DEFORM™ Premier

DEFORM™ Premier is a comprehensive 'state of the art' process simulation system designed to analyze complex metal forming processes, microstructure and grain evolution, transient thermal response, residual stress and distortion. DEFORM Premier includes ithe forming, thermal and heat treatment capabilities of the DEFORM System. Typical applications include:

- forging
- machining
- rolling
- ring rolling
- heat treatment
- extrusion
- heading
- drawing
- die stress analysis
- cogging
- compaction
- upsetting
- residual stress

Using finite element methods, DEFORM has proven to be accurate and robust in industrial applications for more than two decades. The FEM engine is capable of predicting large deformation material flow and thermal behavior with astonishing precision.

The Automatic Mesh Generator (AMG) produces an optimized mesh system where local element size is based on the specific process being analyzed. This facilitates the enhanced resolution of part features while maintaining good control of the overall problem size and computing requirements. A user-defined local mesh density provides advanced users a flexible control to meet their requirements.

The core and rim of the bimetallic coin, shown above, were coined and mechanically joined together within a single operation. The multiple deforming body, advanced meshing and arbitrary capabilities of DEFORM-3D were required for such a complex simulation. Each body was modeled with over one million elements.

While DEFORM Premier provides sophisticated analysis capabilities, the graphical user interface is intuitive and easy to learn. Moreover, it provides utilities to manipulate 3D geometry, including boolean capabilities to trim flash. Shearing and trimming operations can be analyzed, as well as complex machining operations. DEFORM Premier is the foundation for a comprehensive modeling system that integrates raw material production, forming, heat treatment, machining, mechanical joining and rolling.

DEFORM Premier continues a tradition of accuracy and state of the art capabilities that was first established in the early 1980's. Scientific Forming Technologies Corporation has the experience and background to provide unparalleled training and technical support.

Product Specifications

- Deformation and heat transfer are calculated in an integrated simulation environment for multiple discrete objects.

- Fully-automatic and optimized remeshing is performed during simulations.

- Forming equipment models are available for hydraulic presses, hammers, screw presses and mechanical presses.

- Material models include elastic, rigid-plastic, thermal elasto-plastic, thermal rigid-viscoplastic, porous and rigid.

- Deformation, contour plots, load-stroke prediction, point tracking, FLOWNET and other features are available in the postprocessor.

- Multiple deforming body capability allows the analysis of mechanical joining or coupled die stress.

- The FEM engine predicts fracture based on damage models.

- A self contact boundary condition allows a simulation to continue after a lap or fold has formed.

- Multiple operations can be set up to run sequentially, without user intervention, for common forming and thermal processes.

- A machining distortion 'template' is being developed to streamline the calculation of distortion after material removal.

DEFORM™

Design Environment for FORMing

DEFORM™ Premier

Computer System Requirements

• The minimum recommended configuration is:
  - 16 GB RAM,
  - Quad-core processor,
  - 500 GB free disk space,
  - DVD writer,
  - Windows 7 / 8 (64-bit) or select Linux configurations.

Licensing

• The FEM engine is licensed to run on two CPU threads in a floating license configuration. Parallel processing options with additional threads are available.

• This floating license is available to use within a local-area network.

• A simulation queue is included to efficiently run multiple simulations without user intervention.

General Information

• Training, support, updates and DEFORM User Group meetings are available to active users.

• Outputs include images, graphs, tabular data, animations and STL geometry.

• The DEFORM Material Database includes a wide range of steel, aluminum, titanium, superalloy, copper and other material data.

• Technical support is readily available by phone, email, web meetings and the online DEFORM User Area.
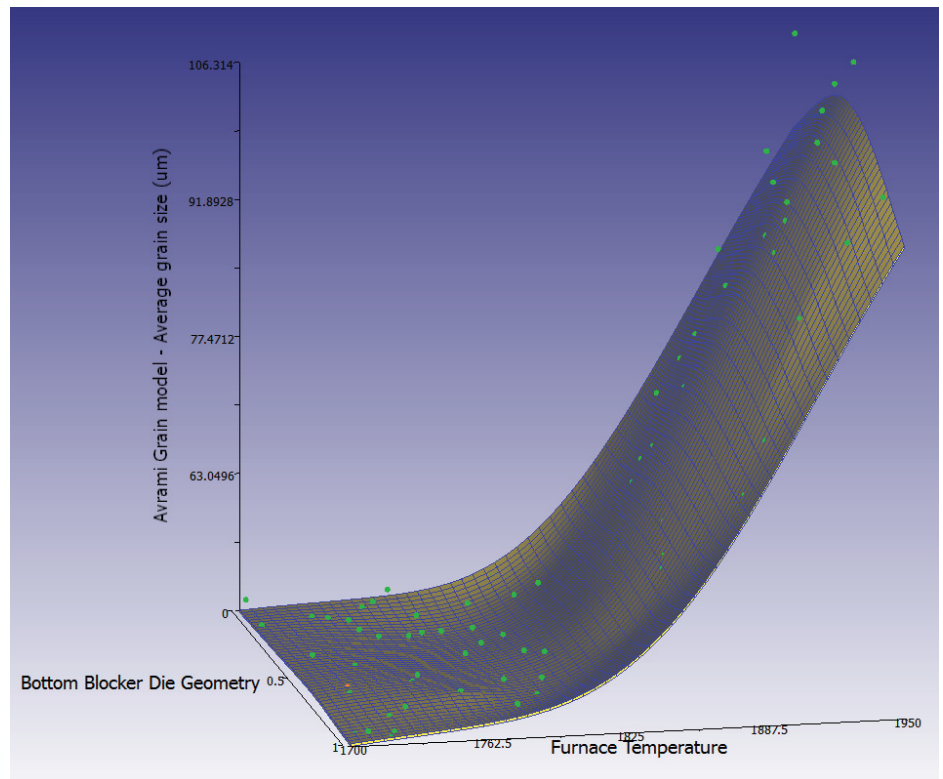
DEFORM Premier provides very powerful DOE and optimization capabilities to run multiple simulations with controlled process variation. DOE allows the user to define a test matrix using a full factorial or statistical sampling (Latin Hypercube) in advance. Optimization allows the system to fine a best process within defined constraints. A custom postprocessor automates much of the data mining and displays results in a usable format.
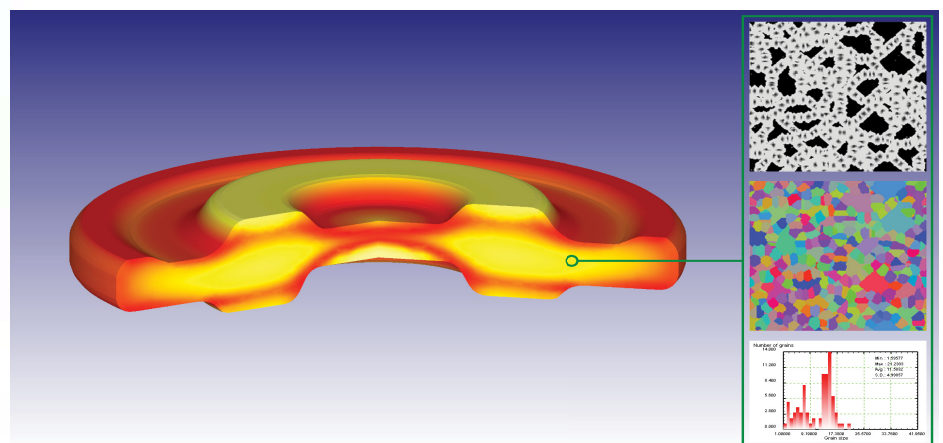
Microstructure modeling is used to predict residual stress and a wide range of mechanical properties. Scientific Forming Technologies Corporation is the leader in the development and application of microstructure modeling for research and industrial applications, as shown with the Cellular Automata (CA) model using the RVE method.