

Industrial machinery and heavy equipment

Fooke

Advancing innovation despite increasing machine complexity

Products

NX, Teamcenter

Business challenges

Create a new generation of machines

Manage increasing demand with the same number of employees

Build the knowledge base within the company

Keys to success

An integrated, end-to-end platform for digital product development

Computer simulation of tool paths and machine motion

Single location for all product data

Results

High-tech solutions that impress the market

More machines manufactured by the same number of employees

Improved product information accuracy



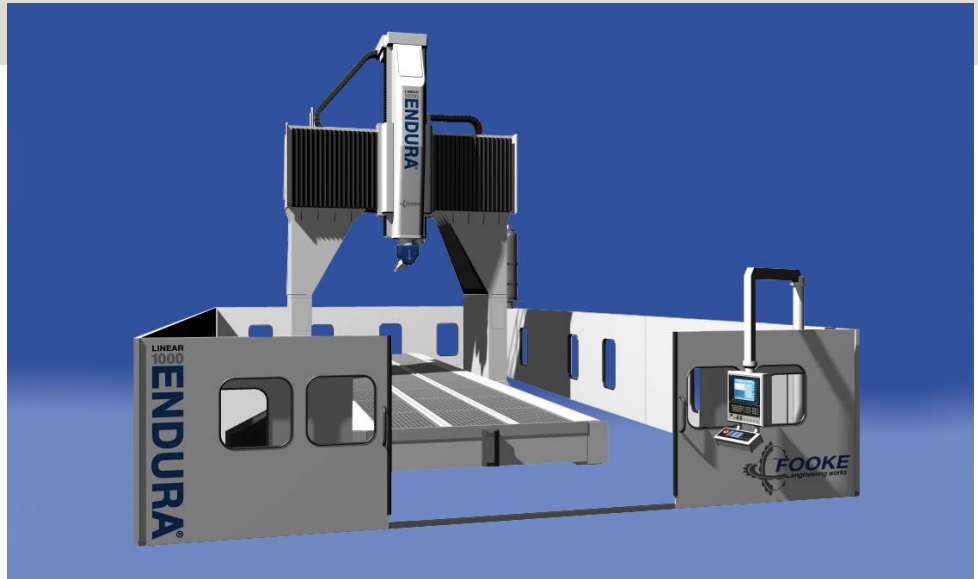
End-to-end product development solution from Siemens PLM Software streamlines the development of very large milling machines

Unique milling niche

As a family business with more than 100 years of tradition, Fooke GmbH has created a niche in the machinery industry that suppliers in Europe, India, China and the USA can't match: very large milling machines that are sold as complete, customized systems. In addition to the machine itself, the system includes the clamping solution and tools as well as measuring and numerical control (NC) programs. These machines can mill aluminum

railway structures up to 100 feet long; perform high-precision processing of vertical tail units; create high-precision skins made of CRP, GRP and aluminum; perform high-speed milling of models for the automobile industry; and address many other specialized applications.

The steadily increasing demand for these machines in the world market, as well as the increasingly complex technical requirements, motivated this innovative enterprise with approximately 170 employees to upgrade its product development process. In particular, management wanted employees of different divisions to work more effectively as integrated project teams. They also wanted to be able to combine heterogeneous information



technology (IT) systems into a complete package for the customer (a five-axis, high-speed milling machine, clamping solution, NC programs and measuring programs as well as comprehensive documentation for worldwide deployment). In addition to requiring durable production machinery, customers have come to expect more comprehensive after-sales services, such as retooling, expansion, maintenance and warranty claims.

Integrated solution is a perfect fit

In 2004, the company began searching for a 3D computer-aided design (CAD) solution for its 15 design engineers, as well as a computer-aided manufacturing (CAM) module that supported high-speed and five-axis machining. "We looked at all the reputable systems on the market," says Hans-Jürgen Pierick, who as team leader of the systems specialists, coordinated the selection process. Five CAD systems with

different CAM combinations were evaluated in conversations, demonstrations and trial installations.

Fooke chose an end-to-end, integrated product lifecycle management (PLM) approach from Siemens PLM Software that included NX™ software, NX CAM, NX Nastran® software and Teamcenter® software. In addition, the company implemented the VNCK virtual NC system for machine-specific simulation of the Siemens 840 D CNC controller. "It was a solution-oriented, unified concept that was a perfect fit for us," says Pierick.

The advantages of this solution became evident even during the pilot program. Having integrated CAD and CAM systems put an end to interface problems, savings hours of conversion labor. And having a common "language" – Teamcenter – improved cooperation among the different divisions.



Advanced machines now possible

Since 2006, all new Fooke machines have been completely developed on the Siemens platform. In particular, the new models of gantry milling machines with overhead bridges – the ENDURA 900LINEAR with linear drive, and the traveling column milling machine ENDURA 1000LINEAR – show how the benefits of the new solution extend to the end user. This new generation of machines is

characterized by an elevated, movable bridge. The use of FEA during the design process resulted in a bridge with higher rigidity, reliability and precision.

A machine of this type is used for the five-axis milling of the Superjet 100's outer skin, which is made of 1.5-millimeter aluminum (AlMg3) sheets. The bridge moves 7 meters in the X axis, 3.5 meters in Y and 1.5 meters in Z. The A axis allows +120 to -95 degrees mobility, while the C axis allows +/-275 degrees. Innovative clamping technology consists of 200 actuators, each of which bears a vacuum suction cup and can be positioned via NC control. The positions of the individual actuators are programmed in the CAM module. The actual positions of the component are determined with Renishaw probes.

This customer selected a Siemens 840 D as the control system for these varied tasks. The Siemens 840 D has strengths not only in five-axis milling but also in the special applications of measuring, setting the neutral zero points and positioning the actuators. The CAM platform adds other strengths. "NX supplies a robust, open CAM system, which is expanded in a program written with Visual Studio.net in order to output measuring and control programs for the Siemens 840 D," says Klaus Harke, CNC system specialist at

Fooke. "This is followed by the programming of the five-axis contour processing."

The entire program can now be simulated using the virtual NC kernel VNCK with machine-specific parameters such as mass and inertia. As a result, for the first time it is possible to support a concept solving a given problem without damaging any expensive components.

The benefits of the Siemens platform have been especially evident in this project. "Programming the machine during development made it available to the customer sooner," says Pierick. Computer simulation ruled out many of the risks associated with innovative machining techniques. In addition, showing the simulation to the customer created confidence in Fooke's problem-solving skills. It also facilitated implementation and training. The delivery of an entire CAM process that had been defined on one platform ensures a successful solution for the customer.

Further expansion planned

"The integration of the Siemens system is what brings the benefits," says Pierick. Fooke passes these benefits on to its customers. Every manufacturing facility meets customer needs with the application of key production machinery. The high performance of Fooke machines is a strong

"We have yet to encounter limitations in our solution from Siemens PLM Software. This gives us confidence that we can also handle future tasks on this platform."

Hans-Jürgen Pierick
Team Leader of Systems
Specialists
Fooke GmbH

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Solutions/Services

NX
NX CAM
NX Nastran
www.siemens.com/nx
Teamcenter
www.siemens.com/teamcenter

Customer's primary business

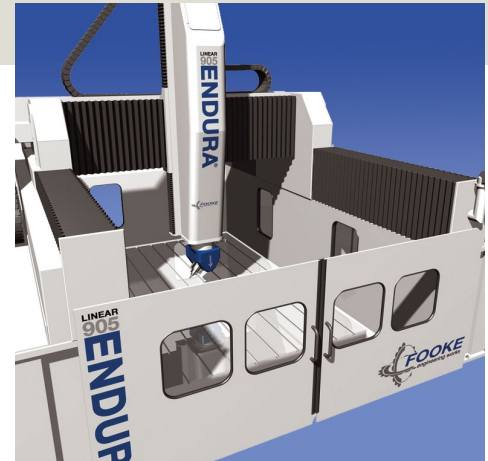
Fooke GmbH develops, manufactures and installs large portal milling machines with linear drive mechanisms and innovative clamping solutions.
www.fooke.de

Customer location

Borken, Westphalia
Germany

selling point, which is not to be underestimated in the capital goods business.

Due to these advantages, the digital product development system is currently being expanded. The company is going to use the viewer functionality of Teamcenter to make product information available to people involved in marketing and production. Now that Fooke's software supplier, Siemens PLM Software (formerly UGS) is part of the Siemens enterprise, Fooke will have a single-source and integrated solution for both its internal and external manufacturing environments.



“An increase in efficiency has allowed us to reach full capacity with the same team for some time now.”

J. Fooke
Managing Partner
Fooke GmbH

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