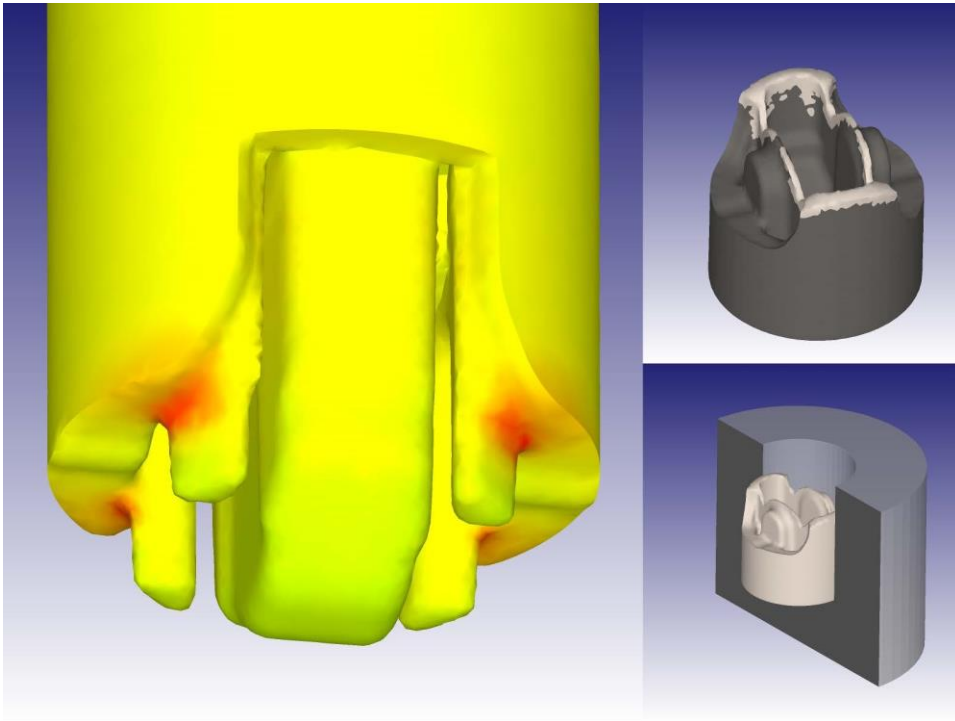# DEFORM-3D

DEFORM-3D is a powerful process simulation system designed to analyze complex, three-dimensional (3D) metal forming processes. It is a practical and efficient tool for the prediction of metal flow, heat transfer and more. Manufacturing operations can be simulated on the computer, avoiding much of the cost and delay of shop trials. Typical applications include hot forging (closed and open die), warm and cold forming, cogging, rolling, drawing, extrusion, heating, machining and mechanical joining.

Based on the finite element method (FEM), DEFORM has proven to be an accurate and robust solution in industrial applications for over three decades. The simulation engine is capable of predicting large deformation metal flow with high precision. An advanced mesh generator automatically applies an adaptive, optimized mesh to parts and tooling. This captures important model detail while minimizing the simulation time. User-defined meshing tools allow advanced users to customize the mesh to their requirements.

A coupled die stress analysis is shown. Maximum principal stress is in red. The small viewports show the forming shape and die contact. Courtesy Wiseco Piston.

While DEFORM-3D provides sophisticated analysis capabilities, the graphical user interface is intuitive and easy to learn. A 'state of the art' multiple operation interface provides guided data input for a wide range of processes types. Individual operations can be combined into process sequences that can be run one-by-one or sequentially. This is the foundation for a comprehensive modeling system that can incorporate forming, material modeling, design of experiments (DOE) and optimization.

Scientific Forming Technologies Corporation (SFTC) staff has a unique combination of industrial, academic and software experience. This diverse background enables SFTC to provide unparalleled training and technical support. Our support staff is personally committed to the success of each and every DEFORM user.

Product Specifications

- Deformation and heat transfer are calculated in an integrated simulation environment.

- 3D simulation describes a wide range of complex geometries, processes and behaviors.

- Planar and rotational symmetry is easily defined, when applicable.

- Automatic, adaptive remeshing is performed during simulations.

- Material models include elastic, rigid-plastic/viscoplastic, elastic-plastic, porous and hyperelastic.

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

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

- Translation, rotation, path and sliding (spring) die movement controls are also supported.

- Multiple operation sequences run without user intervention.

- The FEM engine predicts fracture based on damage models.

- Simulation results are analyzed via a powerful post-processor.

Distribution in Central Europe by:

cenit

www.cenit.com - deform@cenit.com

DEFORM®

Design Environment for FORMing

Computer System Requirements

• The minimum recommended configuration is:

  - 16 GB RAM
  - 1 TB free disk space
  - DVD writer
  - Windows 7/8/10 (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, cogging, machining, shape rolling or extrusion.

General Information

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

• Online documentation is provided in HTML and PDF formats.

• 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-3D
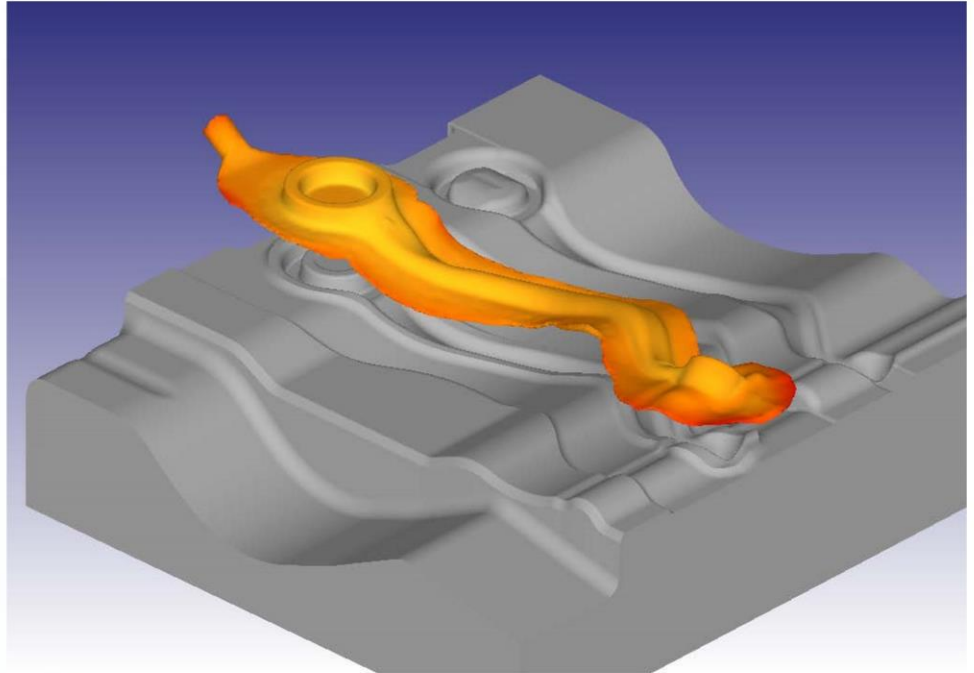
This automotive suspension forging involved multiple hammer blows across multiple die cavities. Heat transfer was calculated during transfer, forging and dwell. DEFORM-3D provides information such as material flow, forming load, energy, strain, temperature, tool stress and more. Courtesy LC Manufacturing LLC.
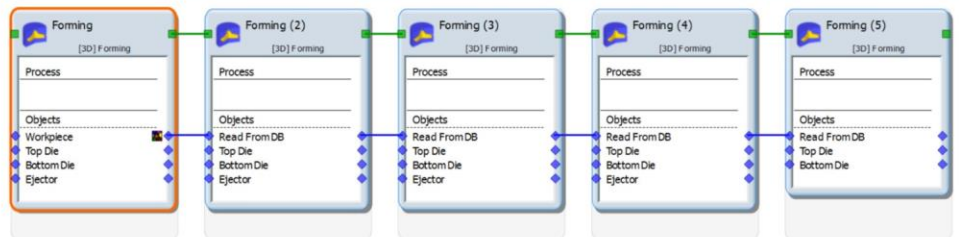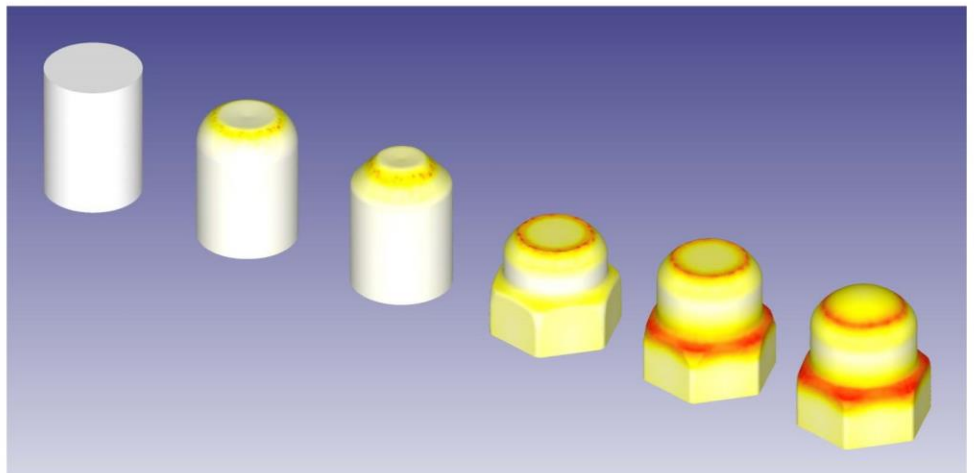
The DEFORM multiple operation environment allows for the automatic simulation of entire process sequences. These are defined using a mix of flowchart, wizard-based and advanced menus. The full five station nut forming progression shown above was simulated, from start to finish, with a single click of the 'Run' button.