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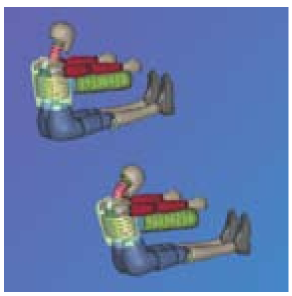


COVER STORY

MSC.SOFTWARE:

BUILDING A BETTER TRUCK WITH VPD

HARDWARE SPOTLIGHT

IBM:

WHAT IS GRID COMPUTING?

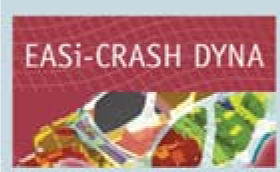
SOFTWARE SPOTLIGHT

ESI-GROUP: EASI-CRASH DYNA

WITH POWERFULL EDITING

FEATURES, SUCH AS AUTOMESH

AND REMESH



FEA Information Worldwide Participant's

Contents

Editor: **Trent Eggleston** **Managing Editor:** **Marsha Victory** **Technical Editor:** **Art Shapiro** **Graphic Designer:** **Wayne L. Mindle**	**Technical Writers:** **Dr. David Benson** **Uli Franz** **Dr. Ala Tabiei** **Technical Consultants:** **Steve Pilz** **Reza Sadeghi**

FEA Information Announcements

We welcome a new Particpant:

ESI Group –North America - We will be bringing you product information on their software:

- EASi-CrashDYNA
- Vibro Acoustics
- Aerodynamics & aero-acoustics

LS-DYNA Resource Page

Now includes MPI and Interconnects

LS-DYNA Resource Page

Now includes EASi-CrashDYNA

LSTC 9th International LS-DYNA Users Conference 2006:

Website with current information – booths, sponsorships and registration are now available.

FEA Information New series Continued:

LS-DYNA NEWS – Part 2. 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.

MFAC – updated new website. www.mfac.com

Course Offering:

SHEET METAL FORMING SIMULATION USING LS-DYNA
Short Course by Chris Galbraith
Location: Kingston, Ontario, Canada -
class runs 9:00 a.m. and until 5:00 p.m

Sincerely,
Trent Eggleston & Marsha Victory

LS-DYNA News – Part 2
Version 971 Developments

*NODE_transform

- Perform a transformation on a node set based on a transformation defined by *DEFINE_TRANSFORMATION.
- Requires as input the transformation ID and the node set ID.
- Allows the node set to be translated and rotated as a rigid body
- More general than *Part_move

*Define_transformation

- POINT option
  - Requested for dummy positioning
  - The POINT option in ROTATE provides a means of defining rotations about axes that have been reoriented by previous transformations in the *Define_transformation definition
  - The coordinates of the two POINTs are transformed by all the transformations up to the transformation where they are referenced.
  - The POINTs must be defined before they are referenced, and their identification numbers are local to each *Define_transformation.
  - The coordinates of a POINT are transformed using all the transformations before it is referenced, not just the transformations between its definition and its reference. To put it another way, while the ordering of the transformations is important, the ordering between the POINTs and the transformations is not important.
- LS-DYNA versions 970 & 971

Mass Property output

- *Database_glstat_mass_properties: This is an option for the glstat file to include global mass and inertial properties in the output for each output state.
  - Mass center, mass, inertia tensor, principle inertias
  - Computed from nodal point and rigid body mass and inertia.
  - Excludes failed nodes and elements
- *Database_ssstat_mass_properties: This is an option for the ssstat file to include mass and inertial properties for the subsystems.
- LS-DYNA versions 970 & 971

*Termination_deleted_shells

- NFAIL1 and NFAIL4, which are defined on *CONTROL_SHELL, checks for negative jacobians and deletes any shells where one is found
- If the NFAIL1/NFAIL4 option is set, the calculation can be terminated based on the number of elements that have failed within a given part ID. The number of failed shells is specified by this *Termination option.
- SMP and MPP implementation
- LS-DYNA versions 970 & 971

*Hourglass

- A new hourglass control option has been added to the type 6 hourglass control for hyperelastic materials
    - Implemented in the Belytschko-Bindeman solid element
        - Uses an exact elastic hourglass stiffness if the hourglass coefficient is unity.
- Combines hourglass viscous and stiffness forces together for tire applications
    - Hyperelastic materials frequently require additional damping for stability
- LS-DYNA versions 970 & 971

*Contact_guided_cable

- A sliding contact that guides 1D elements, such as springs, trusses, and beams, through a list of nodes
- Ordering of the nodal points and 1D elements in the input is arbitrary
- Defined by a set of guide nodes and a part set of one-dimensional elements
- Explicit, implicit, and MPP implementation
- LS-DYNA versions 970 & 971

*Define_friction

- Define friction coefficients between parts for use in the contact options
    - SINGLE_SURFACE,
    - AUTOMATIC_GENERAL,
    - AUTOMATIC_SINGLE_SURFACE,
    - AUTOMATIC_NODES_TO_SURFACE,
    - AUTOMATIC_SURFACE_TO_SUFACE,
    - AUTOMATIC_ONE_WAY_SURFACE_TO_SURFACE,
    - ERODING_SINGLE_SURFACE.
- One *DEFINE_FRICTION input permitted
- Friction values are given for each pair of parts, if n parts exist in the model, then up to n(n+1)/2 unique pairs are possible
- Default friction constants are used if a pair of contacting parts have no defined friction values
- The coefficients are stored using sparse matrix storage. A fast look-up is used to get the friction coefficients for each contact pair. Every contact segment has an associated part ID

*Mat_Muscle

- A Hill-type muscle model with activation and a parallel damper.
- Extension of *MAT_SPRING_MUSCLE to truss elements.
- Mass density is defined so lumped nodal masses are not required
- Implicit implementation
- LS-DYNA versions 970 & 971

*Mat_add_thermal_expansion

- Adds thermal expansion to all non-thermal material models
    - Elastic and hyperelastic
- Applies to all nonlinear solid, shell, thick shell, and beam elements
- Thermal expansion coefficient
    - Contant for all temperatures
    - Load curve defines coefficient as a function of temperature

*Mat_simplified_rubber/foam_with_failure

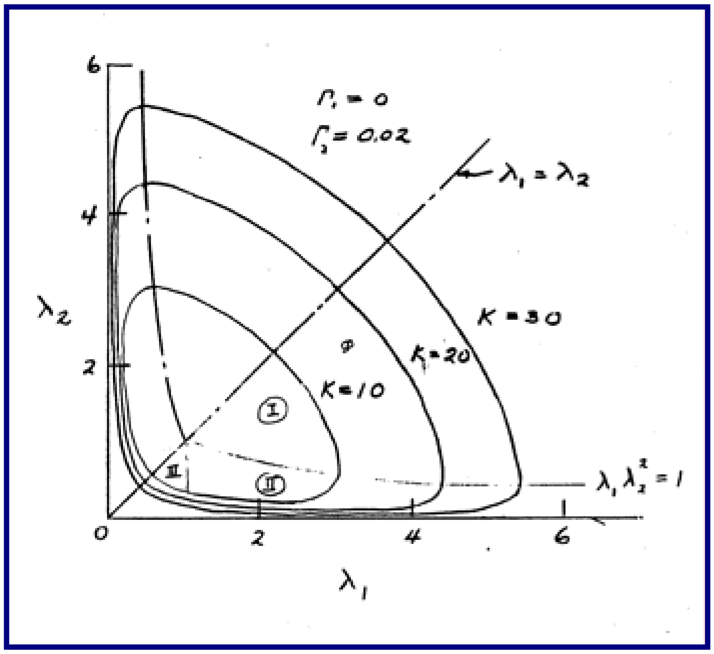
- Failure criterion is defined in terms of the invariants of the right Cauchy-Green deformation tensor:

$$f(I_1,\ I_2,\ I_3) = (I_1 - 3) + \Gamma_1 (I_1 - 3)^2 + \Gamma_2 (I_2 - 3) = K$$

where K is a material parameter which controls the size enclosed by the failure surface

- Works with shell elements
- LS-DYNA versions 970 & 971

*Mat_simplified_rubber/foam_with failure



*Mat_simplified_rubber_with_damage

- Simulates the rubber behaviour under cyclic loading. The implementation uses incompressible Ogden functional
- LS-DYNA versions 970 & 971

$$W = \left(1 - d\left(\frac{W_0}{W_{0,\max}}\right)\right)\sum_{i=1}^{3}\sum_{j=1}^{n}\frac{\mu_j}{\alpha_j}\left(\lambda_i^{*\alpha_j} - 1\right) + U(J)$$

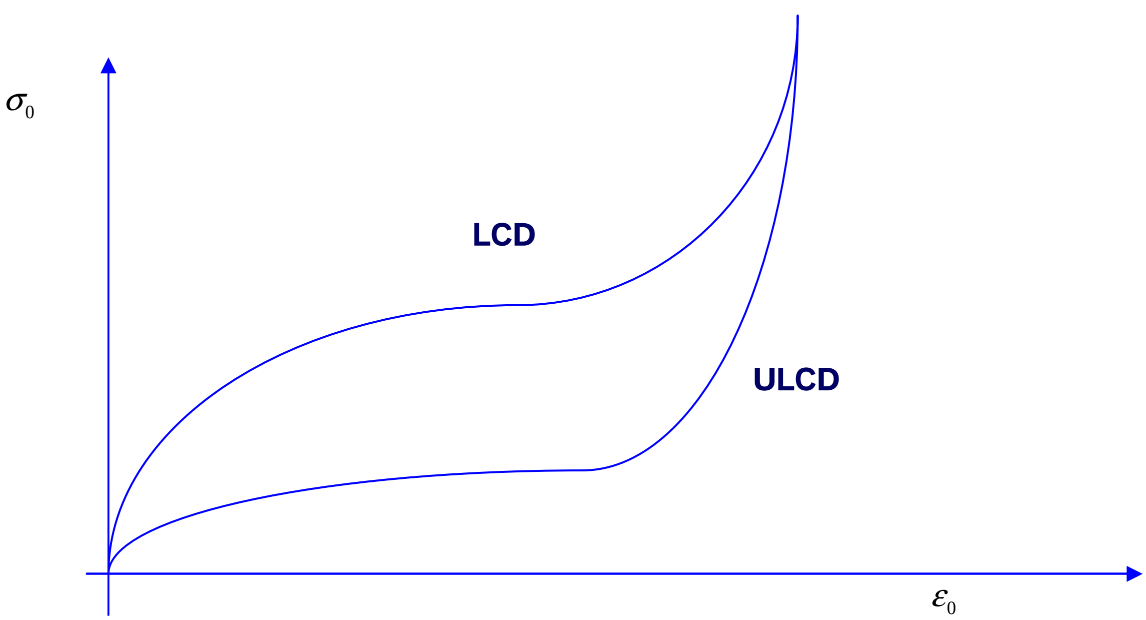
$$W_0 = \sum_{i=1}^{3}\sum_{j=1}^{n}\frac{\mu_j}{\alpha_j}\left(\lambda_i^{*\alpha_j} - 1\right)$$

$$W_{0,\max} = \max\left(W_0, W_{0,\max}\right) \Rightarrow 0 \le \frac{W_0}{W_{0,\max}} \le 1$$

$$0 \le d \le 1$$

*Mat_simplified_rubber_with_damage

A rate independent unloading curve is defined. Rate effects are included by a table definition for stress vs. strain at various rates.



*Mat_simplified_rubber_with_damage

The principal true stresses accounting for damage are easily computed:

$$W = \left(1 - d\left(\frac{W_0}{W_{0,\max}}\right)\right)\sum_{i=1}^{3}\sum_{j=1}^{n}\frac{\mu_j}{\alpha_j}\left(\lambda_i^{*\alpha_j} - 1\right) + U(J)$$

$$\sigma_i \neq \frac{1}{\lambda_j \lambda_k}\frac{\partial W}{\partial \lambda_i}$$

$$\sigma_i = (1 - d)\frac{1}{\lambda_j \lambda_k}\frac{\partial W_0}{\partial \lambda_i} + \frac{1}{\lambda_j \lambda_k}\frac{\partial U}{\partial \lambda_i}$$

BUILDING A BETTER TRUCK WITH VPD

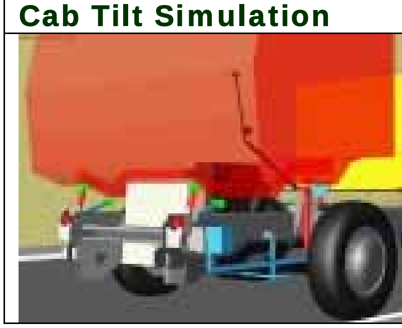
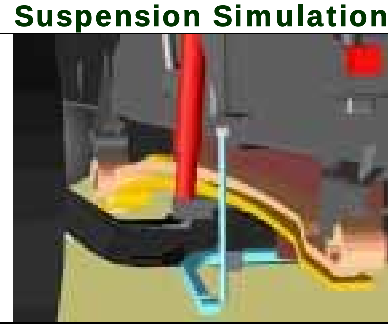
Author: *Dr. Charles Clarke -CAD/CAM consultant and writer based in the UK*

Simulation at Leyland Trucks Expands Analyses, Cuts Design Time, and Reduces Prototypes

Leyland T244 Military Truck. According to Dr. Jim Henderson, senior engineer, dynamics, at Leyland Trucks, “Technology has reached a point now where it would be impossible to do the variety of load case checks and dynamic simulations any other way than using advanced simulation software.”

.

Leyland has been using MSC.Software solutions for quite some time, including MSC.Nastran for about 10 years and MSC.ADAMS since 1997. Like many companies, they started using simulation software for discrete components, then assemblies, and ultimately for the dynamic simulation of assemblies.

Cab Tilt Simulation	Driving Simulation	Suspension Simulation
		

Keeping Up with Design Changes

The basic truck ladder chassis is a relatively simple structure. Because of the need to provide a variety of different body configurations, it is unlikely that trucks will ever move to the more unitary, integrated construction commonly used for cars. Consequently, the essential design configuration of the truck has been very similar since the 1900s. But as design technology has improved, the details of the truck have evolved almost beyond recognition. For instance, new materials have been introduced in recent years, leading to global initiatives to reduce weight through the use of these advanced high-strength steels. Other design details are changing – trucks are now using disc brakes rather than drums – and Leyland engineers must balance incorporating these details while improving quality and still keeping costs under control.

Before adopting MSC.ADAMS, Leyland engineers validated their designs using standard static load cases and traditional finite element analysis, which would approximate some of the situations they now simulate dynamically. “For instance, in cornering situations, we would use a set of static loads to simulate cornering at specific ‘G’ loads or accelerations,” says Henderson. “However, in those days engineering judgement played a much greater part in trying to identify the worst cases. Now that we have the ability to simulate a variety of different manoeuvres dynamically, a fuller set of load cases can be simulated, so we have a better chance of finding the less obvious but critical conditions.”

A full MSC.ADAMS truck model contains a flexible body and chassis, springs, roll bars, axles, cab and engine suspension, the steering mechanism, and any frequency-dependent rubber mounts. Extra detail, such as brakes, propeller shafts, and out-of-balance engine forces, can be included on an ‘as needed’ basis. Simulation also allows several aspects of the operation of crane-bodied vehicles to be better understood, such as vehicle stability on slopes and uneven surfaces, the need for stabilising legs, and the effects of loading and unloading.

When an articulated vehicle is coupling the trailer to the tractor, variables such as tractor speed, tractor alignment, and trailer height (legs can sink into loose ground) have a critical impact on the operation. Being able to simulate the whole process provides accurate load cases for improving traditional lead-up ramp designs by finite element techniques.

Simulating Difficult Manoeuvres

Tilt table simulations improve safety when operating tipper-bodied vehicles on sloping or uneven surfaces. For instance, simulation can run through a situation in which the full payload is inside the vehicle body, the body is elevated to its full extent, and the vehicle is tilted incrementally until its first wheel lifts. It is extremely expensive and time-consuming to perform this test physically because it requires both a real vehicle and the use of a tilt table. By contrast, the simulation is quick, accurate, and allows rapid comparison of alternative configurations.

From analysis of a lane-change manoeuvre, Leyland Trucks dynamics engineers discovered that on a recent vehicle, a military concept truck, rollover could only be achieved using an unrealistically high payload centre of gravity and extreme speed in excess of 60 mph. Because of the potential danger, this is not a test that would ever be carried out physically, so Leyland’s engineers appreciate being able to determine the ultimate performance characteristics of the vehicles they design without having to take physical risks.

Detailed procedures such as cab tilt that could not be properly analysed before can now be investigated with MSC.ADAMS simulations. The cab is lifted by a hydraulic ram until the centre of gravity of the cab passes over its pivot point, when it falls forward and the ram cylinder acts like a damper to slow and control the motion. The simulations help to determine the ram force requirements, identify potential panel interference, and ensure that locks locate correctly.

Typical vehicle handling analyses include steady-state cornering, lane changing, ‘J’ turns and straight-line braking. MSC.ADAMS simulation allows rapid assessment of the effect of minute changes in suspension, wheelbase, tires, or payload position, etc.

Each truck is significantly different from the previous one, so there are very few opportunities to modify and reuse previous physical prototypes. One of the critical areas for trucks is the cab. Because of the greater design sophistication demanded by truck users, cab design and development is becoming prohibitively expensive. This often leads to collaborative ventures between several manufacturers.

Ride comfort is important for the driver and for delicate payloads such as computers. With MSC.ADAMS, Leyland engineers can simulate a variety of ride conditions on highways, secondary roads, Pavé surfaces (cobble stones) and also discrete surface events such as potholes and speed bumps. Truck-specific factors that affect ride include cab suspension, chassis flexibility, and payload, all of which can be easily varied with MSC.ADAMS.

Part of improving the ride of the vehicle involves softening the cab suspension. This results in a compliant ride, which initially may not be to all truck drivers' taste, but after about a month or so they are generally reluctant to go back to more traditional suspension systems.

Speeding the Design Cycle

Simulation represents a significant benefit in terms of final design quality, as well as considerable time savings. A recent project named LF was completed two years faster than the previous equivalent one – in a four-year design cycle rather than six. As always when technology is brought to bear on design, although it is possible to identify benefits, it is unfair to suggest that the comparison is truly 'like for like' as there are inevitable process changes as a consequence of the new technology.

"There are definitely areas where modelling and simulation have helped," says Henderson, "particularly along the lines of reducing the amount of time wasted building physical prototypes with real parts. In the past we would test things, find that they didn't work, and modify them using trial and error. This was considerably unstructured and very much the opposite of the 'design of experiments' approach we take today, to vary things in a structured fashion to identify where the trends lie. There are far more benefits of 3D CAD and sophisticated analysis and simulation so that the LF vehicle, as well as being finished in two-thirds of the time of its predecessor, is of considerably better quality."

The Leyland engineers manipulate and analyse significant amounts of data. One of their approaches is to test the vehicle on the track and then 'drive' the MSC.ADAMS model with the measured accelerations. Consequently, the input files are quite large. The correlation between the track testing and the MSC.ADAMS simulations is good. "Again, it's difficult to quantify the quality of the correlation," said Henderson. "In a time-variant simulation you're never going to match the rise and fall of any particular acceleration exactly, but when you look at the results in the frequency domain you can see that the spikes line up fairly well at the same kinds of frequency. This is more important to us than getting the level exactly right because it's dependent on so many different variables."

Design teams at Leyland Trucks are still focused on getting drawings or parts out – the design process hasn't reached the required level of maturity where it can be simulation-driven. While everyone is keen to move forward, the deadlines are such that tried and tested techniques take precedence. Also, there are a limited number of people in CAE and many more in design.

"From my own point of view, I would like to see more people in the company using simulation, not just the CAE department," says Henderson. "It would be useful if more simulation model building could be done outside the CAE department. There is still quite a lot of repetitive and unnecessary duplication of geometry generation, manipulation, and cleaning. To improve this, CAD and CAE tools need to be linked more closely together."

A prototype vehicle early in the development cycle can prove to be very expensive. "It's fair to say that the use of simulation software has eliminated at least one of these prototypes," explains Henderson. "So the software has certainly paid for itself on the first project. My job is about solving problems in the real world. MSC.ADAMS is powerful and flexible enough to let me model exactly what I need, without getting too deep into software issues."

* * * *

One of the U.K.'s leading manufacturing companies, Leyland Trucks Ltd. is a wholly owned subsidiary of PACCAR Inc., a global technology leader in the design, manufacture, and support of high-quality trucks. Since its acquisition by PACCAR in 1998, Leyland Trucks has become the Group's established center for light- and medium-sized truck design, development, and manufacture, producing trucks from six to 44 tonnes for each of PACCAR's established international brands – Kenworth, Peterbilt, DAF, and Foden.

* * * *

The Leyland Assembly Plant in northwest England is one of Europe's most advanced truck assembly facilities. The company employs 1,000 people and manufactures 14,000 trucks per year, of which approximately 35 percent is exported to mainland European Community markets. Future development is focused on the use of leading-edge technology applications in all aspects of truck design, manufacture, procurement, and logistics.

What is Grid Computing

http://www-1.ibm.com/grid/about_grid/what_is.shtml

In the automotive and aerospace industry, grid computing can:

- Orchestrate and distribute disparate workflow
- Tap underutilized IT resources to accelerate time to market
- Simplify collaboration reliant on complex tools

Technically speaking...

Grid computing enables the virtualization of distributed computing and data resources such as processing, network bandwidth and storage capacity to create a single system image, granting users and applications seamless access to vast IT capabilities. Just as an Internet user views a unified instance of content via the Web, a grid user essentially sees a single, large virtual computer.

At its core, grid computing is based on an open set of standards and protocols — e.g., Open Grid Services Architecture (OGSA) — that enable communication across heterogeneous, geographically dispersed environments. With grid computing, organizations can optimize computing and data resources, pool them for large capacity workloads, share them across networks and enable collaboration.

Evolution not revolution

In fact, grid can be seen as the latest and most complete evolution of more familiar developments — such as distributed computing, the Web, peer-to-peer computing and virtualization technologies.

- **Like the Web**, grid computing keeps complexity hidden: multiple users enjoy a single, unified experience.
- **Unlike the Web**, which mainly enables communication, grid computing enables full collaboration toward common business goals.
- **Like peer-to-peer**, grid computing allows users to share files.
- **Unlike peer-to-peer**, grid computing allows many-to-many sharing — not only files but other resources as well.
- **Like clusters and distributed computing**, grids bring computing resources together.
- **Unlike clusters and distributed computing**, which need physical proximity and operating homogeneity, grids can be geographically distributed and heterogeneous.
- **Like virtualization technologies**, grid computing enables the virtualization of IT resources.
- **Unlike virtualization technologies**, which virtualize a single system, grid

computing enables the virtualization of vast and disparate IT resources.

Grid Benefits:

Grid computing goes far beyond sheer computing power. Today's operating environments must be resilient, flexible and integrated as never before. Organizations around the world are experiencing substantial benefits by implementing grids in critical business processes to achieve both business and technology benefits.

Business Benefits:

Accelerate time to results
- can help improve productivity and collaboration
- can help solve problems that were previously unsolvable

Enable collaboration and promote operational flexibility:
- bring together not only IT resources but also people
- allow widely dispersed departments and businesses to create virtual organizations to share data and resources

Efficiently scale to meet variable business demands:
- create flexible, resilient operational infrastructures
- address rapid fluctuations in customer demands|needs
- instantaneously access compute and data resources to "sense and respond" to needsIncrease productivity:
- can help give end users uninhibited access to the computing, data and storage resources they need (when they need them)can help equip employees to move easily through product design phases, research projects and more — faster than ever

Leverage existing capital investments:
- can help you improve optimal utilization of computing capabilities
- can help you avoid common pitfalls of over-provisioning and incurring excess costs
- can free IT organizations from the burden of administering disparate, non-integrated systems

Technology Benefits

Infrastructure optimization:
- consolidate workload management
- provide capacity for high-demand applications
- reduce cycle times

Increase access to data and collaboration:
- federate data and distribute it globally
- support large multi-disciplinary collaboration
- enable collaboration across organizations and among businesses

Resilient, highly available infrastructure:
- balance workloads
- foster business community
- enable recovery and failure

Frequently Asked Questions:

What is a grid?

All or some of a group of computers, servers and storage across an enterprise, virtualized as one large computing system. Because grids unleash latent power that, at any one time, is not being used, they can give companies a huge gain in power, speed and collaboration, radically accelerating compute-intensive processes. Cost, meanwhile, can remain low, as grids can be built using existing infrastructure, helping to ensure optimal utilization of computing capabilities

What effect does grid have on users whose machines are being utilized for processing?

Grids are designed to be seamless and transparent . A user whose desktop PC, say, is contributing processing power to the grid will experience no negative effects: the grid runs in the background, utilizing available resources when needed by the system. If the PC user decides to run an application that requires more processing power, the work currently being processed on that machine will be dynamically reallocated to another machine in the grid with available processing power

What industries are using grid computing now?

Some examples include: Automotive and aerospace, for collaborative design and data-intensive testing; financial services, for running long, complex scenarios and arriving at more accurate decisions; life sciences, for analyzing and decoding strings of biological and chemical information; government, for enabling seamless collaboration and agility in both civil and military departments and agencies; higher education for enabling advanced, data and compute intensive research

What does it take to build a grid?

Building a grid can be as simple as enabling a small number of PCs (or server or storage network) to take advantage of underutilized processing and storage. This can radically speed completion of a single set of data- or compute-intensive tasks. From a relatively small deployment, you could expand slowly or quickly, narrowly or widely, depending on business needs. Ultimately, an entire enterprise can be enabled for grid — and grids can bring together not only departments and processes within a single company but also those among separate enterprises.

What about security in grid environments?

Grid Security Infrastructure (GSI) is a public-key-based security protocol, using X.509 certificates, a widely employed standard. The protocol provides single sign-on authentication, which allows a user to create a proxy credential that can authenticate with any remote service on the user's behalf, as well as communication protection and initial support for restricted delegation

If I want to learn more about IBM Grid Computing, what's the first step?

Sign up for a Grid Innovation Workshop. These sessions offer a hands-on, business-specific understanding of grid computing's strategic, financial and operational advantages for your business. Customized to individual organizations, IBM Grid Innovation Workshops help companies examine how grid technology can help solve their specific information problems. The Workshop includes an Executive Session, work sessions, validation of findings and a preliminary plan.

FORD LICENSES INNOVATION TO CUT PRODUCT DEVELOMENT TIME AND COST ACROSS INDUSTRY

Ford today announced it is now licensing the technology to Livermore Software Technology Coporation (LSTC) to be included in the company's industry standard LS-DYNA computer aided engineering software.

- Ford Motor Company is licensing springback compensation technology, which has helped the company reduce the time to develop stamping dies by an average of 6 to 10 weeks and is expected to save the company upwards of $20 million per year when fully deployed
- This Ford technology will be licensed to Livermore Software Technology Corporation and included in LS-DYNA, an industry standard finite element analysis program capable of simulating complex real world problems

DEARBORN, Mich., Aug. 16 - Ford Motor Company is licensing an innovation that is expected to save the company more than $20 million annually and reduces the time necessary to develop stamped automobile parts by six to 10 weeks.

Ford today announced it is now licensing the technology to Livermore Software Technology Coporation (LSTC) to be included in the company's industry standard LS-DYNA computer aided engineering software.

“The springback compensation technology we've developed cuts down significantly on the number of tries it takes to make an automotive stamping die perform correctly," said Charles Wu, director of Manufacturing and Vehicle Design Research & Advanced Engineering at Ford Motor Company. "This helps improve quality, fit and finish and to cut the time it takes us to bring a new vehicle to market. We're very excited to license this technology to LSTC so that other companies can benefit from Ford Motor Company's innovation."

Springback compensation simulation technology is particularly important in developing vehicles with Advanced High-Strength-Steel (AHSS) parts, which typically have more springback and use much harder dies that are more costly to re-work. AHSS steels are employed in components, such as the B-pillar of the Ford Freestyle, to help improve body strengths in key areas.

One of many uses of LSTC's LS-DYNA software is to accurately predict the stresses and deformations experienced by the metal as it is being stamped and to determine if the metal will tear or not perform as intended during stamping. The new technology licensed from Ford improves this portion of the software significantly.

The innovative Ford-developed spring-back compensation technology has already been successfully applied over the past three years to dies for parts for the Ford GT, Aston Martin products, Jaguar S-type, Ford F-150, Ford Freestyle, Ford Focus, Ford Mustang and the all-new 2006 Ford Fusion.

LS-DYNA is also used for other complex simulations, including vehicle crash tests. LS-DYNA's predecessor, LLNL DYNA3D, was originally written for military simulations, and consequently, LS-DYNA has advanced features for defense applications. LS-DYNA is capable of simulating projectile penetration, blast response and explosives.

The agreement between Ford and LSTC also states that LSTC software has been selected by Ford as the preferred choice for die face engineering applications worldwide. Additionally, through this partnership, Ford and LSTC agree to further cooperate on research and development for advanced die face engineering applications.

Ford Motor Company, a global automotive industry leader based in Dearborn , Michigan , manufactures and distributes automobiles in 200 markets across six continents. With more than 324,000 employees worldwide, the company's core and affiliated automotive brands include Aston Martin, Ford, Jaguar, Land Rover, Lincoln , Mazda, Mercury and Volvo. Its automotive-related services include Ford Motor Credit Company and The Hertz Corporation.

Aug. 15, 2005

EASI-CRASH DYNA with powerful editing features, such as automesh and remesh

http://www.esi-group.com/SimulationSoftware/EASi_CRASH-DYNA

- **Support of LS-DYNA 970**
- LS-DYNA/MADYMO coupling capabilities for pre- and post processing
- Superpose and merge multiple models
- Simple dummy positioning and seat belt routing
- Pre- and post-processing in the same environment
- Full capability to handle IGES, CATIA V4, UG and NASTRAN files

Pre-Processing Features

- Direct read in of IGES, NASTRAN®, PAM-CRASH, MADYMO and LS-DYNA® data
- Fully automatic meshing and automatic weld creation
- Rapid graphical assembly of system models
- Coupling between FE and rigid body models using EASi-CRASH's multi-window/multi-models/multi-application environment with visual verification
- FE-Dummy and Rigid body dummy structuring, positioning and orientation
- Material database access and manipulation
- Graphical creation, modification and deletion of contacts, materials, constraints and I/O controls
- Automatic detection and correction of initial penetration
- Minimum time step calculation and visualization
- Comparasion & copy of weld point data beetween two models
- Organize & export of model in include file format
- Replacing a component from one model to another model

High Productivity Features

- Quick Model Browsing
- Function Key assignment for fast access to panels
- Improved display speed through Control key
- Automatic window management with iconize capability

Post-Processing Features

- Highly optimized loading and animation of DYNA results for design
- Superimposition of results for design
- User-friendly and complete plotting tool for processing simulation and test data comparisons
- Quick access to stress energies and displacements without reloading the files
- One-click creation of movie files from animation
- Dynamic inclusion/exclusion of parts during animation and visualization
- Display of trajectories
- Import and super-imposition of test results with simulation results
- Removal of rigid body motion
- Synchronization between animation and plots, between simulation result file and test result file

EASI-Plot Features

- User friendly complete plotting tool for processing simulation and test data
- Easy access to engineering functions
- Plot file re-generation using template and session file
- Universal test reading ability
- One-minute CHASE iteration processing
- Overlay of templates

Supported Platforms on Unix/Linux - 2005

VERSIONS	PLATFORMS
SGI/IRIX	
Version 6.5 or higher (6.5.10 recommended)	24 or 48 Bit Z buffer for hardware shading JDK 1.2.2 pre-installed
HP/HP-UX	
Version 11.0 or higher	24 or 48 Bit Z buffer for hardware shading
IBM/AIX	
Version 4.3 or higher	
SUN/SUN OS	
Version 5.8 or higher	
Red Hat Linux	
• Intel P-4 Processor, 1 GHz, 512 MB RAM minimum • 3D Graphics Card (GE Force2) recommended • Red Hat Linux version 8.0 or higher with OpenGL library • GNOME desktop recommended • Mozilla 1.1 or higher for viewing demos	

Installation on Windows - 2005

VERSIONS	Minimum requirements
• Microsoft Windows NT with Service Pack 4.0 or higher • Windows 2000 Professional or Windows XP Professional with Service Pack 2.0 or higher with administrative privileges during installation.	• Intel P-4 Processor, 1 GHz, 512 MB RAM • minimum 3D Graphics Card (GE Force2) • recommended Exceed and Exceed 3D, v7.1 pre-installed • 400 MB disk (free) space required in the Program Files folder • Internet Explorer 5.5 or higher OR Net-scape 6.0 or higher for viewing demos • Acroread 4.0 or higher for viewing manuals

The Japan Research Institute Ltd.

Publication Available On Line

www.feapublications.com - Link “Featured”

Published in the 5th European LS-DYNA Users’ Conference 2005

Simulation of Wave-Dissipating Mechanism on Submerged Structure using Fluid-Structure Coupling Capability in LS-DYNA

Tokura S., Ida T. (The Japan Research Institute Ltd.)

Abstract:

Understanding the wave-dissipating mechanism of seashore structures is important to design effective seashore protection system against high waves. From the engineering point of view, wave dissipation with seashore structures is considered as a kind of fluid-structure interaction (FSI) problem. Recently constructing a submerged structure “flexible mound” is increasing for some advantages. The flexible mound is made of rubbery material and is deformable. Authors tried to apply the ALE (Arbitrary Lagrangian Eulerian) capability in an explicit finite element program LS-DYNA to this problem and compared the behavior of conventional “rigid mound” (breakwater) and flexible mound. Through this preliminary study authors showed that the SFI analysis using LS-DYNA could widely be used to design shore structures.

ARUP

Publication Available

www.feapublications.com - Link “Featured”

Published in the 5th European LS-DYNA Users’ Conference 2005

Perforation of Composite Floors

Algaard W., Lyle J., Izatt C.

Abstract:

Rapid construction methods for multi story buildings involve maximizing the tasks that can be carried out simultaneously on site. The risks of construction workers, fitting out lower floors, being hit by large objects dropped during installation can be managed by understanding the protection provided by the intermediate floors. This paper describes a Finite Element based methodology for assessing the impact event using LS-DYNA. The aim of the method is to evaluate low velocity impacts of heavy objects dropped onto concrete floors in order to establish the potential for perforation. The methodology is validated by comparing the simulation results with empirical penetration formulae available for concrete structures and with some experimental results. It is concluded that the perforation limits can be predicted with good confidence, but that further experimental research in the low velocity range is desirable.

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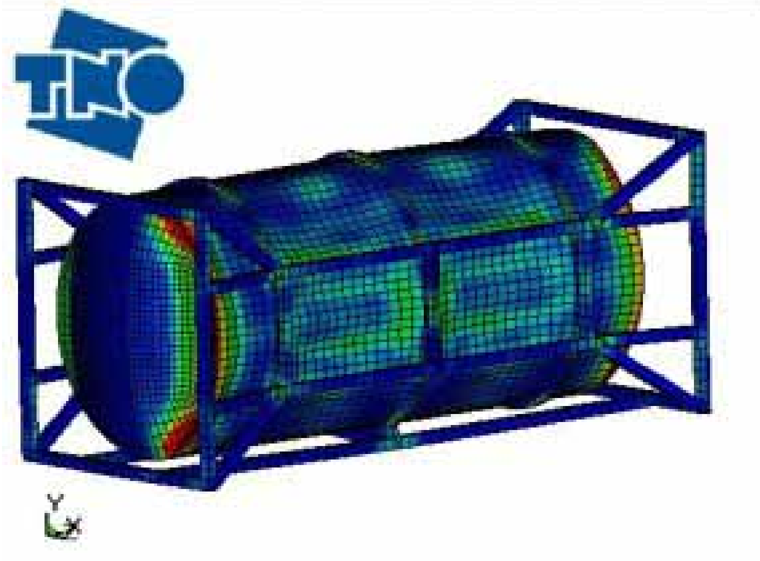
High explosive blast response of a 20 ft ISO Tank Container.

Courtesy Marnix Rhijnsburger - TNO

AVI Library - AVI 84 - Website: Warhead Analysis



The response of a typical 20 ft ISO tank container to a lateral blast loading of 5 tons of high explosives at 40 meters has been modeled. The structure consisted of a stainless steel cylindrical shaped tank with complex curved end caps. The 20 ft ISO frame structure is 'normal' steel. The AVI shows the plastic strains and the deformation mode. Since no hardening is taken into account the residual deformation and plastic strains are somewhat exaggerated

This test has actually performed in May 2004 in Woomera, Australia during two explosive trials. The experimental results show that the deformation mode is similar as simulated.

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

Only two openings are still available for the Introduction to LS-DYNA training class being held at the LSTC Michigan location. August 29th to September 1st

Our training room in our Troy, Michigan Office, has 12 student Pentium 4 machines running Linux and PCwindows. Each course is a combination of lecture and hands-on practice with example files. Lunch is provided on site, with the opportunity to chat informally with the instructor and other students.

With the success of our first classes held in Michigan I have scheduled the following classes at that location:

Sept 19 to Sept 20
ADV. CRASH & IMPACT SIMULATION
A few openings are still available

Oct 19 to Oct 21
IMPLICIT & SPRINGBACK

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

Dr. David Benson – www.topcrunch.org

07/28/05 – 08/20/05

Vendor Submitter Org.	Computer Interconnect	Processor	#Nodes x #Processors per Node = Total # CPU	Time (Sec)	Benchmark Problem	Submission Date
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	32 x 8 256	2058	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	16 x 8 128	2444	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	12 x 8 96	2947	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	8 x 8 64	3638	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	6 x 8 48	4535	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	4 x 8 32	6379	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	2 x 8 16	12386	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	2 x 8 16	12386	3 Vehicle Collision	08/19/2005
IBM/IBM	eserver p5 575/eserver HPS	POWER5, 1.9 GHz	1 x 8 8	24496	3 Vehicle Collision	08/19/2005
Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	64 x 2 128	3074	3 Vehicle Collision	08/03/2005
Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	64 x 1 64	4176	3 Vehicle Collision	08/03/2005
Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	32 x 2 64	4732	3 Vehicle Collision	08/03/2005
Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	16 x 2 32	8433	3 Vehicle Collision	08/03/2005
Galactic Computing (Shenzhen) Ltd..	GT4000/Infiniband	Xeon 3.6Ghz	64 x 2 128	310	neon_refined	08/02/2005

Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	32 x 2 64	418	neon_refined	08/02/2005
Galactic Computing (Shenzhen) Ltd.	GT4000/Infiniband	Xeon 3.6Ghz	16 x 2 32	699	neon_refined	08/02/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	16 x 2 32	655	neon_refined	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	8 x 2 16	1018	neon_refined	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	4 x 2 8	1740	neon_refined	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	2 x 2 4	3254	neon_refined	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	1 x 2 2	6084	neon_refined	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	16 x 2 32	8024	3 Vehicle Collision	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	8 x 2 16	13831	3 Vehicle Collision	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	4 x 2 8	24131	3 Vehicle Collision	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	2 x 2 4	45882	3 Vehicle Collision	07/28/2005
HP/HP	Opteron CP4000/Myrinet	AMD Opteron 2.4GHz DL145	1 x 2 2	90271	3 Vehicle Collision	07/28/2005

WEBSITE UPDATES and Information:

LS-DYNA Papers
www.dynalook.com

The website is updated with the papers from the 5th European Conference. In total 540 documents from six International and European Conferences and all issues of the FEA Information News can be downloaded. The documents can be accessed via the search engine. For example search strings like “honeycomb” or “spot weld” lead to 36 and 25 pdf documents, respectively.

FEA News Archive
www.ls-dynapublications.com

All previous news issues through July 2005 have been added to download.

LS-DYNA Examples
www.dynaexamples.com

The web site allows downloading of example input files for LS-DYNA. Many specific examples e.g. related to metal forming, implicit or thermal analysis can be accessed. Furthermore, all examples from the introductory classes from John Reid, Ala Tabiei and Klaus Weimar can be downloaded.

FAQ LS-DYNA Support Site
www.dynasupport.com

I wanted to know if we can have contact between Beam Elements and Shell elements and what Card is to be used. I have tried all "CONTACT_AUTOMATIC" cards but was not able to get the contact. The part with Beam elements passes through the wall of Shell elements:

In general, *CONTACT_AUTOMATIC_SINGLE_SURFACE, *CONTACT_AUTOMATIC_GENERAL or *CONTACT_AUTOMATIC_NODES_TO_SURFACE should handle a beam-to-shell-surface contact situation. All of these contact types take into account thickness offsets. By this I mean that the contact surface is offset from the shell midplane by half the shell thickness and offset from the beam centerline by a radius of the beam's equivalent circular cross-section. Of course, the contact thickness can be modified by the user on card 3 of *CONTACT_ or by using *PART_CONTACT instead of *PART. The first two contact types mentioned above are single surface contacts and so both the shell and beams parts should be included on the slave side with the master side being null. For an *CONTACT_AUTOMATIC_NODES_TO_SURFACE contact, the beam part (or its nodes) should be slave, the shell part (or its segments) should be master. For any of the above, the search for penetration is made between beam nodes (or more precisely, a sphere around each beam node) and shell surfaces.

If your contact situation is beam-to-shell-EDGE, you might have a problem. In that case, you may have to stick with *CONTACT_AUTOMATIC_GENERAL and add null beams (low density beams utilizing *MAT_NULL) along (merged to) the outer edges of your shells. The null beam part should be added to the slave side of the contact.

LSTC Distribution Channel - August

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

Canada

MFAC

www.mfac.com

MFAC is a full-service supplier to the metal forming industry, offering technical expertise aimed at quickly debugging sheet forming operations.

Germany

CADFEM

www.cadfem.de

As an software- and engineering house CADFEM GmbH is since 1985 one of the first addresses for companies, research institutes and Universities in the field of the Finite-Element-Method (FEM).
The scope ranges from distribution of world leading best-in-class software like ANSYS and LS-DYNA to training, support, consultancy and hardware.

India

GISSETA

www.GissEta.com

GissEta has extensive experience applying CAE tools for product development.We have a broad experience in vehicle crash and safety simulation. GissEta has the people, experience, tools and facilities required to be a strategic partner.

Japan

Fujitsu

www.fujitsu.com

Fujitsu is a leading provider of customer-focused information technology and communcations solutions for the global marketplace. Pace-setting devide techonologies, highly reliable computing and communcations products, and wordwide corps of systems and services experts uniquely postion us to deliver comprehensive solutions that open up infinite possibilites for our customer's success.

Netherlands

Infinite

www.infinite.nl

Located at Minervum 7226A
4817 ZJ BREDA, The Netherlands, Infinite distributes the following software products: ANSYS, LS-DYNA, LMS Virtual Lab. With experience in sales, consulting, training and benchmarking Infinite is involved with customer's needs and solutions.
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EVENTS

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

August 12, 2005
Altair India – 3rd South Asia LS-DYNA User Conference, Bangalore, India

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)

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

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

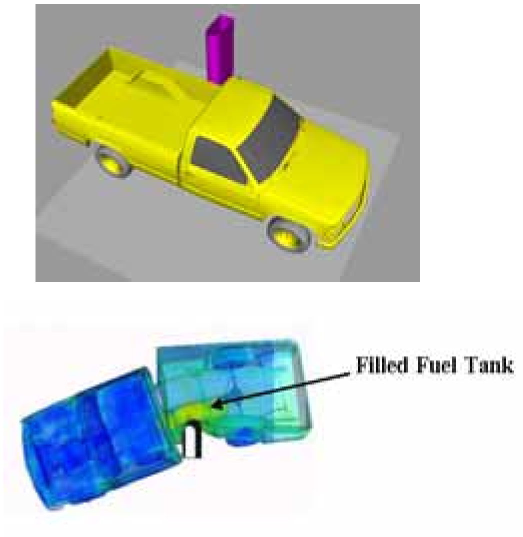
Includes a complete CAD interface capable of importing, modeling and analyzing, any die design. Available for PC, LINUX and UNIX, DYNAFORM couples affordable software with today's high-end, low-cost hardware for a complete and affordable metal forming solution.

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

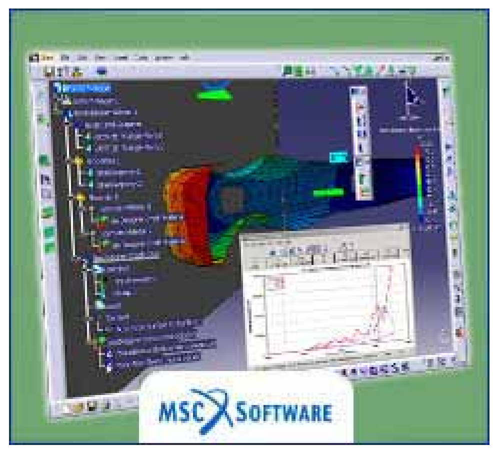
The MSC.Nastran™ Explicit Nonlinear product module (SOL 700) provides MSC.Nastran users the ability access the explicit nonlinear structural simulation capabilities of the MSC.Dytran LS-DYNA solver using the MSC.Nastran Bulk Data input format. This product module offers unprecedented capabilities to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

cMSC.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.

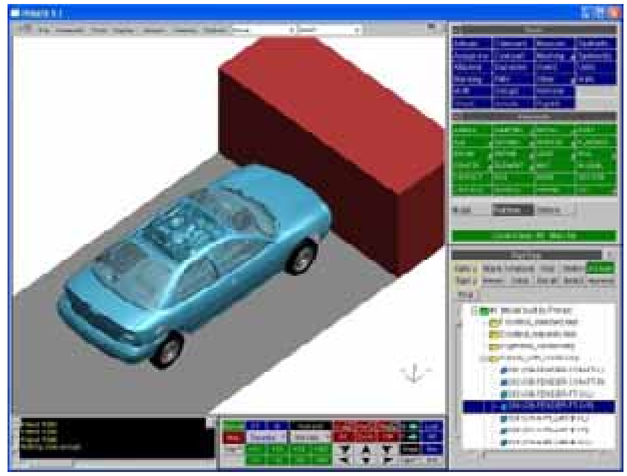
The MSC.Nastran Sol 700 will be released in November 2005. Beta release is available now !

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

Educational & Contributing Participants

Alphabetical Order By Country

China	Dr. Quing Zhou	Tsinghua University
India	Dr. Anindya Deb	Indian Institute of Science
Italy	Professor Gennaro Monacelli	Prode – Elasis & Univ. of Napoli, Frederico II
Russia	Dr. Alexey I. Borovkov	St. Petersburg State Tech. University
USA	Dr. Ted Belytschko	Northwestern University
USA	Dr. David Benson	University of California – San Diego
USA	Dr. Bhavin V. Mehta	Ohio University
USA	Dr. Taylan Altan	The Ohio State U – ERC/NSM
USA	Dr. Ala Tabiei	University of Cincinnati
USA	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 August 01 - 15 2005

August 01

LSTC: limited LS-DYNA license

Oasys: T/HIS is a XY data plotting package

DYNAMAX – Distributor – USA

THEME – Distributor – Korea

CRC – Distributor – Japan

GissETA – Distributor – India

August 08

HP - **The HP blade PC**

INTEL: The Intel® Xeon™ processor

FLOTREND – Distributor – Taiwan

STRELA – Distributor – Russia

DYNAmore – Distributor - Germany

KOSTECH – Distributor – Korea

August 15

FUJITSU – ETERNUS

AMD - AMD Opteron™ processor

Altair Italy – Distributor – Italy

Infinite – Distributor – Netherlands

FIGES – Distributor – Turkey

Altair India – Distributor - India