CNC4you

The Shopfloor Magazine

Volume 3, May **2009**

SIEMENS

Flexible CNC solutions for the shopfloor

Perfect Turning for Perfect Parts

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CNC4you May 2009

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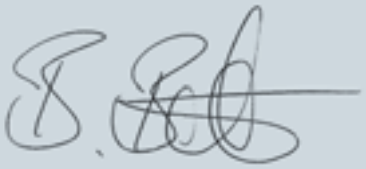
Dear reader:

At the **Turning Days** in Villingen-Schwenningen, Germany, machine manufacturers and suppliers can find out everything they need to know about **turning**, as well as the upstream and downstream process chain in the **production of turned parts**. At this well-attended trade fair in the southern German "turning triangle", it becomes clear just how important **turning** really is.

Perfect turning results not only depend on qualified personnel but also on the correct technical equipment. Siemens provides **CNC technology for every application**: Sinumerik 802D sl with the Manual Machine plus function for simple turning machines and **Sinumerik 840D sl** for more complex challenges such as complete machining, which also comes with the Manual Machine function for the processing of individual parts. **ShopTurn** makes programming simple and guarantees flawless results. Those who want to go a little bit further and venture into the realm of **rotary milling** of free-form surfaces, can count on **NX CAM from Siemens PLM**. It provides valuable assistance with its realistic simulation function.

We look forward to seeing you at **Turning Days**, where you can discover our advanced solutions for turning and milling technology.



Bernd Barthelmann,
CNC application engineer
Siemens AG

Sinumerik 840D sl with Manual Machine function is also ideal for special applications such as machining locomotive wheels

W. Geyer

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Flexible CNC program for the workshop

Perfect for Any Job

The requirements for a modern control technology range from simple turned parts to challenging free-formed surfaces. The Sinumerik 802D sl and 840D sl CNC solutions are rigorously tailored to the needs of workshops and deliver optimum functionality combined with incredibly simple operation.

CNC users are increasingly faced with the challenge of greater product diversity combined with shorter product cycles. Large-scale serial production is becoming less and less popular, with ever smaller batch sizes taking its place. In order to rise to this challenge, machine tools need to be flexible, modular and simple to operate, while also being capable of switching quickly between products.

Advanced control technology plays a vital part in achieving these goals. The Sinumerik 802D sl and 840D sl control systems from Siemens represent a straightforward control concept that can be easily adapted to individual needs. Combining these systems with the Sinamics S120 converter system considerably reduces wiring expenditure and improves fault detection via Drive-Cliq. Both 802D sl and 840D sl feature convenient setup features to streamline production planning as well as simple programming interfaces for operation. The solutions have an integrated tool monitoring feature designed to prevent downtime caused by unscheduled tool changes. Using Sinumerik CNC technology, users can specify the point at which tools should be changed simply by inputting the service life or number of changes. This ensures that maintenance can be performed as planned and the machine tool remains operational around the clock.

For serial and individual parts production

The control panel-based Sinumerik 802D sl is well-suited for use in standardized turning machines, even those with driven tools. Flexible DIN programming and extensive programming aids such as cycles and contour paths make this an easy-to-operate solution, which includes a large memory capacity as standard. Furthermore, standard Compact Flash (CF) cards can be used to back up parts programs, and very large programs can also be executed directly from the CF card. A machine of this kind really comes into its own with the serial production of simple parts for which the program is set once and then continues to run for several series.

Despite this performance, consumer demand for a low-cost cycle turning machine designed to tackle small batch sizes continued to increase. In response to this demand, Siemens launched Sinumerik 802D sl Manual Machine plus, which combines handwheel functions with conventional turning machine features. The result is a leap in flexibility, which provides the ability to produce individual parts or carry out repairs.

When cutting in hand wheel mode, for instance, the tool is moved to the appropriate position and the required cycle is programmed in; this cycle can then be simulated and processed immediately. >>

>> The tool then moves back to its original position and can, if necessary, be replaced with a different tool that is required to machine the workpiece. Following this step-by-step process produces a finished turned part.

Simple programming with shopfloor software

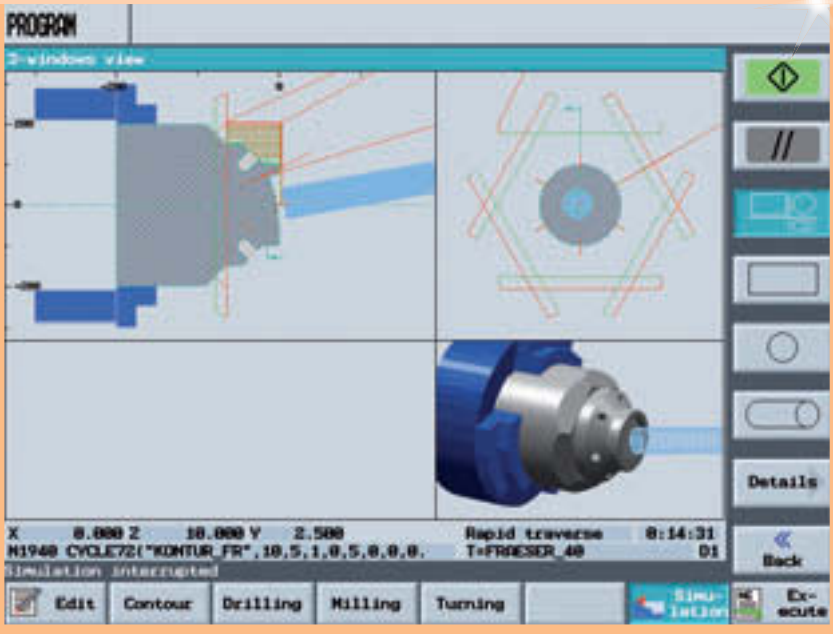
The Sinumerik 840D sl CNC is the perfect choice for production in the upper performance range. This system can be used for a diverse range of applications including tool and mold making, serial production and shopfloor manufacturing; the option for five-axis machining is just one of the ways it differs from the Sinumerik 802D sl. Another special feature of this control system is its multichannel capability: A workpiece can be machined by up to ten channels, i.e. tools, and 31 axes simultaneously. Fitted with the shopfloor-oriented ShopTurn user interface for turning and milling, the control system can produce a graphical display of technological machining steps and geometrical data directly on the user interfaces. This is a significant advantage when programming small and medium-sized series in particular.

ShopTurn makes the machine easier to use because it is tailored precisely to the practice and experience of the machine operator. Each line in the work schedule represents a technological work step (e.g. drilling) or the associated geometrical information that is responsible for the work step (e.g. position pattern). Operators can enter all parameters directly via the input screen, meaning that DIN/ISO knowledge is not a pre-requisite for programming. Nevertheless complete flexibility is nevertheless retained when it comes to program creation because the control functions can be supplemented and extended by entering DIN/ISO sets. ShopTurn and ShopMill – the software applications for milling machines – have identical user interfaces. This makes operation even more simple as users do not have to familiarize themselves with a new interface when they switch to a different machine.

New functions bring versatility

ShopTurn now boasts new functions that extend its range of application: The "swiveling B-axis" function reduces programming time and increases productivity for intricate turning machines with swivel axis and associated milling spindles. The "trochoidal milling" feature means that workpieces with open grooves at the side can be machined with minimal vibration. The "immersed milling" cycle smoothes out grooves and cavities in unstable workpieces. This ensures that vibration is kept to a minimum, making higher cut depths possible. ShopTurn also offers an additional useful function for cycle turning machines: "Manual Machine", also known as "MANUAL" mode,

The technological details



All pictures: Siemens AG

Graphic support for B-axis programming

ShopTurn provides a simple B-axis programming option for milling and drilling operations. The B-axis is simply swiveled to the required level via the swivel cycle and programming is then carried out in the same way as for end face or lateral face machining. The complete machining operation, including B-axis machining, can be verified via the simulation feature to rule out programming errors. Even complex, multi-axis simultaneous machining is now possible on a turning machine with a B-axis. ShopMill's complete functionality is integrated in ShopTurn and can be quickly implemented to create a turned/milled part owing to the fact that it has an identical look and feel.

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can be used to machine workpieces without having to create a parts program. This is particularly useful for special applications (see the article on page 12).

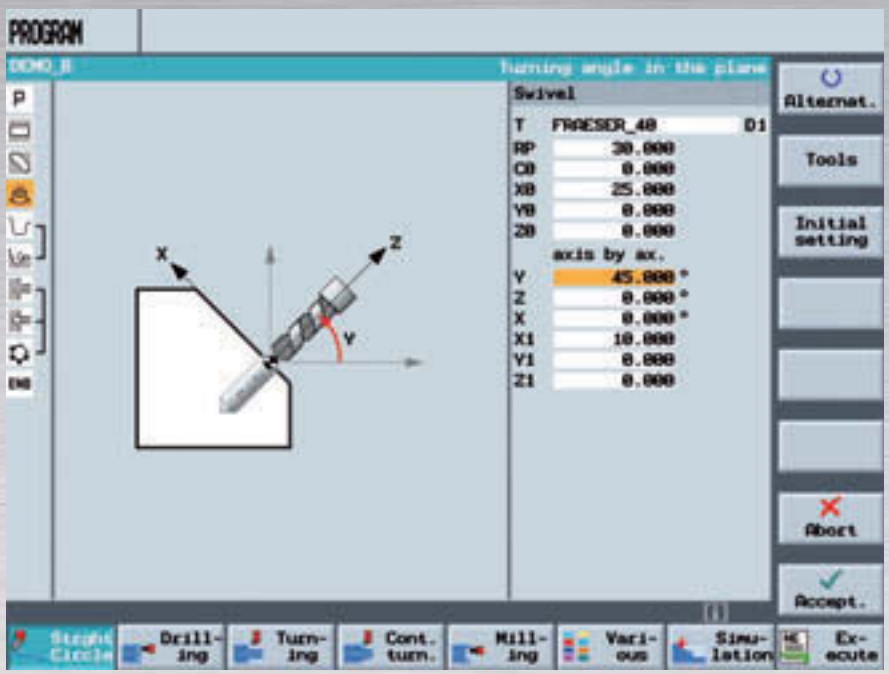
Ideal for even the most complex turning and milling work

ShopTurn and ShopMill are no longer sufficient as programming support for more complex tasks such as the turning/milling of free-formed surfaces. High-speed cutting (HSC) applications used in medical technology, aircraft parts or turbines require special NC programs as well as high-performance machines. NX CAM from Siemens PLM provides a complete solution for the NC programming of multi-functional CNC machines.

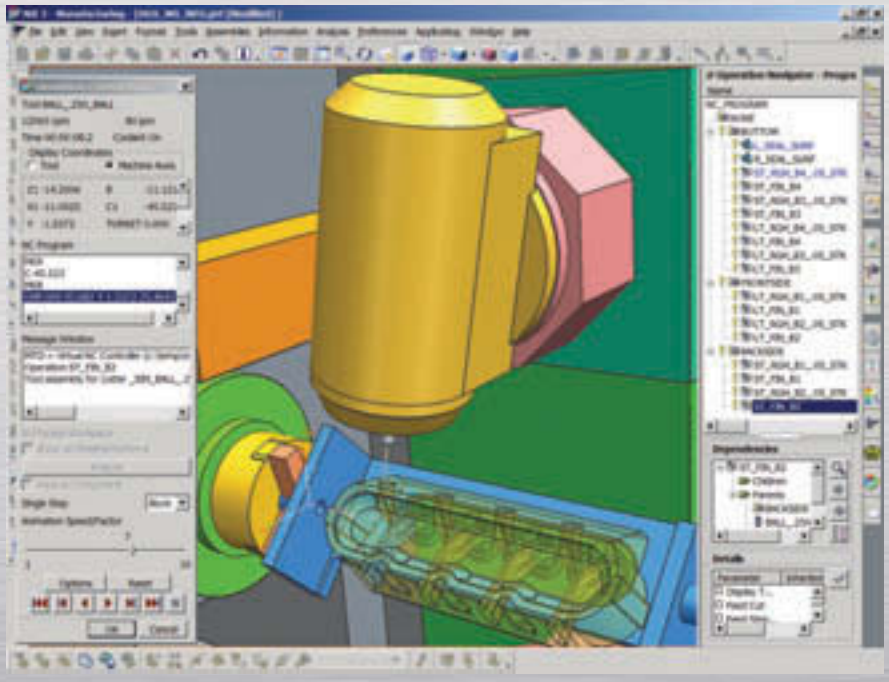
The integrated software functions mean that the extensive programming that would have once been required with these machines is now a thing of the past. When producing a part, the machine operator must first load the CAD data into the program, then define the processing strategy (e.g. the sequence for rough machining, pre-finish cutting, drilling, finish-cutting, etc.) and specify a raw part. The operator can then simulate the selected work sequence. This simulation will indicate chip removal and provide collision warnings. In the case of multi-channel machining, the process synchronization manager synchronizes the tools. The post processor then converts the tool paths into machine-specific routes (G-code). But the real highlight of the program is the impressively realistic simulation feature with optional VNCK (Virtual NC Kernel) from Siemens.With this feature, it is possible to establish, at an early stage whether machining operations are within the machine limits and how the complete machine kinematics look during machining. This saves time and ensures that production is significantly more cost-effective.

From simple turning tasks through to high-speed cutting, Sinumerik solution line keeps machine users prepared for any job. <

ShopTurn accelerates the progression from drawing to finished part. Example: Milling and drilling operation with integrated swivel cycle (Cycle800)



The simulation functions offered in NX CAM ensure reliable monitoring of machine movement during five-axis programming



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The new, automated machine has a maximum turning length of 1 m and swing diameter of 430 mm, and sets itself apart through its solid, stable construction

Publicis

Turning machine with Sinumerik 802D sl and Manual Machine Plus in use at Bito Lagertechnik

A Smooth Transition

Programming made easy: The "Manual Machine Plus" option for the Sinumerik 802D sl offers a virtually seamless switch from the conventional machine to the CNC turning machine. Bito Lagertechnik has used this to its advantage for toolmaking.

Based in Meisenheim, Germany, Bito Lagertechnik Bittmann GmbH is one of just a few one-stop suppliers of products for storage systems. With a staff of 700, this traditional, medium-sized company partly focuses on providing a comprehensive range of shelving and containers, as well as an entire host of other storage products. Its other main area of activity is the planning, implementation and processing of entire projects that are fully tailored to customer requirements.

The equipment design and toolmaking division at the steel-production site in Meisenheim recently obtained a Romi C420 cycle turning machine from the Brazilian manufacturer Romi via the Bochum-based Hommel Maschinentechnik GmbH. This machine supplements the two conventional turning machines already in use. The new, automated machine has a maximum turning length of 1 m and swing diameter of 430 mm, and sets itself apart through its solid, stable construction and its high level of precision and flexibility. Among other things, the Romi C420 in Meisenheim is used to produce spare parts for plastic-production machines in neighboring Lauterecken.

Increased productivity

"This new machine was procured to fulfill two objectives," explains Günter Knecht, head of equipment design and toolmaking: "First, we wanted to provide our machinist Edmund Klein, with a machine to which he could apply his 30 years of experience with relative ease." However, it should also enable the creation and saving of programs in a convenient way and provide easy access to these programs for other employees, as required. "For example, we are constantly reproducing injection-molding nozzles," points out Edmund Klein. "Once I've created the "nozzle" program, I only have to set it up. With the conventional machines, we had to keep starting again from scratch."

Günter Knecht had already opted for Siemens approximately ten years ago during control retrofit. "It was the sim-

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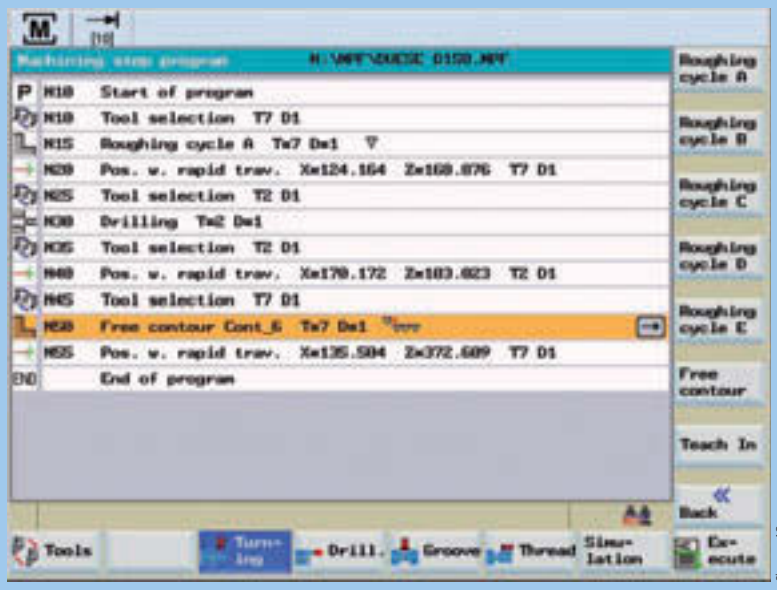
The technological details

"Manual Machine plus" (MM+)

The "Manual Machine plus" user interface offers new turning options. A simple switchover activates a second programming mode for creating a program manually and with simple cycles. This program can then be used like a normal program for additional workpieces. Manual Machine plus makes it easy to switch from conventional machines to CNC machines, and is also suitable for training purposes. Depending on the level of training needed, the one machine can be used as both a manual and a CNC machine.



ple operation of Sinumerik that clinched it for me. I got to grips with the graphic user interface right away, even though it had been 25 years since I had worked at such a machine." And seeing as his employees are satisfied all round with everything the Sinumerik has to offer, this control system should also be a part of the new solution as well.

Familiar operation

"The decisive factor in selecting this machine was the impressive complete package plus its excellent cost-performance ratio for our purposes," explains Günter Knecht. The "Manual Machine plus" (MM+) option package for the Sinumerik 802D sl included in the scope of delivery proved itself to be extremely useful as it enables Edmund Klein to operate the machine (with the support of graphical help images) just like a conventional machine. He can use MM+ to set different cycles manually and then execute via the handwheel. Furthermore, he can create a work schedule from individual work steps in a way that is familiar to him. This plan can then be run as a program on any number of occasions. Free contour programming with fewer current machining contours is also easy with MM+.

Edmund Klein's initial skepticism was quickly overcome and he was able to operate the new turning machine in no time at all. Instructor Hans-Walter Schwab has trained three additional staff members to use the machine so far. "If a program is set up once for a workpiece, the time for subsequent machining processes is halved in comparison with conventional machines. Also, the more complicated the contours, the more time we save," he says.

In addition to all this, the product development for turned parts no longer has to be sent out to external companies. "With the new machine, we can do it quicker ourselves," points out Hans-Walter Schwab. The in-depth training means that employees now have the opportunity to explore the capabilities of the control system and machine better than before, and therefore utilize them better. <

Superb results: the Manual Machine plus option for the Sinumerik 802D sl has enabled Edmund Klein, an experienced machinist, to operate the new machine just like a conventional machine

For more information > www.drehteile-gesell.de > www.weilerusa.com

Subcontractor uses ShopTurn for precision turned parts

Customer Proximity is Key to Success

A small company making precision turned parts stands the best chance of succeeding if it can find niches and fill them flexibly. Shopfloor software for CNC machines is a valuable tool in this process. It helps specialists to control machines and makes it easier for new employees to get to grips quickly with CNC technology.

"Because we are flexible with regards to batch sizes and product ranges, we can immediately react to changing customer demand and produce high-quality products in a short amount of time," says Werner Gesell, summarizing his company's philosophy. Drehteile Gesell GmbH, which employs 10 people and is now into its second generation, manufactures precision turned parts from machinable materials with a diameter of up to 65 mm. In addition to major industrial firms such as the aircraft construction, agricultural technology and communication technology sectors, this subcontractor's customers also include local small and medium-sized businesses.

Flexible manufacturing concept

Serial production typically run to between 2,000 and 3,000 parts. Then there are more complex small series in batches of between 10 and 100 items. Major firms often lack sufficient capacity to manufacture certain parts themselves, and therefore order them from a supplier. According to Gesell, other companies do have sufficient capacity available, but are not able to manufacture the parts for the same price as an external subcontractor.

At the company's headquarters in Monheim, Bavaria, the machine hall contains systems from Gildemeister, Boley, Traub, Spinner, Orion and Weiler. The DZ 35 CNC lathe, which was added in November 2008, was also purchased from Weiler Werkzeugmaschinen GmbH. It has a hollow shaft motor for main spindle and subspindle, a tool turret for 16 tool stations and a Y-axis for the manufacturing of highly complex chuck and shaft parts.

Less time and money on training

"One of our goals is to rationalize the range of control technologies and to work with

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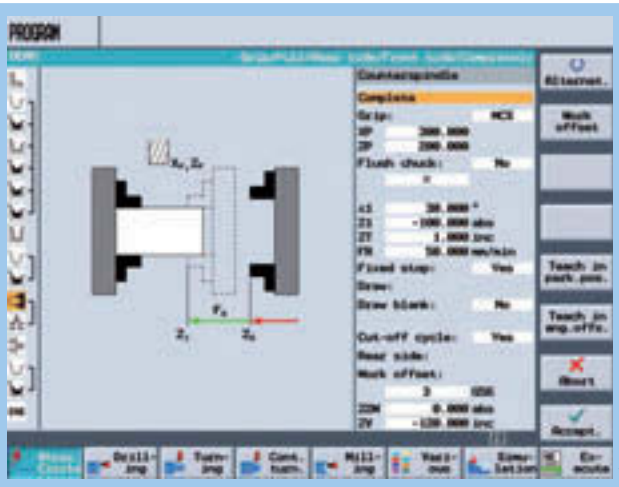
standardized products wherever possible. This makes the machines easier to operate and reduces the amount of time and money spent on training," explains Werner Gesell. Control systems from four different providers are currently in use, and the plan is to standardize this even further. "Siemens control systems have always served us well in the past," stresses the company boss. "We are still using the oldest control systems from the Sinumerik range, while simultaneously introducing the latest Sinumerik 840 D sl on a number of machines. Spare parts and service technicians are quickly available if needed. Above all, Sinumerik CNC beats other control systems hands down when it comes to operation."

The Sinumerik control system on the new Weiler lathe functions in conjunction with the ShopTurn operating and programming interface. ShopTurn enables you to work by entering interactive graphic cycles for turning and milling.

Optimal interaction of programming components

The user interface makes it easy for even new employees to get up-to-speed quickly with CNC technology, as it can be operated without extensive programming or in-depth CNC knowledge. In addition, the program enables maximum process reliability by simulating the work sequences using real tool data. This means that programming errors can be identified and rectified at an early stage. The extensive standardization of control systems now means that each Gesell employee can work on any machine. In addition to the new machine, three further Weiler lathes are used for the extensive product range. Even machine operators with little experience with CNC machines find that they can get to grips with ShopTurn straight away. "They find it even easier than operators who have been programming according to DIN standards for years," says the company owner. <

With ShopTurn, users can enter the subspindle parameters for complete parts machining in a convenient way



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The technological details

ShopTurn for complete machining with subspindle

A convenient subspindle cycle is available for synchronizing spindles and axial movement for part transfer. Functionalities range from pulling long parts with the subspindle to complete machining with picking, pulling, cutting-off and subspindle machining of bar stock. All machining steps of the main spindle machining such as technology cycles and contour calculator are also supported for the subspindle.

W. Geyer

For more information > www.schoema-locos.com > www.seiger.de

Handwheel mode for specialized processing operations

Practical Operation

The SCHÖMA machine factory has opted for a cycle turning machine with Sinumerik 840D sl for the manufacture of individual parts and small batches; this machine also features ShopTurn with Manual Machine. This solution combines the flexibility and benefits of conventional machining with the productivity and efficiency of a CNC, and this is what tipped the balance in its favor.

Christoph Schöttler Maschinenfabrik GmbH (SCHÖMA) is based in Diepholz, Germany. The company specializes in the development and production of diesel-engine locomotives. The model range includes tunnel and shunting locomotives; service, field and narrow-gauge locomotives; and handcars, passenger carriages and gang cars. Around 90 percent of the locomotives produced each year are destined for use in tunnel construction.

Each construction project brings its own specific requirements and each country through which the locomotives travel has different environmental and safety legislation. SCHÖMA uses a modular system to meet a diverse range of customer requirements and the resulting variety of equipment and product versions. One of the tasks facing the company is working out how to equip the locomotives for transportation by rail on differing track widths. Another requirement is locomotives with driving wheels featuring diameters of between 600 mm and 900 mm depending on usage.

The right decision

Faced with even more demanding requirements in terms of production capacity and flexibility, SCHÖMA's Managing Director, Christoph Schöttler, last year decided to add a cycle-control Seiger Record LC 1400 lathe to his array of machines. "We opted for a head turning machine as we do not need a tailstock to produce driving wheels, axle bearing housings and gear wheels. It is working just as we envisioned, so we obviously made the right decision," says Schöttler.

SCHÖMA constructs around 120 locomotives each year, which equates to 480 wheels. In addition, there are also repair orders, which increase the workload to between 560 and 600 driving wheels per year. These wheels are produced in two mountings from forged blanks on the cycle turning machine. The first mounting is used to machine the wheel flange

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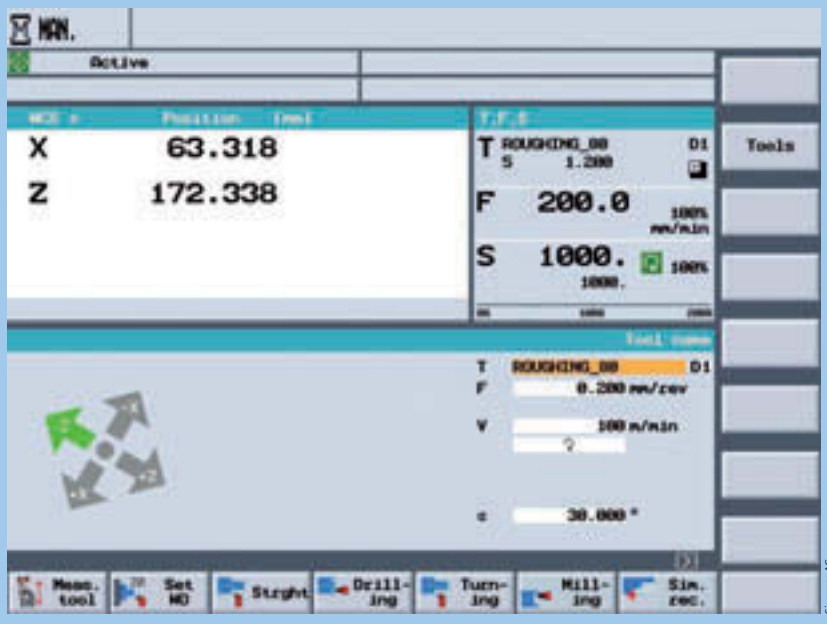
W. Geyer



Siemens AG

The technological details

JobShop software ShopTurn with Manual Machine

After machine start-up, the basic MANUAL screen is immediately displayed and offers direct access to choosing machining options without having to create a parts program.

Machining procedures such as “taper turning” and “straight line face and longitudinal turning” can be executed right away: Simply select tool, feed speed, spindle speed and orientation, and, if required, machining angle, then press “Start”. The active direction is graphically displayed in the basic screen using a compass rose symbol. All machining steps such as entry, thread grinding or drilling can also be started in manual mode.

on the reverse side and the wheel hub. The shaft locating bore is pre-turned. In the second mounting, the first task is to pre-turn the driving wheel profile; after this, the rolling circle level and the wheel shaft locating bore are finished.

Careful approach

The cycle turning machine is controlled by a Sinumerik 840D sl equipped with the ShopTurn software package with Manual Machine. If required, ShopTurn programming can be performed on a separate PC as part of work planning without interrupting the work sequences on the machine. The programs are routed to the machine via the network, where they are called up as required, depending on the workpieces to be produced. The Sinumerik is used for both numerically controlled machining and manual operation with the ShopTurn’s manual functions. In manual mode with electronic handwheels, the machine behaves just like a conventional lathe with an actual value display.

During face and longitudinal turning, the process operates with the entered feed and the spindle speed. The real highlight of the system is that every cycle can be used straight away without having to create a program. At SCHÖMA, the option for manual intervention is used for setting the zero point or for simple contours. Diameters are determined manually if driving wheels have been newly profiled or if driving wheel profiles require resurfacing. The wheel profiles abrade as a result of the high loads experienced in heavy-duty operation, on poor-quality tracks, or as a result of the driven wheels skidding.

“With a machine that uses only CNC, it is difficult to rework the driving wheels as it is not possible to determine how much material needs to be removed. With manual mode, users can adopt a careful approach. This sums up the ease of control,” explains Walter Horstmann, head of mechanical production and wheel set construction at SCHÖMA. <

An inventive example of how to use ShopTurn

Quick Production

The machining systems offered by today's machine-tool manufacturers place high demands on the programming process. Using the lid of a beer mug as an example, we can demonstrate how convenient and easy it is to implement the necessary steps using the ShopTurn technology package.

The pockets and islands on the beer-mug lid "fly" pose no problem for the Sinumerik 840D sl with ShopTurn

Pictures: Siemens AG

The procedure for manufacturing a lid to fit any standard beer mug is an ideal demonstration of the wealth of options available by the correct combination of CNC system and technology package. To make the machining process more interesting and provide a better illustration of the various work steps, the lid used in our example will feature a "flies keep out" emblem. This means that the workpiece will require a series of islands and pockets, so a certain amount of skill is required on the operator's part during programming. Users who do not like the fly can decorate their workpiece with another design; the procedure is described below.

Conversion into G-code

First of all, the design is drawn using a CAD system. In this example, we used Autodesk Inventor 2009. The software's core component is its 3D modeling package. This enables 2D drawings to be derived from the 3D models and components created. The next step is to use the 2-D drawing in DXF format to generate a CNC program that is compatible with the machine; this is done via the CAD Reader that is either part of the SinuTrain software or can be ordered separately as a PC version. The DXF (Drawing eXchange Format) file generated by Inventor is imported into the CAD Reader. Contours and drilling points are then filtered out, and any parts that are not required for machin-

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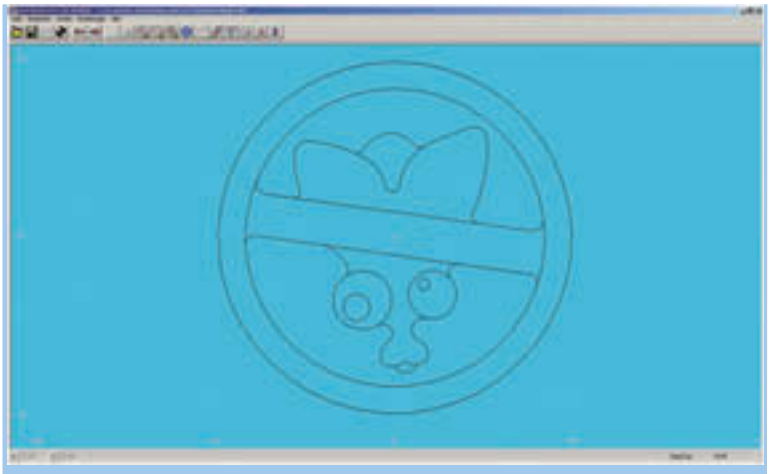

ing (dimensions, hatching, labels, borders, etc.) are removed.

Each individual contour, e.g. the fly's abdomen or one of its wings, is assigned a name, a start and an end point, and is saved. CAD Reader then converts the contours into G-code or into the ShopTurn format, which can be processed directly in the Sinumerik CNC. ShopTurn can be used to produce contour pockets with islands. The operator can specify whether the entry point for the cycle should be helical, oscillating or central, or whether the entry point should be determined using a drill hole. If it becomes apparent during the machining process that a milling tool is too large to clear out the entire contour pocket, it is replaced with a smaller one to remove the residual material.

CAD Reader reduces workload

In this example, the machining process for the beer mug lid is carried out over several work steps on a Spinner TC-600 CNC universal lathe. This lathe is fitted with a Sinumerik 840D sl control system and ShopTurn. The lid is turned in two mountings: the first step turns out the concave inner/lower side and turns on a recess. After the second mounting, the convex outer/upper side is turned, and the contours of the fly and the diagonal bar are milled. The blank for this job is a round piece of material measuring 100 mm in diameter and cut to a thickness of approx. 30 mm. We used an AlCuMgPb alloy.

As the example shows, ShopTurn makes it easy to get ahead with CNC technology. One reason for this is that the programming interface is geared toward the machine operator's way of thinking. The user also has far less work to do when using the Sinumerik control system together with ShopTurn and the CAD Reader because he does not have to input all the coordinates for each contour manually. If he wants to make sure that the process steps he has planned will be performed without a hitch, he can run a simulation before he starts. What's more, anyone using ShopTurn does not require extensive knowledge of a DIN/ISO programming language. However, it is still possible to enter DIN/ISO blocks directly into a ShopTurn program. <

The technological details

CAD Reader

The CAD Reader program makes it possible to process CAD drawings using Sinumerik control systems. The transferred NC programs can be saved as MPF, SPF or ARC files. During the saving process, CAD Reader generates G-codes (NC blocks) from the selected contour. These codes can be processed directly using Sinumerik. Comment blocks that can be processed by the geometry processor or the cycle support are also saved. Imported contours can be recompiled or modified using the geometry processor. Drill holes are usually generated in cycle format and can therefore be recompiled on the control unit.

To output a contour as an NC program, a zero point for the drawing must first be specified in CAD Reader. This is because, in most cases, this zero point deviates from the zero point in the DXF file. To determine a contour to be generated, its start and end points are then selected. The program attempts, wherever possible, to select the contour automatically. If a subsequent element is not obvious, the software switches to interactive mode and prompts the user to select the next element. Selection then proceeds in stages until the end point of the contour is reached.

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EWS

Multiple tool holders enable one work station to be equipped with several tools. “Simple” machines can be turned into machining cells that can process workpieces completely

EWS multiple tool holder for turning-milling centers featuring a Y-axis

Optimum Use of Space

A growing number of parts and increasingly complex workpieces are prompting companies to look for solutions that will help them to get the most from their machine tools. Fitting the turning machine with multiple holders is certainly a step in the right direction.

Nowadays, Y-axis technology comes in many forms.Machines with a fully fledged milling axis and a large tool magazine represent the highest configuration levels, while the simplest version is a turning machine with just one tool turret. If a company is planning to carry out complete machining, the turning center must also have a counter spindle, and at this point, if not before, the number of tool stations available is likely to become an issue. For example, machines with the VDI 30 or VDI 40 tool interface, which correspond to adapters of type BMT 55 or BMT 65, generally have 12 tool stations. If a rod feeding device is used to feed in the raw material, this means that one tool location is already occupied by the rod gripper or material stop.

The parting unit for transferring the workpiece from the main spindle to the counter spindle after processing occupies a further location. This means there are now only ten remaining work stations for roughwork and smoothing as well as centering and drilling work – not to mention driven tools for which this machine was originally purchased. At this point, the user realizes that he is short of work stations and that the complete machining that was originally planned will have to be postponed for the time being due to capacity reasons.

Simple expansion of tool stations

Tool supports such as those developed by EWS Weigele GmbH in Uhingen (Baden-Württemberg), Germany offer one solution. The advantage of the EWS system lies in the interaction between the Y-axis and the machine control system. This enables the Sinumerik 840D sl to use one tool location multiple times. In the case of a turning tool, the tool location can be fitted with four machining tools – provided the neighboring location and the Y-travel of the machine are taken into account.

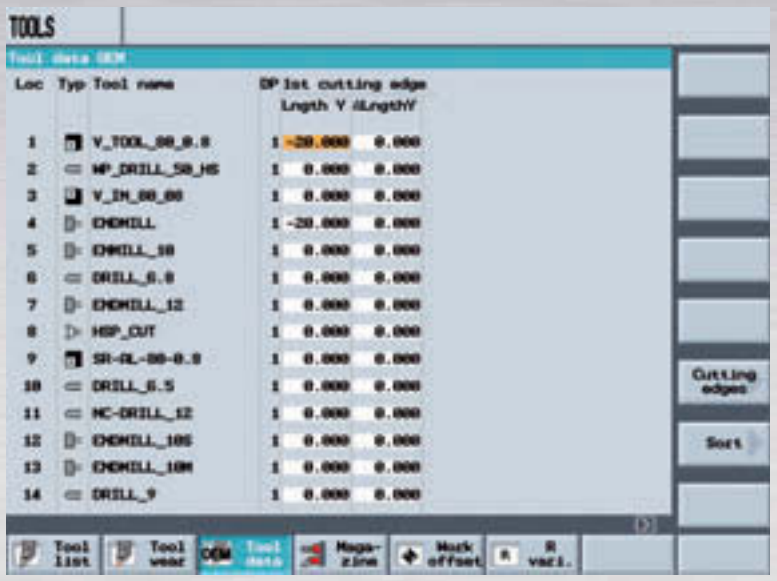
The installation position is not critical as the Sinumerik CNC always corrects to Y=0. The same applies for filling the locations for drill supports. Space optimization solutions are also available when it comes to driven tools, making it possible to expand the number of tools from 12 to 20–25. This enables companies to turn even “simple” machines into powerful machining cells for the complete processing of even more complex workpieces. <

The technological details

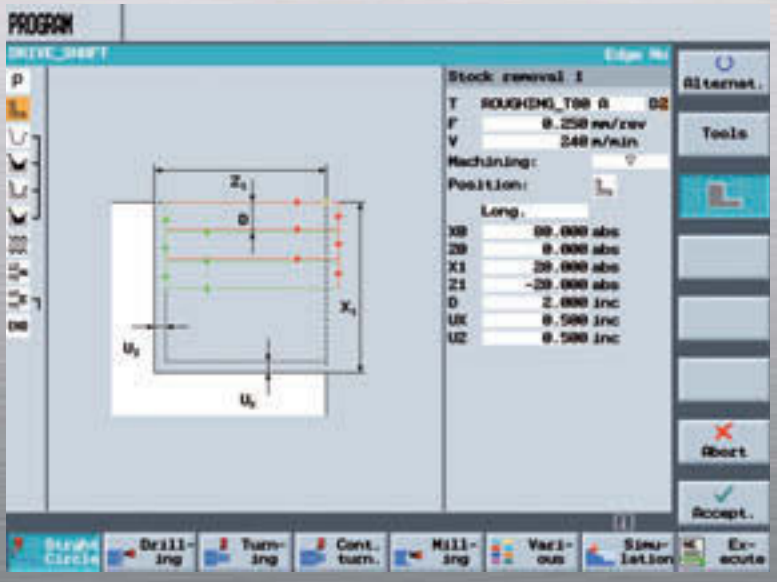
Tool Management with ShopTurn

The multiple tool holder from EWS Weigele GmbH speeds up tool changes on turning-milling centers. The only pre-requisite is that the machine must have a Y-axis so that the tool turret can move from top to bottom. In order to use the system, the tool data must first be entered using the ShopTurn operating and programming environment.

After two different tool corrections have been created for a turret space, the value for cutter 1 is set to negative as this is the lower tool in case of multiple usage of the multiple tool holder. Cutter 2 is the upper tool in the holder and is assigned a positive Y value



On the cycle screen, the user simply selects the corresponding cutter. ShopTurn then processes this cycle automatically with the correct tool and matching Y offset.



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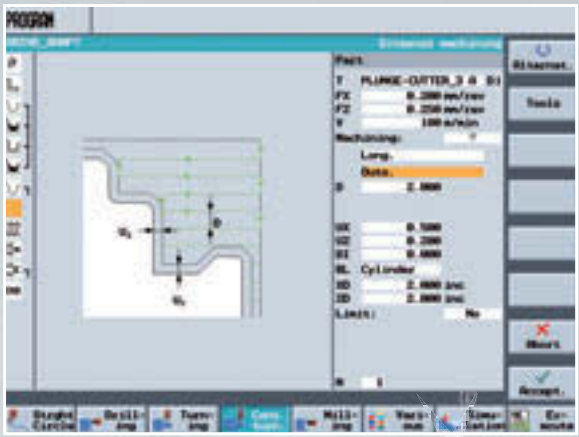
ShopTurn simplifies grooving

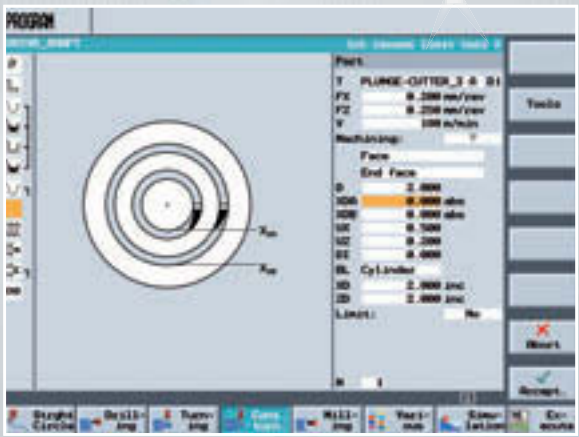
Fewer Tool Changes

MDT shows its strength when standard cutting processes reach their technological limits. Together, Siemens and Seco Tools have designed a solution that covers a range of machining tasks.

> Seco Tools GmbH based in the city of Erkrath, Germany, is a one-stop shop for cutting tools. Particular attention was lavished upon the insert to create a tool system that can both part-off and plunge cut, and is also suitable for longitudinal, face or axial machining and form turning. Alongside the hard metal cutting materials, the development of the clamp and holder design also played a key role in the development of the Seco MDT tool.



In collaboration with Seco Tools, Siemens has developed special groove cycles that are equally simple to operate as standard cutting cycles, using comparable user interfaces. The difference is that a second feed direction is added to the mix when grooving. The feeds for X and Z direction can be programmed using ShopTurn



Where previously a range of tools was required to produce a complete contour, with the MDT system this can now be created without tool changes. Regardless of the machining position – exterior, interior or face grooving – the worksteps in the cycle can be defined with two parameters. When face plunge cutting, the minimum and maximum values of the "puncture" are additionally requested

All pictures: Siemens AG

An important feature is the structure of the interface between the underneath of the cutting insert and the clamp holder contact surface. This structure is a combination of a serrated and prismatic contact surface. The cutting insert is clamped using the upper contact surface and the serration on the bottom of the insert that locks into the matching serration on the insert seat. Thanks to the stability in a radial direction, this rules out any more twisting of the cutting insert.

The MDT solution has a vast number of practical applications, such as producing complex components that have various diameters, profiles and grooves. In the past, implementing this tool strategy has often failed due to the difficult programming required, in particular for boring out or producing deep grooves and complex contours.

Siemens and Seco collaborated to further develop the ShopTurn operating and programming interface. The result is shopfloor-oriented groove cycles that automatically generate tool travel distribution after inputting just a few parameters. Sinumerik users are therefore able to optimize the machine's utilization thanks to fewer tool changes and shorter changeover times. In addition, the universal tools considerably reduce the range of tools required. <

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First TAC in Southern Italy Opened

On September 26, 2008, a new Technology and Application Center (TAC) was opened in Terlizzi in the southern Italian province of Bari. "The TAC provides an ideal basis for cooperation and communication with partners and end customers," explains Filippo Giannini, head of the Machine Tools division at MT Siemens Italia. The topics on display range from the practical handling of Renishaw measuring systems and the use of tool setup devices to measurement instruments for the geometric analysis of machine-made workpieces from Speroni.

In addition to training rooms, the center also has a machine hall with room for a number of machines. The machines on display here include a turning machine with driven tools and two vertical milling machines, one of which is setup in a five-axis configuration. Solutions are presented that provide future employees of companies with the requisite knowledge for turning and milling. The NX6 CAD/CAM system developed by Siemens PLM Software for use in project planning is also being presented. The MCIS (Motion Control Information System) software suite and a tool for Electronic Production Services (ePS) are both installed on a server. The TAC provides the opportunity to test different versions of automation systems together with the customers, thereby determining the most efficient solution before a purchase is made. The machine tools and Sinumerik control systems installed are also used to provide operator training. Last but not least, it is hoped that in the future the TAC will be a forum for questions on machining technology and will act as a communication platform for technology partners. <

Siemens AG

The opening of the TAC in Bari was welcomed by visitors with great interest

Siemens AG

A New Face at the TAC in Erlangen, Germany

After completing a three-and-a-half year training course at Braun GmbH in Kronberg, Germany, to become a machinist specializing in device and precision engineering, Nils Nabor worked for six years in technical prototype production (CNC turning, conventional milling, laser cutting) for the same company. He subsequently worked for two years in design model construction at Braun GmbH as a CAM programmer for three and five-axis milling.

While working, he successfully completed a four-year course at a technical college to qualify as a mechanical engineering technician. Nabor has now relocated from Kronberg to Erlangen, where he works as an application engineer in the Technology and Application Center (TAC). One of his duties involves presenting the different levels in the CAD/CAM/CNC production chain. He is also responsible for training courses, workshops, presentations at trade fairs and machine demonstrations.

In his spare time, Nabor, who was born on January 8, 1981 in Münster, Westphalia, enjoys motorcycling and spending time with his family. <

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