Summer, 2007

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DEFORM™ News

Events:

- October 23 & 24: The Fall DEFORM User Group Meeting in North America will tentatively be held in the Columbus area. Information will be posted to the User Area of the web site as it becomes available. Please mark your calendar.

Training:

- August 14 & 15, 2007: DEFORM-2D training (includes DEFORM-F2) will be conducted at SFTC in Columbus, Ohio.
- August 16 & 17, 2007: DEFORM-3D training (includes DEFORM-F3) will be conducted at the SFTC office.
- August 22 & 23, 2007: The annual Die Stress Analysis Workshop will be conducted at Marquette University in Milwaukee, Wisconsin.
- October 24 & 25, 2007: Advanced training will be conducted in conjunction with the Fall Users Group Meeting in Columbus.

New Office Building

SFTC has acquired a larger office building in Columbus, Ohio to support our growth. We plan to move later this summer. We will keep you informed of timing and new contact information.

Shape Rolling

There are numerous benefits to simulating the rolling processes. The rolled shape can be determined and optimized before testing in the mill. Effective strain and temperature can help to determine if the product will meet specified requirements. Rolling schedules can be designed and simulated to ensure a robust process prior to production trials.

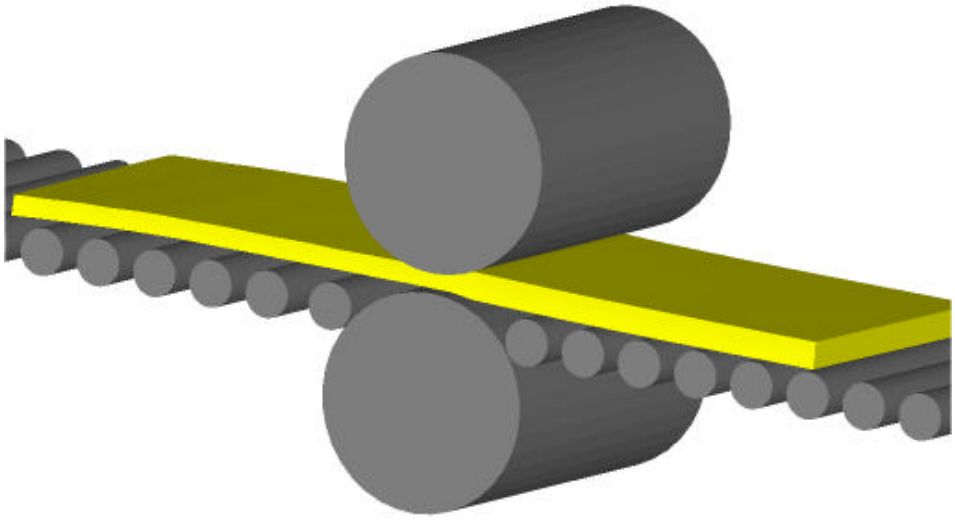
The Shape Rolling module has undergone significant development for the upcoming DEFORM-3D version 6.1 release. These updates will improve performance, robustness and accuracy.

A robust brick element meshing and remeshing algorithm is surviving the most challenging rolling cases.

Side rolls and tables can now be included in the model. These allow the workpiece to be supported and constrained more realistically. Workpiece temperature is more accurate when these objects are taken into account, especially between passes.

New friction models have been implemented that reportedly improve the solution accuracy during rolling. A hybrid friction model was among the new routines added to DEFORM. This hybrid scheme allows the user to combine coulomb and shear friction at the same interface. At low pressures coulomb friction is used. As the pressure increases, the model transitions to shear friction.

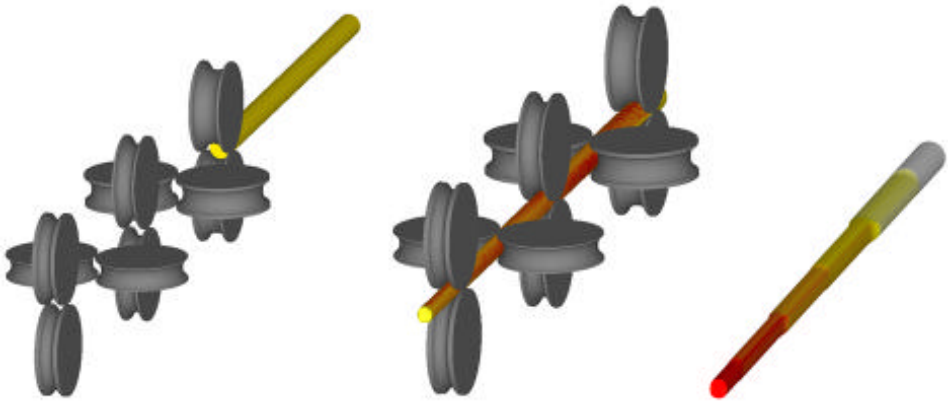
Gravity can be included to improve accuracy of the inlet and exit regions. Bending of the plate on both ends (below) shows the gravitational effect on a hot rolling simulation.



DEFORM™

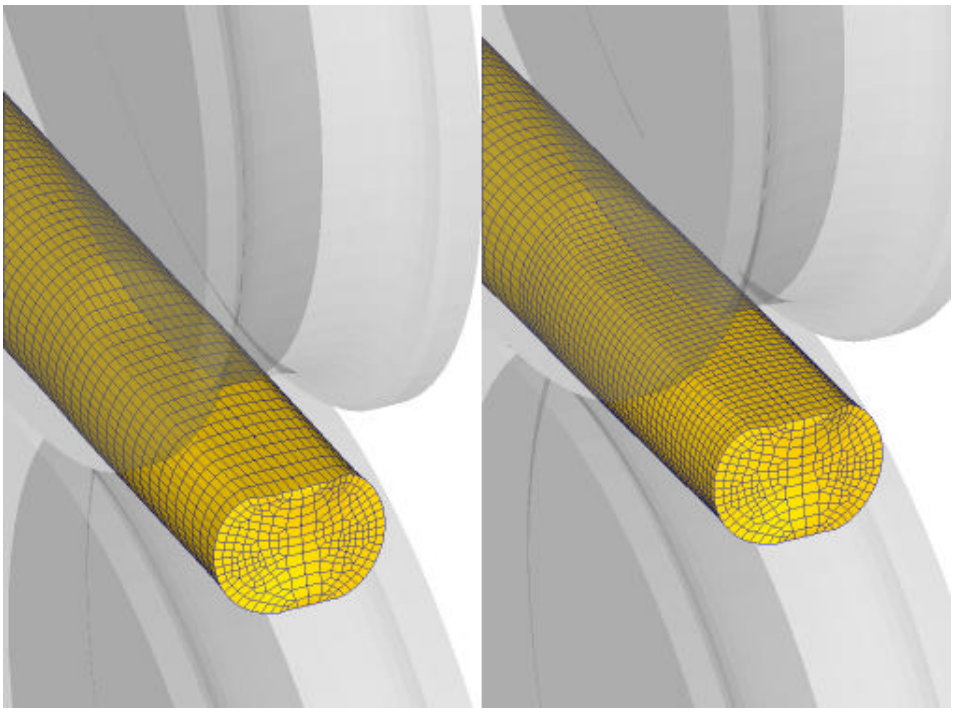
Design Environment for FORMing

The FEM engine is capable of modeling multi-stand rolling using the Lagrangian or ALE models. An industrial 5 stand rolling process is shown. Temperature contours in the workpiece are shown in the starting (left) and ending step (center) from the Lagrangian simulation. The ALE result (right) shows the steady state strain distribution. GUI (preprocessing) enhancements are planned in the future.



An automatic stopping criterion has been added to recognize the completion of a rolling pass. Inertia is considered so that the part will continue moving after coming out of the roll gap. In addition, table objects can now transmit frictional forces to the workpiece. This helps to drive the material into the roll gap and stabalize the solution as the workpiece exits the rolls.

Automatic element subdivision has been incorporated to help maintain element size and quality. When modeling rolling processes, it is important to maintain enough elements under the roll gap to accurately describe the neutral plane. The following image shows a mesh prior to subdivision (left) and a mesh after subdivision (right). Subdivision allows cubic (healthy) elements to be maintained as the workpiece elongates over many uninterrupted passes.



Releases:

During 2006, DEFORM-2D and DEFORM-F2 version 9.0 were released. DEFORM-3D and DEFORM-F3 version 6.0 were also distributed.

During 2007, we are finalizing a very aggressive development plan. The current plan will start with a DEFORM-3D version 6.1 beta in the spring. This will be followed by a formal release in the summer. DEFORM-3D version 6.1 will include:

- the ring rolling system;
- enhanced shape rolling;
- improved geometry handling, import and export;
- microstructure modeling prototype ;
- 3D induction heating (FEM only);
- local remeshing (3D);
- improved parallel computing, and
- the machining (cutting) preprocessor will include enhanced capabilities in defining drill geometry.

Additional developments in 2007 will include:

- ongoing shape rolling development;
- coupled die stress;
- speed and functionality in parallel computing and
- 2D to 3D integration, to name a few.

Ongoing microstructure developments will continue throughout the coming years. Scientific Forming Technologies is partnering with customers, research institutes and government agencies to push the 'state of the art' in microstructure and machining distortion modeling to new levels over the next few years.

For a complete list of all the improvements, please refer to the release notes in the DEFORM User Area.

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