AUTOFORM
Forming Reality

Solutions for the Die-making and Sheet Metal Forming Industries

Dr. Markus Thomma, Global Marketing Director of AutoForm Engineering

AutoForm Engineering offers software solutions for the die-making and sheet metal forming industries. Company headquarters are in Zurich, Switzerland with other offices located in the USA, the Netherlands, Germany, France, Spain, Italy, Mexico, India, China, Japan and Korea.

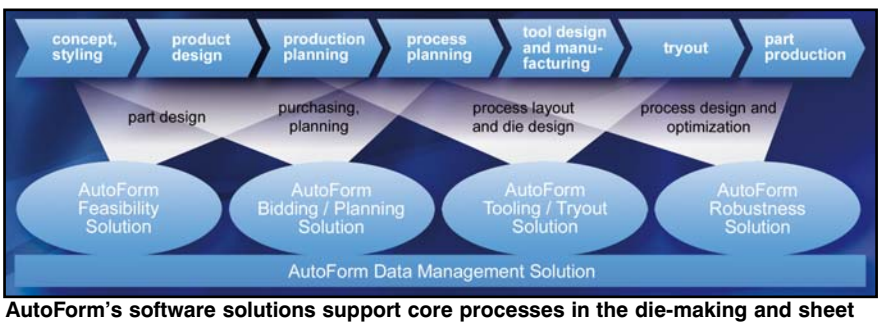
AUTO 2008 Editor, Ken Rogers, spoke with Dr Markus Thomma, Global Marketing Director of AutoForm.

Ken Rogers: What are the benefits to a company within the automotive sector, from using AutoForm software?

Markus Thomma: "Using our software, the customers can benefit in many aspects. Our software solutions improve reliability in planning, reduce the number of die tryouts and tryout time. Press downtime and reject rates in production are substantially reduced. And the use of our software results in higher quality part and tool designs that can be produced with maximum confidence. The software is well-known for accurate results and short computation times, and for its highly intuitive user interface and practical use in design, engineering and production environments. This powerful combination of accuracy, speed and user-friendliness results in revolutionary time and cost savings."

Dr. Markus Thomma

KR: Nowadays, arguably more than ever before, development and manufacturing costs, as well as total time-to-market have to be minimized in order to reach profitability. How is AutoForm meeting the challenge of enabling the development and design of products and manufacturing processes that will be 'right first time'?



AutoForm's software solutions support core processes in the die-making and sheet metal forming industries

MT. "Our software solutions support the tasks of our customers all along their entire process chain (see figure left). The AutoForm Feasibility Solution is used to ensure the

manufacturability of stamped parts from early on in the part design cycle, in order to reduce development time and costs. Applied from early on in the part design cycle, it has been proven to deliver significant benefits in terms of robust part manufacturability and performance, as well as reduced manufacturing costs. This solution is attractive for the concept, styling, product design and production planning departments because early formability checks eliminate costly and late changes of part design."

KR: What are the main features of the AutoForm Feasibility Solution?

MT: "As main features I would emphasize the fact that it is designed to work with unfinished/partial CAD data. It allows initial part-based formability check and blank estimation, rapid process layout, creation of die face geometry and mapping of simulation results to other CAE tools."

KR: Can you provide an outline of some other AutoForm software solutions that are being used by the automotive industry?

MT: "An innovative solution is the AutoForm Bidding and Planning Solution. It is an accurate and easy-to-use software solution for all planning tasks associated with the production of sheet metal parts. It allows users to define a production sequence, evaluate part feasibility, determine the minimum blank and the associated material cost and determine the tooling cost associated with the chosen production sequence.

KR: The automotive industry has experienced major productivity increases in recent years through time and cost improvements. Manufacturers and suppliers are under pressure to increase the reliability of stamping tools in order to achieve efficient and reliable production. They are focused on the development of the best product designs and the best optimized tool designs for a robust stamping process. In what ways can AutoForm help them confront these challenges?

Our software solutions support the tasks of our customers all along their entire process chain

MT: "Using AutoForm software, our customers can meet the current challenges such as the introduction of new stamping technologies, new materials like ultra-high-strength steels and aluminium, or reliability improvements of their stamping processes.

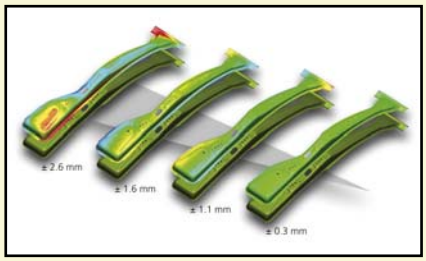
Our Tooling and Tryout Solution addresses these challenges and it is the most widely used stamping simulation software in the automotive industry. It enables the final validation of the entire sheet metal forming process – from the insertion of the blank into the press, through to binder wrap, draw, trim, re-strike, flange, springback compensation and final validation. The solution is well suited to the tasks of process planners and tool designers. Quickly and efficiently, they can setup the entire stamping process, make process modifications, and also consider and evaluate different process layouts in order to find the best and most cost efficient ones. In addition, we have the AutoForm Robustness Solution, which is purely focusing on designing manufacturing processes that ensure process reliability requirements and improve overall stamping plant efficiencies."

KR: What categories of technicians and engineers particularly benefit from the use of AutoForm software?

MT: "Most categories – including Product Designers, Formability Engineers, Draw Development Experts, Process Layout Specialists, and Tooling, Stamping & Manufacturing Engineers. In fact, AutoForm software provides the best Total Cost of Ownership. It's optimized to run on standard computers with no special hardware requirements, and is available for all common computer platforms including UNIX, Windows and Linux. It is compatible with all major CAD systems and can easily be used by employees across different departments and functions. Existing workforces can be trained very quickly to become productive with AutoForm software – which is designed to seamlessly complement existing business processes without introducing any new workflow bottlenecks."

KR: Can you give me some examples of recently developed AutoForm solutions?

MT: "Continuous innovation is of the highest importance at AutoForm. This year we released AutoForm version 4.1. The need for increased accuracy – substantial for springback calculation and its compensation – and increased efficiency of our customers processes was the driving force behind this software release (see box Version 4.1).



Springback compensation of a B-pillar reinforcement, after 3 iterations, the springback reaches a value of less than ±0.3 mm

Version 4.1

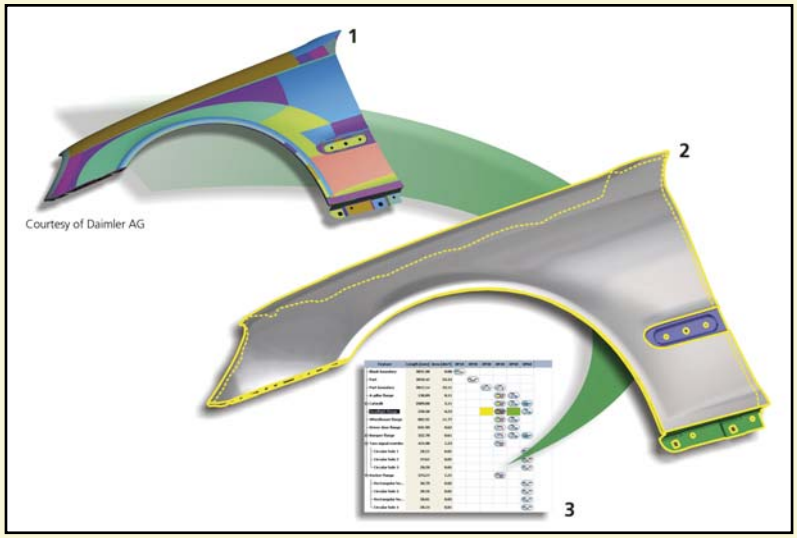
The new AutoForm 4.1 version offers over 200 new features and several key enhancements, significantly increasing quality and productivity. This software release is entirely focused on AutoForm's customers' needs. The new features and enhancements provide the following main benefits:

• Accurate Springback Calculation and Springback Compensation: AutoForm software version 4.1 offers a unique solution for the geometry compensation of parts and tools based on springback results. Die-face engineers can directly take into account springback results and compensate the appropriate tool geometry. As a result, more reliable process layouts are realized during early planning phases. AutoForm springback compensation minimizes the risk of later, costly changes of tooling or processes due to springback effects.

• Accurate Forming Forces: AutoForm 4.1 calculates accurate and reliable forming forces. Based on this information, the user can define the adequate press equipment that is required for reliable production at an early stage in the development process.

• Precise Geometry Modelling (Morphing): Significant and improvements in geometry modelling are achieved by introducing morphing technology. By modifying wall angles, unfolding part areas, the user can identify the best geometry and optimize the process.

• More Efficient Die Development Process (Watertight Substitution and Offset Skins): The die development can be considerably shortened by using the new substitution and offset skins. The original surfaces, even those that are imperfect, can be substituted by a watertight skin early in the development process. Watertight skins are required for CAD solid design. As a result, solid die design can start at an earlier stage. Moreover, an additional skin, offset by a large value, can be generated fully automatically. Such offset skins are required for the solid design of a casting model. Consequently, the die castings can be launched earlier, reducing the lead time by several weeks.



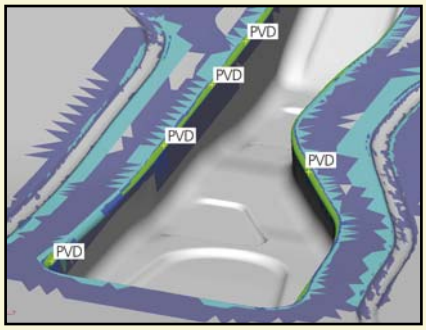
CAD geometry (1), automatic identification of part details (2) and process layout definition (3)

AutoForm-CostCalculator

AutoForm-CostCalculator is the first commercial planning software specialized for press shop planning departments at automotive manufacturers. The tedious Excel-based worksheets, manually created data to describe the sheet metal part, subjective judgments on cost calculation, lack of transparency and result reproducibility have now been replaced by an elegant, easy-to-use software for all planning tasks associated with the production of sheet metal parts.

AutoForm's approach for calculating tooling costs is completely new: it starts from the product geometry, automatically identifies part details, and then determines the required manufacturing process and tooling costs with a minimum of user inputs. Its tremendous speed not only allows one to perform cost calculation much faster, but it also allows one for the first time to systematically evaluate multiple, alternative manufacturing concepts and to determine a cost-optimized manufacturing process.

The new module is fully integrated into the AutoForm software environment, ensuring maximum user productivity. It interacts with other AutoForm modules, for example those for the determination of blank outline, material costs and stamping feasibility of deep drawn parts. As a result, one obtains a planning solution which enables process planners and cost calculators to quickly determine complete, reproducible, and usable planning data.

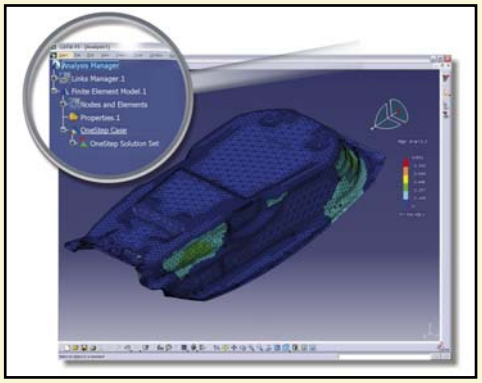


Die for a B-Pillar: different colours represent different types of coatings. The choice of the coating has an essential influence on the lifetime and costs of the tools.

AutoForm-DieAdviser

AutoForm-DieAdviser is the software solution for optimal wear protection. It determines the optimal tool layout and efficient wear protection concept, based on AutoForm-Incremental simulation results. The durability of tool materials, hardening and tool coating are defined taking the production quantity and press stroke rate into account.

This innovative and unique software solution, offers new insights on how to improve tool layout early in the product development process and how to provide longer lasting and lower cost tooling. Using AutoForm-DieAdviser, the customers in the tool design and stamping fields can meet the modern challenges: introduction of new materials such as ultra-high-strength steels, requirements for higher press stroke rates and less lubricant consumption.



Manufacturability assessment inside CATIA

AutoForm-One Step for CATIA V5

AutoForm-One Step for CATIA V5 is the software solution for engineering manufacturable sheet metal parts. The well-known software module AutoForm-OneStep is fully integrated into the CATIA V5 environment. Embedded within CATIA, the OneStep feasibility workbench brings together all functionality necessary for quickly assessing and countermeasuring potential splits and thinning on product prior to its release.

Associativity, manufacturing focus, simplicity and quick turnaround are key features of AutoForm-OneStep for CATIA V5. Staying within the CATIA V5 environment, product designers are able to continuously check their product for stamping concerns. They can perform fully associative manufacturing studies on product features, material grade and gage. They can also consider and evaluate different part designs in order to find the best one. A continuous focus on product feasibility minimizes later expensive product modifications and allows designers to release a manufacturable product. Additional outputs as accurate blank shape, size and part weight add significant value to feasibility assessments.

This fall, we launched AutoForm-DieAdviser, the first software solution for optimal wear protection on the market. This software is a result of our successful collaboration with VST Keller GmbH & Co. KG, which started three years ago. Basically it allows our users to define an efficient wear protection concept already in the tooling engineering phase, which helps to avoid later expensive tool modifications during tryout or during production. Such efficient concept enhances the performance and durability of the tool and ultimately reduces tooling costs (see box AutoForm-DieAdviser).

Also this fall, we unveiled AutoForm-CostCalculator to major OEMs and suppliers. This software allows planning and tooling departments to define rapidly and transparently production sequences and to calculate all tooling costs associated with the production of automotive body parts. This is a completely new approach, since until now the main focus was quality and time. Now we offer a tool to calculate costs, which in fact is adding an additional dimension (see box AutoForm-CostCalculator).

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And finally, I want to mention our latest product that was released in December 2007. We started to embed AutoForm technology in the CATIA environment and our first fully integrated software module on the market is AutoForm-OneStep. It enables e.g. product engineers to run manufacturability assessments – without leaving their CAD environment.

And we shall of course continue to streamline sheet metal forming with leading-edge software solutions, in order to increase our customers' competitiveness and profitability. ■