

Tecnomatix · NX · Teamcenter

## Hermle-Leibinger Systemtechnik

Realizing automation solutions without expensive rework

### Industry

Industrial machinery

### Business challenges

Improve production efficiency

Expand competency as a system solver

Minimize errors and shorten commissioning time

Reduce development costs

### Keys to success

Establishing integrated IT environment that combines capabilities of Teamcenter, NX and Tecnomatix

Leveraging Tecnomatix Process Simulate to simulate and verify robot paths

Automating the process that determines the exact position of each station of robot movement

Identifying errors during the planning phase

**Hermle uses Tecnomatix Process Simulate for the commissioning of its automated machining centers, improving production process validation and customer responsiveness**

### Flexibility is the key

Maschinenfabrik Berthold Hermle AG, whose headquarters are in Gosheim, is one of Germany's leading manufacturers of milling machines and machining centers. More than 20,000 of the company's machines are in operation worldwide, mainly in demanding sectors like tooling and mold making, medical technology, optics, aerospace and automotive.

For a long time, Hermle considered itself to be a mechanical engineering company that applied a standard, modular approach to machine development. This standard approach enabled the company to excel at supplying production systems with a basic line of machine products. However, international competition and the need to offer more customized solutions opened the company up to providing additional options and variants, and to becoming a single-source supplier that could offer its customers a full range of products, including everything from the machine itself to automation solutions and control equipment.

To avoid mixing the highly efficient processes of its own production line with the newer, more flexible approaches required



for custom manufacturing, Hermle founded Hermle-Leibinger Systemtechnik GmbH (HLS) in 1998 as a subsidiary in nearby Tuttlingen. HLS was chartered with producing Hermle-specific automation solutions. HLS's 50+ employees develop and produce diverse robot systems that range in size up to a weight class of 1,000 kilograms. These customer-specific solutions include flexible manufacturing systems, as well as innovative workpiece clamping fixtures and handling systems.

Flexible and highly automated production facilities play an increasingly important role in determining the financial success of today's manufacturing companies. Many of HLS's customers produce lots with a maximum of ten parts. To optimally utilize their production equipment, manufacturers need to be able to quickly react to different client requirements. They must be able to use the same production systems

## Results

Validated production processes

Significantly faster base measurement

Problems eliminated in planning stages

Accelerated delivery dates

Customer solutions simulated and optimized in a virtual environment

**"We are able to iron out many problems during the planning stage. This accelerates the development considerably."**

Rainer Aicher  
Manager  
Mechanical Design Group  
Hermle-Leibinger  
Systemtechnik

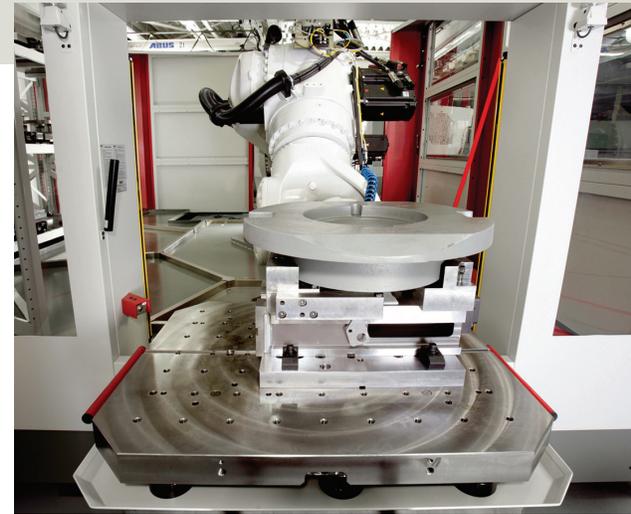
to machine different parts with equal precision, delivering high quality and facilitating quick changeovers. This level of manufacturing flexibility is often best delivered by a third shift. Basically, machine utilization determines profitability, even in the case of a lot size of one and a workpiece machining time of several hours.

### Customer requirements demand targeted process optimization

Customers pass on these increased demands to HLS's systems engineers. Companies that use Hermle machining centers are accustomed to precision and quality. They also expect the same high-level results from the automation solutions that HLS provides for plants. To reliably deliver this kind of high-level performance, HLS uses Siemens PLM Software's Tecnomatix® Process Simulate software. HLS leverages the Process Simulate software to simulate and optimize material flows and robot paths in a virtual 3D environment. Rainer Kohler, HLS's managing director, notes, "Realistic simulation is an increasingly important topic. The ability to verify systems during the planning phase has a significant effect on our production costs."

Process Simulate extends the simulation capabilities that HLS had been using in the past. During definition of the system layout, HLS was using Siemens PLM Software's NX™ software to carry out collision tests between tooling, workpieces and jigs and to avoid safety errors. Similarly, it used NX to perform rudimentary reachability tests and to generate small videos in AVI format to identify problems on the basis of moving images.

However, the company wanted to be able to visualize and verify the entire tool path of a robot. It was particularly important for HLS to identify potential difficulties (such as collisions between workpieces and shelves during loading and unloading) and to identify areas of the plant that are not reachable for the robot arm. The indi-

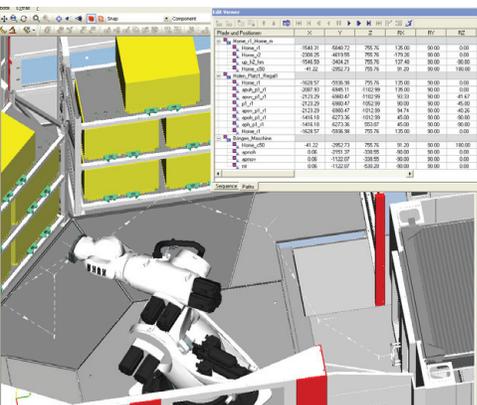


vidual robot approach points require precise estimates. Traditionally, the base measurement – the exact determination of the position of each station of the robot movement – was made manually. This manual process involved a lot of effort, time and a high degree of expertise. As a result, production machine commissioning was often delayed, since extensive rework was often necessary in order to eliminate all errors and satisfy Hermle's quality standards.

### The importance of virtual process simulation

To deal with these issues and deliver the high-quality and precise manufacturing solutions that its customers expect, HLS decided to extend its NX computer-aided design (CAD) capabilities by integrating them with Process Simulate via the digital lifecycle management solution of Siemens PLM Software – Teamcenter® software. By managing their 3D models in the lean JT™ format, HLS's systems engineers are able to work with all of their geometry information in a realistic virtual system environment. After programming the robot path within Process Simulate, the engineers can then use the software to start a simulation to check all of the movement sequences for collisions and reachability.

Similarly, engineers can use an integrated editor to animate other dynamic elements, such as the ways that doors open and close or the ways table tops rotate. This enables them to view a highly realistic



## Solutions/Services

Tecnomatix

[www.siemens.com/tecnomatix](http://www.siemens.com/tecnomatix)

NX

[www.siemens.com/nx](http://www.siemens.com/nx)

Teamcenter

[www.siemens.com/teamcenter](http://www.siemens.com/teamcenter)

## Customer's primary business

Hermle provides automated milling and machining center solutions to parent company (Maschinenfabrik Berthold Hermle AG).

[www.hermle.de](http://www.hermle.de)

## Customer location

Tuttlingen and Gosheim  
Germany

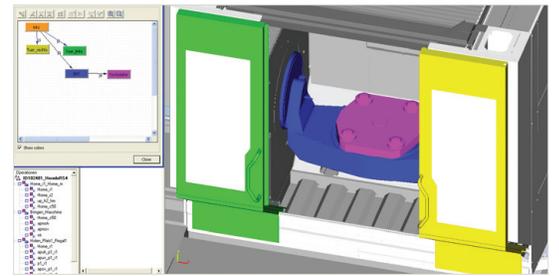
**"With Tecnomatix Process Simulate, we have significantly improved adherence to our customers' delivery dates."**

Rainer Kohler  
Managing Director  
Hermle-Leibinger  
Systemtechnik

simulation. Engineers can also play out other critical factors, such as loading and unloading different workpieces while taking their required tolerances into account or clearly visualizing possible collisions. The integrated Process Simulate and NX solution provides HLS with a detailed 3D representation that conveys an intuitive understanding of multiple problem situations. It also facilitates communication between all of the technicians that work in HLS's product development organization. As a result, the findings from these highly efficient testing procedures enable HLS to optimize the milling and machining systems it delivers well before commissioning is complete.

In addition, Process Simulate provides HLS's technicians with the basis for automatic base measurement, which significantly reduces the time required for subsequent programming. All robot approach points are precisely determined in Process Simulate and transferred to a specially developed scanning program, which can be used to facilitate a fully automated calibration process. The tedious, manual calibration process that used to plague HLS is a thing of the past. "The automatic base measurement, which we have implemented with Process Simulate and the additional tool that we developed ourselves, significantly accelerates development," says Rainer Aicher, HLS's manager of the Design Group. "The process that used to take several days is now done in two hours."

With Process Simulate, HLS has attained its goal of designing and checking the robot processes with realistic behavior during the planning phase. Verified systems



enable HLS to identify potential problems at an early stage. Errors and time-consuming rework that used to be a persistent problem have been almost totally eliminated. Assembly process validation and production system commissioning now proceed faster and with less effort. "We are now more efficient and save considerably on costs as a result," says Kohler. "Much more important is that we have significantly improved our adherence to delivery dates for our customers."

With the successful establishment of Process Simulate within its development process, Hermle-Leibinger Systemtechnik has completed the first stage of its ambitious plan to establish a completely virtual commissioning process for its automated machining centers. The goal is to represent 100 percent of its customer solutions in a virtual environment, where movements can be simulated and optimized. This allows an even faster reaction to problems or maintenance requirements and further enhances customer service.

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[www.siemens.com/plm](http://www.siemens.com/plm)

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