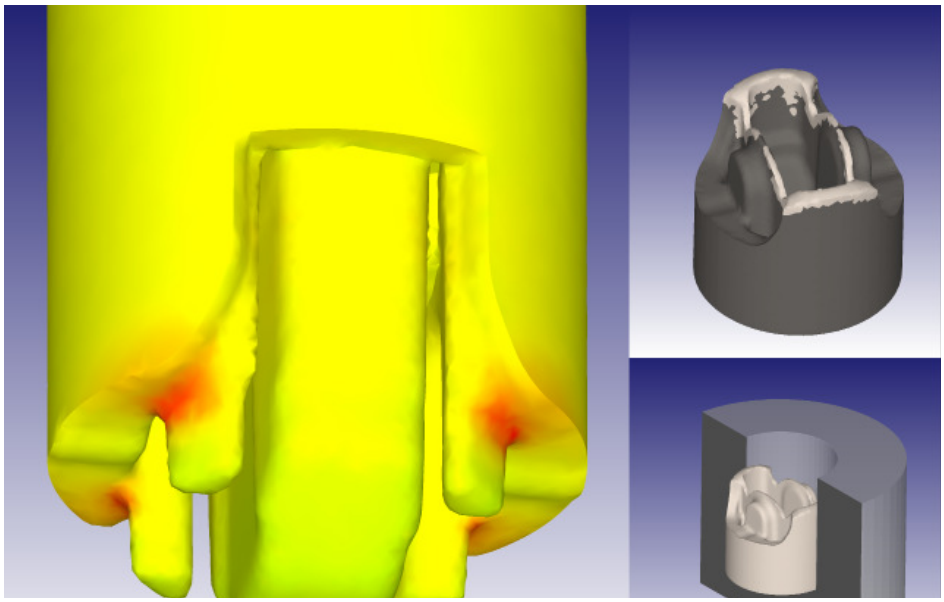
DEFORM™ - 3D

DEFORM™-3D is a powerful process simulation system designed to analyze the three-dimensional (3D) flow in complex metal forming processes. DEFORM-3D is a practical and efficient tool to predict the material flow in industrial forming operations without the cost and delay of shop trials. Typical applications include:

- forging
- extrusion
- cogging
- machining
- heading
- compaction
- rolling
- drawing
- upsetting

DEFORM has proven to be an accurate and robust solution in industrial applications for more than two decades. The simulation engine is capable of predicting large deformation material flow and thermal behavior with astonishing precision.



A coupled die stress analysis is shown, with the maximum principal stress in red. Viewports on the right show the forging shape and die contact.

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.

While DEFORM-3D 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-3D is the foundation for a comprehensive modeling system that integrates raw material production, forming, heat treatment, machining, mechanical joining and rolling.

DEFORM-3D 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™-3D

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 one CPU thread. Parallel processing options are available.
- Node-locked licenses support one user on one computer. Floating licenses are available to use within a local-area network.
- One add-on module is included at no extra charge: forming (DEFORM-F3), cogging, machining, shape rolling or extrusion.

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.

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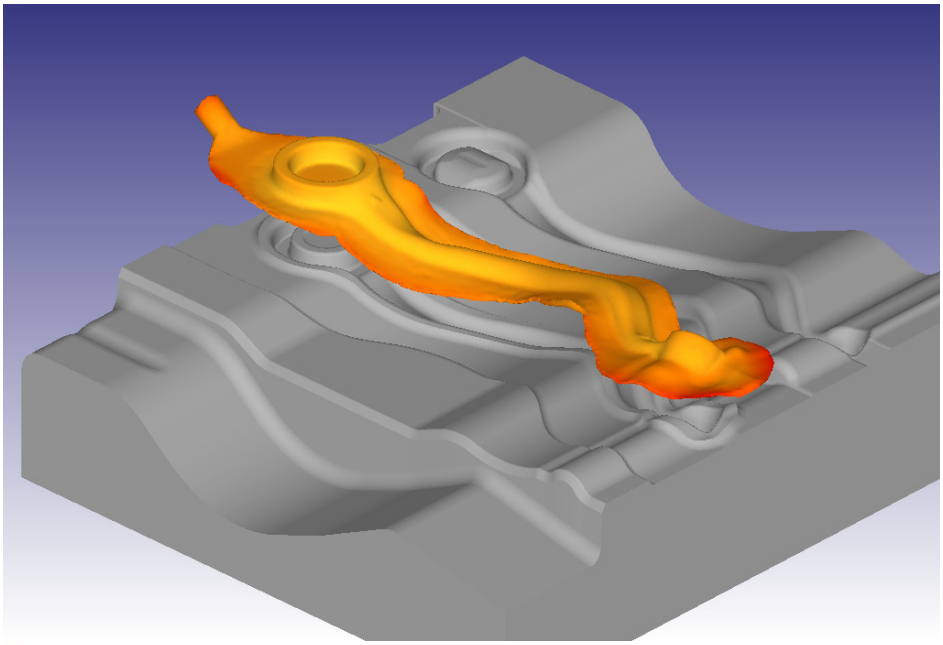
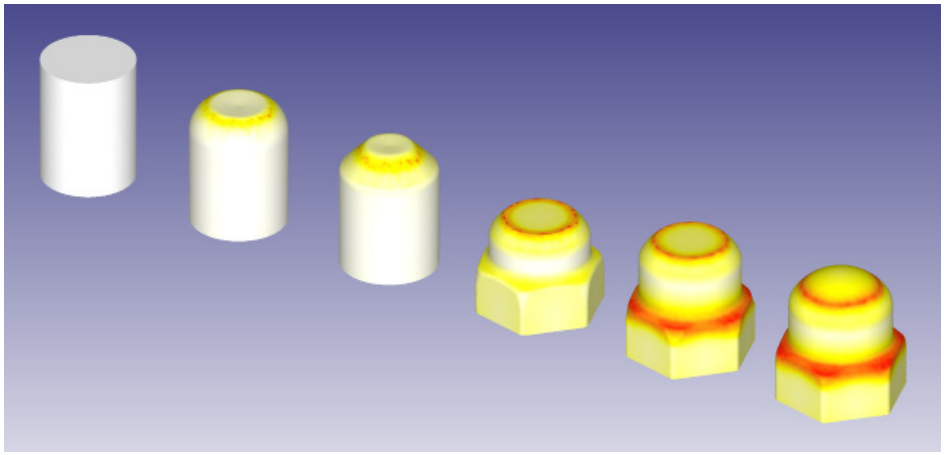
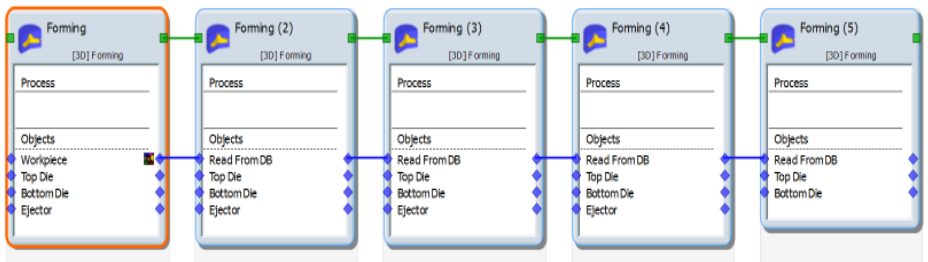


This automotive suspension forging involved multiple hammer blows across multiple die cavities. Heat transfer was calculated during transfer, forging and dwell. DEFORM-3D provides information such as material flow, forming load, energy, strain, temperature, tool stress and more. Courtesy LC Manufacturing LLC.





The DEFORM Multiple Operation environment allows for the automatic simulation of entire process sequences. These are defined using a mix of flowchart, wizard-based and advanced menus. The full five station nut forming progression shown above was simulated, from start to finish, with a single click of the 'Run' button.