Summer, 2011

Volume 9, No. 3

DEFORM™ News

Events:

- August 24 & 25, 2011: Die Stress Analysis workshop at Marquette University in Milwaukee, WI.
- November 8 & 9 (tentative): DEFORM User Group meeting will be held in Columbus, OH.

Training:

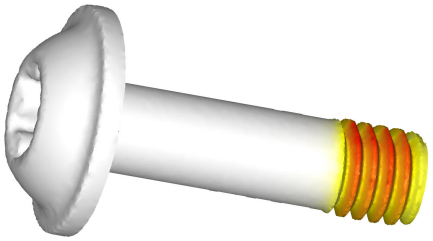
- September 27-29, 2011: DEFORM training will be conducted at the SFTC office.
- November 10: DEFORM Advanced training will be conducted at SFTC office.
- December 6-8: DEFORM training will be conducted at the SFTC office.

Thread and Form Rolling

Fastener and other manufacturers often include secondary rolling operations, such as thread or form rolling, in their manufacturing processes. These methods are performed after primary operations such as heading, cold forming or forging. Secondary rolling operations allow manufacturers to build more value into their finished products. This may allow them to achieve more revenue for a product or differentiate their product from the competition.

Thread and form rolling operations involve rolling material between two flat dies or 2-3 cylindrical rolls. The tools gradually swage the desired shape into the workpiece as it revolves.

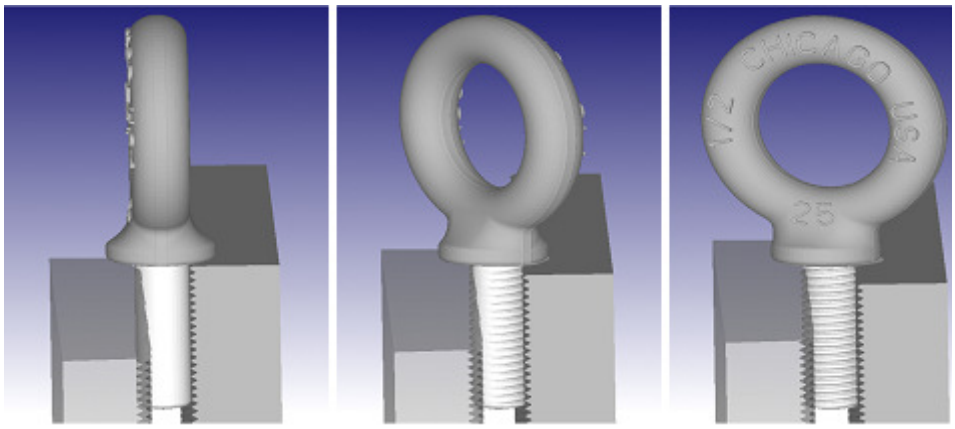
Thread rolling is the most common of the secondary rolling operations. It is regularly used as a premium alternative to thread cutting. Rolled threads are more desirable because they are stronger and reduce material waste.



Accumulated strain (red) is shown on this thread rolled bolt. Higher strain indicates more work hardening, thus stronger threads.

Form rolling can be performed on many of the same machines as thread rolling. It will produce simple geometries, grooves, points, knurls and other shapes. Processing speed is a major benefit to form rolling. It can produce many parts per second and frequently results in better efficiency than heading or cutting.

Thread rolling was first simulated by DEFORM about 10 years ago. At that time, thread rolling simulations were very time consuming, typically taking days to run. Today, thread and form rolling simulations are quite practical. Production jobs are now simulated, using low-cost computers, in a matter of hours.

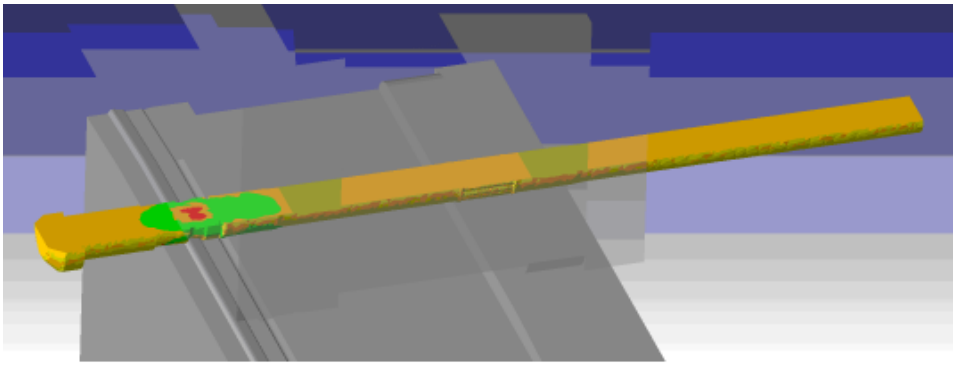


The thread rolling process shown above was performed on a forged eye bolt. The entire manufacturing sequence, including heating, forging, trimming, cooling and machining, was simulated before the rolling operation. Courtesy: Tkach Consulting

DEFORM™

Design Environment for FORMing

DEFORM is particularly useful for troubleshooting production problems. For example, factors influencing the life of rolling dies can be understood through die stress analyses. In other cases, aggressive rolling sequences may cause internal part cracking. Simulation allows the root causes, such as damage or tensile stress, to be identified. In either case, once the underlying phenomena are known, then relative improvements can be made to the design.



Tensile (red) and (compressive) stresses are displayed on a form rolled part shown above. The predicted tensile stresses correlated with actual internal cracking.

Users praise DEFORM for exceptional ease-of-use and unparalleled speed in rolling applications, particularly when compared to other codes. Fastener manufacturers, in particular, should consider DEFORM-3D for troubleshooting or optimization of their thread or form rolling applications.

Windows XP Support

Windows XP is currently one of the most popular operating systems among DEFORM users. Its longevity can, in part, be attributed to a range of issues that accompanied the launch of Windows Vista. The problems caused many companies to skip the upgrade to Vista.

Microsoft is currently phasing out Windows XP. They are officially scheduled to end all support for XP. No new security or system patches will be available after April 8, 2014. In fact, Microsoft is phasing out XP support from various products, including Internet Explorer 9. That decision was due to the inability of XP to support new browser capabilities.

As DEFORM Version 11 is being developed with a new Graphical User Interface (GUI), some compatibility issues are being discovered between XP and the new development tools. These tools allow us to add many new features. For example, “Undo” can be implemented under new application framework. This has been a user request for years. The new system will also take advantage of the latest hardware and software technologies. One successful development has been the 64-bit 3D FEM engine, developed using a new compiler. When tested on Windows 7, the new compiler provided a 30% speed increase compared to earlier versions of DEFORM.

We are recommending that users begin their migration from Windows XP in the near future. It’s still unclear how version 11 will behave on XP. In the worst case, new features or interfaces may be incompatible. In the near term, SFTC will provide Windows XP support for core capabilities of DEFORM within the legacy interface to allow time for an orderly migration. Our current recommendations are moving to Windows 7, with the 64 bit version being optimum for 3D applications. Feel free to contact us if you have any questions.

Releases

DEFORM v10.2 (beta3) and v11.0 (beta) were posted in July. The official 10.2 release should be available in September. Version 11.0 should be available in late 2011 or early 2012. Improvements include:

- MPICH2 improves 64-bit performance and stability
- 64-bit user subroutine support (Windows and Linux)
- Improved batch queue stability
- Centos 5 & Suse 11 support
- Shape morphing and parametric design features included in 3D Geometry Tool
- 2D to 3D translation handles multiphase transformation data
- PATRAN data file format importer
- Dual frequency induction heating in DEFORM-2D
- Enhanced 3D extrusion simulation
- Resistance heating in DEFORM-3D
- Mesoscale microstructure / material model
- 2D torsion mode now supports elastic-plastic materials
- Integrated 2D-3D machining distortion model
- System support for UP-UX 11.23, HP-UX 11.00, HPXC Linux and Suse92 Linux is limited to bug fixing

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