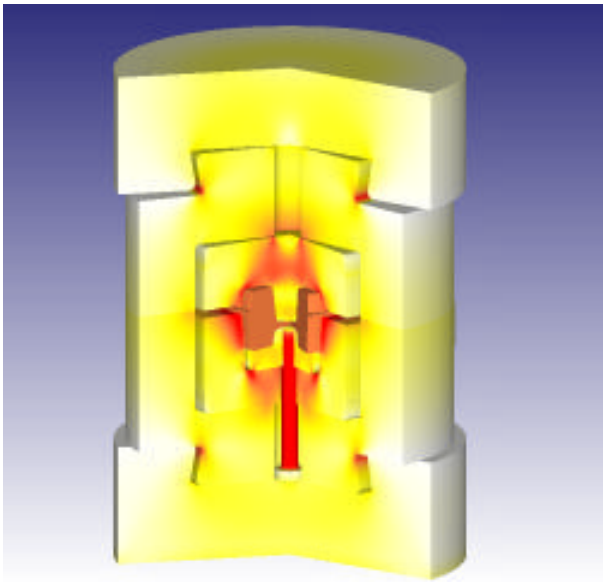
DEFORM™ - 2D

Scientific Forming Technologies Corporation

DEFORM™-2D is a Finite Element Method (FEM) based process simulation system designed to analyze two dimensional (2D) flow of various metal forming processes. It provides vital information about material and thermal flow during the forming process to facilitate the design of products and required tooling. DEFORM™-2D has been used by companies worldwide to analyze forging, extrusion, drawing, heading, upsetting and many other metal forming processes.

DEFORM™-2D offers state-of-the-art process simulation technology. Its powerful simulation engine is capable of analyzing complex interactions of multiple deforming objects with different material properties during the metal forming process. This allows a realistic and accurate modeling of the metal forming process under production environment. Its sophisticated mesh generator automatically generates an optimized mesh system whenever necessary. By considering the solution behavior, the mesh generator generates finer elements in regions where greater solution accuracy is required, thus reducing the overall problem size and computing requirements. Its flexible and powerful graphical user interface makes the preparation of input data and examination of result data very easy to accomplish.



The example on the left illustrates a sophisticated multiple deforming body capability that is unmatched by any simulation program. This hammer forging includes the entire die stack as elastic bodies. Shown are contours of effective stress (red is higher). The workpiece (shown in orange) is deforming with flash using a rigid-plastic material model. Top die stack movement is based on the hammer energy model. The elastic energy due to die deflection adds another dimension of accuracy to the simulation result. The 3D graphic display is created using DEFORM™-TOOLS.

DEFORM™-2D employs a core technology from over a decade of research and production application at leading companies worldwide. Numerous “success stories” have been reported in both product development and die design. It is supported by Scientific Forming, a company dedicated to bring state-of-the-art process modeling technology to the metal forming industry. To ensure successful DEFORM™ applications, Scientific Forming provides training workshops, frequent program updates, Users Group Meetings and responsive technical support.

Product Specifications

- Deformation and heat transfer are automatically calculated in an integrated simulation environment.
- Two-dimensional capabilities include plane strain and axisymmetric simulation.
- Fully automatic optimized remeshing is performed during simulation.
- Forming equipment models are available for hydraulic presses, hammers, screw presses and mechanical presses.
- The material models include elastic, rigid plastic, thermal elasto-plastic, thermal rigid-viscoplastic, porous and rigid.
- FLOWNET and point tracking deformation, contour plots, load-stroke prediction and more are available in the postprocessor.
- Multiple deforming body capability allows for the analysis of multiple plastic workpieces or coupled die stress analysis.
- Fracture initiation and crack propagation models based on well known damage factors are integrated into the FEM engine.
- A self contact boundary condition allows a simulation to continue even after a lap or fold has formed.
- Multiple operations can be set up to run sequentially, without intervention, for common forming processes.

DEFORM™

Design Environment for FORMing

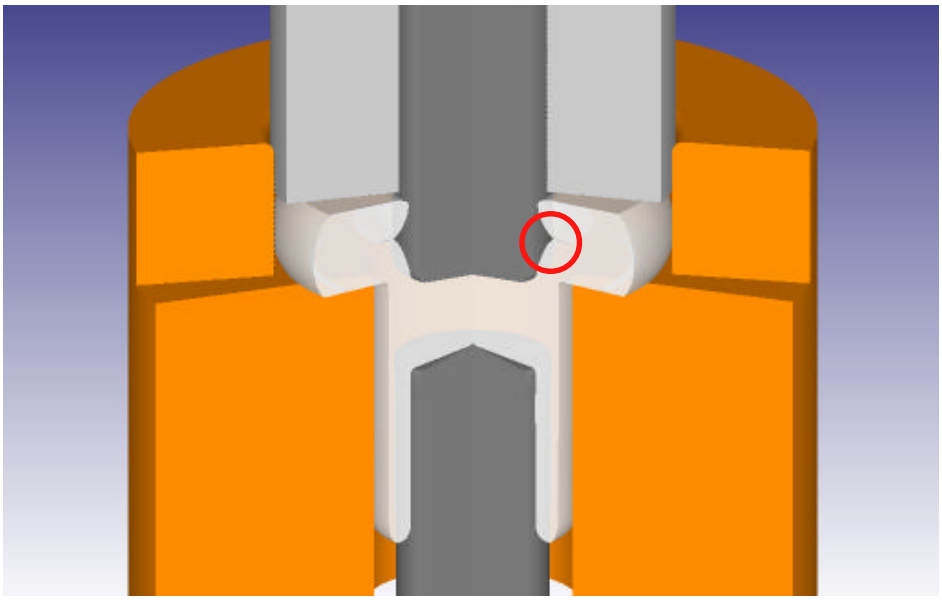
DEFORM™ - 2D

Computer System Requirements

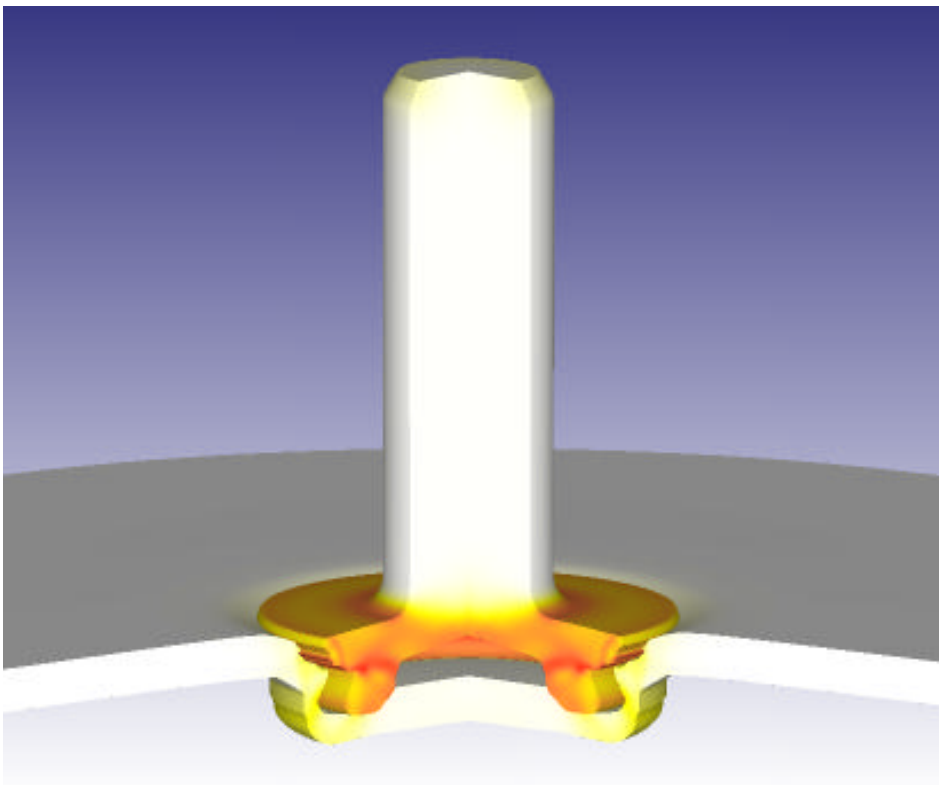
- DEFORM™- 2D runs on popular UNIX workstations, WINDOWS 2000/XP Professional and Linux.
- The minimum recommended configuration is 256 MB RAM.
- At least 2 GB of free disk space, a color monitor and printer are recommended. POSTSCRIPT printers are supported for UNIX/Linux. Standard WINDOWS printers can be used for WINDOWS 2000/XP systems.
- DEFORM™- 2D is distributed on CD - ROM or FTP/download.
- Internet access is desirable to take advantage of on-line technical support and service pack updates.

General Information

- Training, support and regular updates are available to active DEFORM™ Users.
- DEFORM™ Users Group meetings are held regularly.
- Outputs include IGES, DXF, graphics, text data, hard copy and animation.
- On-line documentation is provided in HTML (web browser) format.
- The DEFORM™ Material Database with in excess of 230 materials is supplied by SFTC.



A fastener lap is shown during the final operation of a cold formed automotive part. The actual part exhibited a lap that very accurately matched the simulation prediction (see area circled in red).



A pull test is shown after installation of a self-clinching fastener. In this case, the force predicted by DEFORM™ was within 10% of the experimental value. This demonstrates a powerful multiple deforming body capability for large deformation.

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