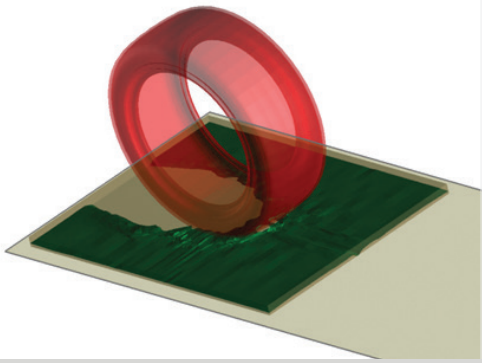
DATASHEET

SimXpert Explicit

Explicit Dynamic Analysis for Enterprise Simulation



Overview

SimXpert is a unified computer aided engineering environment for product simulation that enables manufacturers to accelerate the speed and accuracy of simulation, increase design productivity, and bring better products to market faster. SimXpert accomplishes this by integrating multidiscipline analysis capabilities, the best simulation methodologies, and a high degree of customization all into one engineering environment. Given SimXpert's unified engineering environment, analysts and designs can reduce the number of tools in their engineering workflow and better share critical information with each other.

SimXpert provides multiple workspaces for structural, thermal, explicit dynamics, systems and controls, and multibody dynamics that allow analysts to easily move from one discipline to another while sharing data models and results. This enables all the CAE teams to share the information more effectively, without data loss.

Explicit Workspace

SimXpert Explicit Workspace, a module of SimXpert, brings the power of nonlinear dynamic analysis to industries ranging from aerospace and automotive to manufacturing and consumer products. It offers a unique combination of structural and material flow analysis, including structure-to-structure contact and coupled fluid-structure interaction (FSI) analysis. This makes SimXpert Explicit ideal for aircraft and automotive crash studies, airbag deployment to explosion analysis, and tire hydroplaning simulations, which help improve safety of products with reduced physical prototyping costs.

The extensive library of nonlinear material models ranging from metals and composites to plastics and foams, helps simulate the complex and state of the art materials used in current designs. Large deformation, as well as failure of structures can be accommodated, providing insight into the viability of new designs. The robust contact modeling and detection capabilities provided by SimXpert Explicit help engineers understand the interaction between various structural components, and the resulting contact forces and pressure distribution.

For problems that involve fluid flow, Eulerian technology is used, whereby the mesh remains fixed in space, while material flows the mesh from one element to the next. This approach avoids the numerical difficulties often associated with large deformation of FEA meshes. This formulation allows modeling of liquids and gases, and can also be used study material flow in complex impact and penetration problems.

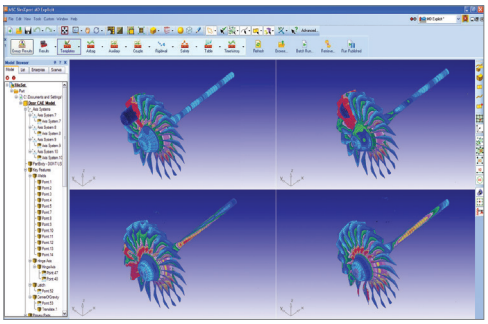
By combining the structural analysis capabilities with material flow capabilities, the Explicit solution in SimXpert provides accurate solutions to many real-world engineering problems like fuel-tank sloshing, air-bag deployment, and blast simulations.

Capabilities

- Perform multidisciplinary analyses with industry's best solution capabilities with MSC Nastran™
- Increase productivity in advanced structural analysis with integrated Pre-, Post-and Solver processing
- Automate repetitive tasks with custom built templates for improved efficiency
- Capture and deploy best practice CAE methods by integrating with MSC's SimManager™
- Smoothly exchange key data between multiple disciplines for higher accuracy

Benefits

- Increase productivity by handling all requirements of the analysis process within one intuitive environment
- Shorten design cycles by enabling maximum collaboration across the extended enterprise
- Maximize business efficiencies by capturing and deploying CAE best practices and deploying throughout the enterprise using SimManager
- Improve accuracy and product quality by unifying the multi-discipline simulation process into a single, integrated environment, leveraging the common data model across the disciplines
- Drive innovation by delivering simulation process improvements at every point of the enterprise, and thereby releasing the experts to focus on making better designs



MSC Software

Enabling Capabilities

- Intuitive object-based user interface with contextual actions
- Advanced browser capability to view, manipulate, and organize model
- Import IGES, Parasolid, CATIA V4, CATIA V5, Pro/ENGINEER, Creo, UG, SolidWorks, ACIS, STEP and STL data for FE modeling
- Interactive CAD cleaning and healing with auto curve, shell, and solid meshing
- Contact creation and setup through easy and intuitive contact tables
- Visualization and manipulation all CAE entities
- User configurable toolsets and menus to streamline the modeling process
- Complete set of specialized crash modeling tools

Modeling Features

- Surface Meshing algorithms: paver, mapped, minimal, quad-dominant
- Mesh seeding: uniform/bias
- Assembly meshing
- Virtual geometry / topological simplification
- Composite modeling and verification
- Connections: Adhesive, bolt, seam weld
- Easy contact analysis set up and checks
- Import and export of solver input files
- Open platform enabling easy integration with third party tools as well as the creation of customized workspaces

Explicit Dynamics Simulation

- Vehicle crash and occupant safety
- Fluid-Structure interaction
- Drop tests
- High velocity and projectile Impact
- Time domain NVH capturing non-linear behavior

Multi-disciplinary Solutions

- Coupled Motion-Structures-Controls

Integration to carry out a diverse set of virtual tests

- Coupled Structures and Motion analysis to perform flexible body analyses
- Coupled Thermal and Structures analysis to seamlessly apply thermal loading to structural analysis
- Coupled linear and non-linear structural analysis to get high accuracy and faster solutions

Post-processing

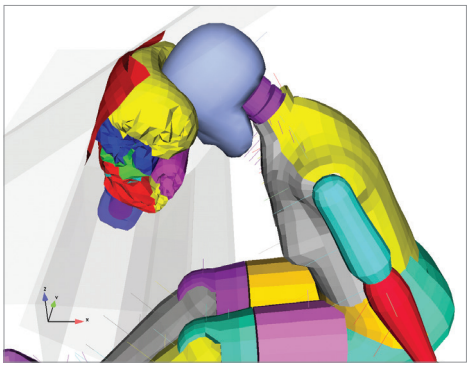
- Multiple window view support to visualize model, state plots and x-y charts and graphs simultaneously
- Result data probes
- Animation of output quantities, including displacements, stresses, strains and vectors
- Visualization of ‘failed’ elements
- Multi-file attachment
- Report generation

Process Capture and Automation

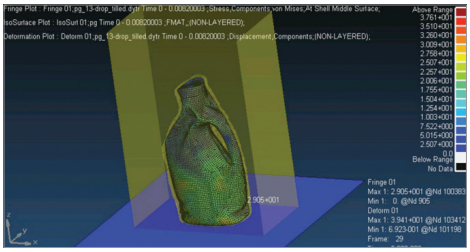
- Capture and record of specific processing tasks as action macros
- Direct integration of macros to create highly complex SimTemplate™ CAE processes
- SimTemplate CAE processes based on macros and scripting to standardize and automate complete end-to-end analyses.
- Batch processing of SimTemplates

Supported Platforms

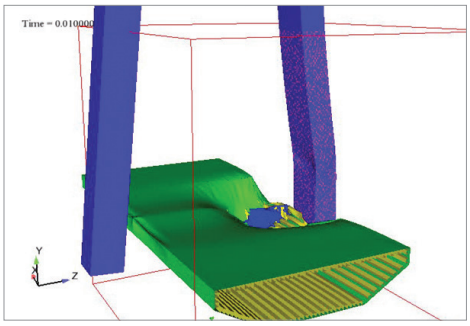
- Microsoft Windows 7 x64 (Enterprise, Professional and Ultimate)
- Red Hat Enterprise Linux 5 (x64)



Airbag simulation



Fluid filled drop test



Blast simulation on a bridge

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