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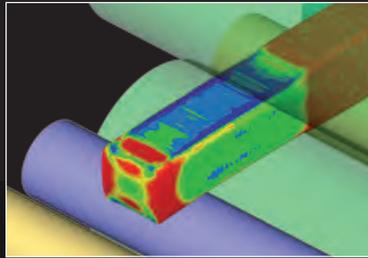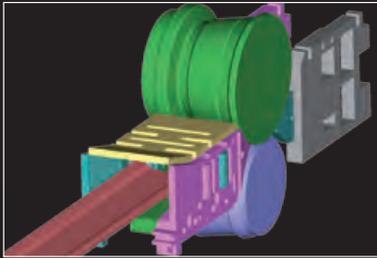## Rolling

Rolling – a highly diversified metalforming process

Going back to Leonardo da Vinci as the supposed inventor of the rolling mill, nowadays hot and cold rolling processes are established standard procedures in metalworking. Basically, rolling is characterized as a metal forming process in which metal stock is passed through a pair of rolls – a deformation process based on pressure. Today you find a large variety of specialized rolling procedures covering a broad spectrum of forming demands.

by courtesy of Mannstaedt

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Rolling

No. 1 in Rolling Simulation

Simufact provides the most precise results due to realistic process representation. Leading machine vendors and many customers rely on Simufact simulation technology.

Take Advantage of the Benefits:

- Shorter development times – shorter time to market
- Fast process optimization
- Deeper process understanding
- Higher process robustness & quality
- Higher machine uptime
- Less material waste and energy consumption
- Significant reduction of costs

Efficient Application for Industrial Usage

- Ease of Use and close to reality modeling even of most complex rolling processes
- Increase of efficiency in model generation due to usage of templates and libraries
- Fully automated run of several rolling passes – simulation of whole pass schedules
- Automated positioning of rolling stock – even in reversing stands
- Import of entire assemblies from CAD allows modeling of entire rolling trains in shortest time

Reach your Optimisation Goals with Simufact.forming

- Check rolling forces, rolling moments and energy requirement
- Look for rolling defects and groove filling in all roll passes
- Visualize necking and bending effects
- Finally meet the geometry and tolerance requirements
- Control the fiber orientation of the rolled pieces
- Optimize the residual stresses
- Meet the microstructure requirement
- Maintain the necessary temperature ranges

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Fields of Application

Materials and Grades
- Carbon Steels
- Low and high alloyed steels
- Austenitic steels
- Super alloys like Inconel, Hastelloy, Waspaloy, Incoloy and Nimonic
- Non-ferrous metals like Titanium, Aluminum and copper alloys

#### Wide Range of Rolling Processes
No matter if slab rolling, profile rolling, tube and wire rolling or roll forming, no matter if calibrating or straightening and regardless of temperature – whether hot or cold: Simufact.forming Rolling enables you to simulate any kind of rolling processes in all dimensions and for all product variants.

Entire Process Chains
Simufact software solutions model the entire manufacturing process chain of a rolling stock: from the initial heating to shearing the stock, rolling, controlled cooling, machining the final geometry up to final heat treatment or, if appropriate, subsequent welding of the rolled material.

Considering all manufacturing conditions
- Modeling of dragged and driving rollers, tape tensions, guiding rollers, feed rollers and stripers
- All special technologies can be simulated, such as pilger rolling and roller spinning, usage of fixed and flying plugs beside many other applications
- No limitations in terms of roll stands and number of rollers
- No limitations in terms roller axes
- No limitations of kinematics – open kinematics concept for individual customizing
- Consideration of roll stand and roller elasticity as well as bearing clearances
- Accurate modeling of rolling processes with piercing operations
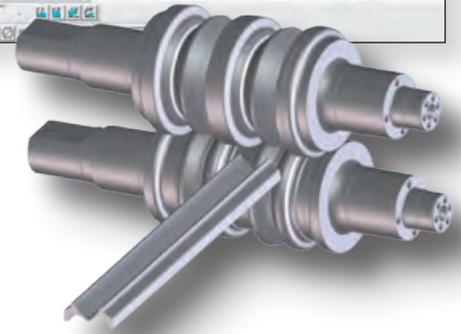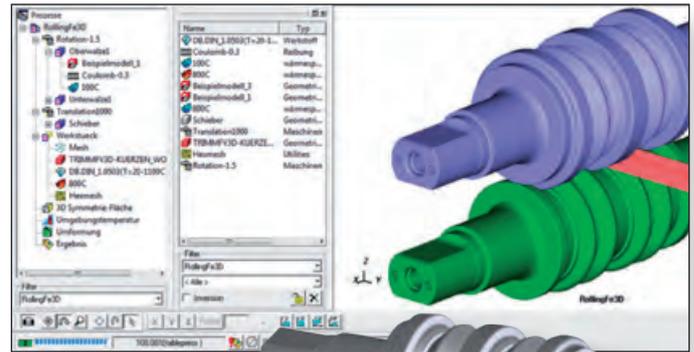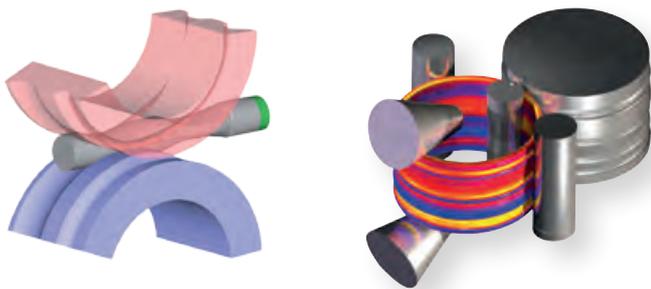
### Our Simulation Expertise – Your Advantage

Tap into our decades of expertise in the simulation of metal forming processes as well as the high technical and functional level of our software solutions.

Highest quality of results due to
- Native, fully coupled elastic-plastic material formulation
- Fully thermal-mechanical coupling
- Flexible kinematics definition with arbitrary boundary conditions: different coordinate systems, translational and rotational movements, including spring definition
- Realistic work piece movement based on real 'rigid body mode'
- Unique friction modeling and tribological formulation ensuring proper gripping of the material and realistic representation of bite and pass conditions as well as the prediction of neutral surfaces
- Consequent usage of hexahedral elements combined with special mesh generation algorithms and strategies for rolled products

Innovative Finite-Element Technology
- Unique solver technology – proven as the 'best in class' in nonlinear simulation
- Fast and robust simulation
- Flexible programming interfaces for individual customizing
- Special structural analysis for rollers
- Support of high speed parallel computing (Multicore Workstations, Cluster Systems)

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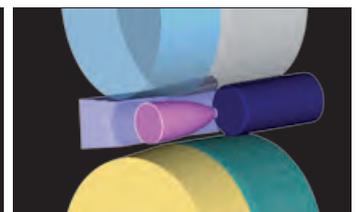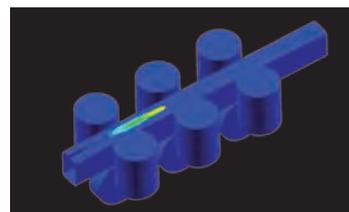
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Please tell us your specific application demands; we will be happy to give advice.