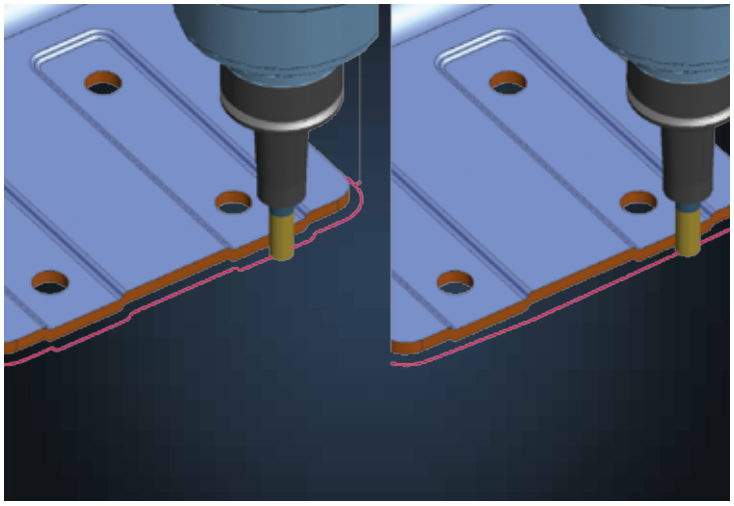
TebisWorld

NC automation. Processes. **Magazine** // **1** // 2017

Tebis Version 4.0 – Release 3 // Interviews with RSB Rationelle Stahlbearbeitung and on die manufacturing // Tebis success stories from RSB, M. Reuss, PS-Prototypenschmiede, Accu-Rite // Retrospective of the Tebis Open House // Tebis Consulting project management // New features // Industry 4.0 in single-part manufacturing // Tips and tricks



04 // New Features in V4.0 R3

30 // Tebis Open House

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Dear readers,

Reliable and efficient manufacturing processes are the key to a stable market position and sustainable competitiveness. But how can such processes be established?

First we must analyze the time required repetitive tasks, the magnitude of machine downtimes and the number of tools used. Based on the results, we define standards for designing and preparing CAD models for manufacturing, for processing sequences and milling strategies in typical tasks, prioritizing the use of tools, and assigning specific machines.

It's then just a short step to achieve extensive automation of a large portion of prismatic manufacturing, and also of roughing and finishing of 3D free-form surfaces, because all manufacturing knowledge is now stored in the Tebis process library and is accessible to every employee. The uppermost layer in process optimization is then at the organizational level. The areas of CAD/CAM and MES (Manufacturing Execution System) are combined.

By this time, any organization looking from an economic perspective will ask two basic questions: Are these goals fundamentally achievable for us? And is it all worth it?

At Tebis, we help you find the answers. Like no other software provider in our industry, we offer customized business consulting with implementation services. Working together with you and your employees, our experts analyze your structures on site and support you in optimizing your processes.

Many customers have since confirmed the great benefit of our process optimization projects: employees are more motivated, NC programming is significantly faster and machine capacity is better utilized. You can learn directly from our customers how they have profited from collaborating with Tebis Consulting and Tebis Implementation. For example, see the success stories from Reuss (page 13) and RSB Rationelle Stahlbearbeitung (page 8).

Robert Mahr, head of Marketing

The interview with Tebis Product Manager Stephan Galozy (page 6) will be especially interesting for sheet metal forming die manufacturers, because he outlines the route to dies without reworking and quantifies the potential savings.

Once again, there's also plenty of exciting news to report. This includes Tebis 4.0 R3 (page 4), which was released in October 2016 with over 60 functional extensions. We also take a look back at our decision-maker evenings and workshops. The report on last year's Tebis Open House, which dealt with everything 4.0, is well worth reading. One of the highlights was a fully automated process cycle we presented in our showroom as an example of small-part manufacturing. Our visitors had the opportunity to personally witness the efficiency benefits of combining the Proleis MES system and Tebis CAD/CAM software. The interview on page 34 with Jens Lüdtke, head of Tebis Consulting, further explores the topic of "4.0."

We wish you an enlightening and thought-provoking read!

New features in V4.0 R3

Tebis 4.0 was introduced to the market in summer 2015 and Release 3 was delivered in fall 2016. The many new features in Tebis 4.0 were always among the hot topics at all this year's industry events in 2016. Here's an overview of the new features in R3.

USER INTERFACE

Simple and informative

Toolbars and menu panels can be docked to the edge of the application window.

Clear overall impression

A uniform edge color, as well as isolines that can be shown and hidden, ensure a clear contrast between wire-frame and surface models.

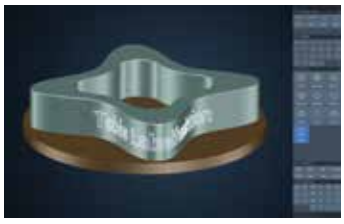
Fast file selection

After Tebis is started, a project dialog appears with preview images from ecently used files.

INTERFACES

Output complex files more quickly

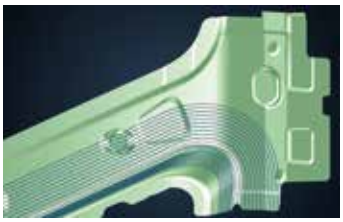
The new "Element export by selection from layer tree" function automatically breaks up Tebis files into multiple individual files. This is optimal for assemblies and complex files with many manufactured parts.



DESIGN AND MANUFACTURING PREPARATION

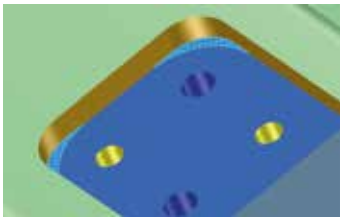
Conveniently engraved parts

The "Design/Cons/Label" function lets you engrave texts, logos and numbers. It creates a text projected on the part geometry. The "NC5ax/MEngrave" function, which is also new, calculates the appropriate toolpath.



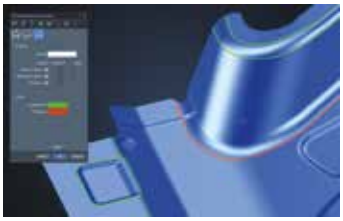
Quickly create parallel curves

Multiple parallel curves can be simultaneously calculated with the extended "Design/Curve/Parall" function.



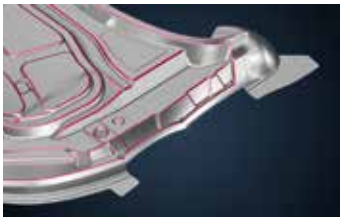
Optimally plan use of tools

You can determine the optimal tool diameter for MPlan and MCont NCSets and account for residual stock before milling. You can switch directly from the Job Manager to the tool library and exchange the corresponding tools.



Easily create guide curves

The "NCPrep/Struct" function lets you conveniently create guide curves for the high-quality "Curve-synchronous" and "Z- variable" MSurf strategies. You can check the curve location, repair and smooth curves, and create parallel curves.



ACTIVE SURFACE PREPARATION

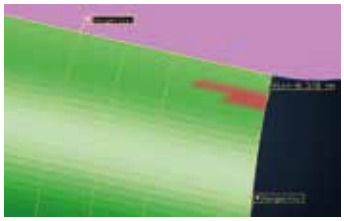
Substantially reduce manual reworking

The "ActSurf/Reduce" function for convenient flattening of positive radii has been extended. This prevents contact between the sheet metal and the die.

REVERSE ENGINEERING

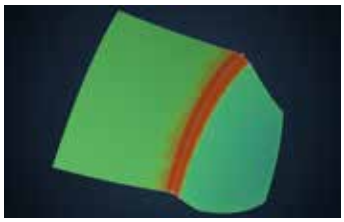
Create perfect surface transitions

Revised algorithms for the "BRep/Surf/Approx" and "BRep/Surf/Fill" functions provide better transition qualities for tetragonal surfaces while simultaneously reducing segmentation.



Easily adjust tolerances

In the "BRepSurf/Approx" and "BRep/Face/Approx" functions, you can use "Suggest tolerance" to select between an automatically calculated suggested tolerance or the default tolerance, depending on the specific application.



Easily optimize edge areas

The "BRep/Curve/Fillet" function enables convenient control of created radius runouts and theoretical edges as well as automatic smoothing of theoretical edges with fewer segments.

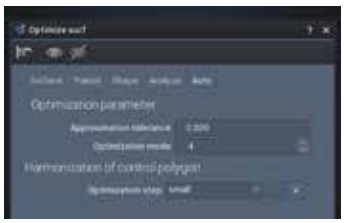
Easily create tangential transitions

Handling for creating tangential transitions has been significantly simplified with optimized tolerances. Tangential connecting nodes (green) can be easily inserted.

SURFACE MODELING

Symmetrical Class A surfaces faster

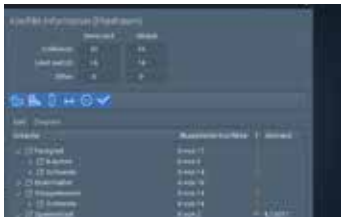
The "BRep/Optim/Curve" and "BRep/Optim/Surf" functions let you symmetrically process control points and control point series.



Apply defaults

User-defined parameters are automatically applied as defaults in the "BRep/Optim/Surf" function.

MACHINE COLLISION CHECKING



Better management of machine conflicts

You can easily distinguish between critical and non-critical conflicts, and filter them according to the affected machine parts.

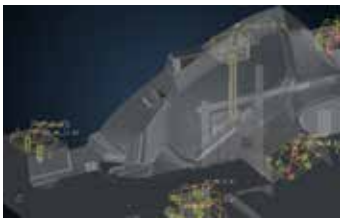
AUTOMATED 2.5D MACHINING

Easily change processing sequence

The processing sequence in feature-based NC programming can now be controlled using feature groups.

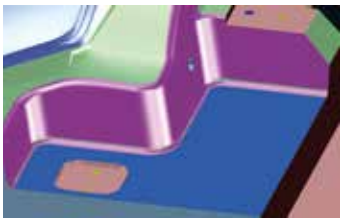
Easily exchange tools

You can exchange tools across machining operations in NCJobs of type "MFeat" and "MSet."



Optimize globally

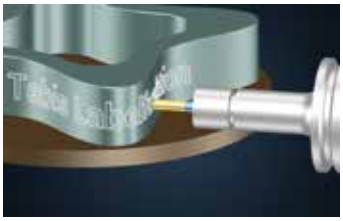
You can use the new "Assign" function to assign NC variables such as material height or protected elements across features—regardless of feature type and parameter assignment.



COLLISION AVOIDANCE

Improved process reliability

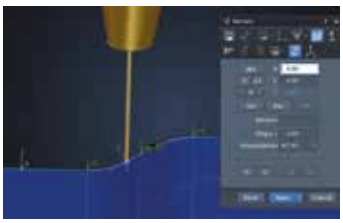
The new "Reduce area" option in the 3-axis "MCurv" and "MFill" functions lets you quickly and easily create collision-free toolpaths for machines that are not suitable for multiple-axis simultaneous machining.



5-AXIS MILLING

Easily create multiple-axis engraving programs

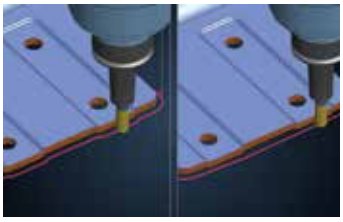
The new "NC5ax/MEngrave" function can be used to create NC programs for engraving texts, logos and numbers. Manufacturing preparation is performed with the "Design/Cons/Label" function.



LASER CUTTING AND TRIMMING

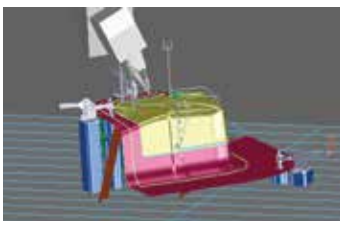
Prevent unnecessary pivot movements

Convenient handling for optimizing head-tilt directions in stamping areas prevents fast pivot movements of the machine.



Reduce cycle time by 30%

Optimized NC point distribution yields more compact NC programs. Distance controls on the machine can be used, paths can be adjusted without (left) and width (right) axial tolerances, and NC points can now be manually removed.



Fully integrated simulation technology

Tebis simulation technology that prevents and limits switch collisions has been completely integrated.

DIE MANUFACTURING // EXPERT INTERVIEW
STEPHAN GALOZY, TEBIS PRODUCT MANAGER

New paths in die manufacturing

Tebis offers a process solution for die manufacturing that can benefit companies of all sizes. The results from a joint project in the FMF/WWF group in Hardthausen-Gochsen near Heilbronn, Germany, speak for themselves: Tebis solutions reduced tryout time by up to 25%, and shortened programming time by roughly 15%.

// Mr. Galozy, who are currently the main users of your process solution?
Our primary users are currently in die manufacturing. These include companies of all sizes, such as car manufacturers as well as tier-1 and tier-2 suppliers and milling providers.

// How did this solution result?
There are essentially three areas of uncertainty that are relatively difficult to control in draw die manufacturing. The first can be attributed to material-specific springback in the sheet metal. The second is associated with the thinning and thickening of the sheet metal during formation. And finally, the stiffness of the die systems varies; the press itself deforms. What happens during processing is never 100% predictable. This resulted in many correction grinding steps and a large effort in manual reworking.

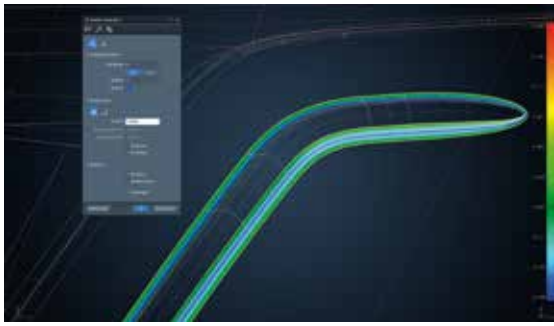
// And you saw the need for action…
It was our customers who had to take definite action. Just look at how the industry has developed over the past years! The quality requirements for sheet metal parts have continually increased. At the same time, project cycles are becoming shorter. It used to take a total of 24 weeks before a part came out of the press without cracks or folds. This is due on the one hand to the long processing time and elaborate assembly, but also and especially to the manual spotting work. With our technology, we have brought this time down to 18 weeks even for large dies such as side panel frames. Think about the lack of qualified personnel, too: An incredible amount of knowledge is needed to perfectly grind dies.

// So what's the solution to this puzzle?
Essentially, design, NC programming and tryout have to be regarded as parts of an overall process rather than as individual work steps.

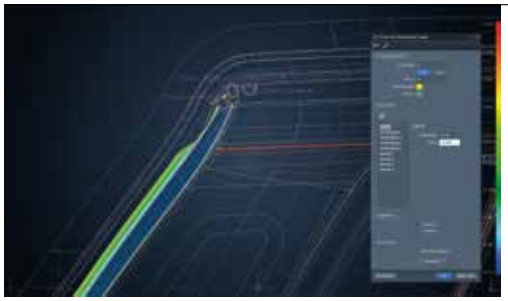
// What has Tebis done in the design area to improve processes?
We developed special deformation procedures to get the behavior of the sheet metal under control; that is, to compensate for its material-specific springback. Our customers now counteract thinning and thickening using Tebis functions specially developed for this application. Our active surface process takes effect for the tools.

// So it's about the sheet metal, springback compensation and the active surfaces in the die. Just what does the Tebis approach look like for springback compensation?
We have been offering solutions in this area since 2009. For years, existing simulation methods have provided increasingly reliable recommendations for exactly how the deformed surface should look. But how these recommendations are transferred to the CAD/CAM world—that's where the problems came in. And that´s where Tebis comes into play: Tebis has developed deformation procedures for all conditions. For example, deformation procedures can not only be calculated for meshes, but also for surfaces, points, topologies, scanned data or rotations. We have since established highly effective processes for springback compensation, both nationally and internationally.

// Now let's talk about the tool. What's special about Tebis here?
Again, it's about transferring as many work steps as possible to the virtual world. We've made a huge step forward with Version 4.0, for both the small-part and large-part processes. We are on the way to achieving a die that doesn't require reworking. Our goal is to prepare the dies so exactly in the future that they can then be immediately assembled and the first parts can be pressed.


Reduced radii in the preview with analysis…


… and the results.



Transition-free pressure surfaces in the preview with analysis…

… and the results.

The figure clearly shows where radii are relieved in Tebis and where transition-free pressure surfaces are created.

// And how does that work?

Previously, attributes such as stock allowance or wall thicknesses were used in areas where the sheet metal is elongated or compressed. This resulted in visible edges that had to be ground away again in tryout. In contrast, Tebis lets you design positive and negative radii with smooth transitions directly in the die. All pressure and spotting surfaces are optimally prepared for subsequent programming, from radius relief to optimization of trim edges, to compensation for press deflection. This is a highly sophisticated process that already enables significant time savings. And we're still just getting started.

// Are there any other benefits?

Overall, there are far fewer residual stock areas, which were always a big problem in the past. And of course NC programming is significantly simpler.

// That sounds promising. But even if parts are perfectly prepared, the CAM functions have to know how to work with them. Sooner or later, this quality has to get to the machine…

Let me point out again: Design and NC programming are closely related. All that preparation would be worth only half as much without our powerful NC programming functions. For example, a very big plus in 3D surface machining is that Tebis does not mill on abstract meshes, but rather directly on surfaces. Tebis can also calculate a constant step between guide curves because the uniform milling paths ensure a homogeneous die surface and shorter machine run times. The exact part geometry and high-quality NC programs also enable the use of fast high-feed rate cutters. The process and the tools are still further optimized with new technologies such as hammer peening, which can stabilize surfaces, by using robots for example.

// Can you provide any specific numbers?

The greatest savings potentials are in tryout. According to our customers—such as the FMF/WWF group, whose specialties include die and prototype manufacturing—the Tebis solution enables a reduction in spotting work by up to 25%. NC programming has become significantly easier, more reliable and faster overall: FMF/WWF mentions a 15% efficiency improvement here. As in all Tebis solutions, we have also placed great value on automation in developing the active surface functions. The work required to create the active surfaces can be further reduced, especially with the new radius relief function.

// So the subject of active surfaces is certainly of interest to other sectors?

By all means. The issues are essentially the same. For example, the burn surface of an electrode also has to be milled with a specific underdimension. Thanks to our many years' experience, we will soon have a suitable solution available for other sectors such as mold manufacturing.

// And finally what about the costs?

We offer the right package for every application. For example, a milling provider who only machines dies needs the Pro design package and the Active Surface Preparation add-on to prepare the manufacturing geometry before NC programming. The costs are calculated based on the license model. The acquisition costs for the Pro design package and the Active Surface Preparation add-on are very low. They generally pay for themselves within the first year.

More information on the active surface process can be found on our website.
http://www.tebis.com/en/processes/processes-in-real-life/a-more-efficient-active-surface-process/

STEPHAN GALOZY

Stephan Galozy, the Tebis AG product manager responsible for the die manufacturing sector and CAD technologies, views design, NC programming and tryout as parts of an overall process chain rather than as separate work steps. In our interview, Galozy also makes it clear that the Tebis solutions for active surface preparation will also be very interesting for other sectors such as mold manufacturing.

RSB RATIONELLE STAHLBEARBEITUNG // EXPERT INTERVIEW
ARNO VOLKMAR, SALES MANAGER // RALF WÜNSCH, NC PROGRAMMER

Faster to the machine with the 2.5D process solution from Tebis

RSB Rationelle Stahlbearbeitung, a medium-sized company in Merkers, Germany, relies completely on Tebis software solutions for its NC programming. We took a closer look at Tebis's automated 2.5D process in a discussion with Sales Manager Arno Volkmar and NC Programmer Ralf Wünsch.

Mr. Wünsch, why do you use the 2.5D process solution from Tebis?
Wünsch: Originally, we only created 3D programs with Tebis. But 2.5D machining was absolutely necessary, especially in manufacturing our parts with large prismatic portions. So we took a closer look at the 2.5D solution from Tebis.

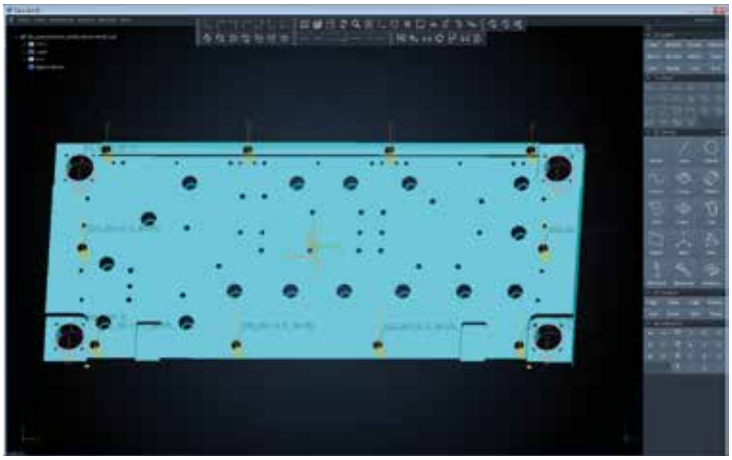
// And what was the result?
Wünsch: Outstanding.

// Specifically?
Wünsch: Tebis creates so-called "features" from purely geometrical elements such as holes, pockets and threads. Features are directly linked to a machining specification; the corresponding milling strategies are already stored. The machining specification accounts for various steps such as drilling, countersinking and thread forming. These are steps for the machine types, the material group or the tool to be used. The programmer only needs to select the correct template.

// Isn't that somewhat rigid? Not all of the tools or machines are always available when needed. And holes are not always equally deep.
Wünsch: The amazing thing about the Tebis solution is the variable approach. Most of the machining parameters and tools can be described as variable. Machines and materials can be combined in groups. For example, consider a tool description: You can use various tools for a machining operation within given limits. Neither the programmer nor the machine operator needs to think ahead about whether a specific tool will actually be available at the time of manufacturing.

Discussion with Sales Manager Arno Volkmar (left) and NC Programmer Ralf Wünsch (right) from RSB Rationelle Stahlbearbeitung.

(picture on the left side) Finished part in quality testing.



2.5D and 3D programs were created entirely with Tebis.

// OK, so the process is simpler. But there's an incredible amount of knowledge stored in these libraries and templates. This all has to be input somehow. Did you prepare the libraries and templates all by yourself?

Wünsch: No. Tebis Implementation helped us with that. The libraries and templates were prepared over roughly 20 days. A colleague and I were closely involved in this process. Then there were eight project implementation days. Five NC programmers and two employees from data processing attended a special training program.

// Wasn't that pretty expensive? Mr. Volkmar, what do you think of this as a sales manager?

Volkmar: Well, our boss, Thomas Müller always says, "In the end, it's not the cheapest solution, but the most cost-effective one that counts." And the cost-to-benefit ratio is outstanding. NC programs that we used to prepare in 40 to 60 minutes now only take 10 to 15 minutes to create. The parts get to the machine faster. The high degree of standardization prevents errors, and the quality standard remains high throughout. Standard tools are consistently used, significantly reducing tool costs.

// You mentioned before that you didn't send only NC programmers to this training but data processing employees as well. Why?

Volkmar: This is very closely related to our organizational structures. In our company, work preparation is performed in the data processing department. Since data processing is automated and very user-friendly, work preparation can be integrated much more closely in the NC process. We have moved some work steps forward. For example, data import and feature assignment of the holes are performed entirely in work preparation. The programmers assign features to the pockets to be milled, and assign the corresponding machining specification. All of this is accomplished in a highly efficient process that benefits us greatly, and that we could no longer do without in our daily work.

Our website provides detailed information on how best to use your resources with the Tebis 2.5D process solution.
http://www.tebis.com/en/processes/processes-in-real-life/automated-25d-machining-1/

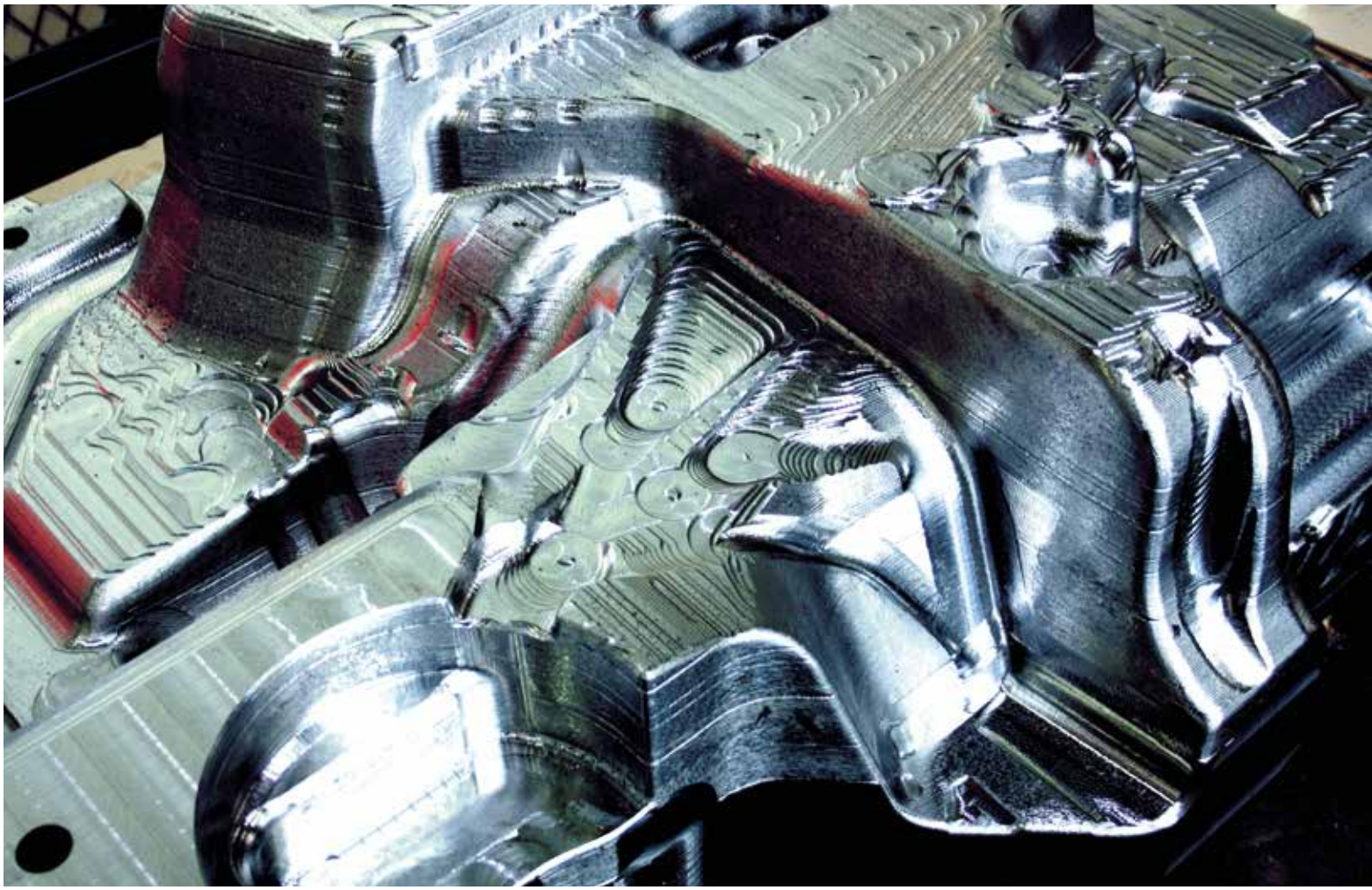
RSB

More information on RSB Rationelle Stahlbearbeitung can be found in our success story on pp. 10-12.

SUCCESS STORY
RSB RATIONELLE STAHLBEARBEITUNG, GERMANY

Fast and reliable

Since it was founded in 1998, RSB Rationelle Stahlbearbeitung, a medium-sized company in Merkers, Thuringia, has always approached new market conditions with care and foresight. The company has grown from a simple metal-cutting operation with inventory management to a comprehensive system provider, quickly and flexibly supplying the right solution for every customer requirement in die and mold manufacturing and mechanical engineering.



Originally, 10 employees manufactured raw material on 15 band saws, primarily for mold manufacturing. The Thuringian company had already expanded its portfolio with CNC machining in 1999, increasing its personnel to 70. This enabled company founder Thomas Müller and his team to take over the next steps in the process chain: preparing the plate material, milling it cubically, and getting it ready for machining. The finished product could now be delivered much faster. And RSB has continuously expanded its portfolio since then.

Sales Manager Arno Volkmar (left) and NC Programmer Ralf Wünsch (center), both from RSB Rationelle Stahlbearbeitung, and Area Sales Manager Christian Apel (right), Tebis AG.

Broad product spectrum

Customer requirements are currently met by 185 employees in 5 departments. Services include flame cutting, sawing, flat grinding, 3-, 4- and 5-axis CNC machining, subcontracting, stress-relief heat treatment, welding, blast cleaning and paint coating. In addition, the product spectrum includes the specific manufacturing of standard mold and die blanks, mold assemblies, die sets and precision flat steels. Since 2014, RSB has also made a name for itself along with its affiliate, VARIO-Metall, in pre-roughing of mold plates and inserts. Overall, the company anticipates monthly machine run times of roughly 15,000 hours. Twenty-five machine centers of all types and sizes are distributed over a production area of more than 10,000 square meters. Especially remarkable is that only 20% of sales are from manufacturing standard blanks. Far more, roughly 80% are from special and individual parts which can take on different forms and place especially high demands on planning and manufacturing.

Service oriented, with outstanding team spirit

Procedures are strictly organized. The sales department checks the inquiry, prepares the order drawing and specifies the individual manufacturing steps. The employees in data management prepare the models for the NC programmers. The NC programmers then send the finished programs to manufacturing with the drawing showing the exact requirements. Everything is set up for maximum efficiency in the machine building as well. Employees operate the machines around the clock in a three-shift operation. RSB emphasizes comprehensive quality assurance: Only one machine operator per shift is responsible for each machine. A powerful ERP system ensures that all process participants can always see the big picture. Employees also compare the calculated and actual machining times after completing the order. This enables advance planning of delivery deadlines; every customer can reserve capacity long before actual data entry. A modern online store, with integrated configurator for L-plates and die sets, makes the order process very convenient for customers and dealers. And anyone in need of a quick response doesn't have to wait long: 90% of all inquiries are answered on the same day. Sales Manager Arno Volkmar says his colleagues are the ones who ensure the company's success. "We could never work so stringently without our highly motivated team." And personnel turnover is very low. Many former trainees, such as NC Programmer Ralf Wünsch, are still working at the company.

Tebis: die-cast recommendation

The expansion of the product spectrum also increases the demands on the software solutions. The topic of 3D milling began to take on greater importance. "At some point we reached a ceiling with our old CAD/CAM software," explains Wünsch. "We had find another solution by 2011 at the latest. At the time, we were milling mold assemblies and mold plates for a larger manufacturer. The data volumes were simply too large; some files could no longer even be opened. And if it finally worked, we might have just barely been able to do the roughing. But in the end, everything ground to a halt during finishing at the latest." The customer recommended trying Tebis. RSB ordered a trial installation—and Tebis won the day, not just for 3D milling. Tebis also scored with the solution for automated 2.5D machining (read the extensive interview with NC Programmer Ralf Wünsch and Sales Manager Arno Volkmar on pp. 8-9). RSB finally switched over completely to Tebis, operating six workstations in 2012.

The bottom line after four years: thoroughly positive

Over the course of introducing the new software solution, RSB closely examined the existing processes together with Tebis, and restructured them where necessary. Tebis consultants participated with a detailed potential analysis, as did Tebis implementers who helped transform the results of the analysis into simple and clear procedures. "We already benefited greatly just from the restructuring," says Volkmar. "For example, the entire tool inventory was significantly reduced, and is now represented in a virtual library. This lets us use the tools much more efficiently. A large number of individual tools have been replaced with standard tools and just a few special tools. We have also revised and simplified the postprocessors." Wunsch adds: "And the integrated template system means we no longer have to spend a lot of time with trial and error in NC programming. We know right away which templates to select for which machining operation." Volkmar sees the high degree of process reliability as another positive aspect of Tebis. "Collision checking monitors the entire tool and exchanges it automatically if a collision is detected. This allows us to always use the shortest possible tools, which is extremely cost-effective." Tebis also has a lot to offer in terms of performance, surface

Customers benefit from the outstanding interaction of RSB and affiliate VARIO-Metall in pre-roughing.

SUCCESS STORY
RSB RATIONELLE STAHLBEARBEITUNG, GERMANY

Pre-roughing.

Even large, heavy steel parts such as this injection molding tool measuring 2,000 x 1,800 x 300 mm, are included in RSB's portfolio.

quality and interfaces. Wünsch notes: "200-megabyte files open in 15 seconds. The high surface quality is remarkable; there are essentially no more surface defects. And the direct interfaces, for example, to Catia and NX, can be individually configured, and can always be adapted to th customers' special requirements."

"At the end of the day, it's not the least expensive solution, but the most cost-effective one that counts. For software solutions, that clearly means Tebis for us."

Synergy effects in pre-roughing

Mold manufacturers looking for a single, reliable source for all steps before heat treatment—squaring, deep-hole drilling and pre-roughing—to find it at RSB. RSB's close cooperation with its nearly 10 years' younger affiliate VARIO-Metall, which started its business in 2007, is highly beneficial here. Like RSB, VARIO-Metall was founded by Thomas Müller. VARIO-Metall specializes in deep-hole drill machining of mold plates and inserts for plastic and die casting mold manufacturing as well as in all deep-hole drilling tasks for mechanical engineering. RSB and VARIO-Metall complement each other perfectly: Vario-Metall performs squaring and deep-hole drilling of the die inserts, and RSB then roughs the parts. The fact that both companies share the same site and have the same management ensures short transport and communications paths. The economic benefit is quite substantial. "Our customers greatly reduce the load on their own manufacturing capacity, save time and machining expenditures, and reduce their transport costs," says Volkmar.

This process also provides exceptional part quality. "We mill with a fixed stock allowance, thus ensuring uniform residual stock," explains Wünsch. "The last machining step is performed with a small tool and the largest possible rounding radii, thus avoiding sharp corners. The workpieces are then optimally prepared for subsequent milling." Another advantage is the fast machining. "We use high-feed cutters, working with a small stepover and high feed rate. Basically, we get everything out of the machine that it's capable of doing."

Thomas Müller, managing director and company founder, RSB Rationelle Stahlbearbeitung and VARIO-Metall

IN A NUTSHELL

- RSB Rationelle Stahlbearbeitung offers a broad product portfolio and is characterized by a high degree of flexibility.
- The company is a single source for squaring, deep-hole drilling and pre-roughing.
- RSB Rationelle Stahlbearbeitung has completely automated its 2.5D process using Tebis.
- Tebis Consultants performed a detailed potential analysis at RSB.
- Tebis implementers helped to translate the analysis results into simple and straightforward processes.

SUCCESS STORY
M. REUSS GMBH, GERMANY

Continuity and advancement is the recipe for success

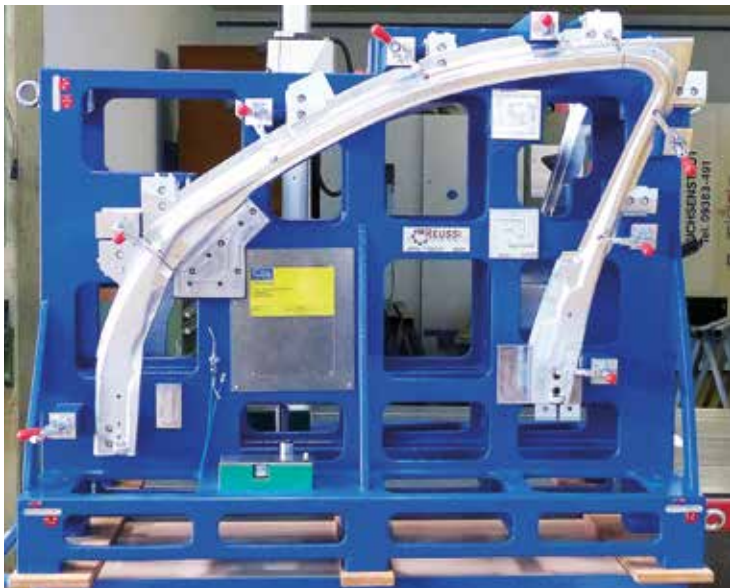
M. Reuss GmbH, with headquarters in Schwarzach am Main, is in its third generation of model, mold and die manufacturing with a broad product spectrum. The company supports its customers from concept to the product being ready for series production, and juggles the conflicting demands of increasingly stringent requirements on the one hand and increasing deadline pressure on the other. M. Reuss successfully meets this challenge by leveraging its more than 65 years of experience and by continuously adjusting its internal processes.

M. Reuss represents a confluence of the traditional and the modern, as is readily evident in a tour through the two buildings with their 2800 m² (30138 sqft) floor space. The joiner's workbench converted to a lathe decades ago by company founder Max Reuss can still be seen along with other inventions of the founder. Today, ultramodern parts are manufactured to the highest precision by seven 5-axis machining centers, such as DMC 105 V linear gantry milling centers and the DMF 260-11 linear traveling column machining center. Models, molds and tools are designed on 4 CATIA workstations and 15 Tebis workstations. The use of Tebis is now almost a tradition at M. Reuss. The company has been using the CAD/CAM system since 1990 and is thus one of the earlier Tebis users—initially, Tebis ran on another historical object, a 286 PC. Currently, nearly 90% of M. Reuss' production is for the automotive industry, primarily interior dies of aluminum with pneumatic or hydraulic actuation, from the prototype to series production, cubing elements or gauges.

First process and investment consulting

M. Reuss acquired its first Huron KX 100 5-axis gantry milling center in 2006. Shortly after investing in additional 5-axis centers, it proved that because the machines manufactured at such a high rate, slower internal processes were no longer able to keep up with them. Corporate management reached out for help to fully exploit the capacity of a DMC 105 linear. The first process and investment consulting project was started with the advisors from Tebis Consulting in 2008. The objective at that time was to modify the processes in such a way as to justify the investment in the machine.

Typical parts at M. Reuss: Test gauge for window frame gauges and cubing side panels, prepared for automotive suppliers.



SUCCESS STORY
M. REUSS GMBH, GERMANY

Project Manager Achim Brückner designing a molding tool for a car seat at the Tebis design workstation. Tebis is used in a floating environment at M. Reuss.

Two Tebis Viewer stations in accounting have significantly improved the flow of information between design and manufacturing and accounting. This shows that the consistency of prepared processes has reached throughout the company.

The analysis of the current situation yielded a detailed list of weaknesses, especially in the flow of information, work procedures, detailed project and machine planning, and tool management. Today, Markus Reuss lists the following aspects as the most important results from the consultation: Paperless manufacturing with prepared templates, and especially automation and standardization in design and calculation of the processes, which resulted in more effective manufacturing. It should also be mentioned that the machine operators at M. Reuss perform NC programming directly at the machine. In-shop programming in Tebis is common. Managing Director Markus Reuss sees benefits in the performance of demanding work directly at the CNC machine and in an interesting and varied workplace for personnel. There is also direct feedback of the experience and knowledge of the machine operators in the programming. Structures and procedures must be clear to enable this model to function and prevent machine downtimes and more frequent questions. Great emphasis was therefore placed on optimal interaction between design and NC programming. The Tebis consultants recommended that M. Reuss make more comprehensive use of Tebis technology, specifically targeting implementation to accelerate processes and optimize collaboration in these areas.

Tebis technology increases productivity

Work with uniform coloring and with features was introduced in design. Tebis implementers set up so-called NCSets for M. Reuss, which can be used to permanently assign or variably describe the exact technical machining sequence for a specific type of machining (such as creating threads or toleranced fits) based on the associated individual functions (such as first centering, then drilling a core hole, then tapping the thread etc.) with all manufacturing parameters and the corresponding required tools. In addition, templates (NCJobs) were set up in which the machining operations were defined for classes of parts with similar structures and tools. This preparatory work enabled the automation and standardization of NC preparation and NC programming. Tebis personnel also imported all the tools into the Tebis tool library. The results were increased efficiency, reduced machine downtimes, and shorter throughput times. The investment in Tebis Consulting and Services paid for itself in the same year, thus exceeding all expectations. 2.5D drilling tools and manual change tools were also included in the Tebis tool library, along with all of the standard machine tools.

Tebis services as a pattern

An extra benefit was that M. Reuss could use the process optimization system set up by Tebis personnel as a type of pattern, which it then applied five times to additional 5-axis milling centers procured over the next five years. Without external help from Tebis, personnel were able to work with feature detection, set up NCSets and templates and add additional tools to the tool library, which now holds several thousand tool combinations. Thanks to the process and investment advice from Tebis Consulting, M. Reuss could invest in new machines and technology even during the 2009-2010 global financial crisis to continuously improve our financial position despite the collapsed market at the time," Markus Reuss explains.

A treat for personnel

The goals set at the start of the project were achieved and the defined measures implemented. What's more, "they serve as the foundation for the work that is still continuing today," says Markus Reuss. Yet there were hurdles that had to be overcome at M. Reuss. Initially, corporate management was confronted not only with the required investment in Tebis AG's consulting and services, but they also feared that the project would drain much of the capacity from daily operations. The affected personnel initially had negative opinions of the changes—a completely normal response, as Jens Lüdtke, head of Tebis Consulting, well knows. "We are confronted with concerns from personnel regarding impending changes in nearly all of our projects. We therefore consider the inclusion of everyone affected to be one of our most important tasks." But M. Reuss personnel were soon impressed by the previously unheard-of speed with which parts can be designed and programmed

in Tebis when the full potential of the software is exploited. And there was a "treat" for the employees, as Markus Reuss puts it, at the conclusion of the project: NC programmers and machine operators now receive a reward for every hour their machines run unattended outside of work hours. Today there is no question: The processes have more than caught up with the machines.

New consulting project for new challenges

A second consulting project has been underway at M. Reuss since October 2015. "It's about accelerating processes again," explains Markus Reuss. Product requirements continue to increase, and the competition is not sleeping. In the automotive industry as well, more and more similar variants are required and the demand for aluminum dies is increasing, placing new demands on automation.

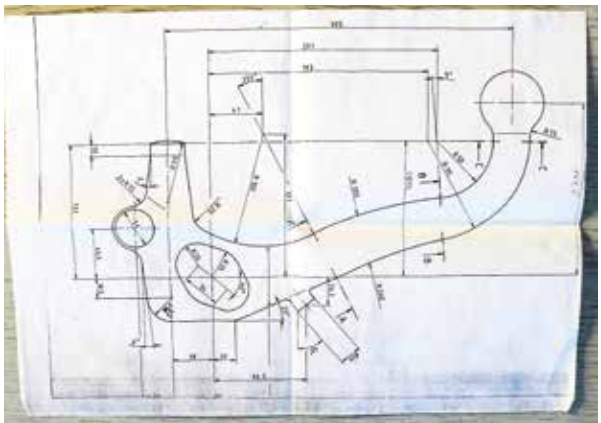
To reduce setup times, M. Reuss wants to work with pallet changers and multiple setup in the future. First, a 5-axis machining center with five tables and 260 tools will be implemented in the company's single-part manufacturing in conjunction with the zero-point setup system that will be prepared by then. "The investment must pay for itself," explains Markus Reuss. As before, he is again relying on Tebis Consulting. This reflects the company's underlying principle: combining continuity and advancement.

2.5D drilling tools and manual change tools were also included in the Tebis tool library, along with all of the standard machine tools.

Managing Directors of M. Reuss since 2000:
From left: brothers Matthias, master mold maker, and Markus Reuss, mechanical engineer (University of Applied Sciences).

TEBIS: SIMPLE AND INTUITIVE

Matthias Reuss is a master mold maker and is expanding this aspect of his operation with two additional master mold makers. He describes the activities of a mold maker as extremely varied and interesting. Designers or CNC millwrights receive several practice tasks in a one-week placement exercise before being employed at M. Reuss. One of the tasks is to implement the sketch of a trailer hitch as a 3D model in Tebis and to design the necessary free-form surfaces. "This task provides a very good estimate within a week of the applicant's spatial perception, implementation of problems, learning ability and development potential. This provides certainty on both sides," says Markus Reuss. "The prospective trainees/specialists praise Tebis as being very simple and intuitive to operate," he stresses. Markus Reuss personally appreciates the continuity and comprehensive functionality of Tebis.



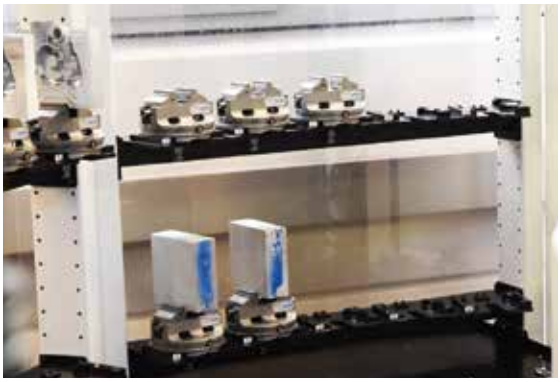
This sketch of a trailer hitch, a journeyman's piece, is a part of the placement exercise. Prospective CAD/CAM specialists at M. Reuss have to implement this as a 3D model in Tebis.

IN A NUTSHELL

- Tebis Consulting: Modifying processes to justify investments in machines.
- Analysis of actual situation takes a close look at processes. Current weaknesses can be detected.
- Package of measures developed. Key aspect: Systematic standardization and automation, paperless manufacturing.
- Tebis implementers set up templates for technical processing sequences and part classes.
- Result: Thanks to the process and investment advice from Tebis Consulting, M. Reuss could invest in new machines and technology even during the 2009-2010 crisis to continuously improve its financial position despite the collapsed market.

SUCCESS STORY
PS-PROTOTYPENSCHMIEDE, GERMANY

Double your productivity with Tebis and Proleis



The XSM 600U with 80 pallet spaces (top) and a linear robot unit with 267 pallet spaces and three different pallet sizes (bottom). The linear unit loads the HSM 600U LP and the XSM600U LP.

The DEA PIONEER 05.06.04 measuring machine with PC-DMIS with Hexagon measuring system and 8-way probe change bank for quality control—directly connected to Tebis Viewer systems.

When young entrepreneurs Rolf Hädicke and Mark Gras started PS-Prototypenschmiede less than three years ago, they were in perfect agreement on one point: "Just giving it a whirl" was not their approach. The company's success was ensured right from the start with a future-oriented manufacturing concept that had clear structures and standardized processes. The plan worked: The objectives of their business plan were fully achieved in 2014, the company's first year of operation.

The specialist for prototypes and pre-series parts

The core competence of PS-Prototypenschmiede is manufacturing aluminum parts as a system supplier. They primarily manufacture prototypes and pre-series parts. However, the company has also made a name for itself in series production, especially as a "savior in the hour of need." Hädicke and Gras and their team are always on hand to rescue a customer's timeline on short notice when the customer is in a bind. These two managing directors can work highly efficiently, remain very flexible and still deliver top quality. This is because PS-Prototypenschmiede doesn't focus on the "what" in manufacturing but rather on the "how." The key is automation.

It's as though the parts manufacture themselves

We get a first impression of the company's "recipe for success" from a visit to the machine building. Everything is essentially taking place at once: Multiple workpieces are being set up simultaneously while other workpieces are being machined in full swing. The three 5-axis high-speed simultaneous milling machines, the Mikron XSM 600U, the Mikron HSM 600U LP and the brand-new Mikron XSM 600U LP are running at full speed. The processes behind the scenes are at least as interesting as the high-tech machines themselves.

Anyone who thinks that NC automation is only for large companies should take a closer look at PS-Prototypenschmiede in Leinfelden-Echterdingen near Stuttgart. With only six employees, this innovative company relies entirely on standardization and manufacturing optimization.

The two managing directors, "sales guy" Rolf Hädicke and "technology guy" Mark Gras with the Mikron XSM 600U, the first machine in their collection.

All of the machines have integral pallet changers, so up to three zero-point clamping systems with diameters of 50 x 50, 150 x 150 or 240 x 240 millimeters can be used depending on the machine.All of the machining and tool data as well as the exact position of the workpiece are saved on chips integrated directly in the pallets. This information can be automatically called up and transferred to the machine. When the workpieces arrive at the machine—at exactly the right time, of course—the correct NC program is already in place. The machine manufacturer's cell manager is directly accessed without the need to manually start up of the machines. A linear unit loads the machines and exchanges the workpieces. But how can these processes function so smoothly? How can such good and reliable NC programs be created so quickly?

"Sales guy" Hädicke has the answer. "First of all, we obviously have the team we need. Our personnel have the best possible training and always give 1000%. But we also need a powerful software tool that completely models our automation process, and a system that allows us to plan and control overall manufacturing." The CAD/CAM software PS-Prototypenschmiede relies on is Tebis. The company decided on the Proleis process, instrumentation and control system developed by ID GmbH for planning and control. Neither Tebis nor Proleis were on board when the company was founded. So Hadicke and Gras contacted Tebis, which both sells and integrates the Proleis solution.

Tebis beats out five competitors

"We quickly reached our limits trying out automation with our old CAD/CAM system," explains "technical guy" Gras. "Programming was also extremely cumbersome. We were completely unable to optimally utilize our high-end machines. We didn't take any shortcuts when deciding on a new system: The software had to be absolutely perfect; we didn't want to make any mistakes. We therefore went right ahead and thoroughly tested six systems at once." Gras explains why they finally decided on Tebis: "The main reason was certainly the fact that Tebis completely models our entire automation process. Tebis puts a lot of emphasis on automation. The entire milling logic is also convincing. Just a few examples: The simulation methods and the virtual machine not only provide for collision checking, but can also be ideally used already in planning. The Tebis feature scanner automatically detects feature types such as holes, threads and toleranced fits and summarizes these in manufacturing categories. The Tebis libraries, such as the tool table with cutting parameters, and the template methods enable absolutely standardized NC programming. The templates are set up once and new programmers can work very efficiently with them after just a brief training period."

Solutions directly from the manufacturer

"A personally appealing aspect for us is that Tebis is also a manufacturer itself," continues Hädicke. "Manufacturers simply identify completely differently with their product than dealers. This is immediately noticeable with Tebis. The customer support and service personnel are always on top

SUCCESS STORY
PS-PROTOTYPENSCHMIEDE, GERMANY

Typical A-series parts milled from solid material with maximum precision thanks to high-speed cutters (HSC).

Left: Four inserts with a total of two hours machining time, milled in a single setup.
Right: Shock mounts in two variants, one hour machining time per pair, one setup.

of things. They really want to help us and they offer solutions that are exactly customized for our processes."

Direct interface with Proleis

"A giant plus was also the integration with Proleis," explains Gras. "The NC programs created in Tebis are linked to Proleis and are matched with the manufacturing control center. Many processes can be started directly from Tebis. For example, when the NC programmer outputs his programs, they already appear at the machine operator, who can decisively assign them. Without Proleis, the processes in the machine building couldn't function in this way."

Proleis ensures process-oriented manufacturing control

PS-Prototypenschmiede plans the entire process from data entry to product delivery directly in Proleis. All the available resources such as personnel, tools and machines are represented in Proleis. For example, tools are automatically replaced based on their service life. Templates for manufacturing processes, including empirical values for expenditures, are stored. When an order is placed, specific deadlines such as order receipt, data entry and completion then form the planning milestones. These are automatically compared with the actual capacities available as processing continues. The calculated and actual times required are continuously synchronized. All ongoing processes are accounted for. Which employees are currently working on which tasks? What is the current machine utilization? Which tools are being used? The manufacturing data are thus always available in a clear and understandable process structure.

High efficiency

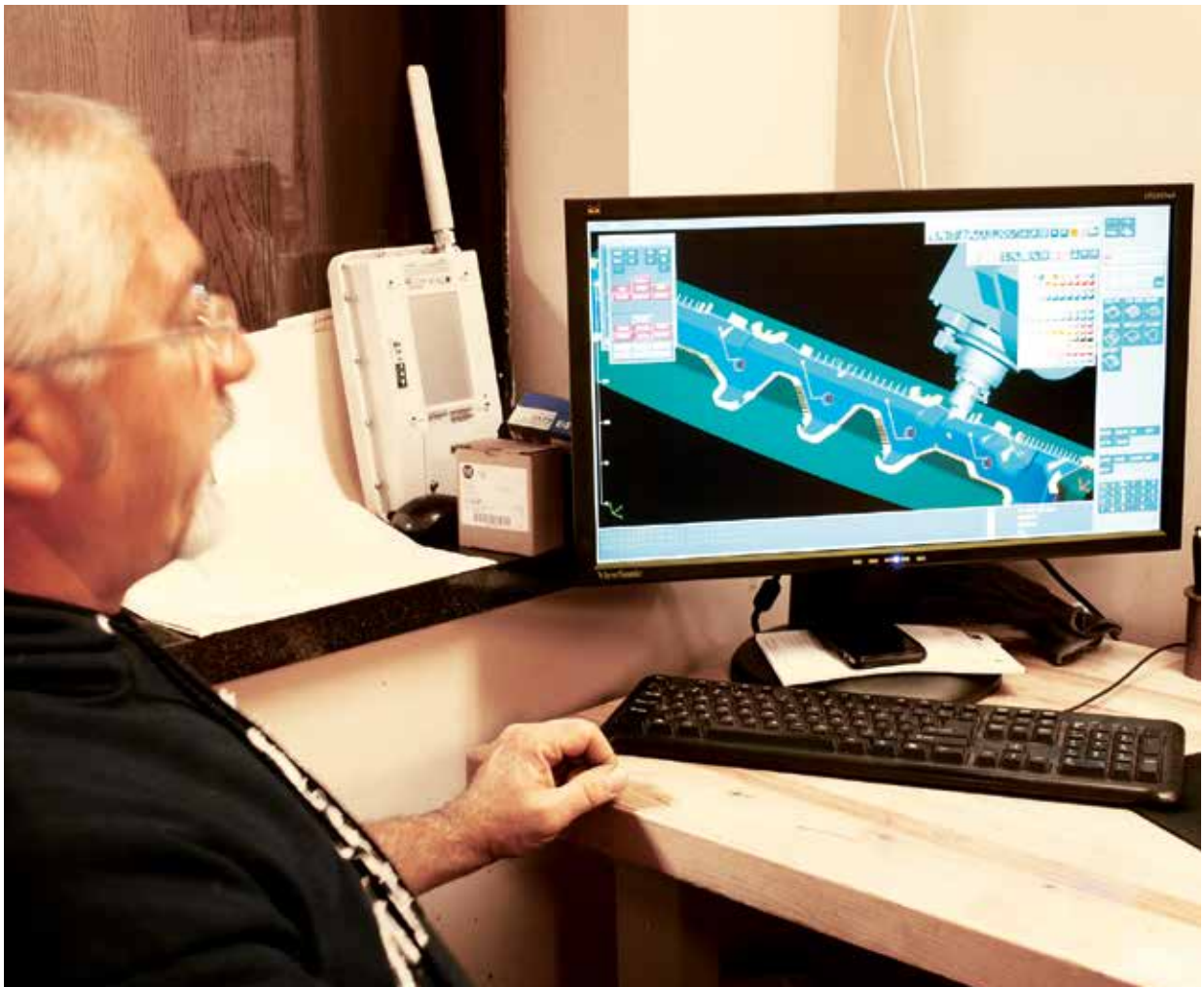
"We have been actively using Tebis since August 2015. With the help of Tebis and Proleis, our machines are now operating at 90% capacity," Hädicke enthuses. "We now need only three to four weeks for machining operations that used to take six to eight weeks." Different individual requirements can be integrated in this automation concept. We are always flexible and can sometimes squeeze in individual machining steps without compromising the overall process or having machines standing still," concludes Hädicke. "This frees up our personnel from time-consuming and error-prone routine tasks, enabling them to better focus on their areas of expertise."

IN A NUTSHELL

- PS-Prototypenschmiede specializes in prototypes and pre-series parts.
- The company relies entirely on automation and standardization.
- The entire manufacturing process is planned in the Proleis MES system.
- All manufacturing is chip-controlled.
- As a "savior in the hour of need," PS-Prototypenschmiede rescues customers' timelines.

Precision programming enriches the 3D laser-cutting process

No company feels the pain of shrinking lead times more than prototype shops. Case in point: Accu-Rite Industries, where the adoption of high-speed 3D laser-cutting technology paired with CAD/CAM programming software represent clear success triggers.



Accu-Rite Programmer Mike Winkler explains how the programmed CAD model (including rib geometry) can be transferred to the cutting device and finally to the formulas for the cutting paths with just a few mouse clicks. The software accounts for the kinematics and geometry of the cutting machine and cutting head, thus preventing collisions.

SUCCESS STORY
ACCU-RITE INDUSTRIES, USA

The requirements

Design and manufacture of seating components and assemblies represent some of the trickiest aspects of automobile production. Simply stated, seats challenge engineers as they must simultaneously satisfy goals related to safety and health, as well as driver and passenger comfort. Seating components— including their many stamped and fabricated metal parts—must account for ergonomic considerations, vibration suppression and strength. Precision Programming Enriches the 3D Laser-Cutting Process Key to the remarkable advances made in automotive-seating engineering is prototype development, the specialty of Accu-Rite Industries, Shelby Township, MI. The firm works with several OEMs and Tier One suppliers to develop reclining-mechanism components, slide tracks, shells and frame parts, reinforcing brackets, hinges, latches and locks. Amongst the tools in the firm's proverbial manufacturing toolbox are, of course, stamping presses (350- to 750-ton hydraulic models), as well as press brakes, machining centers and coordinate-measuring machines. The newest star on its shop floor: a five-axis 3D laser-cutting machine, a TLH-series model from NTC America, with a work envelope of 177 by 45 by 20 in. Equipped with a 2-kW fiber laser, the state-of-the-art workhorse boasts cutting and positional accuracy rated to 0.0015 in., and a pallet changer to optimize throughput. It takes Accu-Rite's ability to trim stamped prototype parts to a new level of efficiency and quality. "We need the highest levels of accuracy available in the industry," says Accu-Rite vice president John Loudon, "to keep up with demands from our customers." Tolerances, he says, often are specified at plus or minus 0.05 mm on stamped parts.

The onus falls to programming

The newest NTC machine joins four CO_2-laser five-axis cutting machines on the Accu-Rite floor, all primarily used to trim prototype stamped parts. The shop processes mostly high-strength steels (some advanced high-strength steels such as dual-phase alloys) to 3/8 in. thick. Lately, though, notes company president Kirko Mickovski, customers have been opting for aluminum seating components—"a perfect fit for the new fiber-laser system," Mickovski notes. "The fiber-laser machine cuts aluminum stampings up to four twimes faster

Even though most of Accu-Rite's prototypes are made of high-strength steel, the percentage of aluminum mold parts is growing. Winkler points out several complex contours that the 5-axis laser cutting machines have to approach. Tebis CAM software supports the process to ensure compliance with the required narrow tolerances for the cutting angle and edge quality.

than our CO2 laser machines, and cuts twice as fast on steel." With that much cutting speed at the ready, part of the responsibility for moving work quickly through the shop falls to the laserprogramming function. And Loudon and Mickovski couldn't be more pleased with the programming solution they invested in several years ago—CAD/CAM software from German-based Tebis (with U.S. operations in Troy, MI). Tebis software, known better for its functionality related to CNC machining, also features a CAM module that drives five-axis laser cutting. Loaded with unique and carefully engineered design capabilities aimed at this tricky application, the software can streamline the cutting process while providing pinpoint accuracy, as well as provide reliable and efficient collision avoidance. It gets clear nods of approval from Accu-Rite management. The seal of approval: "We trust Tebis with our millions of dollars invested in our state-of-the-art laser-cutting equipment," says Mickovski.

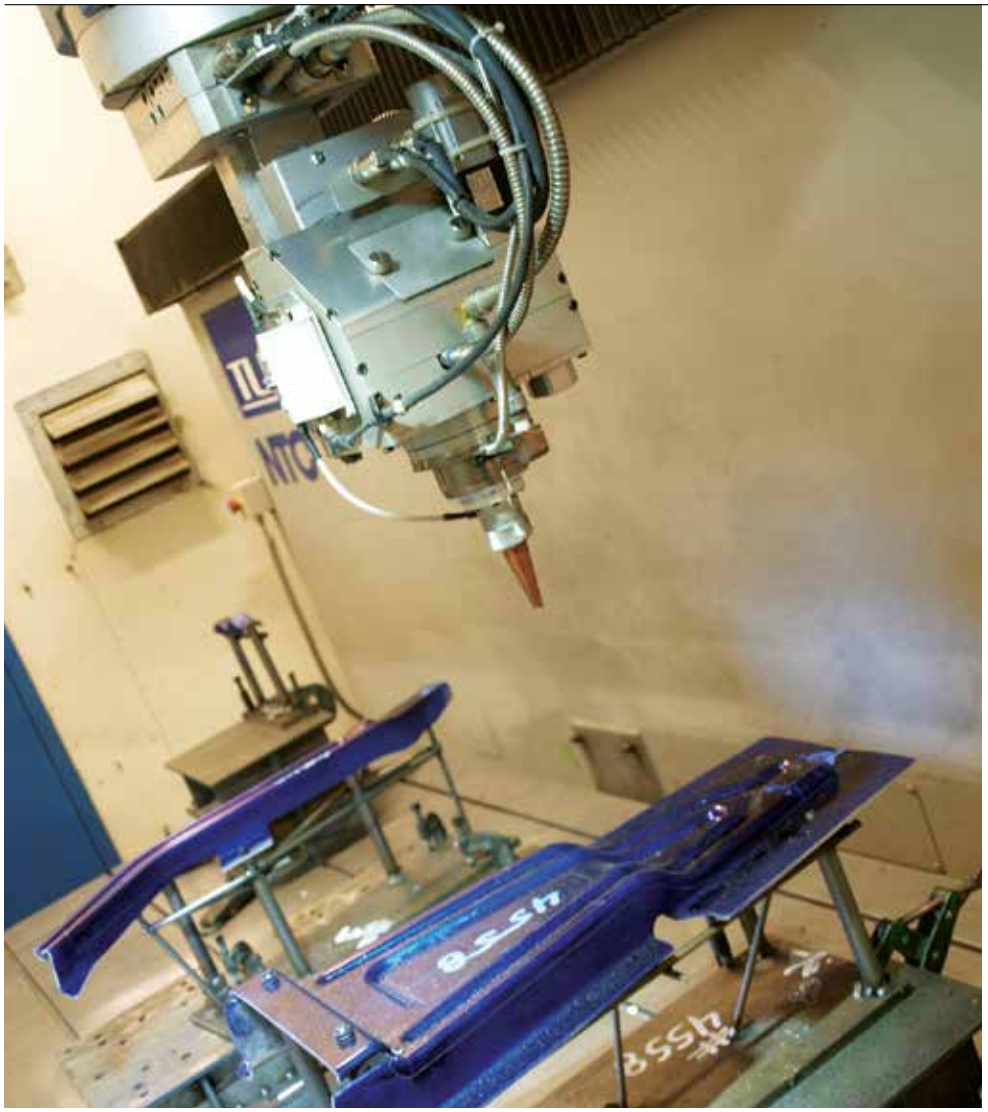
Less air time, more run time

Among the noted features in the Tebis lasercutting CAM module, as noted by Accu-Rite programmer Mike Winkler: With just a few mouse clicks, programming moves from the CAD part model to cutting-fixture design (with supporting-rib geometry included), and on to cut-path formulation. The software considers cutting-machine and cutting-head kinematics and geometry to eliminate collision hazards, while also minimizing major rotational movements. Winkler employs the software to program all five of the firm's 3D laser-cutting machines; machine data—physical dimensions as well as cutting-process capabilities—is contained within the Tebis database. Winkler also notes that the CAM software minimizes laser-head approach and retract movements, "while ensuring the head isn't spinning excessively," he says. "We're minimizing 'air time' and optimizing cutting time." With programming and cutting time optimized, quick turnaround to customers becomes less of a worry, say Mickovski and Loudon. "We don't use kirksite stamping tools, we use steel, because our lot sizes are larger than other types of prototype runs," says Loudon. "This is because seating parts are safety related. Our part runs are relative large (300 to 400 parts is typical), requiring optimum efficiency from the laser-cutting process."

We recently completed a package of 140 part numbers," adds Mickovski. "We ran 60,000 parts, and had the job programmed, through tool development and stamping, and then through the laser-cutting department and on to shopping in just 6 weeks.

Huge time savings

With updates in collision avoidance and other features added to Tebis via recent software updates, programming is faster than ever—"maybe 30 percent faster than it was several years ago," says Winkler, "and the process is more efficient. I'm confident that the programs developed in the office, offline, will run the first time on the shop floor. That means we're not going back and forth from programming to production to fine-tune the lasers. This way, the cutting machines can work on the next job, making money, rather than waiting for program tweaks." Winkler says that he can program some of the shop's simpler parts in just 15 min., and complex parts take only an hour or so of programming time. Out on the floor, Accu-Rite laser-machine operators trust that



Winkler's programs will run correctly, the first time. "In the past," says Winkler, "they used to dry-run every job with the cutting head retracted to a safe position, to ensure the programs were sound, and then make adjustments as needed. They no longer have to perform that wasteful step, which represents a huge time savings--probably 30 min. on every job." Should the operator on the floor, in that rare instance, need to make any modifications to the NC program at the machine, Winkler notes that those modifications can easily be reversed back into the NC job via its relatively simple editing functions.

Digital data

In addition to laser-cutting productivity gains through the use of Tebis software, Winkler also notes improvements in cut quality and in eliminating extra and excessive laser-head movement. This adds up to minimal, if any, secondary operations to clean up cut edges, and reduces maintenance concerns with the cutting equipment.

"Compared to other CAM programs that triangulate the data to derive cut paths," says Winkler, who has been programming Accu-Rite's lasers since the firm brought the technology inhouse in 1998, "Tebis uses digital data. This provides greatly improved blending of data points. So, our cuts look better and edge quality is optimized—we rarely if ever have to post-cut sand or machine the cut edges before shipping the parts off to our customers." Also, the laser-cutting machines run smoothly, with no head whipping or excessive movement, thanks to the built-in knowledge in the Tebis database. The software, for example, automatically monitors the cutting machine's kinematic properties, including tilting limits and preferred starting position. This not only allows it to calculate minimal yet sufficient evasive movements to avoid collisions, but also to minimize head movement. This increases run time while helping to reduce the amount of maintenance we have to perform on the cutting machines."

IN A NUTSHELL

- Accu-Rite Industries designs and manufactures seat parts and assemblies for the automotive industry.
- The company ensures its products are manufactured with the highest precision.
- Accu-Rite relies on Tebis Software for 5-axis laser cutting.
- Tebis enabled optimization of machine run times and shorter programming times.
- Cutting quality has improved significantly.

NEWS

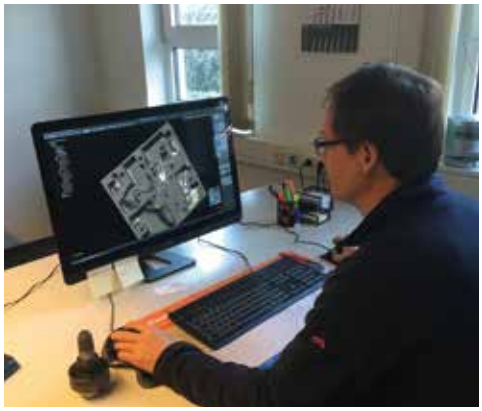
A fully operable system in only four weeks

LÜNTECH GmbH Werther, Germany, specializes in wire EDM and sinker EDM. LÜNTECH purchased electrodes until late 2015, but then decided to design and manufacture the electrodes in-house. During the search for a suitable system, nearby company CNC Speedform recommended Tebis. In addition to Tebis's compatibility with the DCAM eroding software already used in the company, a key selection criterion was Tebis' high implementation and support competence. Over a period of only four weeks in January and February 2016, a Tebis employee set up the workstation for electrode manufacturing, installed and implemented the system, and conducted internal training.

Back to the profit zone

When we reported on Formbar AG under the title "The courage to change," this Swiss company was just in the midst of undergoing a critical change. Formbar AG had considerably expanded its product spectrum under the management of Kaspar Hürlimann, managing director since 2012. Instead of specializing primarily in large orders from the foundry industry, the product spectrum now also included parts for the motor sports, aerospace and automotive industries. The Swiss company had to undertake investments to be able to continue consistently on this path. They procured a Zimmermann FZ33 5-axis CNC-gantry milling machine and also invested heavily in Tebis Software and Services. The courage to change paid off: The company was able to increase its sales in 2016 by 40% over the previous year, has double the machine run times with the same personnel, and enjoys highly motivated employees. Kaspar Hürlimann was one of the guest speakers at last year's Tebis Open House.

CAM process structuring at Andreas Weise GmbH



Model and mold manufacturer Andreas Weise GmbH in Iserlohn, Germany, a Tebis customer of many years, made fundamental changes in its process structures in 2015, relying on the competence of Tebis CAM process structuring. The Tebis process structurers optimized the Tebis libraries and set up templates in the 3-axis and 2.5D areas based on typical customer parts. These templates define the corresponding processing sequences, including appropriate machines, tools and materials. Managing Director Andreas Weise says, "Our CAM programmers are much faster than before. We are using our machines more effectively and have become considerably more productive."

VW Mexico relies on Tebis for its die manufacturing

Tebis was able to provide VW with a convincing and coherent overall concept consisting of both services and specific software solutions. Tebis worked with VW personnel to prepare a comprehensive process and structure analysis in which all process and productivity gaps were identified and existing potentials analyzed. The appropriate software configurations and implementation measures were derived based on these results. Tebis assumed responsibility for project management during the implementation phase. Tebis experts trained the personnel on site and provided support in reorganizing the entire work sequence, from order receipt to the finished product, and in establishing standardized procedures for automated NC manufacturing. The Tebis solution for die surface design will be introduced in 2017. VW expects a significant increase in efficiency from the collaboration with Tebis. Some examples of the defined goals are increasing machine run time, improving process reliability and reducing tryout expenses. The project partners anticipate that the investment costs will be fully amortized over two years.

NEWS

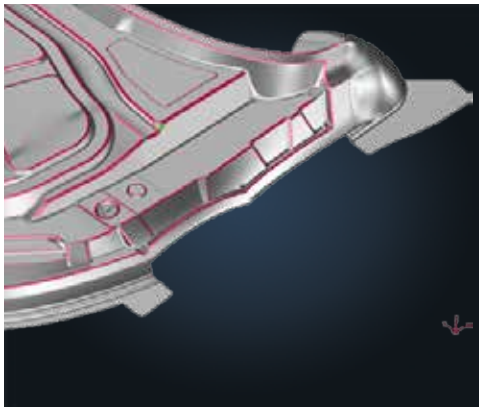
Tebis opens representative office in the heart of Tokyo

Tebis is expanding its presence in the land of the rising sun with a new representative office that opened July 14, 2016. Nearly 200 companies in Japan are now using Tebis. They include most of the OEMs in the automotive industry as well as their tier-1 and tier-2 suppliers.

"A development like this would have been unthinkable without our sales partner, Marubeni Information Systems Co., Ltd.," says Gerardo Müller, director of channel sales at Tebis. "And the potential is still far from exhausted. We intend to shorten the information paths between ourselves and Marubeni with the new representative office."

The prerequisites for last are perfect: The new Tebis office directly adjoins the space occupied by MSYS. Tebis Country Manager Christian Zierhut now supports Marubeni directly on site with his strong marketing expertise. He helps develop marketing and sales strategies that focus on national target groups, provides background information on technical and business questions, works with Tebis headquarters on the special requirements of the Japanese market, and coordinates all market-related activities.

New Tebis releases



Two new releases were on the Tebis timeline for 2016. Release 2 was delivered in April. A special highlight was the new highly efficient milling strategies. Release 3 was on the market in October. This release also includes many new functions to further optimize CAD/CAM processes.

A complete overview of the new Tebis Release 3 is on pp. 4-5.

Tebis Open House—Everything 4.0

The main theme of last year's Open House on June 16 and 17, 2016 was "Everything 4.0." The nearly 200 visitors from die, mold and model manufacturing, as well as from industrial design and mechanical engineering, had the opportunity to learn about three different 4.0 topics in presentations and at many stands: Tebis 4.0, Proleis 4.0 and Industry 4.0.

A complete report on the Tebis Open House is on pp. 30-33.

NEWS

Joe Zhou is the new managing director of Tebis UK and Tebis China

With Joe Zhou as the new managing director of Tebis UK and Tebis China, Tebis AG stresses its commitment to the British and Chinese manufacturing industries. Tebis AG would like to pursue its growth in both markets. Zhou founded Delcam's Chinese business 20 years ago and established it as one of the most important business areas within the Delcam group. He then took on the position of business development director for the Asia-Pacific area. "We are very pleased to have Mr. Zhou on board. He is building on over 20 years of business development experience in business development for CAD/CAM software and services, as well as many years of experience in research and development, including three at the Imperial College in London. I am sure that Mr. Zhou will make a significant contribution to the growth of our business in China and Great Britain," said Gerardo Mueller, director of channel sales for Tebis AG.

Aha moments at decision-maker evenings

Under the motto "Finding solutions and exploiting potential", on April 7, 2016, in Hannover and on April 14, 2016, in Romrod, both in Germany, Tebis Consultant Markus Rausch, and Product Manager Stephan Galozy, used specific examples from practice to show how efficiency in mold and die manufacturing can be significantly increased in a very short time. Die manufacturer Meco GmbH was able to increase its machine run times by 20 to 30% with process consulting from Tebis Consulting and solutions developed jointly by Tebis and Meco. The automated Tebis small-part process enabled a medium-sized automobile supplier to decrease its original manufacturing costs of €835 (approx. $895) per small part to €658 (approx. $705)—an amazing 21% reduction.

Nearly 80 participants attended the "Three partners for efficient manufacturing" workshop

Precisely coordinating the most modern die technology, highly dynamic machine concepts, and powerful process modules yields an optimal milling result. The nearly 80 participants who attended the workshop conducted by partners Aura, Röders and Tebis on April 27 and 28, 2016, in Soltau, Germany, had the opportunity to experience this live. Martin Vortmann, cooperation manager at Tebis AG, Dr. Oliver Gossel, sales manager for HSC maschines at Röders, and Henrik Marsch, head of application technology at Aura, each reported from a different perspective on the important factors for good milling quality. The high point of the event was the manufacturing of actual parts, because the practical test proved exactly what the presenters had previously explained in their presentations. Strategies, cutting data, tools and machines were combined based on the material and part geometry so that the best possible result could always be achieved.

CONTEST SOLUTION

The answer to the contest question in the last issue of TebisWorld is:
Tebis: The Process.

NEWS

Podium discussion with Jens Lüdtke at the 7th BME Forum

Jens Lüdtke, head of the VDWF work group "4.0 in die manufacturing" and head of Tebis Consulting, Chris Groger, senior manager supply chain management at Carl Zeiss SMT GmbH, Rainer Dangel, expert in mold manufacturing and author, and Alfred Graf Zedtwitz, VDMA Werkzeugbau, met on June 15, 2016, at the 7th BME Forum in Stuttgart to discuss the topic of "Die and mold manufacturing 4.0: how can the entire value creation chain benefit?" The four experts agreed that die manufacturing can only benefit from digital networking and intelligent tools. However, the topic is still too nebulous for many companies. "It is important here to clarify what Industry 4.0 means in die manufacturing and point to specific, verifiable achievements have already been made," said Lüdtke.

Help for helpers—thanks from Hannöversche Tafel

During the 2015 Christmas campaign "Donations rather than gifts," Tebis supported a total of seven projects, including Hannöversche Tafel, and sponsored the new delivery van for this charitable organization. The main task of the organization is to collect food and to distribute it to childcare facilities, schools and shelters for the homeless. According to Horst Gora from Hannöversche Tafel, smaller and medium-sized transports, supply operations, and other tasks can now be efficiently completed.

No standard solution for Industry 4.0

©Hanser/Schröder

Jens Lüdtke, head of Tebis Consulting, guided 33 participants through a workshop on Industry 4.0 in Stuttgart on June 1, 2016. This event was designed for beginners and addressed basic questions about the meaning, opportunities and risks associated with Industry 4.0 in die and mold manufacturing. Lüdtke made it clear that a standard solution for Industry 4.0 is not possible. Every company has to defined for itself which steps are expedient. What many people don't know is that subsidies are available for the necessary investments. The participants were very positive about the technical presentations by companies such as BMW, Siebenwurst and Schneider Form on how Industry 4.0 is being realized today in die and mold manufacturing.

"4.0 in die manufacturing" work group at the VDWF

After the kickoff meeting in December 2015, 10 participants met for the second "4.0 in die manufacturing" work group at Karl-Heinz Müller GmbH in Balingen, Germany, in early March. Their goal is to develop a guideline that simplifies the implementation of Industry 4.0 for small- and medium-sized companies. Jens Lüdtke is one of the founders of the work group and moderated the meeting in March. In order to ensure that the guideline is practical in nature, participants took on the task of analyzing how

the more theoretical concept of Industry 4.0 could be tangibly realized in their own companies. The results will be compiled at the next meeting.

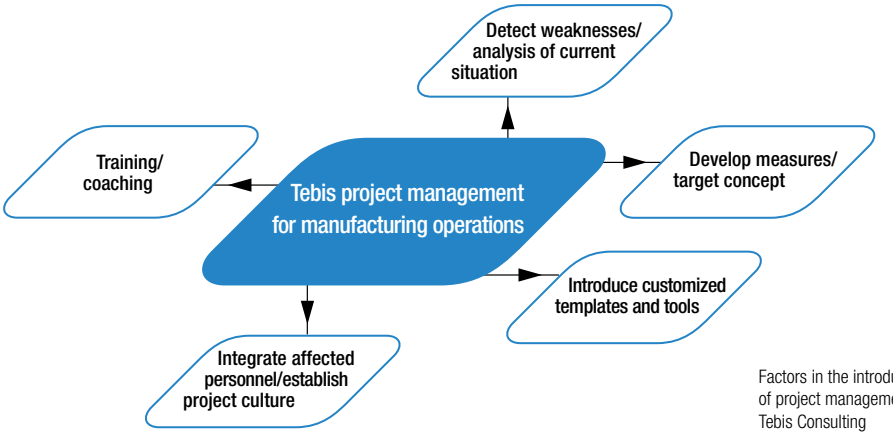
New consulting product

Consistent project management ensures professional processes. Companies have the opportunity to obtain competent support from Tebis to improve their performance with optimal processes. Tebis Consulting offers a new product: project management for die, model and mold manufacturing. In this issue, the "Services" section is devoted entirely to this subject: We present the new offering and show how Josef Hofmann Modell- und Leuchtentechnik GmbH has already benefited from it.

New product from Tebis Consulting: project management for die, model and mold manufacturing

The Great Pyramid of Giza or Gotthard Tunnel—why project management is so important

Even the construction of the The Great Pyramid of Giza over 4500 years ago required objectives, planning and organization. And the fact that the major project of the Gotthard Tunnel was completed on time and within the bounds of projected costs in June of 2016 is the result of successful project management. Neither is a matter of chance or a wonder. Now, you might be thinking, "I have nothing to do with major projects; that doesn't come into question for us." Unfortunately project management in small- and medium-sized companies is still underestimated and often scoffed at. "Someone else will take care of," is the common response. But project management is not a question of project size. It always pays off when a task has a clearly defined time frame and budget, and multiple production factors as well as interdependent subprocesses are required. You've seen it, too. Project management is currently becoming even more important, especially for small- and medium-sized companies. This is driven by dynamic, globalized markets, shorter innovation cycles, and increasing customer requirements. Good project management does more than help to complete projects on time, on budget, and according to the agreed quality and scope. Successfully completed projects ensure the performance and professional level of the supplier, and project management therefore brings with it a clear competitive advantage in winning new orders.

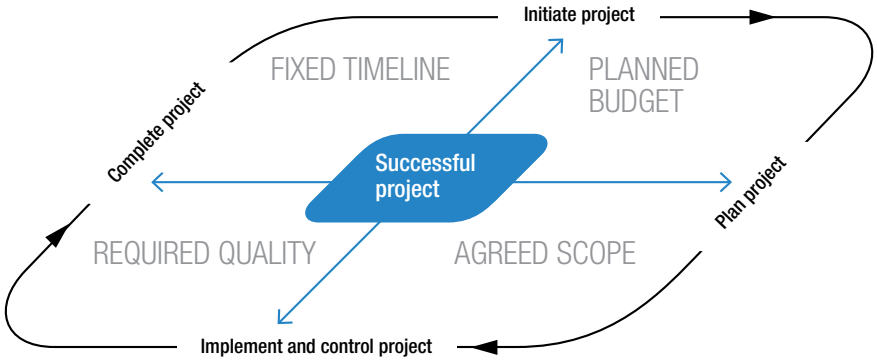


Factors in the introduction of project management by Tebis Consulting

Why introduce project management?

Tebis Consulting has taken on the task of supporting companies in the die, model and mold manufacturing industry in efficient order processing. Tebis consultants have repeatedly seen in hundreds of projects in these industry sectors that their customers are confronted with weaknesses and problems in defining objectives, planning, implementing and controlling projects. Resource and capacity planning is too inexact; customers have change requests, and unscheduled additional expenditures and conflicts are inevitable. Project costs run out of control, supplier management is suboptimal and the flow of information is unclear. The result: Project efficiency suffers and personnel become demotivated. This need not be the case. An inefficiently implemented order is no more up to the fates than the on-time opening of the Gotthard Tunnel was. Professional project management helps in processing orders well. It's a matter of methodology, knowledge and professional tools. And the knowledge and methods of project management are also relevant for small- and medium-sized companies. Tebis Consulting professionals help small- and medium-sized companies in die, model and mold manufacturing ay an appropriate foundation and provide the required tools and structures for professional project management. The basis for this task is the project management methodology developed specifically by Tebis, as well as the comprehensive industry-specific project management experience of Tebis personnel. Individual and sustainable solutions are achieved together based on internal project experience in the company and in accordance with specific customer projects.

© AlpTransit Gotthard AG



Factors for successful projects

management. Also, according to Engineer and Construction Project Manager Rainer Schofer, the on-time completion of the Elbphilharmonie concert hall in Hamburg failed due to inadequate project management. Make sure your projects never end up in the same state.

How does Tebis Consulting work?

The work of Tebis Consulting is divided in two blocks. First, Tebis Consulting offers project management consulting and implementation. Second, upon the customer's request, Tebis consultants can also assume responsibility for project implementation and support internal execution of projects. Specifically, project management consulting and implementation involves first checking the quality of the typical project work in the company, identifying weaknesses in the existing project process, and providing an analysis of the current situation as well as a target concept. Project management in the company is then optimized or introduced for the first time. Customized templates and individual procedures are developed and rolled out companywide. As project management develops increasingly more dimensions and is more than just a collection of methods, tools and concepts, Tebis Consulting places great value on a corresponding project culture in the company. Humans who have to intervene in the process are always affected. Training of team members, personal coaching and supporting the project manager are therefore also on the list of offerings from Tebis.

Conclusion

Every customer project requires a clear procedure that is also clearly understandable for all participants. It must be implemented under the given conditions and requirements, in turn requiring the optimal use of budget, capacity, and time. Results from completed customer projects should be accounted for in future projects. In other words, every project benefits from good project

BENEFITS OF PROJECT MANAGEMENT

- Efficient projects
- Controlled and monitored project processing
- Early detection and countering of project risks, additional time and effort and problems
- Realistic planning of resources and capacities Reduce potential internal and external (customer) conflicts
- Project transparency across departments
- Improved flow of information

Tebis Consulting at Josef Hofmann Modell- und Leuchtentechnik GmbH

Tebis project management increases productivity

Josef Hofmann Modell- und Leuchtentechnik GmbH sees itself as a partner in all matters of model manufacturing and lighting technology, from the lighting layout, design, mold manufacturing, prototype manufacturing and surface finishing to small-lot manufacturing. The company provides "everything from a single source, at top quality, cost-effectively and by the promised deadlines." This is a demanding challenge, requiring that customer orders be processed as professionally as possible. In 2015, Managing Partner Andreas Hofmann asked Tebis Consulting for support, with the objective of improving project effectiveness and efficiency. His goal: ensuring long-term performance and capacity for his customers. The in-depth practical knowledge of the Tebis process specialists was the determining factor for his choice.

Potential for improvement identified

Tebis Consulting's initial task was to secure the implementation of specific customer projects using project management methods and to prepare the company for the implementation of professional, comprehensive project management. Tebis personnel started their work at Hofmann with an analysis of the initial situation. The investigation revealed potential for improvement in several areas, such as incomplete communication and documentation of customer agreements, unclearly written orders and incorrect recording of purchased parts. The reasons for these weaknesses included a lack of standards and structures, uncertain role assignments, and a lack of project transparency. The Tebis process specialists developed a concept for project implementation at Hofmann, along with guidelines and templates for internal procedures and activities. These also took the company's strategic objectives into account.

Project management for the future

Tebis personnel gathered and consolidated the necessary data to prepare for the introduction of a future project management system specifically tailored to the needs of the company. Through knowledge transfer, they increased the acceptance of standards and necessary procedures among Hofmann GmbH personnel. The first project phase was thus successfully concluded. Full implementation of project management took place in the second project phase, which was also successfully completed. Tasks in this phase included the establishment of a project management office (PMO) as well as the standardized implementation of comprehensive project management software, organization of training sessions, and application of suitable methods to ensure the effectiveness of project managers. Tebis personnel worked closely with a dedicated co-project manager from Hofmann throughout both project phases. The mutual cooperation was essential to the success of the project.

Positive conclusion

As a matter of fact, Hofmann is now better able to efficiently process orders, deliver on time, and complete work to the satisfaction of customers. The basis for this is a significant increase in effectiveness and efficiency in customer projects with the help of Tebis Consulting. Information now flows smoothly. Time and effort have been reduced and procedures are more transparent. Andreas Hofmann sums it up as follows: "With the support of Tebis Consulting, we were able to integrate professional and efficient project management in our company within a short time. We will continue to rely on Tebis process specialists in the future."

“ With the support of Tebis AG, we were able to integrate professional and efficient project management in our company within a short time. The combination of technical and organizational process optimizations—in which Tebis AG supported us—gives our company an advantage in all areas. With this solution, which is perfectly adapted to our needs, we are now in a position to provide true added value to our customers. We will continue to rely on Tebis in the future. ”

Andreas Hofmann, managing partner

Measurement of models.

Tebis process specialists.

Awards all around

The collaboration between Tebis and Hofmann is truly a professional one. It therefore comes as no surprise that both companies have been awarded the title of "Bavaria's Best 50," placing them among the ranks of the most successful companies in the state. Hofmann received this award in 2014. Tebis received it in 2015. With this award, the Bavarian Ministry of the Economy each year honors particularly fast-growing, mid-size companies.

Christoph Bayer, Hofmann project manager.

PROCESS EXPERTISE AND INDUSTRY KNOWLEDGE TO ENSURE YOUR SUCCESS

Tebis Consulting analyzes your existing manufacturing process and centrally controls all jointly decided optimization measures through to their completion. The staff members are process specialists and have in-depth practical experience in the manufacturing industry. Tebis Consulting offers industry-specific process and strategy consultation, change management for the implementation of process concepts, and the introduction of project management.

Tebis Open House, June 16-17, 2016

Everything 4.0

The main theme of the last Tebis Open House was "Everything 4.0." Nearly 200 visitors from die, mold and model manufacturing, as well as from industrial design and mechanical engineering, had the opportunity to learn about three different 4.0 topics during presentations and at various booths: Tebis 4.0, Proleis 4.0 and Industry 4.0.

Presentation program with keynote speech on Industry 4.0

Josef-Peter Gallenberger, head of BMW Group Die Manufacturing in Munich and Dingolfing, reported on Industry 4.0 manufacturing in practice during his keynote speech. In die manufacturing in the BMW Group—classic individual part manufacturing—"intelligent parts" as the basis for automated Industry 4.0 manufacturing are no longer a vision but are already a part of everyday life. Using CAD/CAM software components from Tebis and Proleis MES from ID GmbH, 10,000 small parts such as trim steels and flanging plates are now manufactured every year in a highly automated manufacturing cell.

“This gives us some very, very good ideas for the future.”
Gerhard Horn, Adam Opel AG

Visitors were guided through the program using information terminals based on Proleis software for data management and manufacturing planning and control. The contents and locations of the booths could be called up on a touch screen. Webcams provided live action shots of the activities.

“Tebis is very close to reality.”
Josef Westhäußer, EBZ Systec GmbH

The relationship to Industry 4.0 is that the digital model of the part is enriched with increasingly more data on its own manufacturing over the course of the process. The actual part is identified by a barcode stamp and synchronized online with the virtual part. It has all the information from digital planning and NC manufacturing. This data can be called up with a barcode scanner at any time in the real manufacturing world, by both human operators and by the networked systems and machines. At the well-attended presentations, other Tebis users reported on the benefits Tebis has provided for them. For example, Hans Brandner, managing director of BBG GmbH & Co. KG, focused on the good results achieved through implementing Tebis structuring measures. In the FMF/WWF group, the innovative active surface process in Tebis means significantly less reworking on the dies. This was convincingly presented by Jürgen Müller, group technical director. Marcel Voigt, manager of CNC Production & Programming at Toyota Motorsport Cologne, presented the clear benefits of process structuring with Tebis for his company: The same number of employees completes more orders with less overtime, and the hourly machine

“Tebis has allowed us to take a significant step forward, and with Proleis it's been a quantum leap for our company.”
Mark Gras, PS-Prototypenschmiede GmbH

1. Josef-Peter Gallenberger, head of BMW Group Die Manufacturing in Munich and Dingolfing, reported on Industry 4.0 manufacturing in practice in his presentation.

2. Tobias Maresch, robot machining project engineer at KUKA Industries in Augsburg, explained the benefits and opportunities offered by robot-based machining in his presentation.

3. Marcel Voigt, manager of CNC Production & Programming at Toyota Motorsport Cologne, reported processing more orders with less overtime and a shorter hourly machine cost thanks to Tebis process structuring.

4. Jürgen Müller, technical head of the FMF/WWF group, explained the innovative active surface process in Tebis, which ensures significantly less reworking on the dies.

1


2


3


4

> *"Working with Tebis is enjoyable."*
> Bernd Schwenning, E. Zoller GmbH & Co. KG

> *"We meet customers and suppliers here, which is interesting."*
> Heribert Schmuck, FRIMO Freilassing GmbH

> *"It's interesting for us to see how other die manufacturers work."*
> Güngör Budak, Audi AG

cost has gone down significantly. And Kaspar Hürlimann, managing director of the Swiss company Formbar AG, presented information on 40% increased sales and doubled machine runtimes with the same personnel—all thanks to process optimization and automation with Tebis. In the Process Café, our experts from Tebis Consulting and Implementation spoke in a relaxed atmosphere about how value-creation strategies and technical process chains in manufacturing can be optimized. Many opportunities are open to customers with Tebis as the process supplier.

Tebis 4.0

An additional focal point of the event was provided by the functional highlights of Tebis Version 4.0 Release 2. These include adaptive roughing for large depths of cut with full-width avoidance, the creation of guide curves for an optimal path layout, 2.5D machining with standard and free-form features, and surface optimization at the click of a button. Visitors had the opportunity to see first-hand how Tebis 4.0 can be used to save up to 60% machining time, finish smoother, and prepare geometries faster and with greater automation.

Designing processes with Proleis 4.0

Our guests had the opportunity to follow a manufacturing process in our showroom. Process stations demonstrated all the steps from data entry, programming, setup and tool assembly to processing on the machine. We used the Proleis 4.0 software from our collaborative partner ID GmbH to plan and control this manufacturing process and to manage all associated data. This ensures that all data is available centrally and transparently, from planning milestones and resources and the procurement of raw materials, to machine and operating data acquisition. One process station also demonstrated robot tool and pallet handling. Tobias Maresch, robot machining project engineer at KUKA Industries in Augsburg, explained the benefits and opportunities offered by robot-based machining and presented both standard solutions as well as specific customer solutions in his presentation. For example, specially equipped robot systems can be used to combine the machining process with handling or quality assurance. Tebis offers extensive software for planning, controlling and managing data in combination with the Proleis 4.0 software from ID GmbH. Our guests at the Tebis Open House were invited to experience the world premiere of the new Proleis Version 4.0. They had the opportunity to test the new Proleis functions for themselves using information terminals distributed around the facility. These terminals used an electronic management system based on Proleis. Visitors could also use touch screens for information on the locations and contents of the booths. Webcams delivered live images of current activities at the booths and during the presentations. Experts from both companies demonstrated the benefits and opportunities offered by Industry 4.0 for die and mold manufacturing.

"I'm interested in the complete process, from design, data processing and data optimization to the finished NC program, so really from A to Z."
Holger Scherrmann, Daimler AG

"Error-free programming with Tebis: Upload 1-to-1 to the machine, press Start and you're out the door. The machine runs unattended overnight and on weekends."
Wolfgang Lorse, capricorn COMPOSITE GmbH

These include the networking of internal systems and technology as well as industrial manufacturing with intelligent parts. With Tebis, customers benefit from intelligent parts because the software takes the manufacturing environment and its manufacturing processes into account, so that the parts "know" how are machined. At the same time, Proleis knows all the planning data and capacities. As a result, the combination of Tebis and Proleis yields highly flexible, complete digitally controlled manufacturing with a transparent information flow—all characteristics of Industry 4.0.

Also in "moving pictures"

Have a look at the video retrospective of our Tebis Open House:

http://www.tebis.com/en/news-events/latest-news/2016-open-house-review/

Industry 4.0 in single-part manufacturing

The term "Industry 4.0" (the fourth industrial revolution) is nearly commonplace. First announced as a vision, then presented as a success factor for many large industrial operations, more and more small- and medium-sized companies are now asking what is behind this concept. Our expert Jens Lüdtke explains the opportunities and possibilities for getting started in Industry 4.0.

// Mr. Lüdtke, everyone's been talking about Industry 4.0 for some time. Could you briefly explain to us what this term means?

Industry 4.0 is the designation for the fourth industrial revolution, following the steam engine, the assembly line and electronics. The future-oriented project with same name in the high-tech strategy of the German federal government is intended to promote the digitization of traditional industries such as manufacturing.

// What is the goal of this future project?

The goal is the smart factory, characterized by flexibility, efficient use of resources and ergonomics. These in turn are based on vertical networking, that is, the intelligent digital connection of all production resources as cyber-physical systems to the Internet of things [see graphic]. Simultaneous horizontal networking results in the digital integration of customers and suppliers in the business and value-creation process.

// What does this have to do with single-part manufacturing in the model, die and mold manufacturing industry?

If we consider the intentions behind the vision of Industry 4.0, the connection becomes clear: The smart factory will result in greater efficiency, shorter throughput times, greater flexibility, new service-oriented business models and more sales and greater returns. This ensures competitiveness over the long term.

In this flexible manufacturing cell, the employee enters the blank by scanning the barcode and receives the finished part at the end of the process.

The smart factory helps to meet the challenges in model, die and mold manufacturing such as greater competition with providers from around the world, prices falling faster than manufacturing costs, increasingly complex models, molds and dies, continuously shorter project times, shortages in new and qualified personnel, etc.

// So are we going to immediately see regular reports of success with Industry 4.0 in model, die and mold manufacturing?

I'm afraid it's not going to go that quickly. The terms and definitions surrounding Industry 4.0 are highly abstract. As a result, primarily larger companies have addressed the subject so far. The model, die and mold manufacturers more burdened by manually intensive processes currently see little benefit in the concept and are afraid of making large investments.

// But then these companies won't see any of the benefits of Industry 4.0 mentioned before …

That's why an individual approach is critical. Because only if it is appropriate for the specific company, its situation and objectives, will Industry 4.0 result in success.

// Would you explain that in more detail?

It is important to first clearly understand your own situation, that is, what are the strengths, weaknesses, opportunities and risks for your own company with regard to Industry 4.0; what could the success factors be? In the next step, the anticipated benefits from Industry 4.0 have to be defined, both for your own company as well as for your customers.

// That sounds like a pretty complicated task for a typical model, die and mold manufacturer with 20 to 50 employees.

That's why I recommend drawing on external assistance when taking these steps, because you can quickly achieve results in a moderated process. Looking at the desired target situation with Industry 4.0 in your own company, you'll see that measures are needed in the action areas of strategy, personnel and processes.

// So this means that Industry 4.0 affects the entire company?

Yes, and this is why a clear strategy and strong leadership are necessary if the project is to be successful. The vision and strategy for Industry 4.0 must focus on the customers and the economic benefits. It is important during implementation to give the projects sufficiently high priority and assign them the necessary resources.

// So it's best to start the implementation of Industry 4.0 with a commitment from management?

That is actually a necessary prerequisite. The decision to implement Industry 4.0 must be initiated and followed up on from the management level. However, it is also just as important to assign sufficient personnel to the projects.

// And that brings us to the important subject of employees. How is it possible to ensure that personnel will go along with the planned steps?

Most important is certainly open and transparent communication that establishes trust. That is the best way to involve and motivate your employees. The team will also have to be qualified with further training at some points. In the end, this promotes the employees' individual responsibility, thus contributing to the success of the planned digitizing measures.

// But doesn't every company have many digital natives who have grown up with the Internet?

That's not necessary at all. Because when motivation is promoted, all personnel can participate in Industry 4.0 projects, not just IT specialists or digital natives. And the good thing is, digitizing measures make a company more attractive for new digital natives, simplifying the acquisition of qualified new personnel.

SUPPORT FOR INDUSTRY 4.0

Seminar: Industry 4.0 in medium-sized companies

This seminar provides information on the background, history and case studies for "Industry 4.0." Participants determine practical applications for their operations and summarize them in a guideline. It is intended for managers, production managers, managing directors and those responsible for the future orientation of the organization.

http://www.tebis.com/en/service/seminars/industry-40-in-medium-sized-companies/

Consulting: Getting started in die manufacturing 4.0

We work with you to develop a feasible path to digitalization. In four consulting days, we provide answers to questions such as: Where do you want to be in five years with regard to die manufacturing 4.0? What are the economic benefits to your company and your customers? What are the necessary steps to get there?

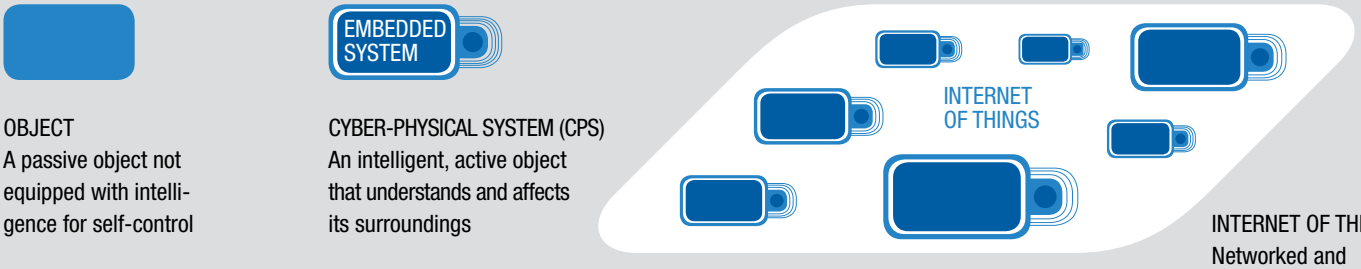
http://www.tebis.com/en/solutions/consulting/strategic-consulting-1/

VDWF work group "4.0 in die manufacturing"

The work group meets every eight weeks at alternating die manufacturing companies and offers the opportunity to learn and exchange ideas about current Industry 4.0 topics and results. Jens Lüdtke is one of the founders of this work group in the German Association of Tool and Mold Manufacturers (VDWF).

http://www.tebis.com/en/news-events/latest-news/tebis-is-an-experienced-player-in-die-manufacturing-40/

CYBER-PHYSICAL SYSTEMS AND THE INTERNET OF THINGS



OBJECT
A passive object not equipped with intelligence for self-control

CYBER-PHYSICAL SYSTEM (CPS)
An intelligent, active object that understands and affects its surroundings

INTERNET OF THINGS
Networked and interacting CPS

// What areas and processes are affected by digitalization and Industry 4.0?

The model, die and mold manufacturing industry is essentially in a good starting position, because the products and parts of the manufacturing process are already digitized in CAD/CAM.

// But this digitalization is not actually Industry 4.0?

Certainly not. Rather, it's about efficiently linking together the areas that have already been digitized and to pursue digitalization in additional areas. Let me give a few examples: Calculation and design with digital templates that extend to the Job Manager and NC programming; automated ordering of raw materials; intelligent management of tool requirements and condition up to the end-to-end use of data in assembly and recalculation. On the systems level, it's about product data management, the systems for planning enterprise resources, materials and equipment, manufacturing control and linking the acquisition of machine and operating data.

// So are there any specific examples of what can be achieved?

Yes, of course. For example, intelligent logistics support in mold manufacturing in which every part can be identified by barcode, every movement is documented by renewed scanning and even transport orders can be created from the MES. This ensures that the location of every part is known and that parts are available for manufacturing and assembly.
Or networked manufacturing control for a flexible manufacturing cell that automatically manufactures trim and coining steels for die manufacturing while ensuring optimal utilization of capacity. This makes the best use of the resources.

// Do you have any final tips to make it easier to get started in this area?

I think that even if you already have a broad solution in mind, it's important to quickly establish small lighthouses that advertise for Industry 4.0. Because successes like that are motivating and establish a climate of identification and individual responsibility. I hope I've been able to show how many Industry 4.0 opportunities there are for medium-sized companies in model, die and mold manufacturing . It's worth jumping on this train and taking the lead in this area of fast technological change. We are working with our customers to ensure that Industry 4.0 becomes a success in model, die and mold manufacturing.

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JENS LÜDTKE

Jens Lüdtke has been with Tebis AG since 2000 and heads the Tebis Consulting department as well as the Göppingen office. He is a trained industrial engineer and holds a degree in mechanical engineering. Together with his team, he has completed hundreds of successful consulting projects in the manufacturing sector. Jens Lüdtke teaches classes in the subject of industrial single-part manufacturing in the age of Industry 4.0 and heads the "4.0 in die manufacturing" work group in the German Association of Tool and Mold Manufacturers (VDWF).

THE INSIDE SCOOP
BY ULRIKE KELLER

These pages list the little tricks and suggestions that can make working with Tebis systems even easier and more efficient. The tips are followed by references to corresponding sections in the context-sensitive help, where users can find detailed information and instructions.

TIPS AND TRICKS

Free-form feature: Manually adjust protected surfaces and plunge positions

I've automatically inserted all of the standard and free-form features in my CAD model using the "Identify features from geometries" function. Now I'd like to automate machining of these features. However, there are two points where I'd have to manually adjust protected surfaces and plunge position. What's the best way to do this?


1

Exact technical machining sequences can be specified for specific machining types using NCSets in NCSet administration. Protected surfaces and plunge positions have to be defined as variable in NCSet administration in order to assign them. They can then be separately selected for each feature.

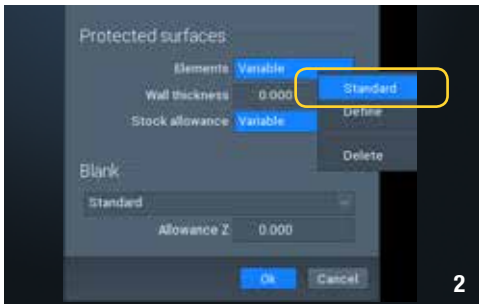
Here's how you do it:

1_In this example, click the "Elements" button for the corresponding NCSets in NCSet administration. The "Elements" dialog opens.

2_Open the context menu in the "Protected surfaces" area for the "Elements" parameter and select the "Standard" option. The parameter is now defined as variable. If necessary, repeat this procedure for the "Stock allowance" parameter. Confirm your inputs.

3_Click "Macro" in NCSet administration. The "Macro" dialog opens. Set the "Positions" parameter in the "Plunge" area to variable as in step 2. Confirm your inputs.

Note: Machining parameters can essentially be set as variable in all dialogs.



2

THE INSIDE SCOOP
BY ULRIKE KELLER

4_Select the "Feature/Edit" function. The "Parameters" dialog opens.

5_Select the first feature for which you want to define specific protected surfaces and a specific plunge position.

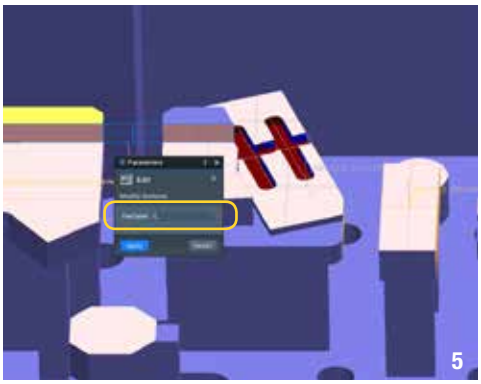
6_Click "Apply." The "Edit feature" dialog opens.

7_The "Variables" parameter in the "Machining parameters" area shows the number of parameters that are defined as variable. There are three of these in our example: protected surfaces, stock allowance on protected surfaces, and plunge position. Click "Enter variables" (…). The "NC variables" dialog opens. Only those parameters are displayed that are defined as variable in NCSet administration.

8_Select the protected surfaces and define the plunge position. Confirm your inputs.

9_Repeat this procedure for all features for which you want to define specific protected surfaces and a specific plunge position.

10_Now only the corresponding features in the Job Manager have to be selected for the respective NCJobs of type "MFeatE" (create toolpath using element features). As usual, the calculation is completely automatic.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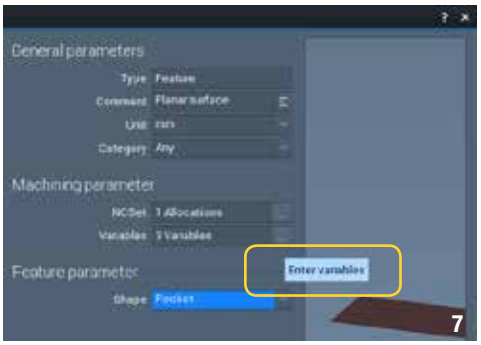

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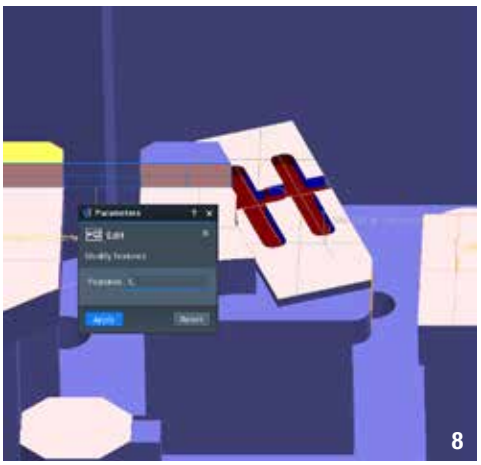

8

You can learn more about editing free-form features by calling up the context-sensitive help for "NC2ax/MFeatE".

You can learn more about how parameters for features that have already been inserted in the CAD model can be changed by calling up the context-sensitive help for the "Feature/Edit" function.

You can learn more about managing NCSets by calling up the context-sensitive help for the "NCBase/NCSet" function.

Grouping features and defining machining sequences

How can I ensure that first the top features and then the bottom features are machined in exactly the sequence I want?

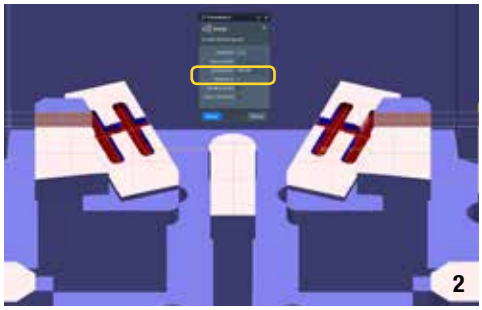
Features can be grouped in Tebis. Grouped features are machined together. You can specify the sequence in which the individual features in the feature group are machined.

Here's how you do it:

1_Select the "Feature/Group/Group" command. The "Parameters" dialog opens.

> Note:
> Curves that are no longer needed in subsequent NC programming can be deleted directly in the "Create structure curves" dialog. This is done by clicking "Delete" and selecting the elements you want to delete.

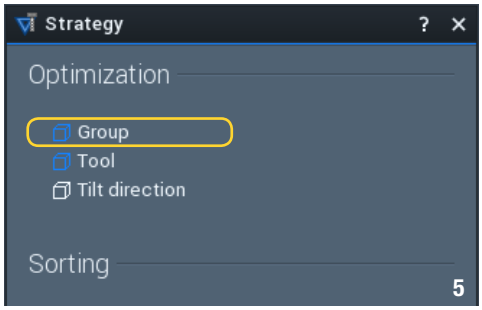
2_Select the features you want to combine in a group. Click "Apply".



3_Select the next features you want to combine in a group. Click "Apply" and close the dialog. The grouped features will be identified with the "Group" banner in the display window. The machining sequence is numbered.

4_Click the "Strategy" button for the corresponding NCJob in the Job Manager. The "Strategy" dialog opens.

5_Three prerequisites must be fulfilled to enable machining of the groups in the sequence you specify: The first entry in the "Optimization" area must be "Group". This entry must be activated, i.e., highlighted in blue. In addition, no other entries must be active. The position of an entry can be changed by dragging and dropping. The entries can be activated and deactivated by double-clicking.



> You can learn more about grouping features by calling up the context-sensitive help for the "Feature/Group" function.

Trade show calendar 2017

interplastica	01/24/2017 - 01/27/2017	Moskau, Russia
Turning Days Süd	01/25/2017 - 01/27/2017	Friedrichshafen, Germany
intec	03/07/2017 - 03/10/2017	Leipzig, Germany
Advanced Engineering 2017	03/08/2017 - 03/09/2017	Göteborg, Sweden
Plastteknik Nordic	03/08/2017 - 03/09/2017	Malmö, Sweden
MECSPE	03/23/2017 - 03/25/2017	Parma, Italy
INDUSTRIE Lyon	04/04/2017 - 04/07/2017	Lyon, France
A&T	05/03/2017 - 05/05/2017	Turin, Italy
Metalloobrabotka	05/15/2017 - 05/19/2017	Moskau, Russia
Moulding Expo	05/30/2017 - 06/02/2017	Stuttgart, Germany
FIP Solution Plastique	06/13/2017 - 06/16/2017	Lyon, France
DMC China Die & Mould	06/13/2017 - 07/16/2017	Shanghai, China
EMO Hannover	09/18/2017 - 09/23/2017	Hannover, Germany
Fakuma	10/17/2017 - 10/21/2017	Friedrichshafen, Germany
Elmia Subcontractor	11/14/2017 - 11/17/2017	Jönköping, Sweden

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