with your interests and questions on LS-DYNA in those regions.

Introduction to Thailand

The first university in Thailand, namely Chulalongkorn University, was established over 80 years ago. Later on, more universities were founded, each specializing in a specific field: Thammasat University in social sciences (law, political science, liberal arts), Silpakorn University in Fine Arts, Kasetsart University in agriculture, and the University of Medical Sciences (now Mahidol University).

Thereafter, came new comprehensive universities: Chiengmai University, Khonkhaen University, and Prince of Songkhla University. During the same period, the traditional one-field universities began to expand to offer degrees in other fields. Also in that same decade, three technical colleges at Thonburi, North Bangkok and Ladkrabang were merged into one, and upgraded to a higher educational institute, the King Mongkut's Institute of Technology.

There are currently over 61 public and private engineering institutes accredited by the Council of Engineers covering civil, electrical, mechanical, chemical, mining, environmental and industrial engineering.

Events (if you have an event you would like posted please send it to me)

ICT & Knowledge Engineering Dec 1-3 2009 – Siam Univ. Bangkok Thailand [http://ict-ke2009.siam.edu/index.php/ICT-KE2009/ICT-KE2009]

International Conference On Applied Mechanics And Mechanical Engineering 2009
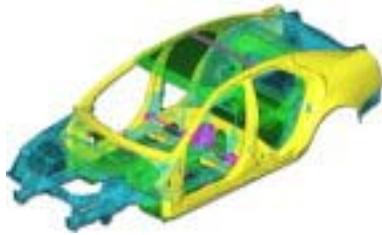
FGPC Validation Phase

Design Process Reduces Mass by 15% on Future Generation Passenger Compartment Phase 2

ETA Inc.

Passenger Compartment Phase 2

ETA, Inc. achieved 15% on the Future Generation Passenger Compartment (FGPC) Phase 2 by applying its Accelerated Concept to Product (ACP) process. The methodology is a multi-disciplinary (MD), 3G (geometry, grade, and gage) holistic design solution, which reduced product mass and cost significantly, while improving crashworthiness, stiffness and quality.

Enlisted by the Auto/Steel Partnership (A/SP) for the FGPC project in 2007, Phase 1 of the FGPC project was a design study based on the ULSAB-AVC to develop a lightweight passenger compartment using Advance High Strength Steel (AHSS). The initial ACP Process could be employed on the diesel variant resulting in a mass reduction of 30% compared with the passenger compartment of the same class, while maintaining the required structural (stiffness, durability) and improving crashworthiness performance.

Recently completed, in Phase 2 (Validation Phase) of FGPC, ETA's advanced engineering team again applied the ACP Process and the lessons learned in Phase 1 to an OEM's present production (2008) donor vehicle. The project achieved a 15% mass reduction of the passenger compartment. Furthermore, the program established that advance joining technology (laser-weld or adhesive

bonding) could increase mass reduction of passenger compartment from 15% up to 20%.

The FGPC projects proved that comprehensive goals are achievable using the ACP process as CAE/CAD designs change simultaneously, maximum mass reduction is possible, design robustness and efficiency can be significantly improved. Moreover, the number of components in a system or sub-system can be reduced and manufacturing efficiency can be achieved. Although for this project the process was applied to a steel product, the process is entirely material independent and possible applications are numerous.

Phase 1, Executive Summary:

http://www.a-sp.net/database/custom/FGPC%20Phase%201%20Final%20Report.pdf

Validation Phase, GDIS Conference: http://www.autosteel.org/AM/Template.cfm?Section=Great_Designs_in_Steel_2009_Presentations&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=32146

ETA Engineering Contact: Akbar Farahani Phone: (248) 729-3010 x 243 Email: akbar@eta.com

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The Living Bridge http://www.oasys-software.com/information/case_studies/living_bridge.shtml

The global analysis was carried out using the Oasys GSA software program.

GSA enables you to analyse and design a range of structural models composed of skeletal frames and two-dimensional finite elements, which makes it the perfect tool for the ever increasing demands placed upon structural engineers.

Originally developed in-house at Arup to meet their demanding and diverse requirements, its capabilities have been proven on thousands of complex and prestigious projects world-wide. These include the Swiss Re, Gatwick Air Bridge, Heathrow Terminal 5, Khalifa Stadium, CCTV Building Beijing, 122 Leadenhall Street, and the Angel of the North.

From a simple beam to a complex multi-storey building, from a sculpture to a fabric structure or a bridge, GSA is the program to solve your engineering problem.

Key Benefits:

Highly intuitive graphical data generator for rapid model creation and 'sculpting' of existing models

Extensive data checking prevents entry of invalid parameters across the model

GSA Products available:

GSA Analysis
GSA Bridge
GSA Building
GSA Fabric
GSA Suite

http://www.oasys-software.com/products/structural/gsa/

A spreadsheet-friendly text file format, full copy-and-paste functionality, and data import in various formats including CIMsteel and DXF all contribute to GSA's reputation for offering excellent interaction with other tools on the engineer's desktop

Model size is limited only by the performance capabilities of the hardware

Display several graphical and tabular views simultaneously with automatic synchronizing across the views

Full on-line program help and logical user interfaces in a familiar environment ensure that minimal learning curves are required

FREE GSA!

You can now use GSA for free. The trial version is fully functional for 30-days; however when it expires the software will act both as a model results viewer and continue to work with a limited capacity. You are only limited by linear static analysis, 50 nodes or elements, and your imagination!
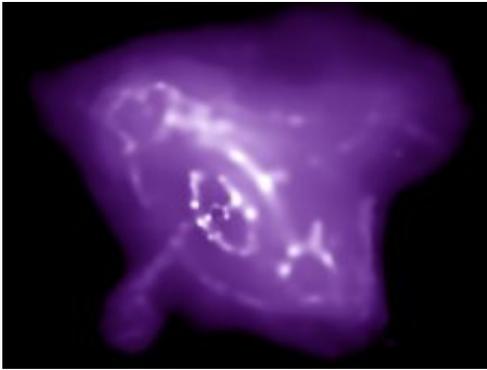
Chandra's Top 10 Scientific Contributions 08.19.09

The Crab Nebula, seen by Chandra on September 28, 1999. Image credit: NASA/CXC/SAO

http://www.nasa.gov/mission_pages/chandra/news/chandra_10year.html

NASA's Chandra X-ray Observatory is celebrating 10 years of exploring the invisible universe. On Aug. 19, 1999, Chandra captured its first image as an astronomical observatory. This first light image opened a new era for science as Chandra began its mission to open a mysterious universe.

Chandra enables scientists from around the world to obtain unprecedented X-ray images of exotic environments to help understand the evolution of the cosmos. The observatory not only helps to probe these mysteries, but also serves as a unique tool to study detailed physics in a laboratory that cannot be replicated on Earth.

"Chandra has changed the whole understanding of dark matter and increased our knowledge of dark energy, as well as gathered new information on black holes," said Dr. Martin Weisskopf, Chandra project scientist at the Marshall Space Flight Center.

Distant galaxy 3C294, observed by Chandra on February 15, 2001. Image credit: NASA/IoA/A.Fabian et al.

"Chandra has produced 10,000 observations in its 10-year life and the demand for observation time, by scientists, is five- to six-times what is available," said Chandra Program Manager Keith Hefner of the Marshall Center. "It continues to be an engineering marvel

that has more than doubled its original five-year mission."

A Chandra "Top 10" reveals some of the most noteworthy discoveries:

Chandra finds a ring around the Crab Nebula. After only two months in space, the observatory reveals a brilliant ring around the heart of the Crab Pulsar in the Crab Nebula -- the remains of a stellar explosion -- providing clues about how the nebula is energized by a pulsing neutron, or collapsed star. (Sept. 28, 1999)

Chandra finds the most distant X-ray cluster. Using the Chandra Observatory, astronomers find the most distant X-ray cluster of galaxies yet. Approximately 10 billion light years from Earth, the cluster 3C294 is 40 percent farther than the next most distant X-ray galaxy cluster. (Feb. 15, 2001)

Chandra makes deepest X-ray exposure. A Chandra image, Deep Field North, captures for 23 days an area of the sky one-fifth the size of the full moon. Even though the faintest sources detected produced only one X-ray photon every four days, Chandra finds more than 600 X-ray sources, most of them super massive black holes in galaxy centers. (June 19, 2003)

Chandra hears a black hole. Using the Chandra observatory, astronomers for the first time detected sound waves from a

super massive black hole. Coming from a black hole 250 million light years from Earth, the "note" is the deepest ever detected from an object in the universe. (Sept. 9, 2003)

Chandra opens a new line of investigation on dark energy. Using galaxy-cluster images from Chandra, astronomers apply a powerful, new method for detecting and probing dark energy. The results offer intriguing clues about the nature of dark energy and the fate of the universe. (May 18, 2004)

Chandra finds that Saturn reflects X-rays from the sun. The findings stem from the first observation of an X-ray flare reflected from Saturn's low-latitudes -- the region that correlates to Earth's equator and tropics. (May 25, 2005)

Chandra finds proof of dark matter. In galaxy clusters, the normal matter, like the atoms that make up the stars, planets, and everything on Earth, is primarily in the form of hot gas and stars. The mass of the hot gas between the galaxies is far greater than the mass of the stars in all of the galaxies. This normal matter is bound in the cluster by the gravity of an even greater mass of dark matter. Without dark matter, which is invisible and can only be detected through its gravity, the fast-moving galaxies and the hot gas would quickly fly apart. (Aug. 21, 2006)

Chandra sees brightest supernova ever. The brightest stellar explosion ever recorded may be a long-sought new type of supernova, according to observations by NASA's Chandra X-ray Observatory and ground-based optical telescopes. This discovery indicates that violent explosions of extremely massive stars were relatively common in the early universe, and that a similar explosion may be ready to go off in our own galaxy. (May 7, 2007)

Chandra finds a new way to weigh black holes. By measuring a peak in the temperature of hot gas in the center of

the giant elliptical galaxy NGC 4649, scientists have determined the mass of the galaxy's super massive black hole. The method, applied for the first time, gives results that are consistent with a traditional technique. (July 16, 2008)

Long observation from Chandra identified the source of this energy for blobs. The X-ray data show that a significant source of power within these colossal structures is from growing super massive black holes partially obscured by dense layers of dust and gas. The fireworks of star formation in galaxies are also seen to play an important role, thanks to Spitzer Space Telescope and ground-based observations. (June 24, 2009)

The Marshall Center manages the Chandra program for the Science and Mission Directorate, NASA Headquarters, Washington. Northrop Grumman of Redondo Beach, Calif., formerly TRW Inc., was the prime development contractor for the observatory. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass.

For more information visit:

http://www.nasa.gov/chandra
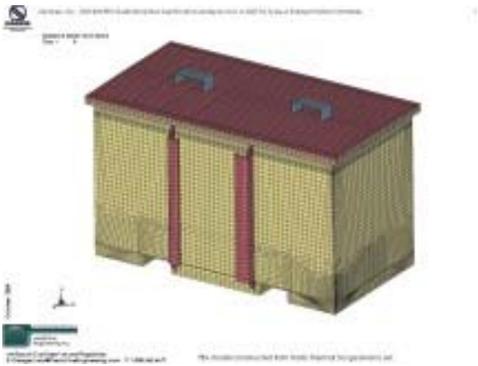
Full graphics can be found on the site and case study:

http://www.predictiveengineering.com/Solutions/products/ls-dyna/container/container.html

Drop Test Analysis of Transportation Container

Objective: Numerically demonstrate using reliable and conservative procedures that the Harris Thermal US DOT Type A Transportation Container (DWG #23762) can maintain containment integrity during a drop-test from a height of 1.14 m (45 in.) onto a rigid surface per DOT Specifications 49-CFR-173.465(a).

Modeling Assumptions and Details: A detailed and comprehensive finite element analysis (FEA) model was constructed using an approved drawing set (DWG ref. #23762) from Harris Thermal Transfer Products (HTTP). This model was developed in close collaboration with HTTP and contains all relevant design features of the designed Duratek Type-A Container (known henceforth as "Duratek Container").

The FEA model was constructed using best industry practices. For example, care was exercised to ensure a high density of mesh granularity in regions of expected high stress. The model was constructed to contain a majority of 4-node plate elements with solid regions meshed with 8-node bricks. Beam elements were used to model the bolted connections between

the lid and the top of the Duratek Container. The model consists of approximately 30k nodes and 29k elements.

The analysis engine used to generate all numerical results is LS-DYNA v970. This explicit FEA solver is an industry standard for crash and drop-test simulations.

Units used in this analysis are lbf, inch, and seconds. Stresses are reported in psi and deflections in inches.

The container has an approximate weight of 14,400 lbf. The weight of the container contents is 10,000 lbf. The total impact weight is 24,400 lbf. The container contents are assumed to be uniformly distributed within the container. At this weight the container falls somewhat on the border between the two weight classes provided in the DOT specification (see Appendix). To maintain conservativeness in this analysis, the higher drop height of 36" was chosen.

The load set assumes that the container is dropped from a height of 1.14 m (45 in). Numerically this is accomplished by positioning the container immediately above a rigid surface and applying a uniform initial velocity of 186 in/sec and a uniform acceleration of 386 in/sec^2 to

simulate gravity. The container is assumed to drop at a 45-deg angle from two orthogonal vertical planes (graphical descriptions are provided in the body of the report) onto its most vulnerable corner. The drop angle and the chosen corner are believed to provide the most severe drop-test conditions. Importantly, the drop height provides an additional 25% more impact energy than that specified in the DOT regulation (36"). Consequently, the calculated damage within the FEA model can be considered to be highly conservative.

The container impacts a perfectly rigid surface that is undeformable. This modeling idealization fully complies with the DOT specification 49-CFR-173.465(a) Section 5.

The lid is pre-tensioned per standard operating procedure for the utilization of the Duratek Container.

Contact behavior was enforced between all contacting surfaces. This numerically complicated behavior is efficiently implemented within the LS-DYNA solver and induces only a modest computational penalty during solution.

Analysis Results: Drop-test results indicate significant and noticeable plastic damage at the corner of the structure. Due to the design of the Duratek Container, this damage was restricted to the very extreme surfaces of the container and did not affect the integrity of the main walls of the container. The large steel block used to frame the outer corner of the container suffers the brunt of the impact damage and transfers this load cleanly into the inner floor and side walls of the Duratek Container. Advantageously, this design feature allows the impact load to be evenly distributed into the container structure during the impact event.

Conclusion: Conservative numerical simulations indicate that the integrity of the Duratek Container will be maintained during and subsequent to the impact event. Based on this simulation, the Duratek Container completely meets the DOT Specifications 49-CFR-173.465(a).
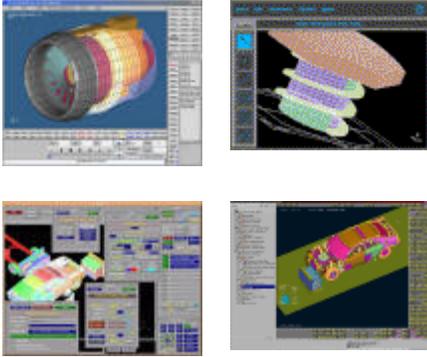
Pre Processing
Post Processing
Model Editing

A preprocessor is a program that processes its input data to produce output. This data is then used as input to another program.

BETA CAE Systems S.A.

http://www.beta-cae.gr/

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

Engineering Technology Associates, Inc.

http://www.eta.com

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

Oasys, Ltd

http://www.oasys-software.com/dyna/en/

Oasys Primer is a model editor for preparation of LS-DYNA input decks.   - Oasys D3Plot is a 3D visualization package for post-processing LS-DYNA analyses using OpenGL® (SGI) graphics.

JSOL Corporation

http://www.jri-sol.co.jp/english/cae/

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

Livermore Software Technology Corporation

http://www.lstc.com

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

China

    Tsinghua University
    Dr. Qing Zhou

India

    Indian Institute of Science
    Dr. Anindya Deb

Italy

    Prode – Elasis & Univ. of Napoli, Frederico II
    Prof. Gennaro Monacelli

Russia

    St. Petersburg State Tech. University
    Dr. Alexey I. Borovkov

Turkey

    Bogazici University
    Dr. Sami Kilic

USA

    Northwestern University
    Dr. Ted Belytschko

    Univ. of California – San Diego
    Dr. David Benson

    Ohio University
    Dr. Bhavin V. Mehta

The Ohio State U – ERC/NSM
    Dr. Taylan Altan

University of Cincinnati
    Dr. Ala Tabiei

University of Nebraska
    Prof. John D. Reid

Connecticut State University
    Prof. Thomas Vasko

LS-DYNA Distributors

LS-DYNA® Solution Package
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LSTC Barrier Models

Alpha order by Country

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Italy	EnginSoft SpA http://www.enginsoft.it/ info@enginsoft.it
Italy	DYNAmore http://www.dynamore.de/ uli.franz@dynamore.de
JAPAN	JSOL Corporation http://www.jri-sol.co.jp/english/cae cae-info@sci.jri-sol.co.jp
JAPAN	ITOCHU Techno-Solutions Corp. http://www.engineering-eye.com/ ls-dyna@ctc-g.co.jp
JAPAN	FUJITSU http://jp.fujitsu.com\solutions\hpc\app\lsdyna\
KOREA	Theme Engineering http://www.lsdyna.co.kr/ wschung@kornet.com
KOREA	Korean Simulation Tech. http://www.kostech.co.kr young@kostech.co.kr
Netherlands	Infinite Simulation Systems, BV http://www.infinite.nl/ j.mathjissen@infinite.nl
SWEDEN	Engineering Research AB http://www.erab.se/ sales@erab.se
TAIWAN	Flotrend Corporation http://www.flotrend.com.tw/ gary@flotrend.tw
RUSSIA	State Unitary Enterprise -STRELA info@ls-dynarussia.com

United Kingdom	OVE ARUP & PARTNERS http://www.oasys-software.com/dyna/en/ dyna.sales@arup.com
USA	Livermore Software Tech. Corp. - LSTC http://www.lstc.com/ sales@lstc.com
USA	Engineering Tech. Assc. Inc. - ETA http://www.eta.com/ sales@eta.com
USA	DYNAMAX http://www.dynamax-inc.com/ sales@dynamax-inc.com

Finite Element Analysis (FEA) Consulting
&
Engineering Service

FEA consultants use a wide range of software simulation programs for controlling the modeling and analysis of structures, systems, products and many other applications. Used by government, homeland security, court trials, and many other industries.

North America

Karagozian & Case (K & C) http://www.kcse.com Shangrui Lan (818) 303-1268	**CAE Analysis** http://www.caeai.com	**Schwer Engineering & Consulting Services** http://schwer.net Len Schwer (707) 837-0559
KBEC Khan Bui (512) 363-2739	**Predictive Engineering** http://www.predictiveengineering.com George Laird (800) 345-4671	

EU – Pacific Rim

AU **LEAP** http://www.leapaust.com Greg Horner 02 8966 7888	**UK** **ARUP** http://www.oasys-software.com/dyna/en/ Brian Walker 44 (0) 1212 133317	**UK** **Dutton Simulation** http://www.duttonsimulation.com Trevor Dutton 44 (0) 1926 732147

Software & Hardware Alliances

Software Solutions

SMP/MPP Hardware & OS

MPP & Interconnect MPI

ETA – DYNAFORM

http://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

http://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.

OASYS   software for LS-DYNA

http://www.oasys-software.com/dyna/en/

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.

ESI Group Visual-CRASH For DYNA

http://www.esi-group.com

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

APTEK

http://www.aptek.com

The MMCD is a graphics-based and menu-driven program that interfaces with the LS-DYNA library of material models and the LS-OPT optimization code. The core of the MMCD is the driver, which calculates the stress-

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

BETA CAE Systems S.A.– ANSA

http://www.beta-cae.gr

Is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment. ANSA is a full product modeler for LS-DYNA, with integrated Data Management and Process Automation. ANSA can also be directly coupled with LS-OPT of LSTC to provide an integrated solution in the field of optimization.

BETA CAE Systems S.A.– μETA

http://www.beta-cae.gr

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

those compressed with SCAI's FEMZIP software

Participant LS-DYNA® SMP & MPP Hardware and OS

FUJITSU	HP	HP	HP	HP
		IA-64	Opteron	Alpha
Prime Power	PA-8X00			
		HP-UX 11.22	Linux	True 64
SUN OS 5.8	HP-UX 11.11. and above	and above		

INTEL	INTEL	INTEL	NEC	
IA32	IA64	Xeon EMT64	SX6	
Linux, Windows	Linux	Linux, Windows 64	Super-UX	

MPP and Interconnect MPI

| CRAY	O/S	HPC Interconnect	MPI Software
CX1	Windows HPC Server 2008, Linux	InfiniB	MSMPI, HP MPI, INTEL MPI
XT5	Linux	SeaStar2	Cray MPI
XT5M	Linux	SeaStar1	Cray MPI
FUJITSU			
Prime Power	SUN OS 5.8		
HP			
PA8000	HPUX		
IA64	HPUX		
INTEL			
IA32	Linux, Windows	InfiniBand (Voltaire), MyriCom	MPICH, HP MPI, OpenMPI
IA64	Linux		MPICH, HP MPI, OpenMPI
Xeon EMT 64	Linux	InfiniBand (Voltaire), MyriCom, PathScale InfiniPath	MPICH, HP MPI, OpenMPI, INTEL MPI
NEC			
NEX SX6	Super-UX		

Training Courses

August & September 2009

Send listings to agiac99@aol.com

Start Date		Check company site for changes to class dates	
Sept 01	US	Introduction to DYNAFORM	http://www.eta/com
Sept 07	US	Advance Options	http://www.lstc.com
Sept 10	US	Contact	http://www.lstc.com
Sept 14	UK	Fluid/Structure Interaction in LS-DYNA	http://www.oasys-software.com/dyna/en/training
Sept 15	US	Intro to LS-DYNA LS-PrePost	http://www.lstc.com
Sept 21	US	Implicit	http://www.lstc.com
Sept 22	FR	Material modelling in LS-DYNA (Plasticity, Damage, Failure)	http://www.asplus.fr
Sept 24	FR	Polymeric Material Modelling in LS-DYNA	http://www.asplus.fr
Sept 24	US	Concrete & Geomaterial	http://www.lstc.com
Sept 29	SE	LS-DYNA, Introductory course	http://www.erab.se
Sept 30	UK	LS-DYNA, Introductory course	http://www.oasys-software.com/dyna/en/training
Oct 22	UK	Implicit Capabilities	http://www.oasys-software.com/dyna/en/training
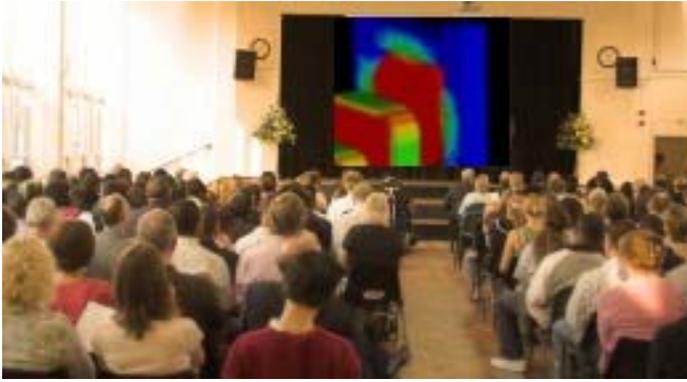
Conferences

&

Events News

Start	Country	2009
Sept 09	Greece	**3rd ANSA &** Int'l Conf http://www.beta-cae.gr/3rd_conference_announcement.htm
Oct 01	Italy	**Enginsoft International Conference 2009** http://meeting2009.enginsoft.it/
Oct 21	France	**DIGIMAT USERS' MEETING 2009/The Material Modeling Conf.** http://www.e-xstream.com/en/digimat-users-meeting-2009
Oct 23	Korea	**Korean LS-DYNA User's Conference 2009 (THEME)** http://www.lsdyna.co.kr/
Oct 27	Japan	**Asian LS-DYNA User's Conference 2009** http://ls-dyna.jsol.co.jp/en/event/uc2009.html
Nov 09	Iran	ICCT09 1st International Conference on Concrete http://www.icct.ir/
Nov 12	Germany	**8th German LS-DYNA Forum** http://www.dynamore.de/conferences/upcoming-conferences.
Nov. 14	US	**SC2009** http://sc09.supercomputing.org/
Nov 18	US	**ANSYS Conf. & 27th CADFEM Users Meeting** http://www.usersmeeting.com/

9th International Symposium Computer Methods in Biomechanics and Biomedical Engineering

www.cmbbe2010.cf.ac.uk

Scope and objectives:

CMBBE2010 is to be held at the Westin Hotel, Valencia, Spain, 24–27 February 2010. The themes and topics for this 9th symposium in the series have been developed through interaction with international experts and therefore reflect the latest development in computer methods in biomechanics, biomedical technology and modelling of biological structures. Key objectives are to highlight and communicate new areas of future potential as well as presenting new techniques that are being successfully applied across medical technology, biomechanics and the healthcare sector. Interdisciplinary research which overarches medical technology, imaging/tissue characterisation, biosciences and applications in clinical practice will be placed at the forefront of the meeting agenda.

LSTC and Arup are two of the sponsors of the symposium.

Symposium Organisers:

John Middleton (Chair), Sam L Evans and Cathy Holt (Cardiff University, UK)

Christopher Jacobs (Columbia University, New York, USA)

Brian Walker (Arup, Birmingham, UK)

Carlos Atienza (IBV, Valencia, Spain)

- 30 Plenary presentations by keynote speakers
- 30 Oral and 6 poster presentation sessions
- Special sessions on emerging topics
- Software and medical technology exhibits
- Sponsored prizes for best research papers and posters

Young researchers are very welcome and reduced fee together with significant student prizes are offered

The meeting has always promoted international collaboration and networking and this is evidenced through the well-known research groups, commercial companies and scientific organisations who continue to present their research and support and sponsor the CMBBE series. If you wish to exhibit, sponsor or organise a special session then please do contact the organisers.

LS-DYNA users are invited to submit papers, where the code has been used in the fields of biomechanics and biomedical engineering.
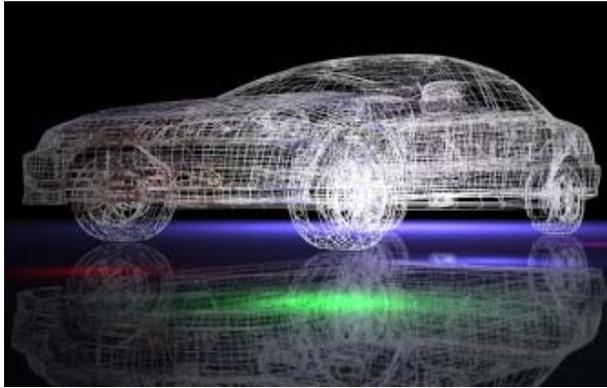
**The 11th International,
LS-DYNA® Users Conference**

June 06-08, 2010

**Hosted by Livermore
SoftwareTechnology Corp.**

To be held at The Hyatt Regency
Dearborn, MI

Abstract Due:	email abstract to: **papers@lstc.com**	Notification:
December 4, 2009	**subject line for e-mail –
Abstract LS-DYNA Conference 2010**	January 22, 2010
Paper Deadline: March 05, 2010	Conference Papers: The presenter of each accepted paper will receive free admission to the conference, provided that the presenter registers for a room at the Hyatt Regency Dearborn under LSTC Conference registration	

Application Areas Being Accepted for Paper Submission:

- Aerospace
- Automotive Crashworthiness
- Ballistic and Penetration
- Biomechanics
- Civil Engineering
- Compressible Fluid Dynamics
- Electro Magnetics

- Heat Transfer
- Impact and Drop Testing
- Manufacturing Processes
- Metal Forming
- Modeling Techniques
- Nuclear Applications
- Occupant Safety

- Seismic Engineering
- Ship Building
- Transportation
- 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
http://www.ls-dynaconferences.com**

8th LS-DYNA Forum 2009 in Germany

DYNAmore invites to the 8th LS-DYNA Forum, November 12th 2009, in Stuttgart, Germany.

Following the successful European LS-DYNA Conference in Salzburg (Austria), this year the German national LS-DYNA conference will be held in form of a one day event with attendance free of charge.

Well known presenters from industry and academia give presentations about their work with LS-DYNA. The main focus of the presentations will be on crash, passive safety, metal forming, and material modelling. Additionally, Dr. John Hallquist (President of LSTC) gives an overview about recent and future developments in LS-DYNA.

The forum will be ideally for LS-DYNA users to share and discuss experience, to obtain information on upcoming features of LS-DYNA and to learn more about new application areas.

The event will be accompanied by an exhibition featuring the latest software and hardware developments related to LS-DYNA.

The attendance of the conference is free of charge – although registration is necessary. For further information

Contact: DYNAmore GmbH
Industriestr. 2
70565 Stuttgart, Germany
Tel. +49 (0) 7 11 - 45 96 00 - 0,
Fax +49 (0)7 11 - 45 96 00 – 29
e-mail: info@dynamore.de
http://www.dynamore.de

EnginSoft International Conference

2009 - 1-2 October 2009 – Bergamo – Italy

2nd Announcement and Invitation

Simulation and Virtual Prototyping are seen as key disciplines for achieving progress in engineering and science in the 21st century. In this light, EnginSoft is hosting its International Conference 2009 CAE Technologies for Industry on 1–2 October in Bergamo, Northern Italy - concurrently with the ANSYS Italian Conference 2009.

This occasion has long become one of the leading events in Europe for all those involved in CAE, with record attendances in 2008, 2007…

The Conference Committee has received an overwhelming response to the Call for Papers and has now published a provisional list of outstanding papers that will be presented on the 2 days of the conference.

The program covers a wide range of innovative topics and applications in such areas as: optimization, mechanics, industrial applications, structural engineering, manufacturing process simulation, computational fluid-dynamics, emerging technologies, durability and fatigue, rapid and impact dynamic, CAD/CAE integration….

Photo: Conference Venue - Centro Congressi Giovanni XXIII Bergamo

The preliminary list of papers can be viewed on the official conference website: http://www.caeconference.com

The Conferences will present the diversity and impact of CAE Technologies to an international audience of users from various industries with different backgrounds, developers, scientists and researchers. The two Conferences will offer a highly innovative platform for interaction and exchange of knowledge, development and application results. Moreover, they will reveal convincing visions for the future of engineering simulation in industry, research and the academia.

The program features presentations from leading experts and key companies from around the world highlighting applications in automotive, aerospace, energy, marine, oil&gas, consumer goods, environment, biomedicine and other areas.

In several product update sessions and in the demo room, conference attendees will hear about the latest developments of state-of-the-art CAE software encompassing:

ANSYS - ANSYS CFX – ANSYS Fluent – ANSYS ICEM CFD – modeFRONTIER – ANSOFT - Flowmaster – LS-DYNA - MAGMASOFT – FORGE – FTI – THIRD WAVE SYSTEM – ESACOMP…

A large accompanying exhibition will see the world's leading solution providers showcasing products and services covering all aspects of CAE technologies.

Delegates and exhibitors will use the exhibition as an international networking forum to gain new insights, share experiences and to find new business opportunities.

Follow the Sound of Innovation – Be Inspired about CAE –

Come and meet us in Bergamo !

Logistics:

Bergamo is located 1h drive from Milan.

Nearest Airports: Bergamo BGY 15 minutes

Milan Linate LIN 1 hour

Milan Malpensa MXP 1,5 hours+

We are very pleased to help you in preparing your trip, accommodation and presence !

For further assistance and information, please contact: Dr. Luisa Cunico, l.cunico@enginsoft.it

In the heart of the territory of Lombardy, Bergamo represents a unique entity for its setting, beauty, history, tradition and culture.

The strategic positioning of the city within the system of the airports of Milan, with the nearby international airport of Bergamo-Orio al Serio, guarantees a tight network of daily connections between Italy and abroad, also with low cost carriers.

The direct link with the national motorway system, allows rapid transfers between the other airports of Northern Italy

(in particular with Milan Linate and Milan Malpensa)

For its vitality in business and value of its economic activity, the territory of Bergamo constitutes one of the fundamental hubs of the Italian economy.

Bergamo's Medieval Citta' Alta

But Bergamo is also history, with the beauty of its impressive medieval Citta' Alta, and its nature, placed as it is, at the foot of the beautiful Orobic Alps and near to the delightful Iseo Lake.

The hotels in the city of Bergamo and surroundings offer highest quality, supported by an excellent infrastructure and first-class services rendered by the local people, at very good quality/price ratio. The layout of the City, its atmosphere, the traditional hospitality of the people, make Bergamo the ideal place to transform any event into a highly enjoyable and unforgettable moment in time.

Visit the main Conference website: http://www.caeconference.com

JAPAN LS-DYNA Users Conference 2009 Dates : October 27(tue) - 28(wed), 2009	Organized by JSOL Corporation October 27th – 28th, 2009

JSOL Corporation is hosting JAPAN LS-DYNA Users Conference 2009 for two days, in order to provide opportunities for LS-DYNA Users in Japan to share information and to enhance fellowship.

Venue:

27th ANA Hotels Hotel Grand Court NAGOYA

28th The Nagoya Urban Institute

Lecture Categories

Mechanical Design

Manufacturing Technology

Automotive Design

Consumer Product Design

Software/Hardware Development

LS-DYNA/CAE Software Application Technology

Material

Optimization

Quality Assurance

New Technology

Harumi Center Bldg.,2-5-24, Harumi, Chuo-ku, Tokyo 104-0053, Japan

JSOL Corporation, Engineering Technology Division

E-mail : event@sci.jsol.co.jp

Review
The 5th China CAE
Annual Conference

The 5th China CAE Annual Conference was held in Lanzhou successfully on July 28th-29th, 2009. CAE conference is organized by China Mechanical Engineering Society (CMES) annually, and it has been recognized as very important event for CAE industry, the conference dedicates to the exchange of information and idea about CAE trends & technical innovation.

Jason Wang - LSTC

LSTC's distributors in China —ETA-China, NEC, ARUP contributed jointly as Golden Sponsor of this conference to promote new technology of LS-DYNA. Mr. Jason Wang, the senior engineer of LSTC, made a presentation about "ALE-FSI Application and MPP Technology" at this conference. In his presentation, information related to constraint, penalty, projection, and relative velocity based FSI were discussed; On the other hand, MPP technology and the future HPC development trend in LS-DYNA were also introduced.

At this conference, LSTC won a special award "The Best Partner of 2009 China CAE Annual Conference" shown above.

Cray Acquires PathScale Compiler Suite Assets From SiCortex

Cray Acquires PathScale Compiler Suite Assets From SiCortex

Supercomputer Leader Will Leverage Intellectual Property and Provide a Path Forward for PathScale Customers

SEATTLE, WA, Aug 27, 2009 (MARKETWIRE via COMTEX) -- Global supercomputer leader Cray Inc. (NASDAQ: CRAY) today announced it has acquired the PathScale Compiler Suite assets from SiCortex. Financial terms of the deal were not disclosed.

Cray plans to leverage some of the PathScale intellectual property to enhance Cray's own compiler offerings over time. The company will contribute other parts of the PathScale intellectual property to the open source community through an alliance with NetSyncro.com, an organization of compiler engineers with strong open source ties. NetSyncro.com will continue developing the PathScale Compiler Suite, provide support for users of the software and will rebrand the effort under the original PathScale name.

"Our main goal for this acquisition was to provide clear direction for those Cray customers who want to continue using the PathScale Compiler Suite on Cray supercomputers," said Peter Ungaro, Cray president and CEO. "We believe turning the PathScale compiler's future development and customer support over to a new and similar PathScale organization accomplishes our goal, as it provides a path forward for PathScale compiler users and helps ensure that the software will have a robust, open source HPC community around it. We also expect our own world-class compiler to benefit from some of the PathScale technology. This is another indicative example of our strategy to acquire the key technology components necessary to building a productive, high performance user environment on our supercomputers."

"I cannot express enough gratitude to Cray in helping rebuild PathScale and giving us this opportunity for the future," said Christopher Bergstroem, PathScale's new CTO. "Our vision ahead is bright and optimistic with a focus to continue our position as one of the highest performing HPC compilers in the industry. As a new member of the PathScale team I intend to lead the way in building a strong open source community for PathScale. We believe our solid commitment to open source will enable the community to thrive by facilitating collaboration, sharing of knowledge, innovation and research."

"PathScale's EKO compiler suite has been a popular choice in the HPC community since 2004," said PathScale Engineering

Director Fred Chow. "Our performance stands out amongst the competition and we continue to raise the standard for the industry. We thank Cray for supporting PathScale and for fulfilling the engineers' wishes to continue their work. The new PathScale will focus on improving product delivery, quality of support, and porting to new platforms to substantially expand our impact in the open source community. We will also focus not only on benchmark results, but collaboration with important open source projects and helping developers tune for performance."

Cray supports three compiler options for the Cray XT(TM) line of supercomputers: The Portland Group's PGI Server Fortran/C/C++ Compilers and Tools for Linux; the PathScale Compiler Suite, which includes high-performance 64-bit C, C++ and Fortran compilers for Linux-based environments; and the Cray Compiler Environment (CCE). The Portland Group continues to be the primary compiler partner for Cray systems, with both PathScale and CCE providing a more comprehensive user environment where required.

Migration paths will be available for all Cray customers, who can contact their Cray representative for additional information. Non-Cray customers who use the PathScale compiler should contact the new PathScale organization directly at http://www.pathscale.com.

About Cray Inc.

As a global leader in supercomputing, Cray provides highly advanced supercomputers and world-class services and support to government, industry and academia. Cray technology enables scientists and engineers to achieve remarkable breakthroughs by accelerating performance, improving efficiency and

extending the capabilities of their most demanding applications. Cray's Adaptive Supercomputing vision will result in innovative next-generation products that integrate diverse processing technologies into a unified architecture, allowing customers to surpass today's limitations and meeting the market's continued demand for realized performance. Go to www.cray.com for more information.

Cray is a registered trademark, and Cray XT is a trademark of Cray Inc. Other product and service names mentioned herein are the trademarks of their respective owners.

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