

DEFORM News

Training

SFTC will offer online DEFORM training for U.S. and Canadian customers on the following dates in early 2025:

- January 28-30
- April 8-10

Detailed training and registration information is available on the DEFORM website.

Customers in other regions should contact their local DEFORM distributor for training options.

Events

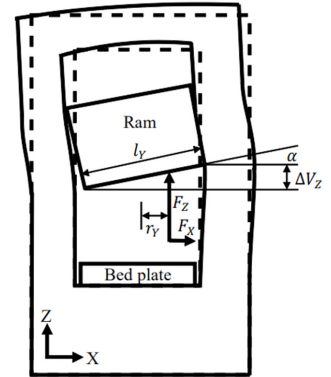
The Spring 2025 DEFORM User Group Meeting (UGM) will be held in Naples, Florida on May 19-20, 2025. More details to come!

Careers

Please visit the SFTC website to view the current career opportunities available in areas such as sales, support and software development.

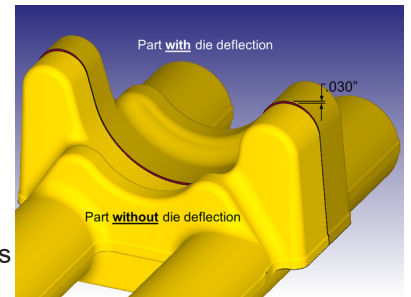
Press Model

In traditional forging simulations, the press is assumed to be a perfectly rigid system. Forces generated during forging have no impact on the die orientation or position. In reality, a press system has a unique behavior under load. Forging forces result in press and tool deflection. Clearance between the ram and guides may allow the ram to shift sideways. Off-center loading might cause the ram to tilt. Such responses (right top) may lead to die mismatch and uneven dimensions in the finished forging (right bottom).



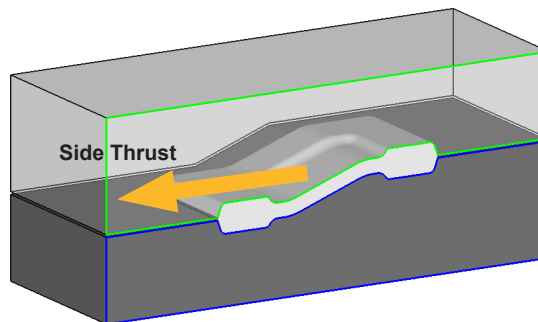
Doege, E., Behrens, B.-A., 2006. Handbuch Umformtechnik: Grundlagen, Technologien, Maschinen. 1st ed. Springer-Verlag GmbH.

Recent DEFORM-3D releases include a new Press Model feature in the Simulation Controls menu. The feature provides users with a way to predict ram shift and tilt under load. Ram translation and/or rotation may be modeled about one or more Cartesian axes. Dynamic press behavior is dictated by six, user-defined, press stiffness values (3 translations; 3 rotations). Stiffness properties can be constants or functions of displaced position/angle.



Press response is available through the Summary and Graphing features of the DEFORM-3D postprocessor. These features allow the user to understand the amount of die tilt or side thrust generated in a particular process design. Many of the other postprocessor tools are also useful in evaluating the impact of die tilt and deflection on the final part geometry.

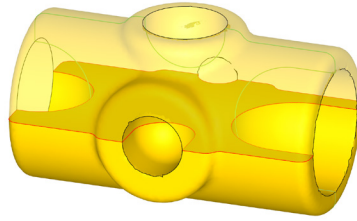
In the following example, the inclined angle of the die cavity produces a lateral reaction force (side thrust) on the top die. The Press Model predicts the side thrust magnitude and the amount of lateral die shift. Die position is updated throughout the simulation, allowing the impact of die mismatch to be observed in the part geometry itself. The die designer may then evaluate the severity of the shift and determine whether corrective action is needed. Potential solutions to the side thrust issue may involve counterlocks or a reoriented parting line.



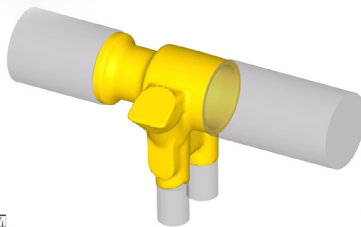
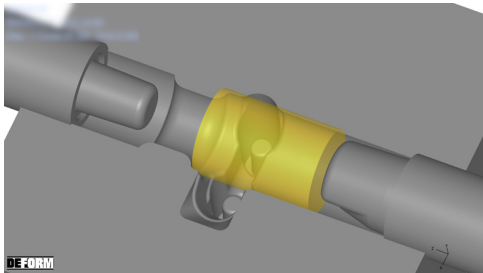
The Press Model is valuable in processes with high precision, where subtle press behaviors may be important considerations in the design of a finished product. The new model also allows users to better balance loads in processes where forging occurs in multiple, offset die cavities during a single press stroke.

Press Model

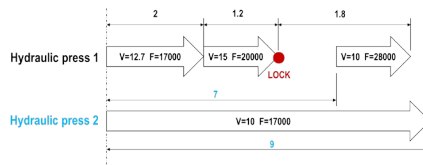
Cored forging processes are popular in the production of copper fitting and valve bodies (right). The processes produce cavities and recesses into a part during forging. Compared to conventional forging, these processes offer more economical production by minimizing waste and subsequent machining time.



Cored forgings are produced on presses that incorporate multiple rams (punches) into their design. The presses are generally more complex than traditional forging presses. They may support one or more punches, each moving with a unique axis, direction, speed and force capacity (below).

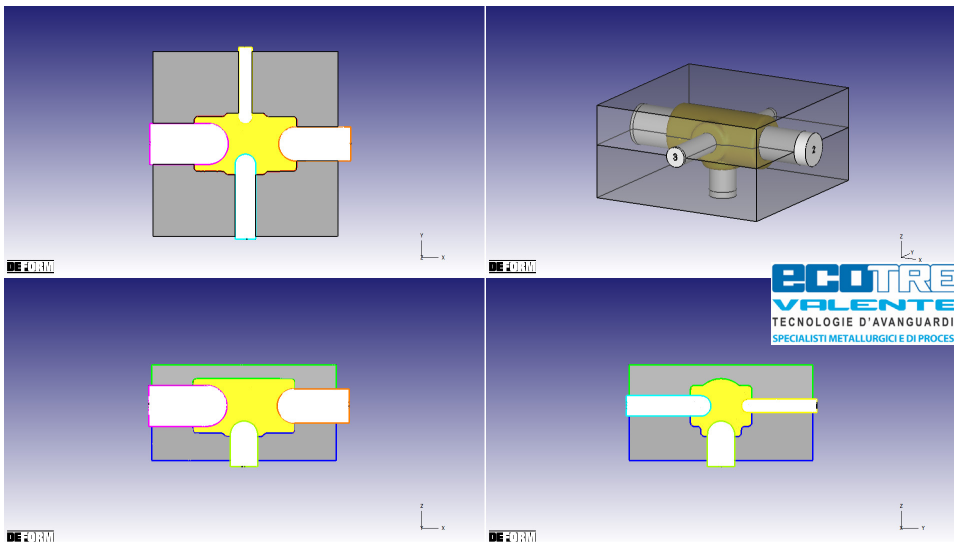


An advanced multiple-ram hydraulic press modeling capability was introduced in DEFORM-3D V14. User interface and solver enhancements enable each punch to follow a complex movement schedule based on its velocity, stroke, forming load and stopping behavior. A punch's schedule can also depend on the position of other punches in the press (right; top). The entire process, including the multi-stage sequencing of each punch (right; bottom), is defined and run within a single operation.



Translation		Rotation					
Type	<input type="radio"/> Speed	<input type="radio"/> Hammer	<input type="radio"/> Mechanical press				
	<input type="radio"/> Force	<input type="radio"/> Screw press	<input type="radio"/> Sliding die				
	<input checked="" type="radio"/> Hydraulic press	<input type="radio"/> Path					
Direction	<input type="radio"/> X	<input type="radio"/> -X	<input type="radio"/> Y				
	<input type="radio"/> -Y	<input type="radio"/> Z	<input checked="" type="radio"/> -Z				
Other	0	0	-1				
Specification / Control(s) Dwell controls Elastic losses Multiple Rams							
<input checked="" type="checkbox"/> Multiple ram press							
Stage	Velocity	Max force	Start stroke	Start object	End stroke	End object	Lock
Stage 1	12.7	17000	0	2 - Top Die	2	2 - Top Die	<input type="checkbox"/>
Stage 2	15	20000	2	2 - Top Die	3.2	2 - Top Die	<input checked="" type="checkbox"/>
Stage 3	10	28000	7	4 - Reference	5	2 - Top Die	<input type="checkbox"/>
+ Max force: 5e+06 0% Cur stage: 0/3 Speed: 0.00 Force: control							

The following cored forging example included a top die, bottom die and five core punches. DEFORM-3D simulations were used to study a variety of punch movement sequences. The final process design produced a part with suitable material flow, die fill and forming loads (below).



DEFORM V14.0.2 Release

DEFORM V14.0 Service Pack 2 (v14.0.2) was recently released for both Windows and Linux. It introduces system enhancements based on customer requests and addresses bug fixes identified from feedback on prior versions. Enhancements include:

- ALE linear friction welding (LFW)
- Tube piercing enhancements
- Cogging pass table import/export
- Measurement Tool label editing
- Enhanced "Show dimensions"
- Gas/lube trap under-fill display
- "Metal flow" report option
- Color bar layout adjustment
- 3D model export for PowerPoint
- Load-stroke summation plot
- Load-stroke superimpose plot
- License expiration warning pop-up
- Start Menu shortcut editor
- Multi-ram press model enhancement
- DEFORM API update
- V14.1 "Beta" mesher availability
- Intel CPU optimization
- Parallel remesh backup meshing*
- Stability improvements*
- Shape rolling flowline tracking*

*Linux specific developments

Full details on the new release are available in the V14.0.2 Release Notes. The release notes also include a summary of the long list of developments introduced in the DEFORM V14.0 release.

Acknowledgement:

SFTC would like to thank ECOTRE Valente srl, the exclusive DEFORM distributor in Italy, for its contributions to the development of the multiple-ram hydraulic press model and for the related examples.

Scientific
Forming
Technologies
Corporation



2545 Farmers Drive
Suite 200
Columbus, OH 43235
Tel: (614) 451-8330
Fax: (614) 451-8325
www.deform.com