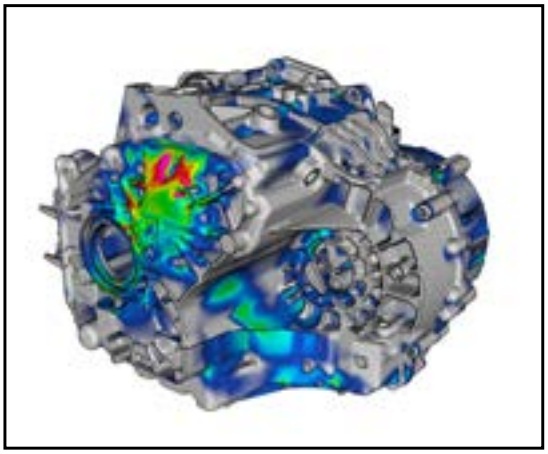
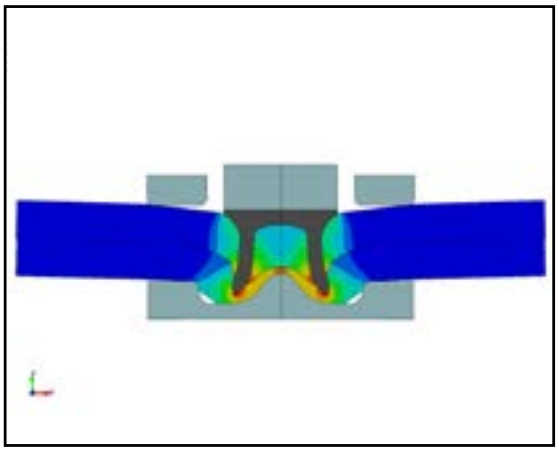
PRODUCTS

Shorter Time to Market with Realistic Simulation

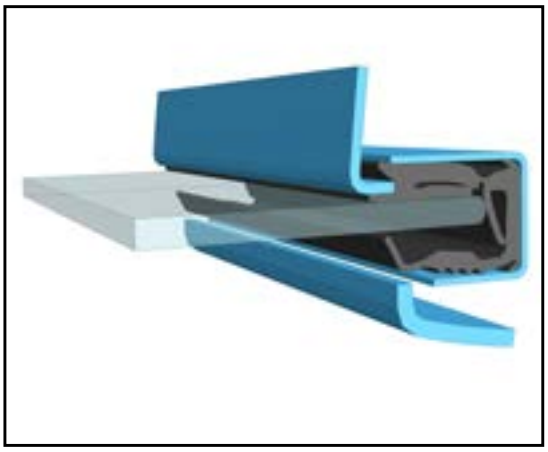
Courtesy of Volvo Car Corporation



Courtesy of Volkswagen AG



Courtesy of DYNAmore Nordic AB



Courtesy of SAAB Automobile AB

CONTENTS

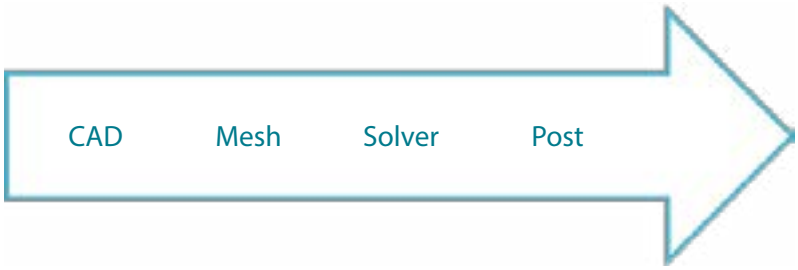
WE OFFER A COMPLETE SOLUTION FOR YOUR ANALYSIS NEEDS

Realistic Simulation is the use of FEA, multi-physics and scientifically based simulation to understand how products and manufacture processes will perform in real life. We believe that the most valued advantage of using realistic simulation is that it results in shorter time to market and reduced development costs.

Well known benefits of introducing realistic simulation in your development are:

- That there is less need for making physical prototypes and testing, this saves time and cost.
- A better understanding is gained of which product or process parameters that affects the performance.
- Reduced risk, because the performance can be evaluated earlier in development process and thus identifying problems earlier.
- Gain information on performance in situations that are difficult to test or measure.

DYNAmore Nordic's programs take you through all four steps to get a perfect simulation of your case:

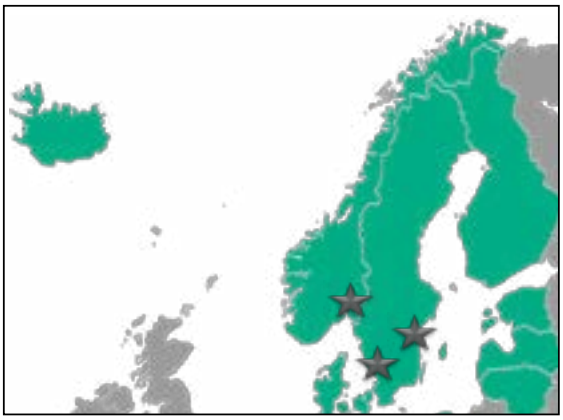


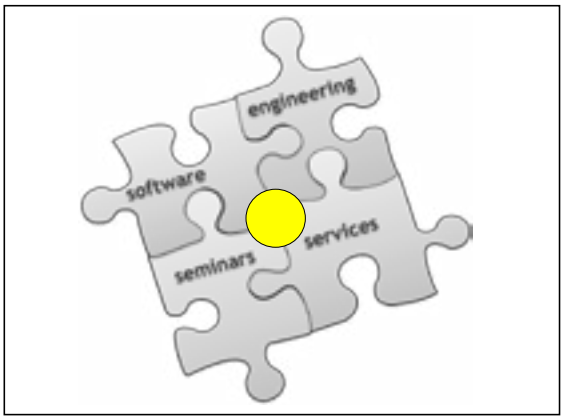
ABOUT US

DYNAmore Nordic is dedicated to support engineers to solve non-linear mechanical problems numerically. Our tools to model and solve the problems are the finite element software LS-DYNA as solver, LS-OPT for optimization, LS-PrePost and ANSA/mETA for Pre- and Post processing.
Our headquarter is located in Linköping and our second office is located Gothenburg. Our distributor SimEvolution is located in Oslo, Norway.

SERVICES

We sell, teach and support the software products LS-DYNA, LS-OPT, LS-PrePost, ANSA/mETA, DIGIMAT and SpaceClaim. In addition we provide engineering services for numerical analysis and integration of simulation software in your CAE environment.





CUSTOMERS

The majority of our customers are from the automotive, defence and aerospace industry. Some examples for the Nordic countries:

- All vehicle OEMs located in Sweden are customers of DYNAmore.
- The majority of suppliers for crash relevant parts in the automotive industry use LS-DYNA.
- The vast majority of Nordic engineering services companies for vehicle related simulation are customers of DYNAmore.
- LS-DYNA is the most frequently used explicit finite element code in the Nordic countries as well as worldwide.
- >75 different companies that use LS-DYNA are customers of DYNAmore Nordic.
- >20 different companies that use ANSA for FEM and/or CFD are customers of DYNAmore Nordic.
- >20 larger companies for consultancy services are customers of DYNAmore Nordic.
- Many universities use LS-DYNA in their research and/or education.

FACTS

- DYNAmore Nordic has 20 employees located in 2 offices. Many employees of DYNAmore Nordic are experts in the area of non-linear dynamics using LS-DYNA, LS-OPT, LS-PrePost, ANSA and mETA and the integration of our software into customers IT infrastructure.
- The company has been profitable since the foundation.

HISTORY OF DYNAMORE NORDIC

We have been working with LS-DYNA and advanced simulation since the very early years of the technology. Below is a short history of the company Engineering Research and its successor DYNAmore Nordic.

1980: Professor Larsgunnar Nilsson founds Engineering Research, a privately held company. The objective was to offer consultancy services with DYNA2D and DYNA3D and to sell his newly developed finite element software FEMP. One of the very first European installations of DYNA2D and DYNA3D (the predecessors to LS-DYNA).

1984: Bofors AB, Saab Scania AB and Volvo Car AB start using DYNA3D, supported by Engineering Research.
1986: Engineering Research becomes incorporated (AB).
1986: Saab Scania AB starts using DYNA3D for crash analysis on a regular basis.
1989: Engineering Research becomes the distributor of LS-DYNA in the Nordic Countries.
1991: The first Nordic LS-DYNA Workshop was held in Visby, Sweden
1993: More than 50 LS-DYNA customers in the Nordic countries. The Swedish automotive industry is the largest group of customers.
1999: Engineering Research arranges the 2'nd European LS-DYNA Users Conference in Gothenburg, Sweden.
2000: - More than 75 LS-DYNA customers in the Nordic countries
- 5 employees
- Office is moved to larger premises at Garnisonen in Linköping to allow further expansion.
2006: Engineering Research becomes the General Distributor for Beta CAE Systems (ANSA & Meta pre- and postprocessors) in the Nordic countries.
2007: January 1: Relocation to an office with dedicated class and meeting rooms at Garnisonen in Linköping to allow further expansion.
2007: Volvo Car Corporation chooses LS-DYNA for all their crash simulations.
2010: The staff is now 15 persons, engineers and PhDs.
2011: July 1 DYNAmore Nordic AB is formed when the German LS-DYNA distributor DYNAmore GmbH purchases all the assets of Engineering Research Nordic AB from Professor Larsgunnar Nilsson. DYNAmore Nordic AB takes over all personal and business from Engineering Research Nordic AB.
2011: (July and onwards): DYNAmore Nordic is now a part of the DYNAmore group. The DYNAmore group distributes LS-DYNA in all European countries (and Turkey) except for France, Great Britain and Ireland.

THE ADVANCED SIMULATION TOOL FOR NONLINEAR, LINEAR, DYNAMIC AND STATIC ANALYSIS

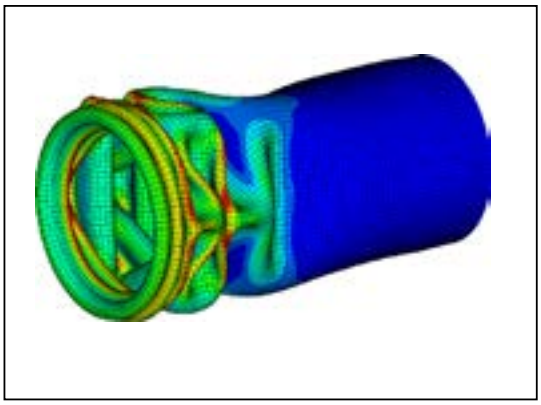
ABOUT

LS-DYNA is a highly advanced general purpose nonlinear finite element program that is capable of simulating complex real world problems. The distributed and shared memory solver provides very short turnaround times on desktop computers and clusters operated using Linux, Windows, and UNIX. With LS-DYNA, Livermore Software Technology Corporation (LSTC) aims to provide methods to seamlessly solve problems requiring:

"Multi-Physics" "Multi-Processing"
"Multiple Stages" "Multi-Scale"

LS-DYNA is suitable to investigate phenomena involving large deformations, sophisticated material models and complex contact conditions for structural dynamics problems.
LS-DYNA allows switching between explicit and different implicit time stepping schemes. Disparate disciplines, such as coupled thermal analyses, Computational Fluid Dynamics (CFD), fluid-structure interaction, Smooth Particle Hydrodynamics (SPH), Element Free Galerkin (EFG), Corpuscular Method (CPM), and the Boundary Element Method (BEM) can be combined with structural dynamics.

By determining product characteristics before a prototype is built, for many products LS-DYNA is the key to reducing time to market.
Carrying out investigations with the aid of LS-DYNA supports the design of robust products with superior performance. For pre- and post-processing, LS-DYNA comes with the LS-PrePost tool. LS-PrePost can be utilized to generate inputs and visualize numerical results. The software package LS-OPT for optimization and robust design is also supplied with LS-DYNA.
With the option of multidisciplinary simulations, LS-DYNA significantly increases potentials for developing innovative products. These advantages contribute towards reducing development costs.
All above-mentioned features and software packages are supplied as a single unit. LS-DYNA is not split for special applications, and the licensing scheme enables the different disciplines to be combined without limitations.

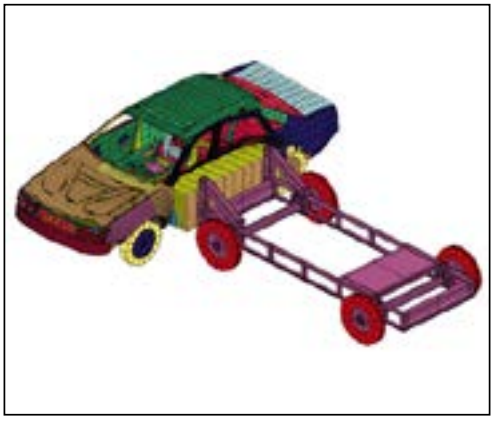


LS-DYNA has been developed in California for more than 20 years. It is the most frequently-used code for many complex applications in structural nonlinear dynamics. Its usage is growing rapidly due to LS-DYNA's flexibility, enabling it to be applied to new disciplines. The new developments are driven in co-operation with leading universities from all over the world and new requirements requested by the vast customer base.

CAPABILITIES

LS-DYNA's analysis capabilities include:

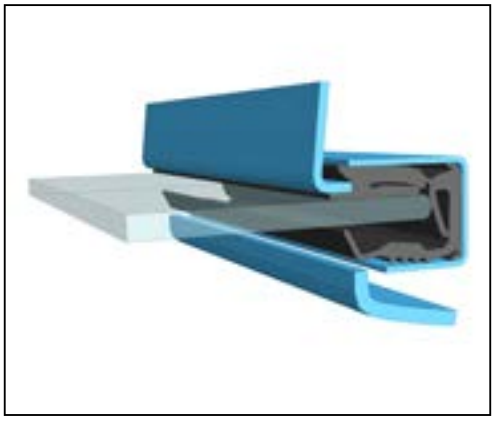
- Full 2D & 3D capabilities
- Nonlinear dynamics
- Rigid body dynamics
- Quasi-static simulations
- Normal modes
- Linear statics
- Thermal analysis
- Fluid analysis
    - Eulerian capabilities
    - ALE (Arbitrary Lagrangian-Eulerian)
    - FSI (Fluid-Structure Interaction)
    - Navier-Stokes fluids
    - Compressible fluid solver, CESE (Conservation Element & Solution Element)
- FEM-rigid multi-body dynamics coupling (MADYMO, Cal3D)
- Underwater shock
- Failure analysis
- Crack propagation
- Real-time acoustics
- Implicit springback
- Multi-physics coupling
- Structural-thermal coupling
- Adaptive remeshing
- SPH (Smoothed Particle Hydrodynamics)
- EFG (Element Free Galerkin)
- Radiation transport
- EM (Electromagnetism)



ELEMENT LIBRARY

LS-DYNA's element library includes:

- Beams (standard, trusses, discrete, cables, and welds) (with over 10 beam element formulations)
- Discrete Elements (springs and dampers)
- Lumped inertias
- Lumped masses
- Accelerometers
- Sensors
- Seatbelts
- Pretensioners
- Retractors
- Sliprings
- Shells (3, 4, 6, and 8-node including 3D shells, membranes, 2D plane stress, plane strain, and axisymmetric solids) (with over 25 shell element formulations)
- Solids (4 and 10-node tetrahedrons, 6-node pentahedrons, and 8-node hexahedrons) (with over 20 solid element formulations)
- SPH Elements
- Thick Shells (8-node)



MATERIAL LIBRARY

LS-DYNA's material library includes:

- Metals
- Plastics
- Glass
- Foams
- Fabrics
- Elastomers
- Honeycombs
- Concrete & soils
- Viscous fluids
- User-defined materials
- Explosives

CONTACT ALGORITHMS

LS-DYNA's contact algorithms include:

- Flexible body contact
- Flexible body to rigid body contact
- Rigid body to rigid body contact
- Edge-to-edge contact
- Eroding contact
- Tied surfaces
- CAD surfaces
- Rigid walls
- Draw beads

ABOUT

LS-OPT is an optimization tool which interfaces perfectly with LS-DYNA, allowing the user to structure the design process, explore the design space and compute optimal designs according to specified constraints and objectives. The program is also highly suitable for solving system identification problems and stochastic analysis.
It is included with LS-DYNA without extra cost.

OPTIMIZATION

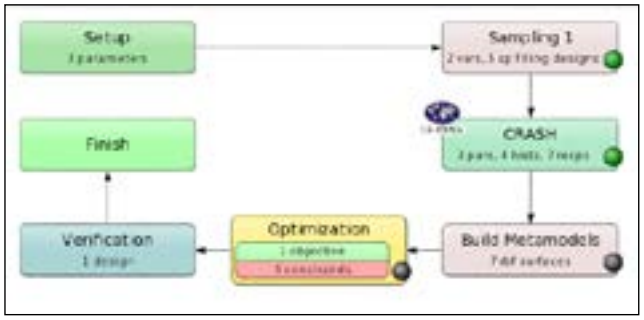
The Optimization capability in LS-OPT is based on Response Surface Methodology and Design of Experiments. The D-Optimality Criterion is used for the effective distribution of sampling points for effective generalization of the design response.
A Successive Response Surface Method allows convergence of the design response.
Neural Networks provide an updateable global approximation that is gradually built up and refined locally during the iterative process. A Space Filling sampling scheme is used to update the sampling set by maximizing the minimum distances amongst new and existing sampling points.

Optimization of Restraint System
By courtesy of Audi AG

LS-OPT allows the combination of multiple disciplines and/or cases for the improvement of a unique design. Multiple criteria can be specified and analysis results can be combined arbitrarily using C or FORTRAN type mathematical expressions.

CAPABILITIES

- Response surface technologies
- Genetic algorithm
- Multi-Disciplinary Optimization (MDO)
- Multi-Objective Optimization (MOO)
- Reliability Based Design Optimization (RBDO)
- Mixed discrete/continuous variables
- Shape optimization



DOE STUDIES - DESIGN EXPLORATION

- Design Of Experiments (DOE)
- Meta-models to explore design space
- Global sensitivity analysis

STOCHASTIC ANALYSIS

- Monte Carlo investigations
- Estimation of mean, standard deviation, correlation
- Reliability studies (FOSM, FORM)
- Visualization of statistical results on the FE model

SYSTEM IDENTIFICATION

- Identification of system/material parameters
- Visualization of fitting history for curves

POST-PROCESSING

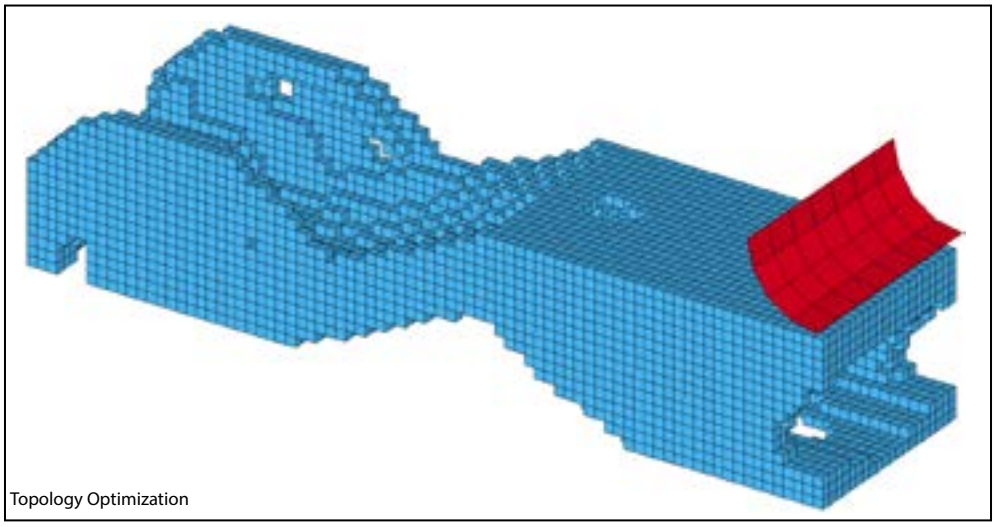
- Meta-model visualization (2-D/3-D)
- Sensitivities, correlation matrix
- Scatter/history plots
- Pareto optimal solutions

ABOUT

This tool is used to optimize the topology of parts for nonlinear problems involving dynamic loads and contact conditions. It can be implemented to find a concept design for structures analyzed using LS-DYNA.
LS-TaSC is included with LS-DYNA without extra cost.

GENERAL CAPABILITIES

- Solid design using hexa and tetra elements
- Shell design using quad and triangular elements
- Global constraints
- Multiple load cases
- Tight integration with LS-DYNA
- Large models with millions of elements



Topology Optimization

GEOMETRY DEFINITIONS

- Multiple parts
- Constraints: extrusions, casting, symmetry

POSTPROCESSING

- Design histories
- LS-PrePost - plots of the geometry evolution and the final design

ABOUT

LS-PrePost specializes in importing, editing, and exporting LS-DYNA models based on keyword input files. It is included with LS-DYNA without extra cost. The latest versions feature a redesigned graphic user interface which maximizes the graphics area by intuitively grouping program functions into icon-based toolbars. LS-PrePost supports the latest OpenGL standards to provide fast rendering of fringe plots and animation results. In order to keep pace with enhancements to LS-DYNA, the software is under constant development. Since no license file is required, LS-PrePost can be easily installed onto any machine operated using Windows or Linux.

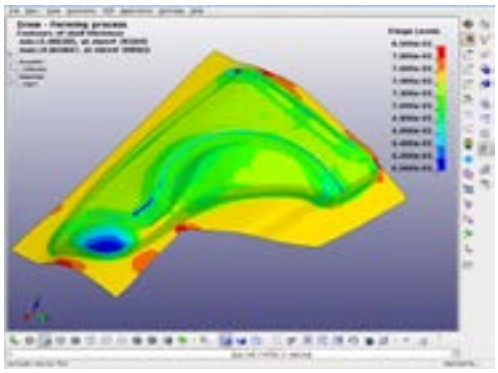
GENERAL FEATURES

- Comprehensive support for LS-DYNA input and output files
- Image output formats: PNG, TIFF, JPG, BMP, PCX, PS, PSIMAGE, GIF, VRML2
- Movie output formats: MPEG, AVI, animated GIF
- Command line interface

LS-PrePost During Pre-Processing

PRE-PROCESSING FEATURES

- Other FE input formats
- CAD input formats: IGES, STEP
- CAD geometry data creation and manipulation, including cleaning, healing and simplification
- Mesh generation
- Mesh manipulation, creation and modification
- LS-DYNA entity (keyword) creation: coordinate systems, sets, parts, masses, CNRBs, boxes, spot welds, SPCs, rigid walls, rivets, initial velocity, accelerometers, cross sections



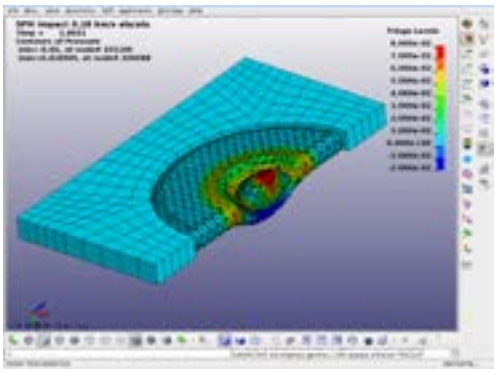
LS-PrePost During Post-Processing

SPECIAL APPLICATIONS

- Airbag folding
- Dummy positioning
- Seatbelt fitting
- Metal forming
- Roller hemming
- Model checking

POST-PROCESSING FEATURES

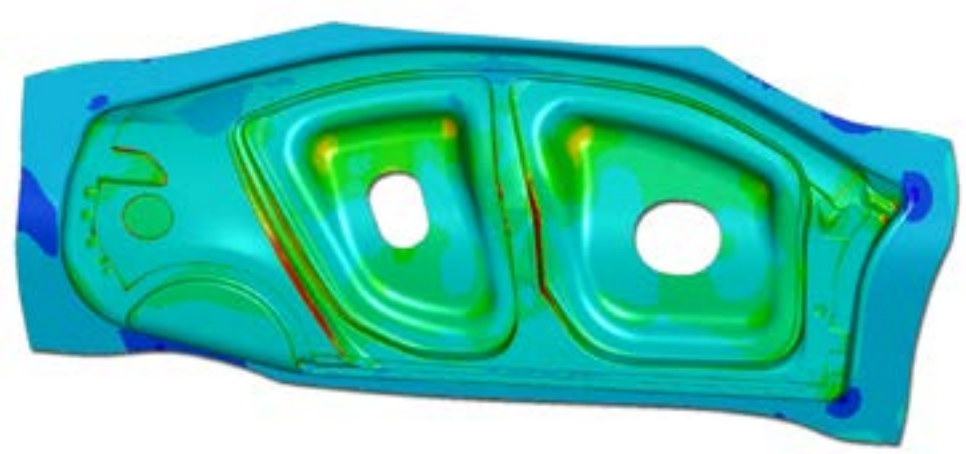
- 3-D animation
- Time history plots
- XY plots
- Contour plots
- Overlay plots
- Vector plots
- Fringe plots
- Particle visualization
- Fluid visualization
- DYNAIN file generation
- Section analysis



ABOUT

DYNAFORM reduces the tryout time and costs that are associated with the tooling design and development cycle. Designed to be easy to use, DYNAFORM contains numerous automated functions to aid in even the most complex forming problems. Models can be either constructed or imported using DYNAFORM's powerful pre-processor. LS-DYNA, DYNAFORM's analysis engine, is an implicit and explicit solver used by the world's top aerospace, automobile and ordnance companies. DYNAFORM's post-processor contains a myriad of tools for interpreting the LS-DYNA analysis.

Now in its 10th year, DYNAFORM is a well established product with over 700 licenses worldwide.
Its applications include: Tool Surface Modeling, Finite Element Mesh Generation, Draw Bead Force Prediction, Binder Wrap Analysis, Draw Die Simulation, Trimming Operations, Spring Back Simulation and Compensation, Multiple Stage Tooling Simulation and more.



FEATURES

AUTOSETUP: The complete LS-DYNA interface allows a comfortable configuration and analysis of complex deep drawing simulations. The functionality of the AUTOSETUP is not confined to the deep drawing and also simplifies the simulation of tube forming, rotary bending, roller hemming and superplastic forming processes.

AUTOMATIC MESH GENERATION: The integrated mesh generator has been optimized for the meshing of forming tools and provides a fast and reliable mesh generation by a few fingertips.

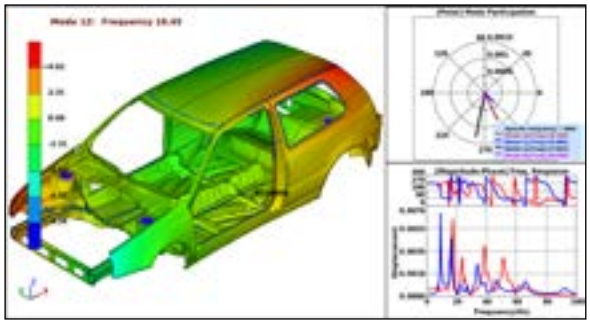
DRAW BEAD DEFINITION: DYNAFORM permits the rapid creation and modification of geometric drawbeads and analytic replacement models in a user-friendly interface.

PROCESS DEFINITION: The geometry data can be imported by the integrated CAD interface and assigned to the appropriate tools so that they take over their function. This approach permits for many standard processes a largely automatic process definition and positioning of the tools on the blank.

AUTO CONTACT DEFINITION: Contacts between the sheet and tools are also defined automatically, same for the contacts between tools if required.

TAILOR WELDED BLANK MODELING: DYNAFORM allows the calculation of sheet metal forming processes with parts whose thicknesses vary within the blank.

EXTENSIBLE FUNCTIONALITY: Even the basic version of DYNAFORM offers an exceptionally wide range of functions. By licensing additional modules, the functionality can be extended: The BSE module is a complete solution for accurate blank size estimation, nesting to maximize material utilization, piece price and scrap calculation.
The DFE module interactively generates binder surfaces, addendum profiles and surfaces with full associativity between FEA mesh and surfaces. It can be used for the springback compensation of the tools. The DSA module offers a LS-DYNA based FEA solution to analyze die system operations including scrap removal, die structural integrity and sheet metal transferring.



ABOUT ANSA

ANSA is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment.
ANSA is the users' preference due to its wide range of features and tools that meet their needs. The list of productive and versatile features is long and the alternative tasks and processes to be completed using them are countless

ABOUT mETA

μETA post processor is a thriving 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.

MAIN APPLICATION AREAS

In daily industrial CAE processes and in numerous independent benchmarks, ANSA has proven to be not only the most effective CAE pre-processor, but also the only one that could actually handle some of the modeling tasks.

The speed and versatility of ANSA is due to the synthesis of concepts developed and/or perfected by BETA CAE Systems S.A.. Through these innovations, ANSA has been leading the CAE pre-processing software industry for more than a decade.

Some of the features that distinguish ANSA are:

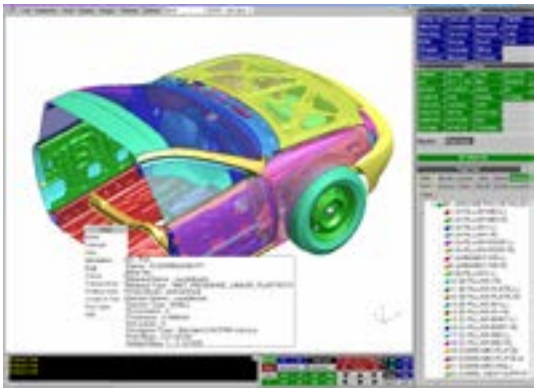
- Fast, robust proprietary algorithms,
- Easy to use geometry clean up, healing and construction,
- Geometry based assembly and boundary conditions definition,
- Mesh with geometry associativity,
- Controllable and predictable shell and volume meshing,
- Straight forward batch meshing,
- CAD and FE-models in one data base,
- Connections manager for direct and versatile assembly,
- Fast, automatic and high quality meshing of assem bled geometry,
- Mesh reconstruction, coarsening / refinement and quality improvement,
- Interoperability between pre-processing Decks of numerous solvers,
- Parts management, linking, and powerful database management features,
- Intuitive and highly customizable menu interface

Some of the features that distinguish μETA are:

- Powerful, complete 2DPlot tool, integrated into the same software.
- Interoperating 2D-plot and 3D-display in a way that data can pass from the one to the other.
- Report tool, integrated into the same software.
- Lots of reporting capabilities, such as statistics, multi model / states statistics and powerful annotation tool.
- Effective video and image handling, with matching, video synchronization, video tracking and more.
- Linear combination as well as any other mathematical operation can be applied on results.
- Calculation of Modal Response results.
- High level of support of ABAQUS .odb files.
- High level of automating processes through session files, with variables and loops, user toolbars and custom short-cuts.
- A scripting language same as in ANSA, which further extent automation capabilities.
- Completely customizable, user friendly, interface.
- Effective coupling into optimization cycles.
- Remote control of μETA process through the network.

ABOUT

The Oasys PRIMER pre-processor is designed to make preparation and modification of LS-DYNA models as fast and as simple as possible, improving user productivity and efficiency and reducing the time spent manipulating and developing models suitable for LS-DYNA.
Our priority with Oasys PRIMER is to provide complete support for every LS-DYNA keyword. The user can be assured that every model read in and written out will lose no data.



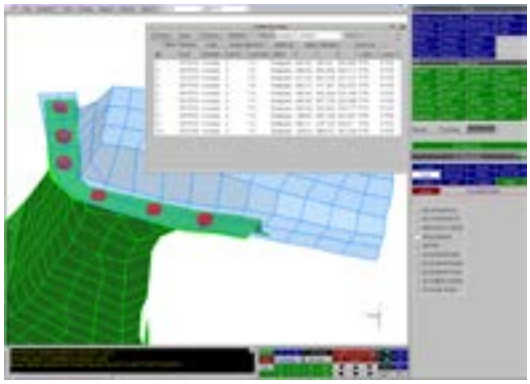
MAIN FEATURES

- Full support for LS-DYNA version 971
- Connections function for defining various connections (e.g. spotwelds, bolts) including a Autoweld function that does not require an input file
- Quick-pick menu for on-screen manipulation of entity display characteristics
- Quick-pick menu for on-screen editing of LS-DYNA keywords
- Easy access to part data through the Part Tree navigation menu, and Part Table
- Cross reference viewer menu for tracking how different entities refer to each other
- Airbag Folding including mesh-independent airbag folding
- Seatbelt fitting including automatic seatbelt re-fitting after dummy re-positioning
- Mechanisms
- Keyboard shortcut keys for most of the common functions
- Simple meshing capability.
- Full support for LS-DYNA parameters
- Background image and image/model alignment function

Oasys PRIMER is designed specifically for pre-processing with LS-DYNA. Therefore the user interface is clear, simple and tailored towards LS-DYNA - without any compromises.

All of the common keywords can be created, modified and graphically visualised to help users understand exactly what a model contains and how the various entities are inter-related.

CONNECTION DEFINITION



The Connections function within Oasys PRIMER allows the user to quickly and easily create spotwelds and bolted connections. These can be created manually, using a spotweld file, or automatically using the Autoweld option.
The Connection Table allows the user to review the status of the various connections within a model and make modifications. Once created the data is stored along with the keyword file allowing the connections to be easily updated. The connection data can also be written out as a separate file for use with other models.

PART TREE & PART TABLE

The Part Table functions in Oasys PRIMER allows the user to quickly review or modify properties such as thickness, element type, material type, yield stress, or density of an individual part or a whole series of part.
The Part Tree enables users to quickly navigate around their models, giving a visual display of the parts that are in each include file and allowing the user to move parts between include files with a simple click-drag function.

ERROR CHECKING

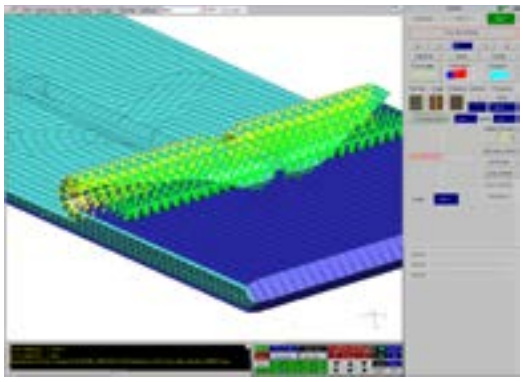
Oasys PRIMER has a large range of checking functions. These include basic mesh quality checks, and over 3000 LS-DYNA specific checks to help reduce the amount of time taken to get a new model up and running.
The Check Window and Error Tree Viewer allows users to clearly see any errors within a model and quickly locate the items that are causing the errors.

OCCUPANT SET-UP

There are a number of functions available within Oasys PRIMER to aid with setting up and positioning occupant dummies within a model. These include:

- Dummy Positioning
- Mechanism that allows seat position to be quickly adjusted
- Seat Foam Compression which allow users to pre-compress seat foam
- Seatbelt Fitting which allows users to easily fit a seatbelt to a dummy and automatically re-fit the belt if the dummy is repositioned

AIRBAG FOLDING



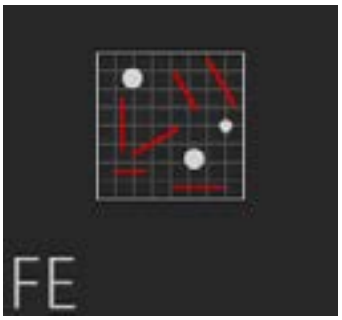
The Airbag Folding function in Oasys PRIMER allows users to define the folding pattern for 2D and3D airbag.
It includes a range of fold types such as thick, thin, tuck, spiral and scrunch. It also includes distortion and penetration checking to ensure the quality of the final folded airbag.
Once created the folding pattern data is stored along with the keyword file allowing any updates to be easily carried out.

ABOUT

DIGIMAT is a state-of-the-art nonlinear multi-scale material & structure modeling platform, which helps engineers to design and optimize composite materials in a fast and cost effective way. From small scale nanocomposites via honeycomb sandwich panels up to fiber reinforced plastics, rubber and hard metals, DIGIMAT software covers a large variety of materials being used in automotive, aerospace, consumer and industrial equipment industries.

With its six different tools which can be licensed separately, the DIGIMAT modeling platform also offers a high degree of modularity.

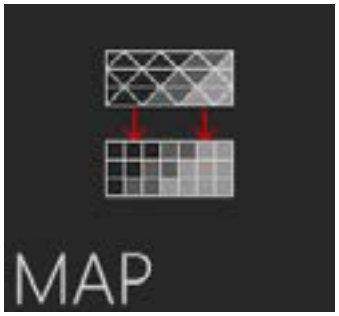
Digimat MF: Mean-Field homogenization software used to predict the nonlinear behavior of multi-phase materials.



Digimat FE: Finite Element based homogenization software used to model the nonlinear behavior of Representative Volume Elements (RVE) of material microstructures.

Digimat MX: Material eXchange platform used to prepare, store, retrieve and securely exchange Digimat material models between material suppliers and end-users.

Digimat CAE: Digimat linear and nonlinear interfaces to major processing and structural FEA software to enable multi-scale analyses of composite structures.

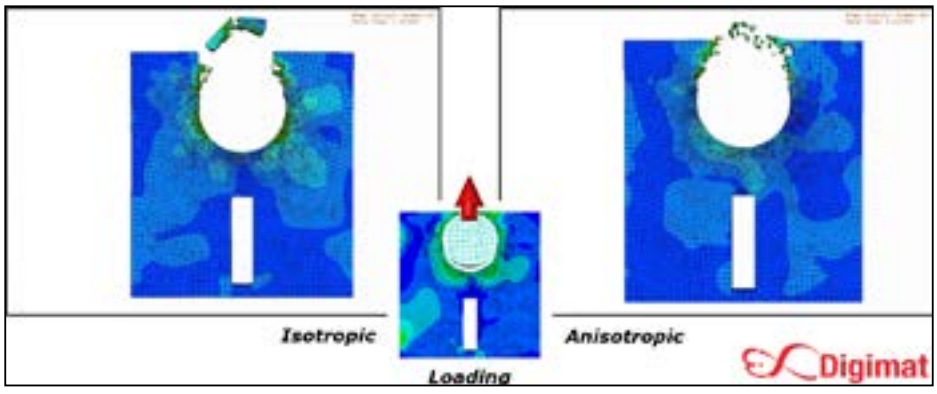


Digimat MAP: Shell & 3D mapping software used to transfer fiber orientation, residual stresses and temperatures between dissimilar processing and structural meshes.

Digimat RP: Easy and efficient solution for the design of fiber reinforced plastic parts.

Digimat HC: Easy and efficient solution for the design of honeycomb sandwich panels.

A standard combination of the different DIGIMAT tools for licensing would be DIGIMAT-MF, DIGIMAT-map and DIGIMAT-CAE, allowing engineers to close the gap between process simulation and serviceability simulations as well as the consideration of micromechanics in their full scale analysis. For an in-depth look into the material, DIGIMAT-FE allows the user to generate RVEs, mesh them and even perform micromechanical simulations with the generated structures. Willing to avoid extensive experimental testing and sharing generated data with other users of the DIGIMAT community, the DIGIMAT-MX exchange platform is recommended for a first approach during the basic material characterization.



DIGIMAT is developed by the e-Xstream engineering company, being focused on state-of-the-art multiscale modeling. Since September 2012, e-Xstream engineering belongs to the MSC software company.
More information at www.e-xstream.com.

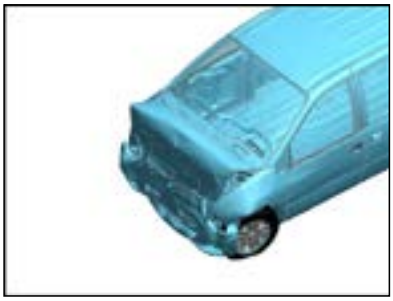
ABOUT

FEMZIP is a specialized tool for the compression of LS-DYNA results. It reads and reconstructs the native data formats. The decompression tool FEMUNZIP is available at this website free of charge.

Simulation results are usually stored in 32- or 64-bit floating point representation. Due to numerical approximation errors and the inaccuracy in the model description itself, the 32- or 64-bit floating point representation is often unnecessarily precise compared with the effective precision of the simulation results. Therefore FEMZIP is mainly based on lossy compression. The loss is controlled by the user by means of precision settings specified for the geometry and for each variable. In addition FEMZIP supports the option to compress specific variables losslessly as well as the option to eliminate variables completely. In general, lower precision settings result in higher compression factors.

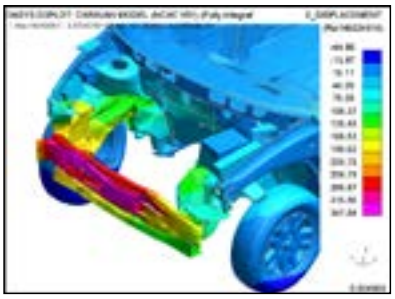
FEMZIP is fast, easy to use, reliable and creates small data files

Result files from crash analysis require high storage capacity (>GByte per file, up to 100 TByte per year). The compression tool FEMZIP helps you to save time and archiving resources. Because FEMZIP was specially developed for the compression of simulation results. In contrast to conventional compression tools, FEMZIP starts in the specific data structure of LS-DYNA.



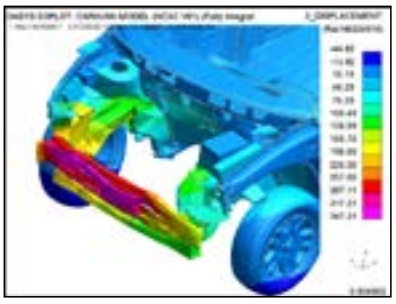
Reduction of information density

FEMZIP allows you to control a reduced precision of the results. Thus it is impossible to reduce the data significant, without loosing important information. The user decides which inaccuracies are receivable or which post decimal positions should be reduced.



Archiving, Back-up and fast data exchange

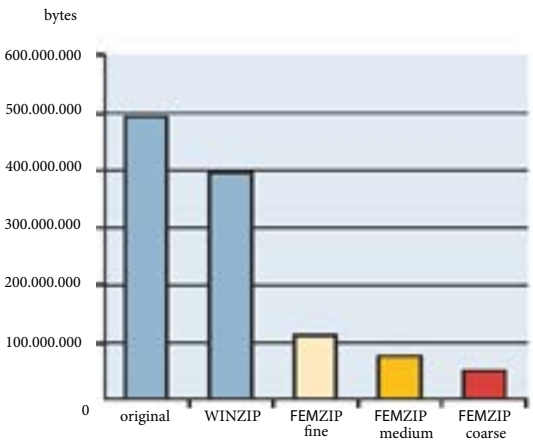
With FEMZIP you can reduce data files for storage and the time for data transfer, configure Back-up systems effectively - a first view on results with low resolution is also possible using average transfer rate.



Supplementation and Decompression

FEMZIP is also suitable for plotcprs, provided by DYNAmore. The data generated with FEMZIP can be decompressed by using the free tool FEMUNZIP.

Example with compression factor varies from 5 to 10



The FEMZIP software tool was especially developed by the Fraunhofer Institute for Algorithms and Scientific Computing SCAI, Sankt Augustin, Germany.

ABOUT

Founded in 1989, Forming Technologies Inc. (FTI®) is the world's leading provider of software solutions for the design, feasibility, and costing of sheet metal components. FTI® has provided OEMs and suppliers in the automotive, aerospace, electronics, and appliance industries with innovative solutions designed to reduce development time and material costs.
Our leading edge technology enables our customers to immediately improve their balance sheet by reducing material and labour costs. FTI® solutions are sold through an international network of reseller partners around the world.

FEATURES

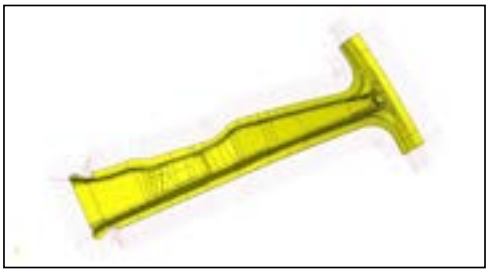
COST ESTIMATING

COSTOPTIMIZER provides users with a fast and accurate method for developing blank shapes and coil nests, and makes recommendations to alter stamped component designs for cost reduction. It is specifically designed for purchasers, planners, estimators, engineers, account managers, and tool and die designers.

COSTOPTIMIZER ADVANCED combines the power of FTI's premier formability analysis, blank development and blank nesting tools with specialized product and process optimization tools that help identify design changes that will ultimately reduce product and manufacturing costs by 10-15%. The advanced capabilities make it ideally suited to product and process engineers, as well as purchasers, planners, estimators and account managers.

PRODUCT DESIGN

FASTFORM Advanced identifies problems in minutes, enabling users to implement changes earlier in the product life cycle, which ultimately saves corporations millions of dollars, annually.
Formability results consider component or tool geometry and account for material properties, friction, binder surface, die addendum, blank holder force, pad pressure, draw beads, and tailor-welded blanks.

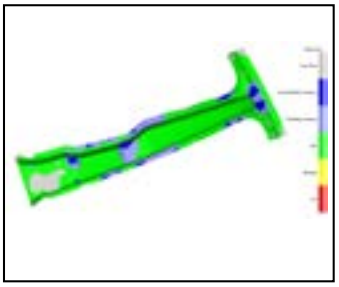


PROCESS PLANNING

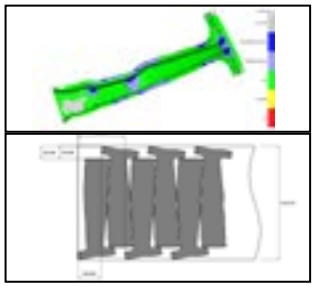
Process Planner is a stamping Knowledge Based System for process planning and die cost estimation. The system processes parts made in progressive, transfer and tandem presses.

PRODUCTS

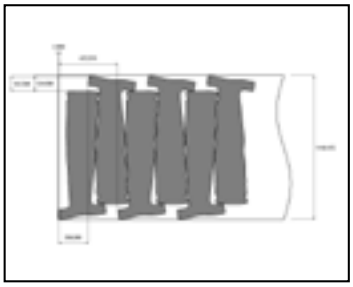
FastBlank



CostOptimizer



BlankNest



To assess a vehicle, tests are carried out under comparable conditions. For this purpose, accurately specified barrier and dummies are used as test devices. DYNAmore develops and distributes the FE models of these test devices.

Side Impact Dummy Models

For side impact load cases models from DYNAmore (FAT, PDB) and from FTSS are available. Soon free models from LSTC will complete the product portfolio.

Frontal Dummy

FTSS develops validated dummy models based on their physical anthropomorphic test devices (ATD), that are used in car crash testing all over the world.

Rear Dummy Models

The BioRID 2 model is used for the investigation of seat performance under rear impact loads, with the focus on the prediction of whiplash injuries. It is developed by DYNAmore.

Human Model

For the consideration of the human body under impact loads, the THUMS model can be used. Human models of different sizes and positions are in preparation.

Child Dummy Models

Humanetics and DYNAmore develope validated child models based on their physical anthropomorphic test devices. These models are used in frontal and side impacts all over the world.

Pedestrian Impactors

Different developers support LS-DYNA models of the pedestrian impactors; FTSS (First Technology Safety Stystems), OASYS (Ove Arup SYStems) and a consortium of Daimler, Porsche, Lasso and Peng (DPLP).

Free Motion Head Form

Headform models are available either from LSTC (Livermore Software Technology Corp.) or from Humanetics. These models are distributed by DYNAmore.

Side and Rear Barrier

Side and rear barrier models following specifications of ECE, FMVSS, IIHs, NCAP,. have been developed by Oasys and Cellbond.

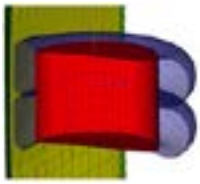
Frontal Barrier Models

A range of LS-DYNA finite element models for frontal barriers have been developed by Oasys and Cellbond.

Moose Model

This dummy model is developed for the evaluation of the crash-worthiness of new cars regarding moose crash accidents. A physical moose crash dummy has been developed by the Swedish National Road and Transport Research Institute (VTI).

Pendulum Model



Glass structures have to comply with several requirements relating to different loading scenarios and design variations. For that purpose, the deformable pendulum model was developed.

Please find below a brief description of small tools that facilitate the usage of LS-DYNA. The tools are written in Perl or Fortran and are available for most operating systems. An evaluation and the usage in production are free of charge for our customers, and users that are supported by LS-DYNA distributors we cooperate with.
The majority of tools are by courtesy of Daimler, Porsche and Opel.

plotcprs
Compress and manipulates d3plot files

check13
Check and summarize initial penetration warnings.

nodrel
Nodout in alternative coordinate systems.

check-failed
Gives info about failed elements.

check-binout
List contents and integrity of binout file.

check-hsp
Checks the d3hsp file for various model information.

d3plot-head
Substitute title. Changes titles in d3plot files.

kin2plot
Converts Madymo kin3-resultfiles into d3plot file.

plot2bc
Generate *BOUNDARY_PRESCRIBED_MOTION cards from d3plot for a given node set.

plot2coor
Reads nodal coordinates from d3plot file.

plotintrusion
Calculates maximal intrusion of a subset of nodes.

plot2nodout
Generate ASCII data from d3plot file.

rcrel
Transformation of contact forces into a local system.

seghandle
Listing and manipulation of interface segment files.

byteswap
Swaps binary files little/big endian computers.

License Agreement
Request form for DYNAmore tools for LS-DYNA
To apply for a free of charge evaluation license visit:
www.dynamore.se/en/products/tools/ls-dyna-evaluation-license

DYNAmore Nordic is a complete supplier of CAE software, from CAD to Post-processing and we also supply turn-key LS-DYNA workstations and HPC (high performance computing) cluster. We deliver the best price/performance hardware to be used for LS-DYNA simulations.

The servers are pre-installed with the DYNAmore Nordic Cluster Suite software. This software include a queuing system, specialized scripts for LS-DYNA to easily clean or backup simulation data. It is also possible to add Thinlinc, a remote graphical software that utilized the local graphic cards and makes it possible to remote look at results in e.g. LS-PrePost or mETAm, also on laptop without high performance graphic cards.

We deliver a turn-key solution integrated in your IT-infrastructure within four weeks.

One example of system consist of:

- File server and master node
- Cluster server, where each server has two nodes.
- Each node have two CPU's with 8-12 cores each.
- Each nodes can maximum install 256 Gb RAM
- Commuication through Infiniband

Each server has 32 cores and you can add more servers if you later want additional resources. We only use hardware from well known manufacturers in the HPC-business.

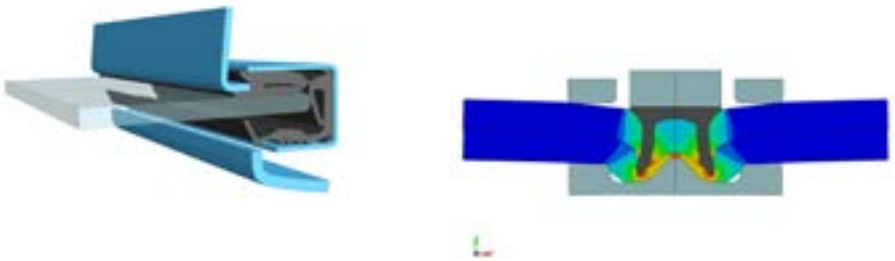
Our team of experienced CAE engineers are available to you as a resource for high quality simulation and FEA-analysis of your products and manufacturing processes or simulation method development. Our CAE software developers can extend and customize LS-DYNA, LS-OPT and LSPrePost to fit your special needs.

ENGINEERING SERVICES

Everyday our team of experienced engineers aid companies with their needs in finite element analysis, simulation, and optimization for product development. Due to our complete setup of CAE software and extensive computer cluster, we can provide a complete analysis solution from material testing to final analysis report with a short turn around time

BEYOND REGULAR CONSULTANCY

Our senior engineers and application experts can aid you in refining your modeling and simulation workflow and simulation procedures. This can prove valuable when faced with new LS-DYNA analysis challenges due to introduction of new material types such as polymers or simulations methods such as acoustics, advanced implicit analyses, MMALE or DEM.



APPLICATION AREAS AND EXPERIENCE

- Vehicle safety, crash analysis, interior safety, pedestrian safety
- Metal forming, hydroforming, bending, stamping, hot forming
- Welding, riveting and other joining processes
- Explosion analysis and blast loading
- Offshore: drop tests, impacts, collisions on pipelines and sub sea structures
- Roadside safety
- Vibration, NVH and acoustics
- Analysis and dimensioning of cabs of haulers and other vehicles (ROPS/FOPS)
- Thermo-mechanics
- Fluid-structure analyses
- Composites and polymers
- Drop testing

While many of our activities deal with problems in the automotive industry, our services are not limited to this application area. We are offering our support also to customers in rail, offshore and aerospace industries.

ROAD SIDE SAFETY ANALYSIS EN 1317 AND EN 12767

We have performed > 100 projects in the analysis and dimensioning of road side safety equipment according to standards such as EN 1317 and EN 12767.
We are members or the Swedish Organization of Road side and Bridge Fences, the Swedish Standards Institute and the Swedish working group TK/248 for the development of the EN 1317 standard.

MATERIAL MODELLING

Accurate material models are a key ingredient for obtaining simulation results that can be depended on. We have aided many companies with material modeling and developing methods for determining matarial properties from tests including the selection and development of testing methods. Examples of projects are:

- Automatic procedure to determine very high temperature dependent material properties of steel from simple bending test and inverse modeling using LS-DYNA and LS-OPT.
- Designing testing methods and corresponding material indentification method for determining the GISSMO failure parameters of metals (*MAT_ADD_EROSION).
- Development of a material model and procedure for continuous arc welding simulation.
- Development of a testing method to identify material parameters of rubber under large deformation under multiaxial loading.
- Implementation of numerous material models in LS-DYNA ranging from concrete and metals to rubber.
- Developing av procedure for modeling of automotive seat foam including pore air flow modeling using *CONTROL_PORE_AIR.
- Modeling of composite and composite sandwich materials in projects for light weight vehicles, e.g. for the crash analysis of the ZBee and the EU FP6 SuperLIGHT-Car-project.

DEVELOPMENT OF LS-DYNA

Since many years Dynamore is engaged in code development for LS-DYNA. The material rules for composite materials were already implemented in 90s.Today, a small group is working for implementing new features and methods in LS-DYNA. We are directly connected to the release management of LSTC. The clients are from USA, Germany and Asia. Our capabilities cover the entire spectrum of FE technology.

Examples for the implementation are:

- Material models for fibre composites
- Extension of the tissue material model for implicit calculation
- Contact for modelling of failing glue joints
- Bar/beam implementation (resulting) for asymmetrical cross-sections
- User-defined interface for friction under MPP
- User-Element interface
- General damage formulation with premature damage /initial damage
- Welding point models
- Material model with mixed hardening under cyclic load/stress
- Material model for cohesive links
- Material model for forming calculations: Hill 90

SOFTWARE DEVELOPMENT

Since many years, DYNAmore is active in the development of LS-OPT and LS-PrePost and is heavily involved in the preparation of the development plans and the prioritization of individual development projects. We work closely with the developers in the U.S. The algorithmic development takes place largely in the U.S, whereas the development of graphical user interface takes place at DYNAmore in Sweden and Germany.

We can create prototype implementations to visualize your data in accordance with your needs. Depending on the requirements, new features can be included in LS-OPT and LS-PrePost.

Examples for the implementation are:
- Development of visualization methods of optimization results (multi-objectives, Pareto data, constraints, Sensitivities, etc.)
- Visualization of Meta-models
- GUI programming for LS-OPT and LS-PrePost
- Interfaces to other pre- or post-processors
- Process automation for optimization

1st CONTACT

Marcus Redhe
Director DYNAmore Nordic AB,
Sales Software, LS-DYNA, ANSA
+46 - 013 - 236681
+46 - 070 - 5513142
marcus.redhe@dynamore.se

Daniel Hilding
Director DYNAmore Nordic AB,
Consulting, LS-DYNA
+46 - 013 - 236685
+46 - 070 - 6536685
daniel.hilding@dynamore.se

Elin Ekman
Marketing, Administration
+46 - 013 - 236687
elin.ekman@dynamore.se

SUPPORT AND TRAINING

Jimmy Forsberg
LS-DYNA, Support, Primer
+46 - 013 - 236695
jimmy.forsberg@dynamore.se

Anders Jernberg
Licensing, LS-PrePost Development,
LS-DYNA
+46 - 013 - 236684
anders.jernberg@dynamore.se

Anders Jonsson
LS-DYNA, Implicit, mETA
+46 - 013 - 236693
+46 - 0701 - 442648
anders.jonsson@dynamore.se

David Karlsson
LS-DYNA, mETA, ANSA
+46 - 013 - 236694
david.karlsson@dynamore.se

Mikael Schill
LS-DYNA, Material modeling,
Forming Technology
+46 - 013 - 236692
+46 - 0704 - 157956
mikael.schill@dynamore.se

Klas Engstrand
LS-DYNA, FE-Models, Primer
+46 - 013 - 236682
klas.engstrand@dynamore.se

David Aspenberg
LS-DYNA, Optimization,
Training
+46 - 013 - 236690
david.aspenberg@dynamore.se

Thomas Johansson
Sales Software, Key Account,
LS-DYNA
+46 - 013 - 236688
+46 - 0701 - 442631
thomas.johansson@dynamore.se

Mats Landervik
LS-DYNA, DIGIMAT
+46 - (0)31-3012860
mats.landervik@dynamore.se

HEADQUARTERS GERMANY

DYNAmore GmbH
Industriestr. 2
D-70565 Stuttgart, Germany
Tel: +49 (0)711 - 45 96 00 - 0
Fax: +49 (0)711 - 45 96 00 - 29
E-Mail: info@dynamore.de
www.dynamore.de

HEADQUARTERS SWEDEN

DYNAmore Nordic AB
Brigadgatan 14
SE -587 58 Linköping, Sweden
Tel: +46 (0)13 - 23 66 80
Fax: +46 (0)13 - 21 41 04
E-Mail: info@dynamore.se
www.dynamore.se

OFFICE NORTH

DYNAmore GmbH
Im Balken 1
D-29364 Langlingen, Germany
Tel: +49 (0)50 82 - 9 14 00 - 51
Fax: +49 (0)50 82 - 9 14 00 - 49

OFFICE INGOLSTADT

DYNAmore GmbH
Donaustr. 7
D-85049 Ingolstadt, Germany
Tel: +49 (0)8 41 - 12 60 48 -34
Fax: +49 (0)8 41 - 12 60 48 -38

OFFICE DRESDEN

DYNAmore GmbH
Pohlandstraße 19
D -01309 Dresden, Germany
Tel: +49 (0)3 51-46 67 69 85
Fax: +49 (0)3 51-45 19 56 1

OFFICE BERLIN

DYNAmore GmbH
Stralauer Platz 34
D-10243 Berlin, Germany
Tel: +49 (0)30-20 68 79 10
Fax: +49 (0)30-20 07 83 82

OFFICES ON-SITE

Daimler AG, Sindelfingen
Tel: +49-(0)70 31-81 31 91

Daimler AG, Untertürkheim
Tel: +49-(0)7 11-45 96 00 - 20

SWITZERLAND

DYNAmore Swiss GmbH
Technoparkstrasse 1
CH-8005 Zurich, Switzerland
Tel: +41 (0)44 - 6 33 61 62
Fax: +41 (0)44 - 6 33 13 94

ITALY

DYNAmore Italia S.r.l.
Piazza Castello, 139
10124 Turin, Italia
Tel: +39 335 - 157 05 24

SWEDEN, GOTHENBURG

DYNAmore Nordic AB
Theres Svenssons gata 10
417 55 Gothenburg, Sweden
Tel: +46 (0)31 - 30 12 860
Fax: +46-(0)13 - 21 41 04