

Productive SolidCAM

Trend-setting Process Accelerator

3M ESPE relies on SolidWorks and integrated SolidCAM in its design and manufacturing departments

With over 200,000 licenses sold in just six years, SolidWorks is the shooting star of CAD software vendors. In the design departments of manufacturing companies, users can only benefit from the accelerated workflow to the degree allowed by the data flow in the value creation chain and the performance of downstream activities. This, in particular, applies to the interaction of CAD with CAM. Sure: integrated CAD/CAM systems have existed for years. But most are either strong on the aspect of design or are predestined for NC programming – depending on the historic background and origin of the system. In addition, these solutions can often be used efficiently only by specialists, as both CAD design and the generation of NC programs requires specific know-how. Up to now there is a lack of CAD/CAM systems that “do justice to both worlds”. Up to now! SolidCAM now provides a fully integrated CAM engine for SolidWorks that is absolutely convincing in terms of functionality, performance and economy. The mechanical workshop located at 3MESPE AG in Seefeld, Germany provides an example of the advantages of the integrated SolidWorks+SolidCAM solution.

3M ESPE AG is a term well known to dentists. The range of dental products fills a catalogue of over 120 pages, covering the A to Z of supplies. In addition to dental chemistry, this globally successful company develops and manufactures mixing,



Michael Roppenecker, Director of Mechanical Engineering, 3M ESPE AG, Seefeld: “Our target: minimize costs and turnaround times.”

metering and polymerization machines suited to laboratory and practical use. Their mechanical engineering department is also one of the driving forces behind the company’s success. Michael Roppenecker, Director of Mechanical Engineering: “For many products the production, packing and packaging machines that we develop, build and maintain within the company give us an important competitive advantage.” Apart from securing manufacturing know-how, fast time to market for new products is naturally very important because the competition is very active in this economic sector. Roppenecker: “We initiated a comprehensive re-engineering

process about six years ago to reduce turnaround times and costs. At the same time we also examined our process chains for areas of potential optimization.” One of the consequences: in 1998 the design department

switched from 2D CAD (ME 10) to 3D CAD. SolidWorks was awarded the contract for 7 workstations. Roppenecker: “Through the use of 3D in design, the demands made of our mechanical workshop have



Going quickly from concept to marketable product: the complete integration of SolidCAM in SolidWorks guarantees data integrity and a

homogenous working environment for CAD and CAM, which both designers and machining pros can quickly learn and use to enhance performance. Today hardly any production drawings are done manually at the 3M ESPE mechanical workshop. The time needed to do NC programming for complex parts has been reduced by around 60% within half a year. The reliable simulation option for NC programming garnered high praise.

3M ESPE

In more than 50 years ESPE Dental AB has developed from a family-owned company into a major company internationally active in the dental market. Foresight and market-oriented far-sightedness were also behind the strategic step taken in 2000: the merger of ESPE Dental AG with the 3M Dental Products Division to form 3M ESPE AG. Then as now work is being done successfully on offering advanced

systems to dentists, making their work easier, and helping them to provide better services. In well-equipped laboratories, approximately 900 workers in Seefeld, Wertingen and Landsberg, use the latest production facilities to develop and make products that set standards.



Using SolidCAM, 3M ESPE was able to program demanding 5-axis operations efficiently and process-sure. Even more: With the SolidCAM postprocessor, extra options could be added that provide functionality beyond the standard machining cycles of the DMU 80T's Heidenhain CNC MillPlus controller.

also changed rather quickly. 3D CAD motivates and even inspires designers to combine more features into a single part. In short: workpieces are getting more complex. As a result the demands made of manufacturing are also rising.” And because the precision required in manufacturing must satisfy ever increasing needs, about two years ago the need arose to add a center for 4/5 axes multi-sided machining at the existing machine shop. An investment in a DMU 80T was made in 2001. To get a return on investment with such an expensive machine, efficient and reliable NC programming is needed. The programming system to be purchased should not cover just the CAM side, but as Roppenecker reminds us, also “was required to provide the technical data-related links with the design department. We are today under constant time and cost pressures and there is no time to concern ourselves with transferring CAD data; such things have to work perfectly at the push of a button.” This is by far not the normal case, particularly for stand-alone CAM solutions, that need translators



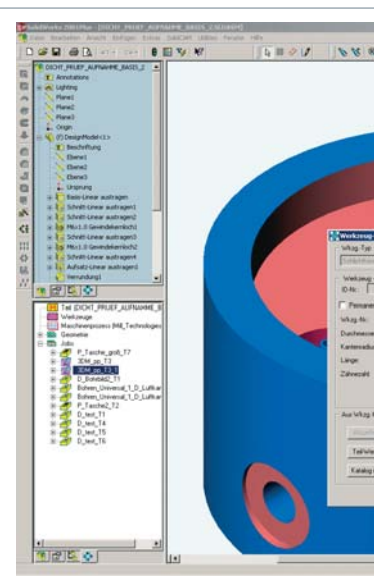
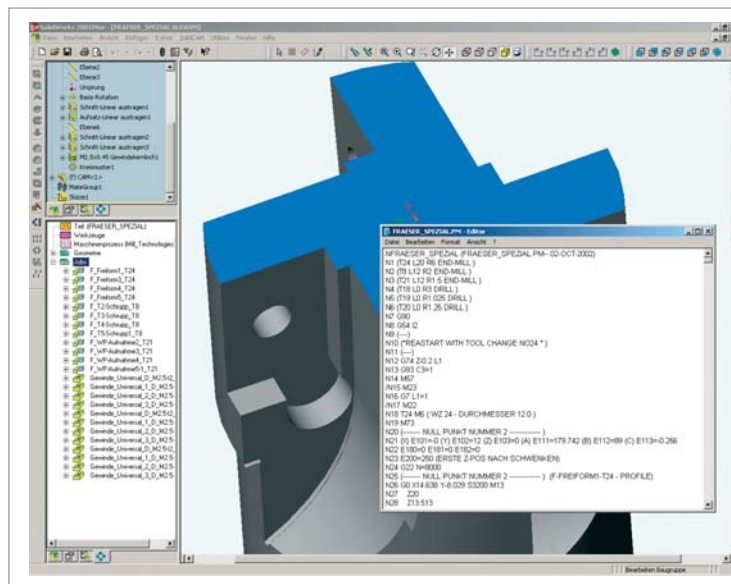
Monika Blumenstock, CEO, MB CAD-Computer Vertriebs GmbH, Feldkirchen-Westerham: “Great potential for SolidCAM”

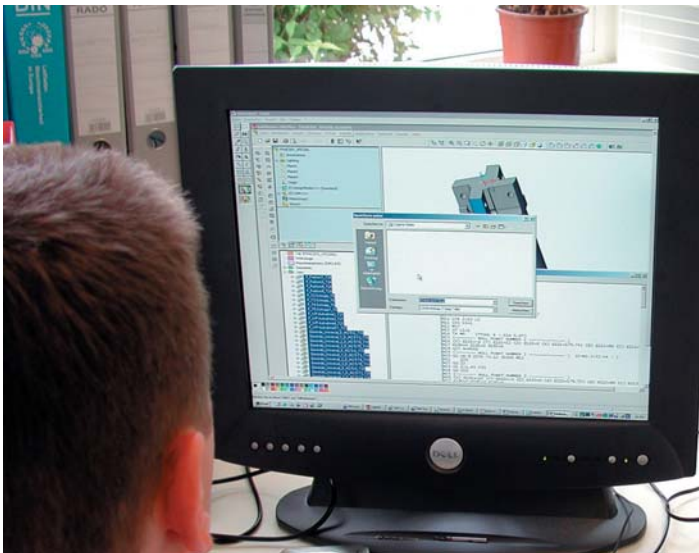
to interface to CAD systems. Roppenecker formulated another demand as “the possibility of no longer having to create and administer production drawings manually.” Investment costs also played an important role. No investment without realistic return! The search for a system meeting these requirements was going slowly until the beginning of 2002. The turning point came with the news that SolidWorks, popular and already successfully used in 3D design, and SolidCAM, highly regarded by machining professionals, would be available as a fully integrated CAD/CAM system. Monika

Blumenstock, CEO of MB CAD-Computer Vertriebs GmbH, a SolidWorks authorized reseller: “SolidCAM for SolidWorks became available at just the right time. The number of SolidWorks customers who do not want just efficient 3D design, but also expect professional, practical CAM features, is steadily rising. I see a great potential for SolidCAM.” This was validated even more, seeing the thoroughly positive experience in three departments at 3M ESPE with SolidWorks and with the integrated SolidCAM

SolidWorks

SolidWorks Corporation, a Dassault Systems S.A. company (Nasdaq: DASTY, Bourse de Paris), develops and markets 3D CAD software solutions. SolidWorks was founded in 1993 with the mission of bringing powerful 3D design into product development. In 6 years of shipping products, SolidWorks has become the world standard in 3D CAD software, selling more than 200,000 total seats of software worldwide. The 3D CAD vendor has branch offices located all over the world and organizes the sales and support of its products through an international network of authorized resellers. The company's headquarters is located in Concord, Massachusetts. (www.solidworks.com)





'best-in-class': With SolidCAM fully integrated in SolidWorks, mechanical design models and drawings can be transformed into workpieces, prototypes, dies and molds and production tools, fast and easy.

network license. Roppenecker: "We have reduced our programming time by 60% in a short period. Manual drawings have been extensively reduced, i.e. they are not used at all when using SolidCAM for NC processing on the DMU 80T. By now, almost everything in our company is done using SolidWorks and integrated SolidCAM. The approach for NC programming is based entirely on practice. SolidCAM is a real machinist's tool." The works director also had high praise for the postprocessor modified by SolidCAM for the DMU 80T "We implemented

features and options in the post-processor that the Heidenhain standard machining cycles did not offer". One example of this are the postprocessor options for coolant control which provide valuable services when programming NC jobs for machining plastics. Other features include extra options for locking the 4th and 5th axes. Even engravings, done as projections on 2D and 3D surfaces, are not a problem. Roppenecker: "Using SolidCAM we can do efficient NC programming for complex prismatic workpieces, under operator control or fully automated". For the NC program-

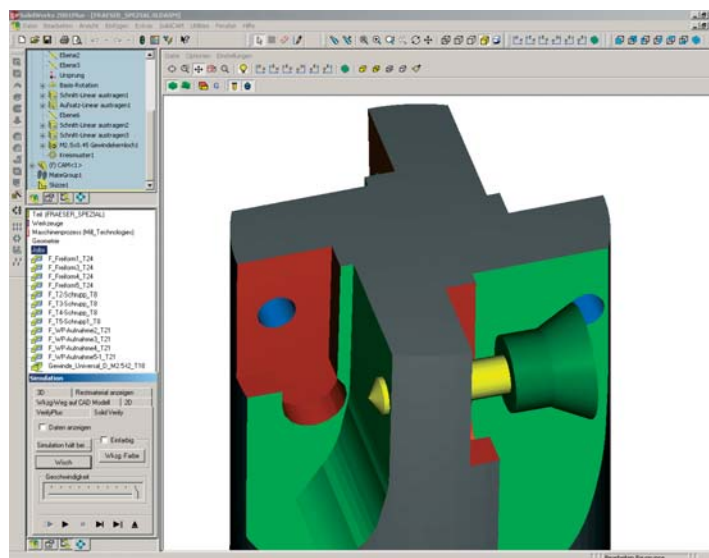
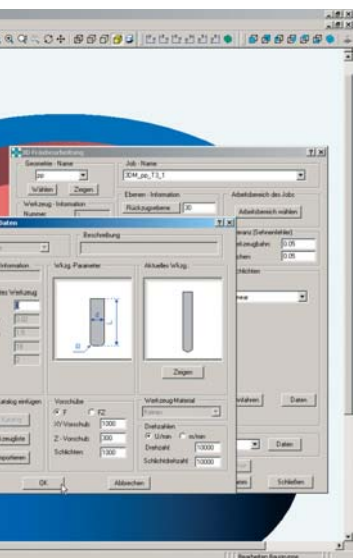
ming of prismatic workpieces, SolidCAM analyses the 3D volume or surface model and automatically searches for all machinable pocket and profile features. Users of conventional CAM systems have to define numerous operations and contours on different Z levels – this takes time and the margin of error is high. SolidCAM takes you directly to the desired result. Simply use a tool of a larger diameter to rough it down, remove the rest material with a tool of smaller diameter and then finish the wall and floor areas. Rest material preview reliably shows if all areas have been machined. NC programming on 4/5 axis machining centers such as the DMU 80T can be done just as successfully as on conventional 3 axis machines. After entering the machining home position from which to work, SolidCAM automatically rotates the model into the desired position. The 2D and 3D operations are defined and checked using the new True Solid simulation. The NC postprocessor, customized to each type of CNC control, automatically creates the finished NC program, including all machining homes, offsets and rotations. Roppenecker: "The program simulation works very reliably and has been made obligatory at our company. This "dry run" on

the computer gives us the assurance we need to really run the machines unattended." And if the design should be changed, this poses no problem concerning the NC programming. NC

SolidCAM

SolidCAM develops CAM systems for mechanical manufacturing. The current product SolidCAM 2003 is the result of more than 18 years of expertise in CAM development. SolidCAM is available as a fully integrated CAM module for the SolidWorks CAD-System and is a SolidWorks Certified Gold Product for CAM. SolidCAM GmbH's headquarters, sales and training center are located in Schramberg in the Black Forest. With additional support locations in Mannheim, Stuhr (near Bremen) and Schleusingen, fast and competent support throughout Germany is guaranteed. (www.solidcam.com)

operations generated by SolidCAM are associatively linked to the original SolidWorks design model; this reliably eliminates potential sources of errors and updates the associated NC program for CAD modifications at the click of a mouse. SolidCAM provides another tool for productivity that should not be underestimated: the possibility of creating complete machining processes,



Turbo: SolidCAM helps the user in each step of NC programming through powerful, easy-to-use menus and features. Rest material preview and True Solid simulation are examples of what's included – and: the use of flexible and powerful machining processes allows accumulated machining know-how to be structured, archived and available for reuse at any time.

archiving them systematically and connecting them in any way. Using machining processes

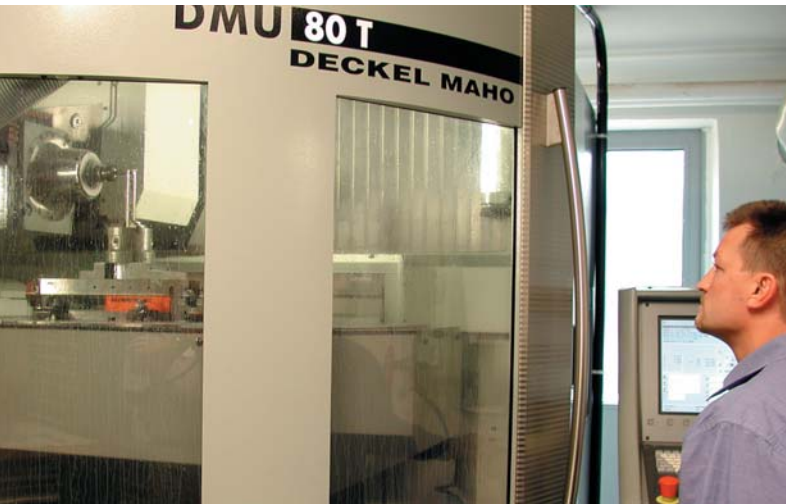
the wheel". A machining process is more than a macro and more than just a database including

SolidWorks users can extensively automate all their NC programming one step at a time.

Individual process steps can be edited, changed and simulated at any time, allowing workpieces with similar characteristics, such as drilling templates, threads and cavity geometries to be programmed in record time. It should also be mentioned here that some practice is required before such records can be set. Roppenecker treated himself to a total of 6 days of SolidCAM training at company headquarters in Schramberg; including 3 days of 2D and 2.5D training, 2 days for NC programming of 3D jobs and a special day for machining processes. His assessment: "Highly recommended. The costs are within bounds and the time invested starts earning long-term interest immediately." The costs for training and for the SolidCAM modules and

postprocessors used at 3M ESPE is certainly not small, but according to Roppenecker the cost "pays for itself within 24 to at most 36 months by the advantages achieved."

Text and pictures: Klaus Dieter Hennecke, engineer and freelance journalist, Olpe

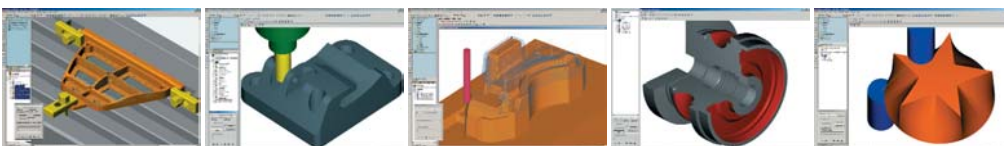


allows accumulated know-how to be built up systematically, collected, bundled, structured and reused in any way. And this incidentally also helps any company organized around manufacturing to avoid "reinventing

technology, tool and machine parameters. A machining process combines complete NC operations by using intelligent and flexible links. By using generative, knowledge-based machining processes,

SolidCAM

SolidCAM is the complete, integrated "best-in-class" manufacturing solution for efficient and profitable CNC-programming inside SolidWorks. As a SolidWorks Certified Gold Product for CAM, SolidCAM provides seamless single-window integration and full associativity with the SolidWorks design model, making it the ideal complement for SolidWorks for product development. SolidCAM supports the following technologies: 2.5D milling, 3D milling, Turning (with special support for ISCAR CUTGRIP tools), Turning with Driven tools and 2/4 axes Wire-EDM. SolidCAM creates optimized NC programs for all standard CNC controls.



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