Spring, 2019

Volume 17, No. 2

DEFORM® News

Training:

- June 18-21, 2019: DEFORM training will be conducted at the SFTC office in Columbus, Ohio.
- August 13-16, 2019: DEFORM training will be conducted at the SFTC office in Columbus, Ohio.

Events:

- August 20-21, 2019: The annual Die Stress Workshop will be hosted by SFTC, in conjunction with Marquette University, in Columbus, Ohio.
- August 22, 2019: A one-day training (focused on die stress modeling in DEFORM) will be conducted following the workshop.

DEFORM Version 12

This spring brings a new major release of DEFORM, Version 12. V12 builds upon the next-generation simulation interface and revolutionary multiple operation (MO) workflow introduced in DEFORM V11. V12 introduces many "under the hood" enhancements and new applications. Users of all skill levels can expect improvements that make DEFORM faster, more powerful and easier to use than ever.

Preprocessor/FEM

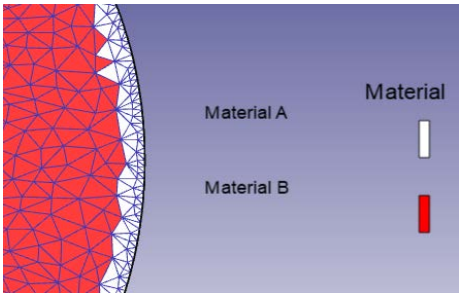
The speed of the MUMPS solver has significantly increased. Depending on the process, users may see speed improvements of up to 30%. Computers that are many years old may not be able to utilize the new MUMPS solver. Thus, the legacy MUMPS solver may still be chosen during installation.

A new contact method, Augmented Lagrangian Contact (ALC), will be made available in the preprocessor. ALC lets users take advantage of the Conjugant Gradient (CG) solver for simulations involving multiple deforming objects. This combination provides a notable speed increase on such simulations. This will particularly benefit users modeling mechanical joining cases.

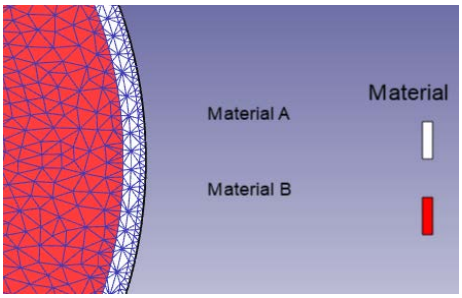
A revised "Run (options)" menu adds two new features to the interface. Parallel remeshing, introduced in V11.3 via a control file, is now readily available. It leverages multiple processor cores to reduce remeshing times. An automatic report generation option has also been added. It allows predefined reports to be generated at simulation time.

New local remeshing capabilities allow users to remesh a specific portion of the workpiece, rather than the entire part. State variables and geometry detail outside of the local volume thus remain unmodified. This benefits applications involving fine detail and many remeshes, such as is the case with machining.

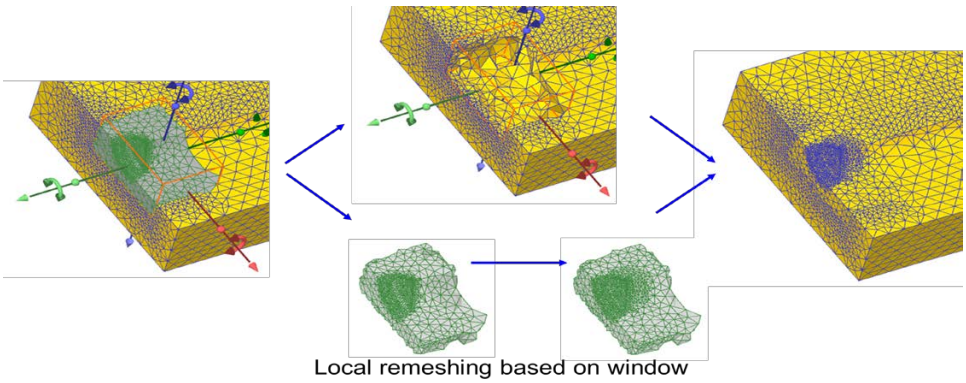
The default global remeshing program has also been improved in V12. Rigorous testing has proven it more robust than in previous versions. In addition, multi-material meshes now better preserve the interface between two different materials in a single body.



Multi-Material mesh in V11.3



Multi-Material mesh in V12



Local remeshing based on window

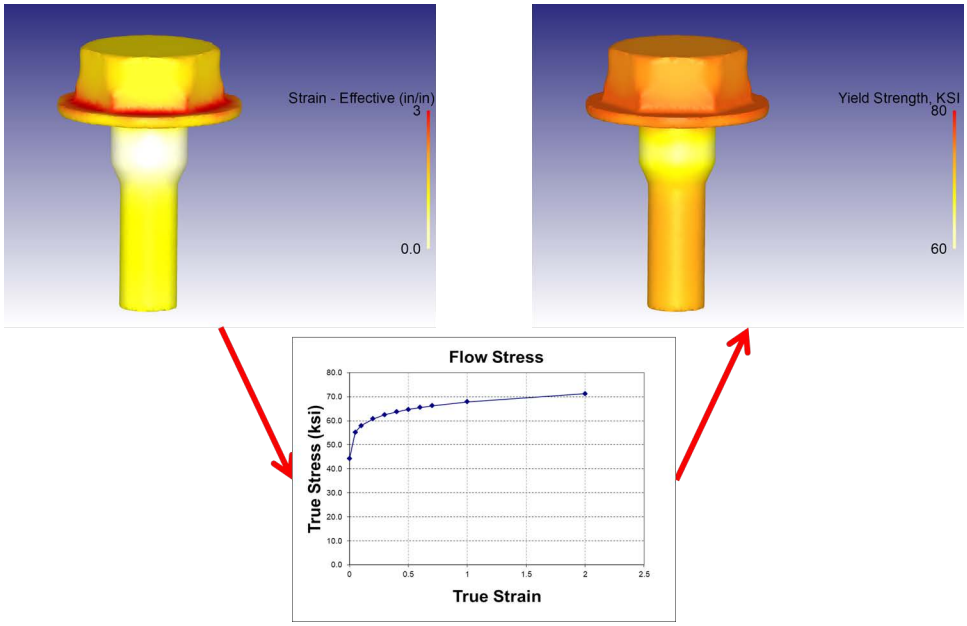
DEFORM®

Design Environment for FORMing

Designers and engineers using the Forming Express interface will be pleased to learn that it has received numerous upgrades. Improvements widen its range of applications and simplify model setup. Newly features include rigid contact for sliding dies, hybrid friction, a faster 2D solver and setup assistance for the hydraulic presses.

Postprocessor

The new “State Variable Mapping” feature allows users to plot custom variables based on known data relationships. A simple look-up table allows an existing state variable to be converted to a different output variable. This provides an easy way to display custom variables, such as yield strength or hardness, based on their relationship to a standard state variable, such as strain (below).



The ability to comparing different simulations has been enhanced through the new superimpose feature. Models and graphs can be overlaid on one another, typically via a drag-and-drop between windows. This enables a more direct comparison of results.

Animation creation has been modernized in V12, making it easy to show off DEFORM results. High resolution animations can be exported with file sizes small enough for email. More control is provided over frame rates and scheduled pauses throughout a multiple operation sequence. Higher quality animations are possible and more widely available video formats are supported.

Miscellaneous

Upon first opening V12, one of the most apparent changes will be that of the new DEFORM Main Menu. The program has been visually updated and offers several new features. New problem creation now allows users to start a problem from scratch, import a saved template or import a preinstalled example. The Problem Explorer tree now updates automatically, includes standard file explorer functions and includes a search feature. The preview window will display images of all these simulations under the selected folder. It also displays comprehensive DOE/optimization summary graphics.

A guiding vision for DEFORM is to model the entire manufacturing flow path for formed metal components. Thus, new application support was a strong focus in V12. Several new modules and capabilities were added in processes that are challenging to setup or simulate. New modules are introduced for shot peening, ring rolling, spinning, extrusion and data analytics. New capabilities are also added to support additive manufacturing, arc welding, gas nitriding and linear friction welding (LFW).

Releases:

DEFORM V12.0 enhancements and new features include:

New DEFORM Main Menu
New Data Analytics Module
New Shot Peening Module
Next-generation Ring Rolling Template
Next-generation Extrusion Template
Next-generation Spinning Template
Cogging Template enhancements
2.5D linear friction welding (LFW)
2.5D roll forming
3D electromagnetic forming
3D ALE stir welding
3D ALE spinning
Hyperelastic (rubber) material model
Improved porous material model
Arc welding support
Additive manufacturing (AM) support
Gas nitriding/nitrocarburizing support
Enhanced MO project templating
Forming Express enhancements
Updated boolean capabilities
Improved multiple material group mesh
Mesh layer slicing
Inconel 625 microstructure data
Augmented Lagrangian Contact
Solver additions/updates
MUMPS solver speed-up
New local remeshing methods
Improved global remeshing
Parallel remeshing
Automatic report generation
Postprocessor graphics overlays
State variable mapping
Relative motion postprocessing tool
New animation controls
Steady-state wear model
DOE/optimization case studies
Expanded DOE options
Extended optimization functions
Revised DOE Postprocessor
Expanded RVE options
Titanium MEDC model
Lab exercises for new applications
Updated License Manager
Updated Service Control

The complete list of the new features can be found in the V12.0 release notes. Release notes are included with the software installation and are also available on the DEFORM User Area.

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