TUBE CHINA 2008
Shanghai / China
Sept. 23-26, 2008

data M: Software and Hardware Solutions for the Sheet Metal Industry

Press Release

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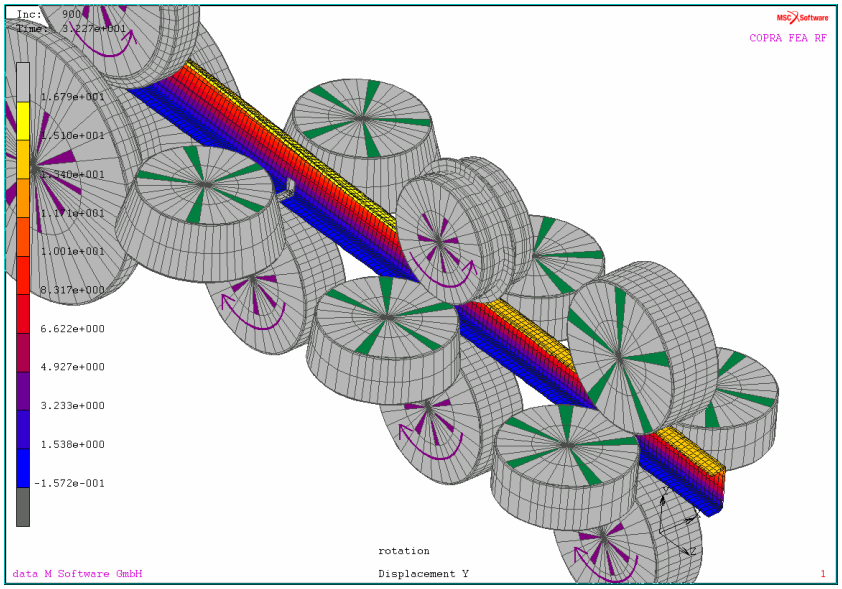
at
TUBE China 2008
Hall W4, Booth B07

Roll Form and Tube Mill Tooling – COPRA® FEA RF Software Presentation of new Release "COPRA® FEA RF 2009"

At the Tube China 2008 exhibition in Düsseldorf taking place from September 23-26, 2008, data M will present the new version of the Finite Element Simulation solution for the roll form process – **COPRA® FEA RF 2009**.
When doing the first steps of development in the middle of the Nineties of the last century we had some dreams what Simulation Technology could do one day. Today these dreams have come true. COPRA® FEA RF helps to understand the roll form process, trace for occurring problems and do a target- oriented optimisation. Of course also roll form technology is developing so that it is necessary to add new possibilities into the FEA software.

COPRA® RF 2009 comes with a new commercial package and a lot of additional possibilities for the simulation of roll formed tubes and sections.

This new version has come closer to reality than any other simulation- or analysis software ever. However – not only the FE Analysis software but also our known design package COPRA® RF has got enhanced (see below). One example is the handling of cage forming methods and interfaces to 3D CAD/ CAM Systems, Inventor and SolidWorks.



Picture 1: *Figure of model with friction / rotating rolls including:*

- *driven rolls at specific rotational speed (purple arrowed)*
- *idler rotating rolls, driven by speed of the sheet (green striped)*
- *welding and deactivating of welding addition*
- *drawing die (with friction) for improved forming process*

Model with driven stations

Up to version 2007 COPRA® FEA RF worked without friction and rolls were not rotating. This has advantages for the estimation of the quality of the design itself, but it did not take into account design elements like a step up of the root diameter, longitudinal elongation or hole deflection of the strip caused by different speeds. With COPRA® FEA RF 2009 it is now possible to automatically build an FEA model with rotating rolls and friction.

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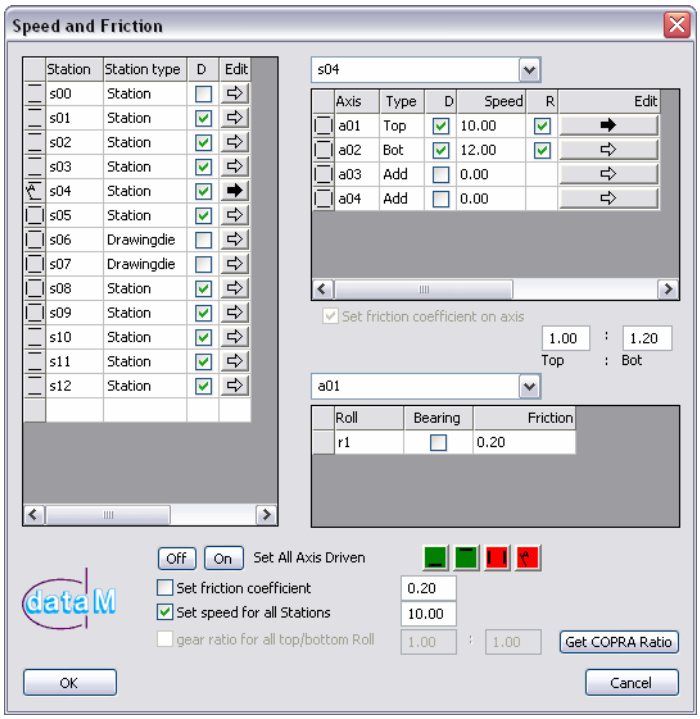
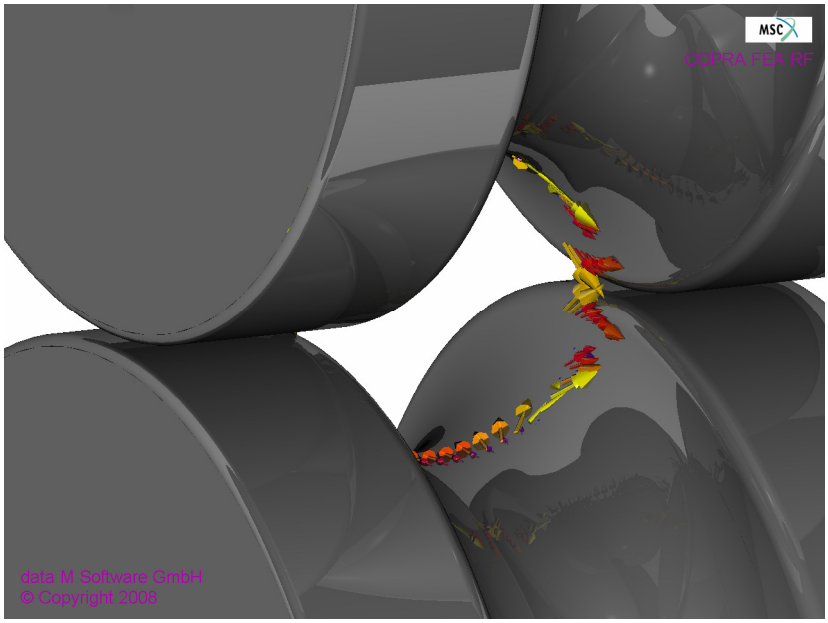


Picture 2: *Comfortable input of the machine's speed settings: driven / non-driven axis, rotational speed for driven axis, gear ratio, frictional behaviour*

- Comfortable input of the machine's speed settings: driven / non-driven axis, rotational speed for driven axis, gear ratio, frictional behaviour, etc
- Investigation of the elongation of the tube during forming and calibration e.g. due to step up of roll diameter
- Investigate difference in behaviour between driven top and bottom roll or bottom roll driven only
- Shows the pulling and or braking behaviour of driven stations. The simulation will show if the profile will "get stuck"
- Defects caused by e.g. different positions of the drive diameter will be made visible
- Check the braking behaviour of non-driven stations

- Investigate the line speed as a function of the rotational speed and friction settings of the machine
- Investigate the rotational speed of the non-driven axis
- Investigate the driving torque of the driven axis
- Calculating a simulation with rotating rolls and friction is especially interesting for thin wall tubing where it can make a difference if one station is pushing too much and the continuous tension is not guaranteed over the complete line



Picture 3: *Definition of transporting diameter by comparing forward and backward slip between rolls and profile*

Display of forming forces

Comfortable investigation of distribution of pressure in e.g. breakdown or idler stations but especially also in the fin stations and calibration stations by the use of representing the contact pressure by arrows. Size, colour and direction of the arrow give information about roll pressure over the circumference of the tube.

Improved welding process

The weld process can now also be calculated for unsymmetrical sections and using more than 1 processor. The unsymmetrical welding can also be calculated with or without taking into account the weld addition.

Extended restart possibilities

A restart is now possible during the simulation of the calibration stations (e.g. in round-to-shape) also when started from the round tube (so if the starting station of the original simulation was not the flat strip).

Alternatives for thin walled tubes

With COPRA® FEA RF 2009 the calculation time could be even more reduced compared to the current version – Interesting for extremely thin walled or long sheets.

Multi-processor ability

For COPRA® FEA RF 2009 two options for parallel processing are available. One is a parallel_2 license allowing calculating one job on 2 processors. This reduces calculation time by up to 40%. The second option is a parallel_4 license reducing the calculation time by up to 65%.

Extended export possibilities

IGES and DXF interface to export the results of a Simulation to e.g. Inventor or AutoCAD. Not only the 2D cross sections are exported, but the complete 3D deformed sheet.

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COPRA® RF Software – new features presented at Tube China 2008

Cage Forming

The design of a cage can be done very easily, the results will also be automatically prepared for the simulation. Besides optimising the quality of the tube forming, the simulation helps to optimise e.g. downhill and cage-mill-settings.

SolidWorks Interface

Beneath the Inventor interface data M will also present an interface for SolidWorks. It allows to transfer a roll design directly into SolidWorks where it can be completed, e.g. with adding the stations, tool holders for accessory rolls or similar extra equipment.

Download of text and pictures at:

http://www.datam.de/en/shows-press/press/08tube-china

If you have any questions, please do not hesitate to contact:

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Reprint free of charge;
Author's copy kindly requested.

Valley, July 2008

press News

TUBE CHINA 2008
Shanghai / China
2008 年 9 月 23-26 日,

data M: 板金属成型的
软件和硬件解决方案

产品技术信息

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德国 data M 软件公司

2008 中国管材展览会

W4 号厅, B07 展台

data M Software

展示冷弯和焊管成型机轧辊技术 – COPRA® FEA RF 软件新版本“COPRA® FEA RF 2009”

杜塞尔多夫展览公司举办的 2008 年中国管材展览在 9 月 23—26 日在上海举办，data M 将展示用于冷弯成型工艺的新版本的有限元仿真解决方法——**COPRA® FEA RF 2009。**

从上个世纪 90 年代中期的初始研发阶段，我们就希望能采用仿真技术。今天这些梦想已经成真。COPRA® FEA RF 帮助我们理解冷弯成型过程，预测和分析发生的问题，并且实现优化的目标。冷弯成型技术是在不断发展的，对 FEA 软件增加新的功能就理所当然。

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data M: 板金属成型的软件和硬件解决方案

COPRA® RF 2009 作为一个商业软件包，增加了很多冷弯及焊管截面成型模拟的功能。

这个新版本比任何其他模拟或分析软件更接近现实。不仅是有限元分析软件，而且大家熟知的设计软件 COPRA® RF 也得到加强（见下文）。其中一个例子是笼式成型（cage forming）方法和与三维 CAD / CAM 系统，Inventor 和 SolidWorks 的接口。

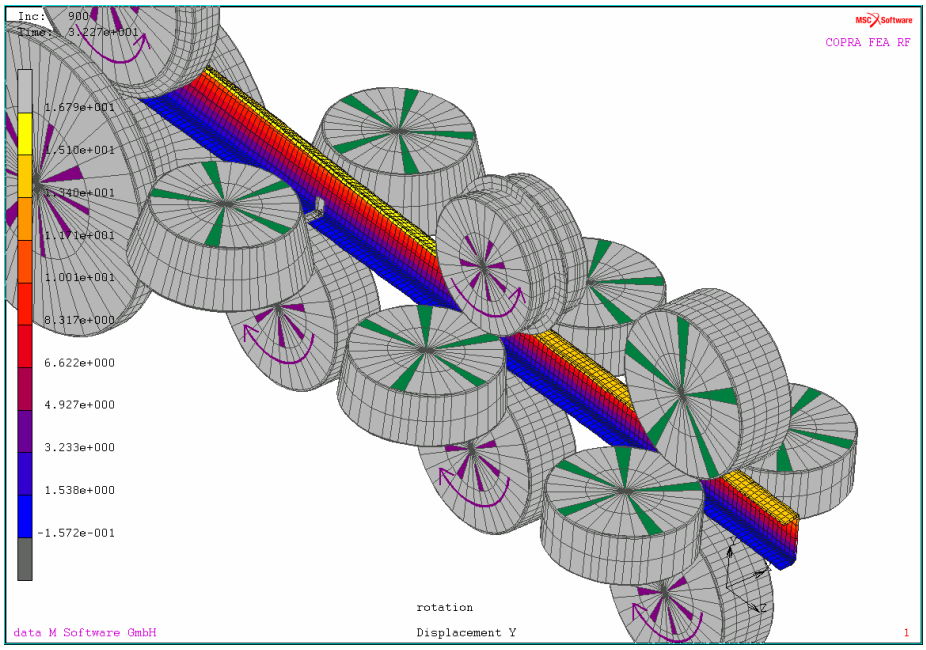

图 1： 有摩擦的模型/旋转轧辊包括：

- 一定速度的驱动辊（标有紫色箭头的）
- 被动旋转辊，通过板材的速度驱动（带有绿色条纹）
- 焊接及焊接补偿的功能
- 有摩擦的拉拔模改进了成型过程

有驱动机架的模型

改进了 2007 COPRA® FEA RF 版本没有摩擦和轧辊不旋转的问题。原版本对于设计本身的质量评估计是有效的，但是它没有考虑某些设计元素的影响，例如由于轧辊驱动直径的增加、不同速度引起的纵向延伸对板带上已有孔的畸变影响。COPRA® FEA RF 2009 现在可自动建立起旋转轧辊的摩擦模型。

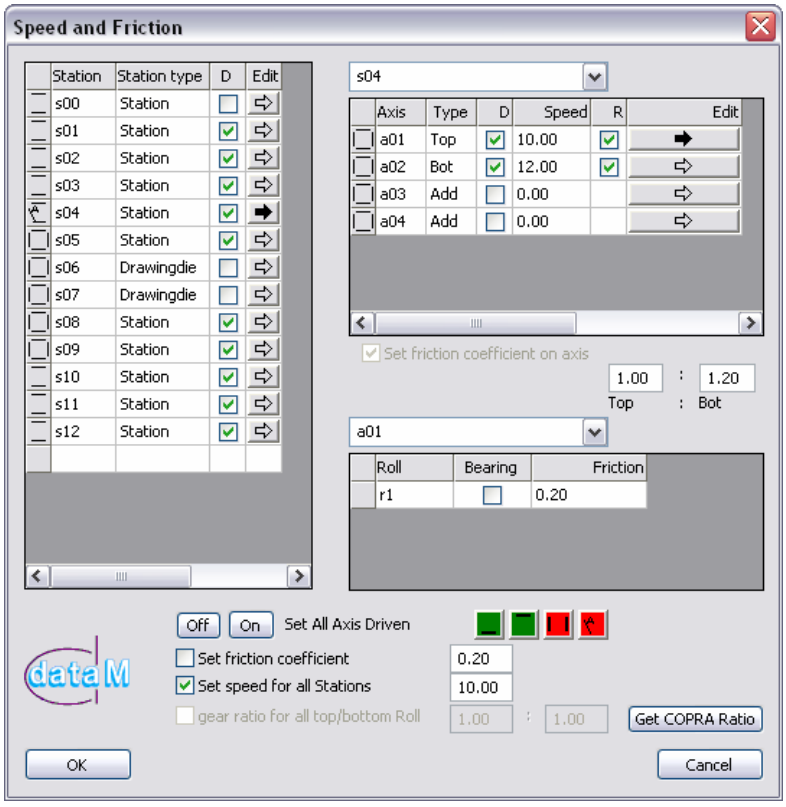

*图 2：*方便的机器速度的输入设置：驱动/非驱动轴，驱动轴的转速，齿轮速比，摩擦特性，等等

- 方便的机器速度的输入设置：驱动/非驱动轴，驱动轴的转速，齿轮速比，摩擦特性，等等

- 管材在成型和精整阶段的延伸研究，例如：由于轧辊直径的增加引起的拉伸。
- 上辊和下辊的同时驱动与仅有下辊驱动的特性是不同的。
- 显示驱动机架的拉动和或阻力特性。如果截面被“ 卡住” ，模拟会显示出来。
- 可以观察到产品的缺陷，例如由辊面不同的驱动直径位置引起的缺陷。
- 检查非驱动机架的阻力特性
- 轧辊的摩擦和旋转速度的设置作为成型机线速度的函数
- 非驱动轴的转速
- 驱动轴驱动力矩
- 用旋转轧辊和摩擦计算仿真，尤其对薄壁管成型有特殊意义。如果轧辊上某一位置推力太大和在成型线上不能保持连续的张力就会出问题。

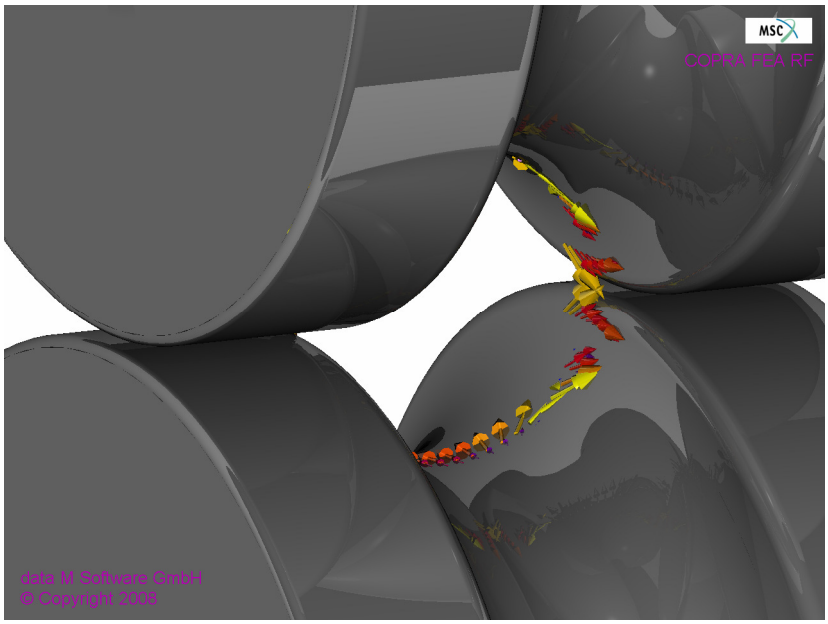

图 3：用轧辊和型材截面之间的前滑和后滑定义和比较传送直径

▪ 成型力展示

研究在初成型阶段或者被动立辊机架，特别是在导向片机架和定径机架的压力分布，用箭头表示接触压力。箭头的尺寸、颜色和方向给出轧辊在管材周边上的压力信息。

▪ 焊接过程的改善

该焊接工艺现在也可以计算非对称截型并且使用多于 1 个以上的处理器。非对称焊接也可以计算出有或不考虑到焊接余量的情况。

▪ 扩展了仿真的范围

从定径机架开始启动模拟现在是可行的（例如从圆管到异型管），即从圆管开始仿真（如果起始模拟的机架不是原始平板带也可）。

▪ 薄壁管的仿真

对于极薄壁的管或长板带，用 COPRA® FEA RF 2009 的计算时间可以比目前的版本减少很多。

▪ 多处理器的能力

COPRA® FEA RF 2009 的两个方案的并行处理数据是有益的。一个是 parallel_2 并行双核许可证，允许计算一个仿真工作用 2 处理器。这就降低计算时间达 40 % 。第二个方案是一个 parallel_4 并行 4 核许可证减少计算时间达 65 % 。

▪ 输出的扩展

IGES 和 DXF 格式接口输出的模拟结果，例如：Inventor 或者 AutoCAD 的。不仅是二维截面的输出接口，也可以是完整的三维变形的板材。

COPRA® RF 软件–
在 2008 年中国管材展览会展示新的特征

▪笼式成型（Cage Forming）

笼式成型设计很容易，设计结果可自动为仿真做好准备。除了管材成型质量的优化，模拟有助于实现优化，例如：在下山量和笼式轧机的设置。

SolidWorks 接口

在 Inventor 下的界面下，data M 也提供了一个对于 SolidWorks 的接口。它允许轧辊设计直接传输进入 SolidWorks，可以进行诸如增加机架、轧辊支撑附件或类似的辅助设备的设计。

若需下载文本或者图片：

http://www.datam.de/en/shows-press/press/08tube-china

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