infoforum

Newsletter of data M Sheet Metal Solutions GmbH

Foreword

Dear readers,

Promising prospects in turbulent times.

data M Sheet Metal Solutions felt the effects of the crisis too. But despite all dire prophecies the global economy continues to march on - although admittedly some of the pace has been taken out of it. I don't want to gloss over the current situation of course. Still, in our industrial sector, roll forming and sheet metal processing, I do think we can view things with a little more optimism.

Technical progress is a key success factor, something we pursue intensively and to master it, something we invest in and develop into business. data M is consequently not only the producer of the leading CAE software solution COPRA® RF. It's also a dependable provider of services, for analysis or research and development.

Even when the business going is tough you notice that those companies stand their ground that are technology-driven and don't stray from their goals. If you're innovative and generate added value for your clientele, through more benefit and more efficiency, you're rewarded by a business upturn of its own. So to emerge from the crisis stronger than before you must stay on the ball technically .

Thus, and especially in 2009, data M Sheet Metal Solutions continues to demonstrate its capability as your partner for sustainable development through powerful methods of design and simulation.

Yours truly,

Albert Sedlmaier
Managing Director

Attention: new!

COPRA® RollScanner videos

Ask now for the new videos:
08024-640-0

Flexible roll forming

Research & development

COPRA® Adaptive Motion Control – the automation platform from data M Sheet Metal Solutions for flexible roll forming of discontinuous cross-sections – now comes in an entirely new generation. As many as 256 axes with different cams can be driven simultaneously by one control. Plus, new station kinematics, preprocessing, postprocessing and inline operations can be integrated, and optimally synchronized with existing motion control functionality...

There at a mouse click

Online seminars

Saving on traveling expenses can be a must in a weak economy. But you can still keep learning without having to leave the workplace. It's quite simple by webinars...

COPRA® RF 2009

Cloning rolls

For many profiles rolls may be used multiple times. For a more effective process chain, version 2009 enables rolls to be cloned...

Exhibitions

Blechexpo 2009

This year data M has a special show – "Time- and cost-effective management of roll tools"...

COPRA® RF 2009

New version

In this version of COPRA® RF we have been concentrating on four major issues, that will make the design of sections...

New company name, new logo, new service center

From software developing to technical roll forming services

Valley. data M has been renamed, and the reason is rather simple: In the course of more than two decades the company has changed a lot, and so has a great part of the business activity. The former company name did not give precise evidence of what the company does and offers. Therefore the management decided to rename the company.

data M
Sheet Metal Solutions

New company name, newly designed company logo

Renaming a company is actually an everyday and normal matter, which can be handled without any problems. But in times of a weak economy like today people tend to ask funny questions like "What is going on there? Are they bankrupted or do they have a new partner?" To make it clear from the very beginning: data M is a sound company enjoying a stable economic situation with full order books. The company is independent and will remain so in the future. This should eliminate all rumours once and for all...
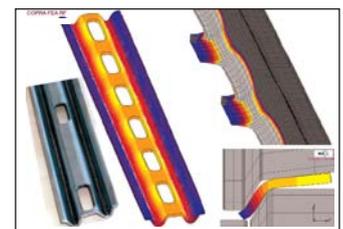
Tube and section machining - Interview *Blechnet.com*

Virtual roll forming is already a reality

The profitability of roll forming sinks or swims depending on your experience and knowledge – either that in the heads of designers and machine operators or in software packages for design and manufacture...

Tube and section machining, CAD/CAM - Interview *Blechnet.com*

A veritable treasure trove of rolls

Sets of rolls frequently go into storage once they have been used. Assuming 10,000 tools you may soon have rolls worth a million or more lying unused in a warehouse. A front-to-end process chain from data M Sheet Metal Solutions in Valley, Germany is aimed at scanning, saving and retrieving the geometry data for access to this treasure trove, as managing director Albert Sedlmaier explains...

From software developing to

data M Software is now

The head office in Valley / Oberlaindern

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The beginning

data M Sheet Metal Solutions GmbH's history began long before the actual founding of the company. Dipl.-Ing. Albert Sedlmaier, the founder of the company worked from 1982 until 1987 as a research engineer at the Technical University of Munich / Germany in the field of mechanical design, CAD/CAM and roll forming.

On behalf of the Studiengesellschaft fuer Stahlanwendung/ Düsseldorf, Germany he worked and graduated on investigations concerning the subject roll forming (CAD/CAM, expert systems...). Co-founder Stefan Freitag graduated at the same University.

The results and developments in those days of research inspired the young engineers to found data M Software GmbH in June 1987 with the objective of developing mere software. At that time everyone was convinced that as much as possible in a production process should be automated.

That was the mainstream trend in those days. Out of this work arose slowly the process simulation sector, but very soon the founders realised that the design software alone was not sufficient. Consequently they in 1988 offered services and commenced design work themselves. Beside the work with software developing this sector very soon became an important business pillar of its own.

Thus the engineers had an excellent tool at hand, which enabled them to also offer engineering solutions and controlling technology in addition to their manifold software solutions.

Says Sedlmaier: "Meanwhile we had learned to understand the roll-forming process in detail and we were then in the position to take the company another step forward by offering design services ourselves." With immediate effect the software development was adjusted and nothing was automated any longer. Even the marketing was changed accordingly and data M insisted from that time on that its software cannot automate everything.

"That changed a lot with us", continues Sedlmaier, "after that the designing engineer was our friend and not our enemy any longer, as before. We increasingly focused on process simulation, i.e. a designing engineer designed something and we wrote an analysing program, which

I Tube roll forming   I Section roll forming   I Sheet metal bending   I Support center

Products I COPRA®   Services I

technical roll forming services

data M Sheet Metal Solutions

calculates the result of the roll forming process and simulates the roll forming process. In those days we invested a lot into research & development and collaborated with diverse universities and scientific institutions even in India and China. From the beginning our contacts into these regions were notably good, and I can say that today, in times of an economic crisis, our company generates about 15 % of its turnover in Asia."

Customer proximity is exceptionally important - data M expands its business all over the world

R&D work is daily routine for the data M team. That is what established the reputation of the company as being a problem solver or, as Albert Sedlmaier comments with a smile, as a troubleshooter. Companies from all over the world called for the Upper Bavarians and asked for assistance.

Very soon Sedlmaier realised the high potential that derives from the internationalisation of his firm and its services. Consequently he and his co-founder began to look for distribution and engineering partners in Europe and overseas with whom they can market not only their software products but also their services.

This local presence helps data M to improve its customer proximity and its practical relevance,

which is most important for its work.

Goal of this expansion policy is to establish many of the so called "**data M competence centres**", in which the parent company holds the majority. By establishing these branch offices the roll forming experts can any time keep an eye on the market developments and are able to react fast and flexibly to the wishes of their customers all over the world.

data M Sheet Metal Solutions - a highly technical service centre

So far data M delivered the feasibility studies and the tooling as well as the roll forming concept to its customers. These services will in future be added by a machine, which can produce prototypes of rolled sections.

Not only on the basis of "flexible roll forming", on which data M has been working for many years, the company in future will be in a position to offer its customers a complete concept consisting of theory and practical experience – from feasibility studies and the tooling concept as well as the roll forming concept to the prototype of the section.

Once a client has accepted the overall result data M will as a consultant assist the roll former in realising the concept.
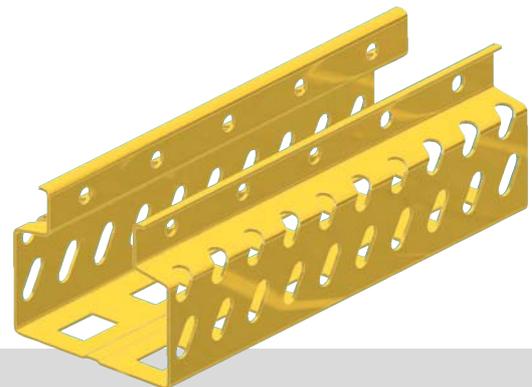

COPRA® Rollform Solutions

data M
Sheet Metal Solutions

I Training center   I Service center   I Research center   I Improvements   I Future visions

COPRA®   Research & Development I COPRA®

Tube and section machining

08 / 11 / 2008 - Author: Dietmar Kuhn

Virtual roll forming is already a reality

Walter Frick of *blechnet.com* interviewed managing director Stefan Freitag.

Stefan Freitag, managing director of data M Sheet Metal Solutions in Valley, Germany: "Virtual roll forming front to end is already a reality."
With modern software it is possible to create new designs of even complex sections in a matter of days.

The profitability of roll forming sinks or swims depending on your experience and knowledge - either that in the heads of designers and machine operators or in software packages for design and manufacture. So what is the role of software in the roll forming process? We spoke about that to Stefan Freitag, managing director of data M Sheet Metal Solutions.

Blechnet: Stefan, how does the right software improve the advantages of roll forming even more?

Freitag: With the design software for cold rolled sections obtainable on the market today it's possible to create new designs even of complex sections in a matter of days. Instead of the six weeks it might have taken you 20 years ago. Analytical simulation tools enable the designer to check for flaws in the layout phase already. They support you in particular in detecting linear expansion. Because of the roll forming process this is one of the main causes of defects on the finished section. But calculations of this kind always base on the designed cross-sections. Spring-back between stations or compliance of shafts – as with high-strength material for example – doesn't enter into it.

You can only do this with an FEM calculation. But the use of software has still made design operations much more efficient. Today you can very easily derive similar section cross-sections from ready existing designs because the basic calculations for the flower are fully parametric. It doesn't matter if the shape or the geometric dimensions including sheet thickness are different. Every change made to the final cross-section is automatically adopted in the roll forming flower. That makes for effective use of roll forming experience that's already accumulated. The systems are also transparent, meaning that a designer is able at any time to reconstruct the calculation of bandwidth or method of calibration that's been used.

Additional calculations like statistical strength or theoretical spring-back help the engineer to optimize their first design in as much as possible. The software also supports the design of roll tools. Specially attuned functions can be used to automate certain design processes. These include the implementation of forming rolls or definition of clearance angles. Manufacturing data are automatically extracted from the designed rolls. That also means a substantial time-saving because it does away with all the detailing effort.

You can also search for and re-use rolls saved in a database. That economizes on manufacturing time and cost. A further important point is the greater use of accessory rolls. As cross-sections become increasingly complex a profiler today can no longer manage just with the classic station arrangement of top and bottom roll plus side roll.

Blechnet: What influence does the software have on the machined result?

Freitag: Today you find very complex cross-sections being manufactured by cold roll forming. The quality achieved is also a result of the software that's used. Calculations become reproducible and the results reapplicable. Typing errors are ruled out when calcu-

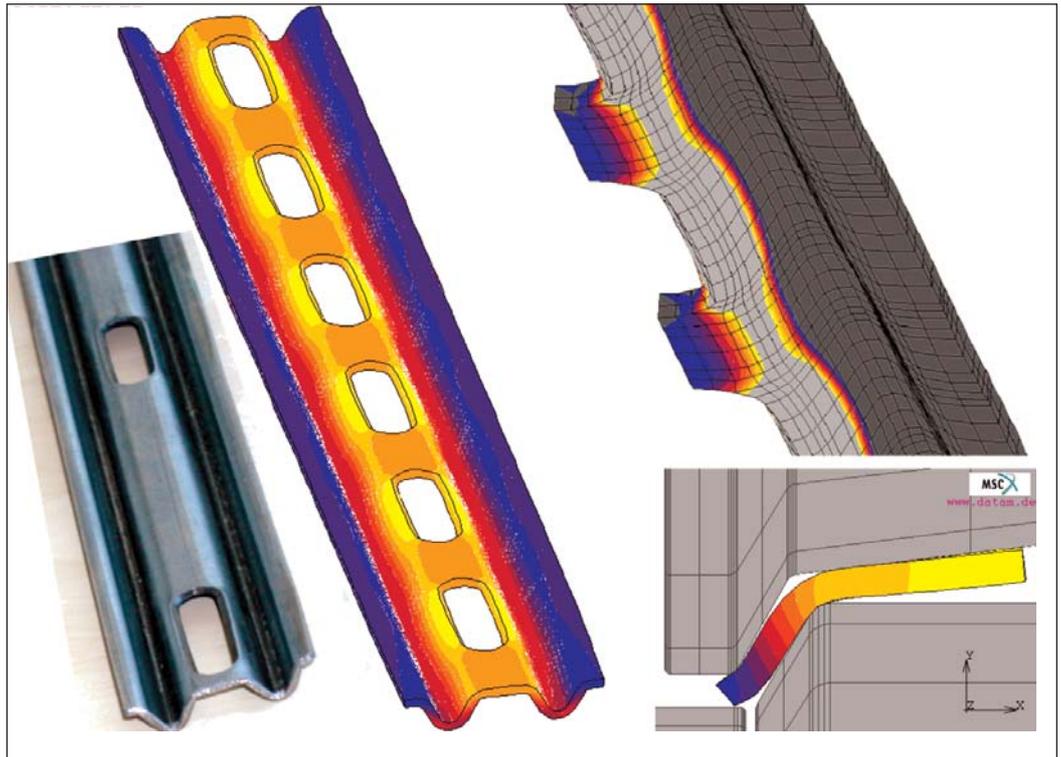*Today you find very complex cross-sections being manufactured by cold roll forming.*
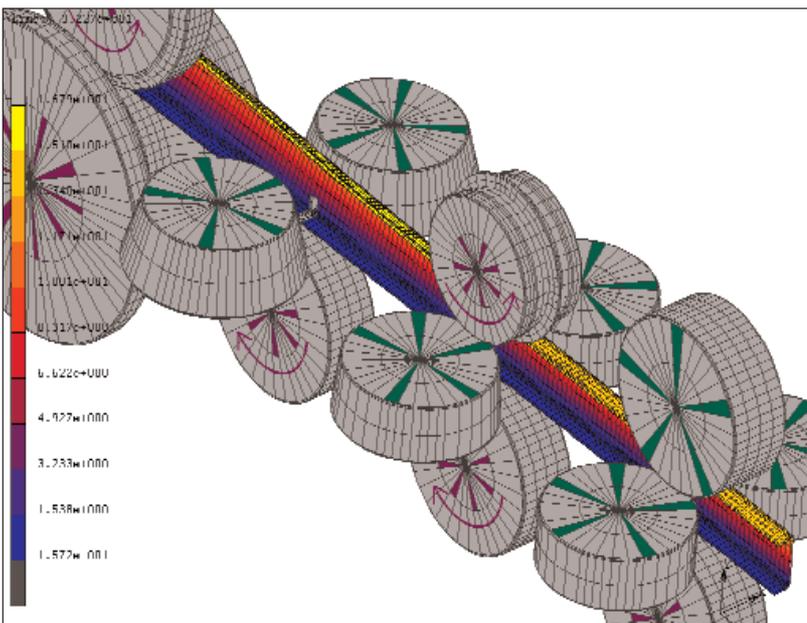
Today you find very complex cross-sections being manufactured by cold roll forming.

lating the neutral fiber or configuring the flower. The use of software also gives you the accuracy of NC lathes that's possible today, which is another contribution to quality. You mustn't forget that the quality of the end-product depends on many process factors – the quality of the design, of the material, of the roll production, of the rolling plant and of the setting up must all be good too.

If one of these factors doesn't line up properly you'll have problems with the end-product.

Blechnet: Can you simulate the roll forming process by software entirely, is virtual roll forming possible?

Freitag: Yes, virtual roll forming front to end is already a reality. When it emerges from design the set of rolls is automatically dressed for simulation. The mesh necessary for the strip is automatically extracted from the position of the bending points, the material and process parameters are defined. In other words are you manufacturing from a coil or blanks, should cutting of the strip to length be simulated, do you want to simulate with the simplified model, or must you calculate with rotating rolls and friction.

If it's a case of ready punched strip the hole pattern can be transferred to the mesh for the material. This shows whether the geometry or position of the holes alters. Based on this information it's possible to correct the shape of the, in most cases, very costly punch-

ing die as early as the drafting phase.

That in turn saves time and cost when starting up. The use of drawing dies or molds in simulation isn't a problem either. We've worked on several hundred industrial projects in recent years that in most cases involved optimizing sets of rolls by means of FEA.

Feedback from these projects attest to very good harmony between theory, or simulation, and practice. There are some instances where the results don't match, and then we have to determine the cause. With high-strength materials it's often compliance of shafts that produces a different result on a machine to what was simulated.

So you use the simulation results to calculate the compliance of the shafts, set the roll gap appropriately, and calculate the profile anew. The larger roll gap means that the material is not formed more than necessary, and you can then achieve extremely small spring-back rates.

If the conditions accompanying theory and practice agree, the re-

sult will be right too. Of course simulation always proceeds from the figures that are issued by design. So if the tolerances of the produced rolls are not correct or the rolls are wrongly produced in the first place – that's still possible

even in the age of numerical control – the results of simulation aren't what you end up with in reality.

In such cases the COPRA® RollScanner is a solution for testing rolls.

Tube and section machining: CAD / CAM

11 / 24 / 2008 - Author: Michael Corban

A veritable treasure trove of rolls

Albert Sedlmaier, managing director of data M Sheet Metal Solutions in Valley, Germany: "What's really clever about it is that I can even re-use worn rolls."

Michael Corban of *blechnet.com* interviewed managing director Albert Sedlmaier.

Sets of rolls frequently go into storage once they have been used. Assuming 10,000 tools you may soon have rolls worth a million or more lying unused in a warehouse. A front-to-end process chain from data M Sheet Metal Solutions in Valley, Germany is aimed at scanning, saving and retrieving the geometry data for access to this treasure trove, as managing director Albert Sedlmaier explains.

Blechnet: Albert, why is it worth re-using roll tools?

Sedlmaier: Big companies will manufacture about a hundred new sections in the course of a year.

An average set of rolls consists of between 200 and 250, which can fast add up to a few tens of thousands before the year's out. Some of these new tools are bound to be already available in stock – but they just can't be traced. We reckon that a good 10% of the rolls can be found in the inventory. That makes for a simple calculation. For a hundred new sets each of about 200 rolls I'm already stocking 2000 of them. Since each roll costs an average of 150 euros, I have potential tooling worth about 300,000 euros just waiting. I only need to find the right tools. If new rolls are added, the proportion will look even better longterm.

Blechnet: Why don't companies use as many used roll tools as they could?

Sedlmaier: Even if users attempt to restrict themselves to certain basic forms, there are still a whole number of project- or profile-related rolls that aren't so easy to re-use. Often you only have paper drawings of the major applicable tools, and it's impossible to search through them all.

Blechnet: Do CAD data make it easier to retrieve them?

**Sedlmaier:** Even that doesn't help because roll tools are operated,

and possibly remachined. In most cases nobody does the updating for this – meaning that the CAD data aren't a reliable picture of the geometry of the particular roll. Then there's a second aspect. Tools that have rolled some tens of thousands, sometimes perhaps millions of meters of material show wear and tear. The profile is no longer that of the original design. Even if I did find matching CAD data, I still don't know what exactly the roll looks like.

Blechnet: So what should someone do so they can re-use old rolls?

Sedlmaier: The simplest way is to create a process chain, as we do by combining our COPRA® Recycling Database with the COPRA® RollScanner. The process chain then looks as follows. A roll is scanned and the real contour that's found is transferred direct into the recycling database. Parallel to that we break down the contour into Fourier coefficients, which is useful for the search algorithm. In this way the user can speedily and simply search for similar rolls in their specific recycling database.

Blechnet: How does the search work?

Sedlmaier: We work in multiple steps because we obviously want a result as fast as possible. First of all the roll borehole must match, then of course the maximum diameter and maximum width. In that way I can fast restrict the search because it's only a matter
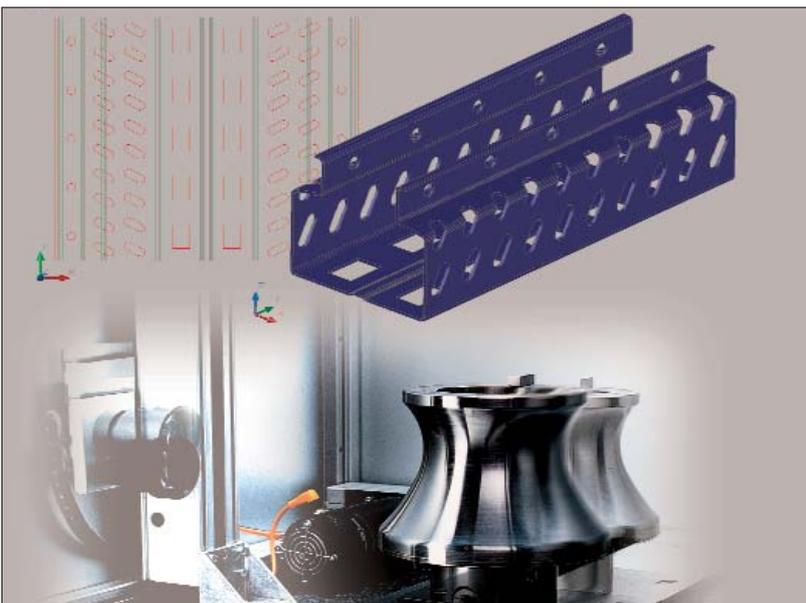
Even if you have the CAD data of the tools, you still do not know their precise contour. The roll scanner can detect how worn they in fact are. These data automatically land in the recycling database, allowing a targeted search for old tools.

At about 150 euros per tool you can soon be stocking rolls worth millions. Costs are easily cut by re-using just 10% of them.

of geometric comparison. So there are only a small number of rolls that come into question for the intended application.

Another important criterion is that the rolls I find shouldn't have an intersection with the contour I'm searching for. If the search doesn't produce a result, a second approach is a similarity search by Fourier coefficients, enabling me to find similar contours fast. Here the contour of the recycling roll is analyzed and saved so only rolls are found that really have the required contour. There were approaches in the past but in Unix days neither harddisk capacity nor computing speed were adequate for obtaining a result in an acceptable time.

Blechnet: So how fast is the search today?

Sedlmaier: Normally a roll is found in a matter of seconds – and it has to be for such a solution to be accepted. Imagine I had to wait just one minute for each roll of a set of 250 tools. That would take half a workday, which is out of the question. But with the SQL databases available today under Windows obtaining a response within seconds is no longer a problem. Seamless integration of the individual steps as in our solution also promotes acceptance, especially because it simplifies operation.

Blechnet: What does the application look like for the designer?

Sedlmaier: Naturally they want to know what rolls already exist or

what sections have already been designed. So first they sketch the rolls they're looking for. If a matching recycling roll is then found it can be inserted in their CAD system in a separate layer.

What's really clever about searching by Fourier coefficients is that the designer can specify the oversize for the roll they're looking for. So even worn rolls can be used again. Also, only those rolls come into question that can be reworked within the set limits and with relatively little effort to produce the required contour fast.

The recycling roll that's found is subsequently linked with the designed roll so that the production data, such as material and sawing lists, clearly show that this roll already exists and only needs to be remachined. Once that's done, the found recycling roll is of course, and automatically, removed from the recycling database.

Blechnet: And when does the roll scanner enter the scene?

Sedlmaier: As a rule you work with two databases. One holds the tools that are in use, the current

ones, while the other is the so-called recycling database.

Given the data, you could simply load the data set after use into the recycling database. But you still have to ask what contour the used tools really have. And I've no idea of the contours of older roll sets. That's precisely why we developed the roll scanner. At one go, and automatically too, the data are suitably formatted for the database and saved, including the Fourier coefficients. From then on the geometries - and the real ones on the tool – are ready for retrieval by the user in the recycling database.

Blechnet: How much effort does this involve for the user?

Sedlmaier: The actual scanning operation is a fast matter. The main effort is one of logistics. In addition to transporting the rolls out of storage and back again, the organization of storage plays a major role. Because I can't fetch the scanned tools from storage when I need them if I don't identify and store them properly. The user doesn't have to bother about managing the data sets. The COPRA® RollScanner is designed to take

care of that. It gauges the roll tools speedily and accurately, saves the results in the database, and can issue a report direct with information about the quality of the rolls. Our development focused very much on ease of operation.

The COPRA® RollScanner from data M

NEW - profile development from a single source

News from research & development

Feasibility studies, development of forming concept, prototyping

COPRA® Adaptive Motion Control – the automation platform from data M Sheet Metal Solutions for flexible roll forming of discontinuous cross-sections – now comes in an entirely new generation. As many as 256 axes with different cams can be driven simultaneously by one control. Plus, new station kinematics, preprocessing, postprocessing and inline operations can be integrated, and optimally synchronized with existing motion control functionality.

The data M concept seamlessly integrates multiple functions in the control system to save on an appreciable number of extra processors with their hardware. The human/machine interface, programmable logic control functionality and motion control run on a single industrial PC with one hardware and software platform. The concept is rounded off by an integrated category 4 safety system.

Up to 256 axes with one PC

A single PC can drive as many as 256 axes without any hardware add-ons. Other controls generally require cascading and elaborate synchronization. In the COPRA® Adaptive Motion Control all axes can of course move on different tracks. And you can select any number of reference points for the cams.

Different kinematics

COPRA® Adaptive Motion Control now supports different parallel and serial kinematics together with their hybrids. Selection of types is by straight-forward software parameterizing.

In addition data M has developed a now patented system for flexible forming stations that based on Bi-Pod parallel kinematics, which is of course integrated in the kinematics module. Besides the mechanical benefits of the system through two identical axes, startup effort for the axes is drastically reduced because their dynamics are similar.

Operation and programming

Generation of cams is fully automatic from the geometric data of the ready cut sheet metal, which can be imported on a DXF interface. Very different kinds of kinematics are supported and transparent for the user. These include front-end aligning stations or laser cutting systems.

Production data acquisition – set and actual numbers, setup, operating and production times - are part of the COPRA® Adaptive Motion Control standard, as are 3D visualization and motion simulation of the individual flexible stations to control collision of the in part very complex motion sequences.

The ground-breaking concept of integrating all functionality in a single control system means that the individual axes are conveniently started up and checked for errors by the control PC, which also serves as an operator terminal. Centralized data management simplifies the entire diagnostic process, additionally optimized by remote maintenance and in particular by remote actuation of the system.

Application in research

The first application of the new COPRA® Adaptive Motion Control from data M is as part of the European PROFORM research project – an innovative manufacturing process concept for flexible and cost-effective production of vehicle bodies in white: profile forming.

The project, budgeted with more than 10 million euros, is being conducted by 24 partners (including data M) from six countries. It is sponsored by the European Commission as part of its 6th framework program, priority 3 (www.proform-ip.org).

One of the controls is installed in the PROFORM prototype system, which was presented to the public in October 2009 in the course of the ROLLFORM `09 congress.

Competence in and around roll forming

data M is a well-known name in the roll forming industry for, among other things, its feasibility studies (COPRA® FEA RF) and roll forming and tool concepts.

Through the competence thus achieved in areas like control and the mechanical design of flexible roll forming plant, data M is continuously expanding its service capability, through its own flexible roll forming installation for instance.

This puts data M Sheet Metal Solutions in a position to offer complete process concepts for the roll forming industry.
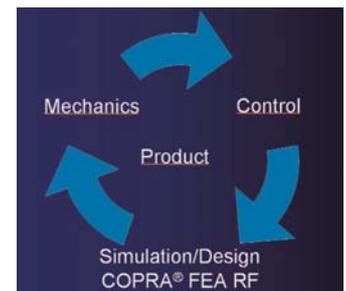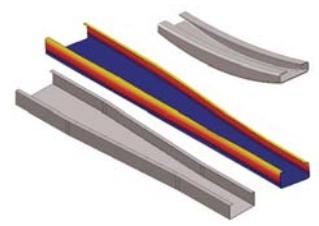

Example 1:
profiles - variable in height and depth
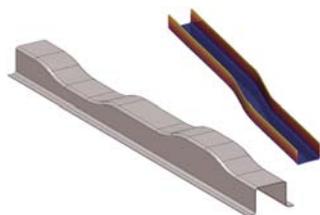
Example 2: profiles - variable in width, height and depth

Example 3:
roof profile

Example 4:
conical or bent profiles

There at a mouse click

Online seminars - webinars at data M!

Saving on traveling expenses can be a must in a weak economy. But you can still keep learning without having to leave the workplace. It's quite simple by webinars. A webinar is a seminar held over the world wide web, so the word is just created by adding web and seminar.

In future we'll be announcing these webinars on our homepage (www.datam.de). And this is where you can register for them. If you wish, we'll inform you of an event by e-mail. You're registered for a webinar at a mouse click.

A data M specialist will hold the webinar, and all participants form the "virtual classroom". But each participant sits at their own computer, and follows the presentation of a topic onscreen. The oral explanation of the speaker to what is shown onscreen is communicated over a standard telephone line, and listeners can also ask questions by a conference circuit. Each webinar deals with a specific topic and lasts between 30 and 60 minutes.

The advantages are obvious – cost savings and little need for organization at both ends. Plus it is possible for data M to span various areas of interest in a number of small sessions, and to maintain communication with you during times of an economic or financial crisis.

Planned topics
Innovations in COPRA® RF 2009:
• Roll construction

• Hole patterns
• Automatic networking of holes
• CAD interface with Inventor and SolidWorks
• FTM

Roll construction in COPRA® RF:
• Cloning rolls
• Distance rings
• Draw plates
• Recycling rolls

Hole pattern editor in COPRA® RF:
• Creating and processing 2D hole pattern
• Creating and processing 3D perforated sheet model
• Creating 3D FEA control model
• Generating new COPRA® project from 3D model (adopting profile and

hole pattern)

Working with FEA:
• Generating data from COPRA® RF project with hole pattern
• Preparing FEA model
• Simulating model
• Analyzing results

Parametric profile and flower development in COPRA® RF in conjunction with COPRA® SpreadSheet:
• Profile construction in COPRA® RF
• Development of flower
• Parametric modifications in design and development

To find out about webinars, visit
www.datam.de/webinar.htm

COPRA® RF 2009

Cloning rolls

For many profiles rolls may be used multiple times. For a more effective process chain, version 2009 enables rolls to be cloned. The following functions are available:

• Manually clone rolls in the current stitch and across stitches.

• Select a roll or automatically clone all rolls in the current stitch.

• Automatically clone a roll across the selected stitch.

• Image tools and automatically clone.

• Image roll(s) and automatically clone.

• Copy roll(s) and automatically clone.

• Copy rolls and clone across stitches.

• Interactively cancel clone(s).

• Automatically cancel clone selection in the current stitch.

• Cancel all clones in the current stitch.

• Cancel clones across stitches.

• Notice of where used for clones.

• Roll number optionally excluded from the cloning operation, i.e cloned rolls can be numbered differently.

• Cloned rolls can be modified at any point – no mother roll to which other rolls relate.

• Cloned rolls with different numbers are output in lists with the same geometry and different numbers, i.e. only the associated roll number appears, and manufacturing knows that the roll is an identical part (e.g. requiring no new NC program).

• Only dimension cloned rolls once. If a cloned roll was al-

ready dimensioned, information is retained by a control parameter. Analogously for NC data, the DXF file and NC file are only created once for cloned rolls.

• Trace and clone rolls of the same gometry stitch by stitch.

• Attributes of cloned rolls are identical.

• Identify clones by color and line weight or by prefix in the roll number.

• Subsequently alter the color of a cloned roll.

• Show the installed position (identical or mirror-inverted).

• As an option automatically show notice of where used when saving a modified cloned roll; the degree of geometry modification can optionally be judged by showing the original contour.

• All modification functions for rolls are also available for cloned rolls.

• Modification of one cloned roll automatically modifies all clones.

• Position-variant and position-invariant shifting of cloned rolls within a stich.
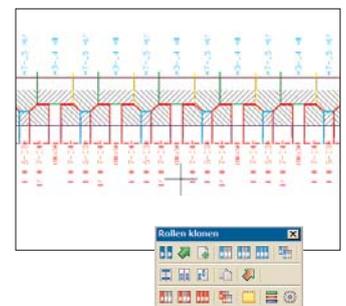
Cloned rolls with the same roll number.

data M with special show

Special show — "Time- and cost-effective

At this year's BLECHEXPO, data M is presenting new versions of its COPRA® RF roll forming program for designing roll tools, and COPRA® Metal Bender for 3D sheet metal design under AutoCAD or Inventor.

Successful and cost-attractive manufacture of roll formed parts not only calls for an efficient tool set – the design, production and maintenance of roll tools are also of decisive importance. The data M booth at the BLECHEXPO 2009 show is consequently focusing on "time- and cost-effective management in developing roll tools".

As part of a front-to-end presentation the engineers from the Bavarian-based company are showing their COPRA® RF software solution for developing and designing roll tools. Repeatedly needed roll geometries can now also be cloned from existent tools.

A new kind of database function allows re-use of old rolls (Recycling Database).

A fully automatic and highly precise roll gauging machine – COPRA® RollScanner 100-3 – illustrates how simple it is to save an existing set of roll tools in the database.

Of course data M will also be demonstrating the latest version of its successful COPRA® FEA RF simulation package and explaining the various add-ons.

Similarity search for profile and roll cross-sections

When you start to design a tool, one of the questions immediately posing itself is often: "Haven't we done something like this before?" or "Haven't we already solved this problem?"

If the answer is "Yes", you start to search for the documentation. That means defining a whole

number of classifying codes or other descriptive features. In the case of special profiles, because of the variety of possible forms, such a search can turn into a formidable task.

COPRA® RF now offers a method in its database that does away

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with the need for classifying roll contours (with profile cross-sections soon to follow). The search, across all ready saved contours, is for similarities of geometry and not for allegiance to a particular group. The method used here is based on a mathematical Fourier transform, with the necessary calculations running in the computer unnoticed by the user – the profile cross-sections or roll tools that are found are presented in ascending order sorted by their similarity with the reference profile. Speedily and simply, the user can in this way view not only the particular profile cross-section but also the forming plus the roll tools used for the purpose.

COPRA® Recycling - Database

Many a COPRA® RF user may have thousands or even tens of thousands of rolls that are out of use, either because the particular profile is no longer produced,

or the roll was beginning to show too much wear and tear. If you say the average value of a roll is € 150, the user can fast be stocking rolls worth € 1.5 million or more that are no longer used. This is where the COPRA® RollScanner comes in.

In the combination of COPRA® RF Roll Database and COPRA® RollScanner it is then possible to send scanned rolls straight to the database and retrieve them. You could already search through criteria like roll bore, maximum diameter or maximum width. But then you also found rolls whose contours were smaller at certain points than those of the rolls you were looking for. What is special about this solution is the seamless integration of the single work steps and ease of operation – essential for good acceptance.

COPRA® RF and FEA RF – automatic networking of perforated strip

It was possible before now with COPRA® FEA RF to transfer the punch pattern to the flat strip for finite element simulation. But that can be time-consuming – depending on the shape and position of the perforations. COPRA® FEA RF version 2009 automates the pro-

cess. For this purpose parts of COPRA® MetalBender were integrated into COPRA® RF software.

The profile cross-section is generated in AutoCAD as a 3D object. Taking the punch library, the different hole shapes are produced at the appropriate positions in the ready profile. Seeing as this is already done three-dimensionally, you no longer find the restrictions or problems familiar from 2D.

Of course you can also read in a ready modeled profile as a 3D volume model. You can turn and shade the profile in any way, very simply define the surfaces and reference points for the areas to be punched. The punch library is very easily expanded by your own punch shapes. It is also possible to draw and alter perforations with standard AutoCAD.

The cross-section produced in this way with all perforations is then wound up, the perforations in the flat strip then automatically being at the right positions.

But the hole pattern can also be generated direct in winding up. It is possible to automatically produce a 3D model from the 2D hole pattern. This creates the ready profile with all punchings (even in or through bending zones).

The resulting punch contours are transfered to COPRA® FEA RF where the network is automatically matched so that all perforations contained in the blank cut go into the flat strip. This does away with the tedious manual working of the flat strip in COPRA® FEA RF.

In addition, extra tools such as socalled drawing dies, as often used in roll forming, can now easily and automatically be transferred from COPRA® RF CAD to COPRA® FEA RF simulation. These additions very much simplify modeling of the roll forming operation, contributing to realistic verification of the forming process.

at BLECHEXPO 2009

management of roll tools"

Simulation of roll forming process – COPRA® FEA RF software

Model with driven rolls

Up to version 2007 COPRA® FEA RF worked without friction and the rolls did not rotate. This presents advantages when it comes to judging the quality of the design. But extra aspects like increasing the driving diameter, longitudinal elongation or hole deflection in the strip caused by different speeds were not consid-

ered. Since COPRA® FEA RF version 2008 it is possible to automatically generate an FEA model with rotating rolls and friction:

Display of forming forces

Simple determination of the distribution of forces appearing in the stations.

Multiprocessor capability

COPRA® FEA RF version 2009 comes with two options for parallel processing. One is a parallel_2

license allowing a simulation to be computed by two processors. This reduces time to compute by up to 40%. The second option is a parallel_4 license that cuts computing time by as much as 65%.

SolidWorks interface

In addition to Inventor, data M presents an interface for Solid-Works. This allows a roll design to be transfered straight into Solid-Works for completion, e.g. by adding stations, tool holders for

accessory rolls and similar extra apparatus.

COPRA® FEA RF – the data M simulation program for roll forming – is especially appreciated by users because of the realistic mapping of the roll forming process.
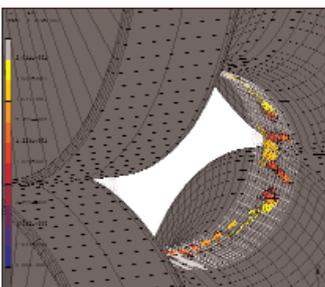
It helps to understand the process better and pinpoint the causes of manufacturing problems.

COPRA® RollScanner demonstrates how simple it is to save an existing set of rolls in the database.

COPRA® RF design and process simulation of perforated profiles.
COPRA® RollScanner for precise capture of roll geometries.

Determination of the transport diameter by comparing the forward and backward slip between the rolls and the profile.
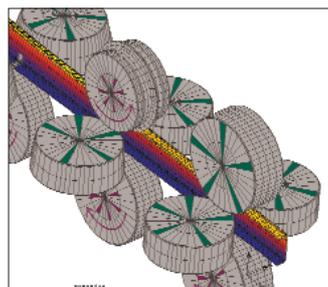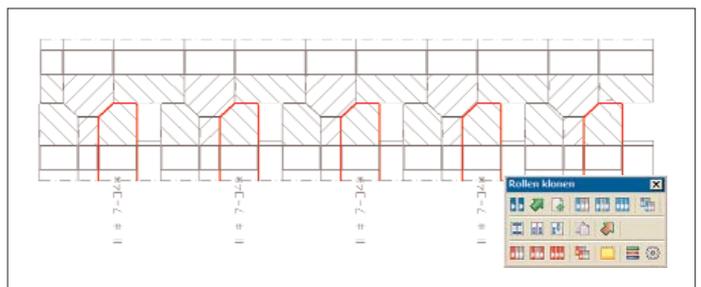

Illustration of a model with friction/rotating rolls:
- driven rolls at specific rotating speed (purple arrows),
- rotating idler rolls driven by sheet metal (green stripes),
- welding and deactivation of welding addition,
- drawing die (with friction) for improved forming process.

Cloned rolls with the same roll number.

COPRA® RF 2009 software

COPRA® RF 2009 - what's new?

now available!

In this version of COPRA® RF we have been concentrating on four major issues, that will make the design of sections with pre-punched material, or the handling of trapezoidal and corrugated sections, much easier; and also the design process for complex open sections will be more effective. The focus for COPRA® RF 2009 has been on the following features:

- A 3D punch hole editor for use with pre-punched material (1).

- The possibility to automatically mesh pre-punched material (2).
- The possibility to clone rolls (3).
- The possibility to re-use/ recycle existing roll tools (4).

In recent years it has become apparent that the use of finite element simulations will be more and more important in the roll forming industry.

Due to growing popularity of lightweight construction, the sheet thickness is constantly be-ing reduced, to compensate the loss in stability; more and higher strength materials are being used.

More and more profiles are also being rolled with pre-punched material, where the quality of the holes in the final section in terms of correct position and shape are also an important issue. For all cases, only little experience and trial and error method are available within the roll forming industry.

Therefore, the only way to avoid expensive and time wasting experiments is to virtually simulate the process with FEA. This is the reason why data M Sheet Metal Solutions GmbH has on the one hand focused upon making the roll design faster, and on the other to take away the time wasting modification of the FEA mesh when using pre-punched material, with COPRA® FEA RF. The target being to significantly reduce the time required for preparing an FEA simulation.
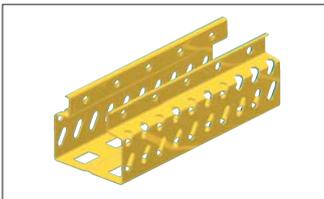
1. 3D Punch-Hole Editor
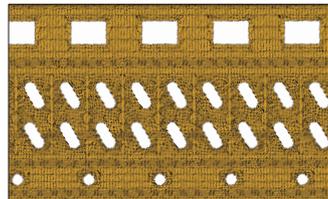
2. Punch-Hole Meshing
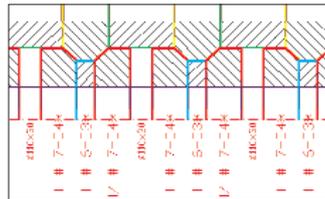
3. Cloning Rolls

4. Roll Recycling Database

1. COPRA® RF 3D Punch-Hole Editor

Before the meshing of pre-punched material can be done automatically, it is necessary to define punched hole shape and punched hole position in the COPRA® RF design software.

With the previous versions this was simply not possible, as this was based upon 2D only. Our target has been to allow any punched hole shape in any combination. For this reason we have decided to combine the COPRA® RF software with our COPRA® MetalBender 3D solution.

In MetalBender 3D it is very easy to define 3D sheet metal parts with any punched hole shape. Therefore we have taken this facility and integrated it into the COPRA® RF software.

Another target was to make the handling as easy as possible; the punched holes can be defined either in the flat strip, or in the final section.

Beneath the integrated library of standard holes, the user can also define punch tool shapes and add them, creating a personal punch tool library. The program also allows the possibility to make the individual stations visible including the punch holes.

2. COPRA® FEA RF Punch-Hole Meshing

With all the information about shape and position of punched holes created, with the punch hole editor, the mesh can now be created automatically.

Therefore, it is no longer necessary to transfer the information about the punch holes into the MSC.Mentat program, delete the elements in the position of the holes, and drag the nodes into the correct position.

To make life even easier, a mesh preview is now available, illustrating the automatically calculated mesh with or without holes, and any change in the meshing parameters will update the mesh preview automatically.

The preview also shows the number of elements, thus mak-ing it easier to find the optimum constellation.

This new feature saves hours of time previously necessary to prepare the FEA mesh.

3. COPRA® RF Roll Design – Cloning Rolls
> See page 9.

4. COPRA® RF Roll Recycling Database
> See page 6.

Contact

Contact data M for more information!

Why not get in touch with us and find out more about our products? We'll be glad to consult or send you our free information brochures.

data M Sheet Metal Solutions

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