

Klartext

HEIDENHAIN

PRODUCTION PERSPECTIVES

Perfect molds and transparent processes

Editorial

Dear Reader,

We have put together this new issue of *Klartext* with the theme "Production Perspectives." We want to take a look at processes and workflows from different points of view, adding some new ones along the way. You might even gain some completely new perspectives.

For example, the StateMonitor software provides a real-time view of your machines' production status. This opens new options for the acquisition, evaluation, and visualization of machine data. With this information, you can uncover hidden potential in machine availability, increase machine utilization, improve productivity, and gain new business perspectives.

HEIDENHAIN controls provide new options in many different areas, such as turning, training or high-precision parts manufacturing for the motorsport industry. This is because HEIDENHAIN controls create opportunities for success through improved performance.

And naturally in toolmaking and moldmaking, it is well worth your while to take a look at Batch Process Manager and the numerous TNC functions for perfect molds. These functions open up a wide variety of perspectives for improving efficiency. Whereas many TNC functions max out the potential of your milling machine in terms of precision and dynamics, Batch Process Manager optimizes the planning of production sequences with its automated job processing.

Keep your eyes open, and you will discover ever more new perspectives for improved production. Happy reading!



Dömer Stanz- und Umformtechnologie utilizes the TNC 640 with Batch Process Manager for their in-house toolmaking.



At NAFO, the StateMonitor software renders production transparent and opens up room for new challenges.

Legal details

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With TURN PLUS, you can create NC programs directly on the lathe control at the stroke of a key.



10



16



34

Klartext

69 + 07/2019 North American Edition

Content

Flexibility

RWT, the specialist for vehicle and engine parts, about their experiences with the first EMCOTURN E65 to feature the HEIDENHAIN CNC PILOT 640.

4

First HEIDENHAIN PARTNER TRAINING for TNC in U.S.

HEIDENHAIN's exciting new partnership with Community College of Denver makes the Rocky Mountain region a focal point for CNC machining with 5-Axis TNC.

8

Efficiency leap

Exciting opportunities are opened up for Dömer Stanz- und Umformtechnologie by a machining center from OPS-Ingersoll and the Batch Process Manager software of the HEIDENHAIN TNC 640.

10

Practical

The new software update 09 broadens the machining capabilities of the TNC 640 with new functions.

14

Freedom

New machines and technologies are meant to open up new opportunities. That's why the toolmaking company NAFO has networked its machines via the StateMonitor software.

16

Transparency

SMW AUTOBLOK is testing the new StateMonitor software version 1.2 in its special production facility. First experiences...

20

All-rounders

DMT and HEIDENHAIN have created highly unconventional perspectives on apprentice training at the Lörrach vocational school.

24

North American Manufacturers See HEIDENHAIN In Action During European Technology Tour

28

Overhaul

At the Robert-Gerwig-Schule in Furtwangen, apprentices made a school project out of retrofitting their training machines.

32

At the stroke of a key

Innovative programming options make the CNC PILOT 640 the perfect lathe control for the shop floor.

34

Knowledge pool

Experienced experts on the HEIDENHAIN Helplines respond immediately and competently to customer inquiries.

38



USER REPORT

Flexibility

Small quantities, frequent setting up, continuous optimization, and highest quality: RWT has successfully turned these challenges into its strengths.

RWT has its head office in Russbach am Pass Gschütt, bordering on the Salzburg region and Upper Austria. The company's success lies in the manufacture of milled and turned parts, for which the team pushes the boundaries of the doable, especially in terms of precision and quality. According to co-owner Reinhard Thor, this is what gives the company its solid prospects on the market. For this reason, he invests in leading-edge production technology like the EMCOTURN E65 with the HEIDENHAIN CNC PILOT 640 – the first ever to be delivered to an EMCO customer.

One tenth of a μ for motorsport

Reinhard Thor quickly sums up RWT's business model and recipe for success: "We have specialized in parts for engines and vehicles. In carefully-tuned grinding processes, we achieve precision in the one tenth of a μ range. We support our customers with our specialized expertise right from the design stage. This way, we can jointly optimize the manufacturing processes and workpieces from the very beginning."

What sounds so simple demands a lot of courage, flexibility, and commitment from both management and the workforce. "A supplier to the motorsport sector has to respond quickly and unbureaucratically to requests for changes. Designs practically never remain unchanged, and tweaks are always being made, so that corresponding changes must be made to the NC programs," says Reinhard Thor, describing the daily routine at RWT. This is why only skilled operators stand at the machines at RWT; turning operations are programmed entirely on the controls on the shop floor.



Pioneering spirit in the choice of machines

Just how courageous Reinhard Thor is, is reflected not only in the company's commitment to the demanding motorsport industry, but also in its purchase of a new lathe. "We bank fully on HEIDENHAIN controls for milling and turning. So too with our new lathe. Since we knew that EMCO builds good lathes anyway, we were confident that the new combination of an EMCOTURN E65 and the HEIDENHAIN CNC PILOT 640 would work. So why shouldn't we be the

first customer to put such a machine into service?" Reinhard Thor grins mischievously.

Christian Höll, a skilled operator who chiefly works as a setter on the EMCO, is pleased about the pioneering spirit of his boss: "I am totally happy with the new machine. It worked from the very start. Any problems were minor—nothing essential that would have impaired production." In handling these small teething problems, EMCO and

The CNC PILOT 640 and EMCOTURN E65 are a perfect match.

"We love the challenge!"

Reinhard Thor about the decision to be the first customer to deploy the EMCO E65 featuring the CNC PILOT 640



HEIDENHAIN provided fast and effective assistance. "At both companies, we always have a contact partner with an open ear and—even more importantly—solutions for our needs and wishes," confirms Reinhard Thor. The magnetic sign with the HEIDENHAIN Helpline numbers now sits hardly noticed on the machine cover.

Learning by doing

And what is it like to operate the machine? "The intuitive touch operation is really a dream," enthuses Christian Höll, who had no problems switching from his older HEIDENHAIN lathe control to the latest CNC PILOT 640. "The programming is wonderfully easy, and with just a few adjustments, I can

even use old programs from previous controls. I taught myself to operate the new control—learning by doing, drawing from knowledge from previous work with HEIDENHAIN controls." And, pragmatic as he is in the shop, he adds another argument in favor of the touch control: "At first I was skeptical about the touch-screen getting dirty. But a quick wipe once a week is all that's needed. Even here on the production shop floor, you don't have to worry about it."

Christian Höll primarily uses smart.Turn and TURN PLUS for programming: "This allows very flexible programming on the control. I can also make changes and adjustments at any time with the clearly structured programs. This allows me to bring all of my personal turning expertise

to bear on the programs. And if my knowledge does reach its limits, the interactive help on the CNC PILOT 640 is always there with the required information."

Precision even with a lot size of one

RWT is now using the capabilities of its new EMCO machine to the max. This includes classic turning operations all the way up to milling, drilling, and tapping with the Y axis. The motorsport supplier primarily uses this machining center to machine small series of up to 30 parts from raw blanks. Often made of difficult-to-machine materials such as magnesium alloys, the raw blanks are fed via a bar loader for diameters of

Thanks to the realistic 3-D graphics, Christian Höll always has a watchful eye on the intended and actual state of affairs.



"The intuitive touch operation is really a dream."

Skilled operator Christian Höll about working with the HEIDENHAIN CNC PILOT 640



up to 60 mm. The unloading of the finished parts is handled by an ejector and conveyor belt. The machine's high basic accuracy is decisive for RWT. "Many parts do not have to be reworked despite the high accuracy requirements," Reinhard Thor cheerfully remarks.



+ All information about RWT:
www.r-w-t.com



+ Discover the EMCOTURN E65:
www.emco-world.com



+ CNC PILOT 640: the perfect lathe control for the shop floor:
www.klartext-portal.com/cnc-pilot640



Christian Höll had no trouble adjusting to the new machine and its touch operation.

First HEIDENHAIN Training Partner for TNC in U.S.

HEIDENHAIN's exciting new partnership with Community College of Denver makes the Rocky Mountain region a focal point for CNC machining with 5-Axis TNC.

With more than 8,000 students, Community College of Denver (CCD) is a leading point of entry to higher education in the Rocky Mountain region. CCD offers more than 100 certificates and degrees, and helps students transfer to a four-year institution or immediately start working in their chosen field. Now, with its recent certification as a HEIDENHAIN PARTNER TRAINING, CCD and its Advanced Manufacturing Center (AMC) play an integral part in supporting and advancing TNC control applications all around the world.

CCD's Advanced Manufacturing Center is a state-of-the-art 33,280 square-foot facility offering degree and certificate programs in machining and welding. CCD's manufacturing programs started as a basic teaching manufacturing center in 1978, equipped with tools and machinery on a level respective to its time. Machines with cutting-edge technology were added in 2015 — such as the latest welding equipment, EDM machines, a dual spindle lathe and most notably two five-axis milling (GF Machining Solutions HPM 450 U) with HEIDENHAIN iTNC530 controllers — after the AMC was awarded a government grant.

CCD's Advanced Manufacturing Center in action.

The Partnership

The CCD-HEIDENHAIN partnership began with a donation of three TNC programming stations to the AMC from HEIDENHAIN management. With this partnership, CCD effectively uses their five-axis machines equipped with advanced TNC controls to their full capacity, as well as provides additional teaching tools for the students.

In January 2019, HEIDENHAIN announced that CCD's AMC became the first HEIDENHAIN PARTNER TRAINING in the U.S. To achieve this, CCD's faculty completed several rounds of advanced training on TNC controls and successfully passed an extensive exam.

CCD's subsequent final exam covered not only TNC theory but also programming exercises with complex contours that can be mastered using "SL-cycles" and Free Contour (FK)-programming.

Machining & Welding Continuing Education Training

CCD and HEIDENHAIN have hosted two five-axis machining workshops at the AMC with other partners such as GFMS, Mastercam, AME, HARTWIG and Triad Machine Tool Company. Participants were shop owners, operators, local NTMA association members and CCD students. In addition to the hand-on training, partners presented their latest products and features, such as HEIDENHAIN's Global Programming Settings and the Smart Machine Features OSS (Operator Support System) by GFMS.

In the first workshop, participants learned about the differences between CAM programming and programming at the machine (for non-five-axis parts). Colin Smith, a CNC manufacturing student who is finishing his Associate of Applied Sci-





HEIDENHAIN announces that Community College of Denver (CCD) is their first Authorized Training Partner for HEIDENHAIN TNC controls in North America. Pictured here (from left to right) are: HEIDENHAIN's Julian Renz, CCD's Eric Miller, HEIDENHAIN's Joe Pizzoferrato and CCD's Matthew Sweeney.

ence degree, noted, "HEIDENHAIN's programming language is safer than others. The offsets are always active."

Another workshop topic included how to configure a machine's postprocessor in order to achieve the highest surface quality and cycle times with HEIDENHAIN TNC controls (for five-axis parts). Examples that were given included optimal point distribution outputs from CAM, and correctly configuring HEIDENHAIN's contour tolerance cycle according to the machining tasks.

During the workshops, the AMC used the HPM 450 U five-axis mills as demonstrations. Parts were run that showed the TNC functions Global Programming Settings and Adaptive Feed Control (AFC). With AFC, the feed rate was adjusted to the spindle load to show how to machine faster, improve tool life and reduce machine tool components (spindle and ball screw) wear.

HEIDENHAIN trainers enjoyed watching the students and participants learn

throughout the workshops. And feedback from the workshop participants was positive all around.

One student at the workshop noticed how functions discussed in the presentations became live during the machining demonstrations. "I was impressed by the ability to compensate for small things like vibration and finishing, either automatically or conversationally," commented Woojin Bae. "I see how it helps in the last precision machining step."

+ Learn more about their academic programs at www.CCD.edu/AMC and more about their machining and welding continuing education trainings at www.CCD.edu/AMC-Training.



As a certified HEIDENHAIN PARTNER TRAINING CCD in Denver can now help machine shop operators and programmers train on their five-axis machines, enhancing their knowledge to accelerate to the next level of five-axis CNC controls.



+ It is easy to register for these special training classes! Visit CCD's website at www.CCD.edu/AMC-Training.



Efficiency leap

A fully automated machining center from OPS-Ingersoll, combined with Batch Process Manager from the HEIDENHAIN TNC 640 opened up exciting new economic and technological perspectives for Dömer Stanz- und Umformtechnologie.

At first, a visit to a stamping and forming plant always feels a little like a trip back to the early days of industrialization. Here, mechanics and technology can still be physically felt as elemental forces, such as when a 1000-ton press thunders down rhythmically, accompanied by the metallic ringing of the stamped parts as they tumble out of the ejector. Nevertheless, by the time Michael Dammer, Managing Director of Dömer Stanz- und Umformtechnologie in Lennestadt, explains the setup of one of the complex molds, it becomes clear that you are standing in the middle of a high-tech enterprise.



Compact unit:
The OPS-Ingersoll machining center
with the TNC 640 and robot cell



"Batch Process Manager is intuitive and self-explanatory to operate—it's excellent"

Phillip Schröder, user on the OPS machining center

A description of the current daily routine of Dömer's in-house toolmaking sounds like a who's who of innovative machining strategies. This includes 5-axis machining, HSC machining, hard machining, one-off production, and small series of mostly three to five parts, but not more than ten workpieces. Also included are dealing with tough, difficult-to-machine materials and the demand for perfect surfaces along with high contour accuracy. And as if that were not already enough, changes on short notice to the planned production process are an everyday occurrence for the toolmakers. This is because they are responsible not only for new tools but also for rapid replacement if a mold is suddenly unable to withstand the enormous forces of the punching machines.


Keeping on top of costs with unattended shifts

Nowadays, Dirk Schröder, head of toolmaking, and two colleagues handle this demanding job with the help of a 5-axis HSC machining center from OPS-Ingersoll, combined with a large tool change system, pallet system, and a robot. Michael Dammer sums up the criteria for this investment decision succinctly: "We want to stamp. To stamp we need tools. And, initially, each of these tools is a unique specimen customized to the article we wish to manufacture." Because costs are always at the forefront in toolmaking, new equipment should attain a high degree of automation. "My wish was to have a manned early shift followed by two unattended shifts during which the machine operates with full automation," says Michael Dammer, explaining the requirements profile.

Dömer has not yet completely reached this goal. But Michael Dammer sees progress and doesn't for one instant regret the investment. "We've had the equipment for about a year now, and we have been working with it productively for the past six months. I'm very optimistic that we'll be going to an unattended third shift during the course of this year." For Dirk Schröder, this is not an unrealistic prospect. "We are currently achieving 14 hours of spindle operating time per day, and we can set up in parallel."

Flexibility boosts efficiency

When it comes to efficiency, the functionality of Batch Process Manager from the HEIDENHAIN TNC 640 is the driving force. It organizes the machine's job management with convenience,



"Everything is always set up—for everything"

Dirk Schröder, head of toolmaking at Dömer

Phillip Schröder (left) and Dirk Schröder in the robot cell with the combined pallet and tool change system

clarity, and flexibility because, with it, fitting in extra jobs or changing the job sequence are no longer a problem. "With Batch Process Manager, we can work in a way that matches how things are in practice," says Dirk Schröder, going on to describe what this looks like. "Three jobs are planned, and then another two arrive. In the past, we had to rewrite everything, perform a new setup, and retool."

That was especially a problem with complex tools because machining them often required a lot of time for programming. "Setting up again was a time sink to the power of ten. But that's no longer the case. Now, everything is always set up—for everything," Dirk Schröder is pleased to confirm. To this end, the large tool changer has sufficient replacement tools at the ready. Schröder continues, "we don't have a single machining tool lying on the workbench. They are always all in the machine. Thus, all we have to do is program the workpiece and load the pallet in the rack. Then we press NC Start, and the machining begins."

User friendliness for convenient operation

Phillip Schröder, one of the two users of the new equipment, corroborates his namesake: "Nowadays, I just call the pallets. Changing the machining sequence requires only a few clicks, and the desired pallet then queues up." This works

so easily because each pallet is a production order and is handled as such in Batch Process Manager, and the pallets may be fitted with multiple small parts. Phillip Schröder can immediately see which jobs are planned: "Batch Process Manager clearly displays all of the information about each production job: pallets, associated programs, setups on the pallets, and so on."





*Typical part:
The mold for stamping a carrier plate
for tractor-trailer brake pads...*

Trouble-free changeover with unexpected effects

And how was the changeover for the workforce? "Above all, our team had to learn new processes," remembers Dirk Schröder. For example, they had to get used to the fact that the machine runs unattended. "At first, my colleagues didn't want to go home after the early shift because they wanted to keep an eye on the running machine. I literally had to send them home," he says laughing at the thought of those first days.

There were no problems whatsoever in handling the machine and control. This is primarily thanks to the HEIDENHAIN control that was implemented from the outset by Dömer. "HEIDENHAIN makes the only control that truly everyone can understand," says Dirk Schröder. Phillip Schröder backs him up: "If you have trained on a previous HEIDENHAIN control, you can also operate any of the new controls, including Batch Process Manager, which was completely new to us. But its operation is simple, intuitive, and self-explanatory. After just ten minutes of instruction and a couple of tests, we were ready to roll—it's brilliant." Phillip Schröder is also a great fan of the TNC cycles: "Many of the cycles truly relieve our workload." This is why the VISI CAM software implemented by Dömer utilizes the control for program generation.

Pleased about the machine, automation, and control

At Dömer, the increase in efficiency already achieved is not just on paper. It is also clearly visible in the toolmakers' hall. The machine inventory was reduced from six machines to two 3-axis machining centers, one lathe, and the new OPS machine. This is reason enough for Dirk Schröder to sum up contentedly: "The new machine has helped us make a real leap forward in technology and efficiency."



... and managing director Michael Dammer with the stamped product.



**+ For everything about
Batch Process Manager, visit:
www.klartext-portal.com/bpm**



**+ Information about Dömer
and its range of services:
www.doemer-ring.de**



**+ The machine:
www.ops-ingersoll.de**

Practical



You can never stop getting better—this principle also applies to the functions of the TNC. As a result, the new software update 09 opens wider vistas in machining with the TNC 640.

Functions for even more practical shop-oriented machining are key features of the software update 09 for the TNC 640. These include the Extended Workspace Compact additional display area, a complete 3-D machine model in high-resolution 3-D test graphics, the new gear-machining cycles, and a TNC user management feature for customized access options. Furthermore, the user's manuals have been restructured. They are now available in the following versions: "Conversational programming;" "Setup, Testing, and Running NC programs;" and "Cycle programming."



New graphics and input functions

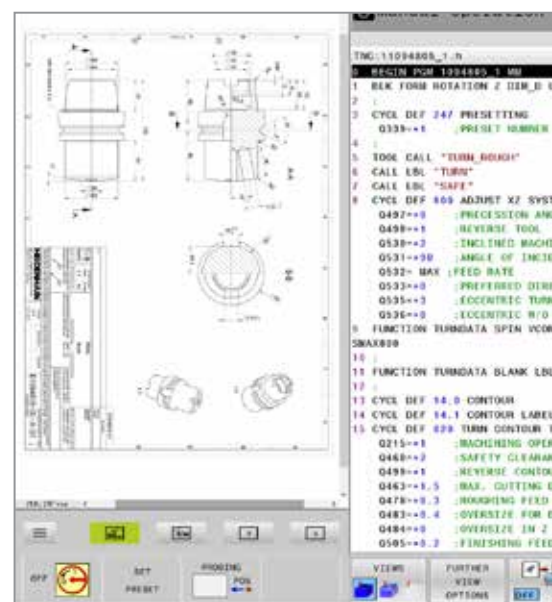
The **Extended Workspace Compact** additional display area on the TNC 640 provides even better access to all of the applications you need for your daily work. Via Connecting Machining, you can display additional information and external applications (e.g., PDF or CAD applications) right next to the control screen. Requirements:

- A machine with the new MC 8562 main computer
- The 24-inch widescreen monitor

In the **CAD viewer**, you can define the preset or the datum by directly entering the values in the List view window.

The **high-resolution 3-D verification graphics** can depict the complete machine model in addition to the milling simulation, provided that the machine manufacturer has configured and enabled the collision objects of the machine.

You can now use **Q parameters** to read from and write to freely definable tables.



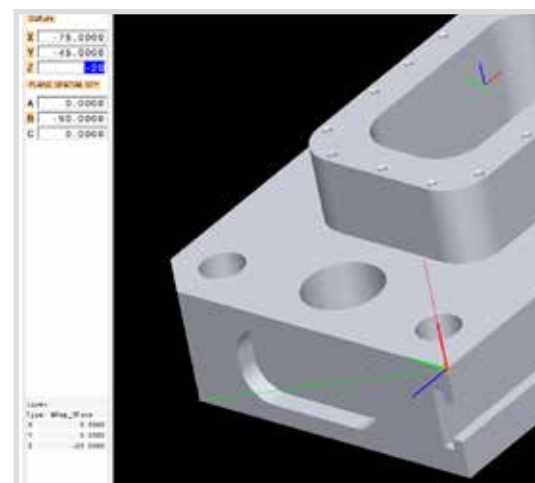
Extended Workspace Compact



New functions for job management

With the **State Reporting Interface (SRI)**, HEIDENHAIN offers a simple and reliable interface for acquiring the operating states of your machine and for communicating with higher-level MDA or PDA systems. Since historical production data can also be provided via the SRI, valuable production data can be retained even hours after a company network failure.

Now you can open **Batch Process Manager** in the Programming; Program Run, Full Sequence; and Program Run, Single Block modes in order to plan and execute machining jobs. Batch Process Manager supports you in shop-oriented machining and does so immediately, even without software option 93 (Extended Tool Management).



CAD viewer



Enhanced reliability with the TNC 640

The new **Component Monitoring** software option enables the automatic checking of defined machine components for overloading. Component Monitoring keeps you informed about the current loading of the spindle bearing and reacts if the specified limit values are exceeded; for example, with an NC stop. In this way, you can prevent a frequent cause of expensive machine damage and unplanned production downtime.

You can also significantly improve process reliability using the new **TNC user management** feature. You can customize access to match the activities of different users and systematically prevent operating errors on the control.

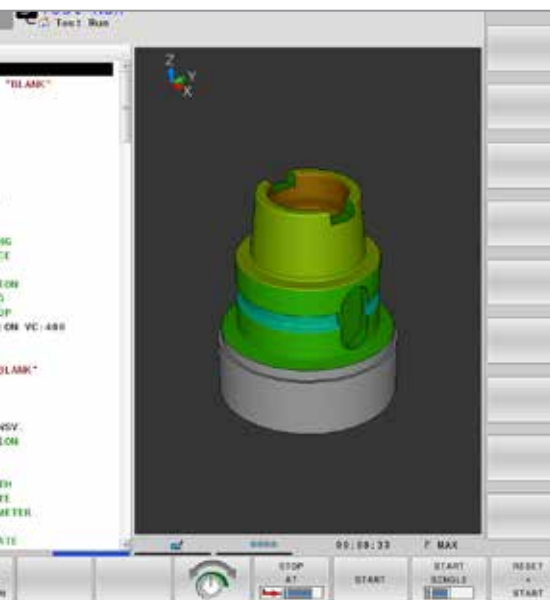


New machining options

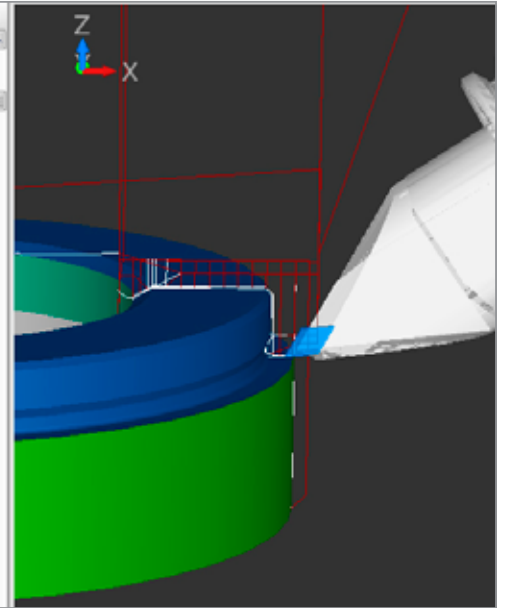
The new **Gear Cutting** option 157 provides user-friendly cycles for the cost-effective production of external and internal toothing on standard machining centers. With the new hobbing and skiving cycles, you can manufacture high-quality gear teeth in a single setup using full-surface machining. This includes static shifting to increase tool life and synchronous shifting for manufacturing helical gear teeth.

The **Advanced Function Set Turning** software option 158 provides extended cycles and functions for mill-turning (option 50). This includes cycle 883 TURNING SIMULTANEOUS FINISHING. It enables the finishing of complex contours within a single cut, thereby preventing visible transitions.

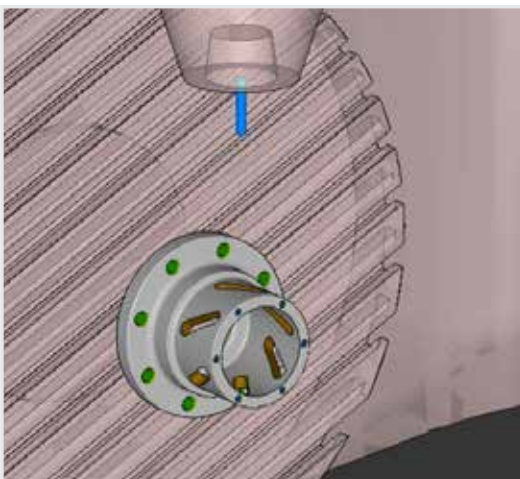
Additional **automatic probing cycles** for detecting rounded corners save time through the simultaneous measurement of rotation and position. The new semi-automatic mode enables probing even if the position of the workpiece is not yet known.



```
TNC:\1_TNC_DEMOS\3_ex...1_START_Hohlrad_02.h
55 FUNCTION TCPM F TCP AXIS POS PATHCTRL
  AXIS REFPNT TIP-CENTER
56 CYCL DEF 883 TURNING SIMULTANEOUS
  FINISHING
  Q460=+2      ;SAFETY CLEARANCE
  Q499=+0      ;REVERSE CONTOUR
  Q558=-90     ;EXT:ANGLE CONT.START
  Q559=+90     ;CONTOUR END EXT ANGL
  Q505=+0.2    ;FINISHING FEED RATE
  Q556=-20     ;MIN. INCLINAT. ANGLE
  Q557=+60     ;MAX. INCLINAT. ANGLE
  Q555=+2      ;STEPPING ANGLE
  Q537=+0      ;INCID. ANGLE ACTIVE
  Q538=+0      ;INCLIN. ANGLE START
  Q539=+45     ;INCLINATN. ANGLE END
  Q565=+0      ;FINISHING ALLOW. D.
  Q566=+0      ;FINISHING ALLOW. Z
  Q567=-0.08   ;FINISH. ALLOW. CONT.
57 L X+70 Y+0 R0 FMAX M303
58 L Z+5 R0 FMAX M99 MQ1900
59 M305
60 CYCL DEF 801 RESET ROTARY COORDINATE
  SYSTEM
61 * - Skiving
```



Advanced Function Set Turning



High-resolution 3-D verification graphics

The new user manuals and all new functions as PDF documents:



+ Conversational programming:

http://content.heidenhain.de/doku/tnc_guide/pdf_files/TNC640/34059x-09/bhb/892903-27.pdf#page=46

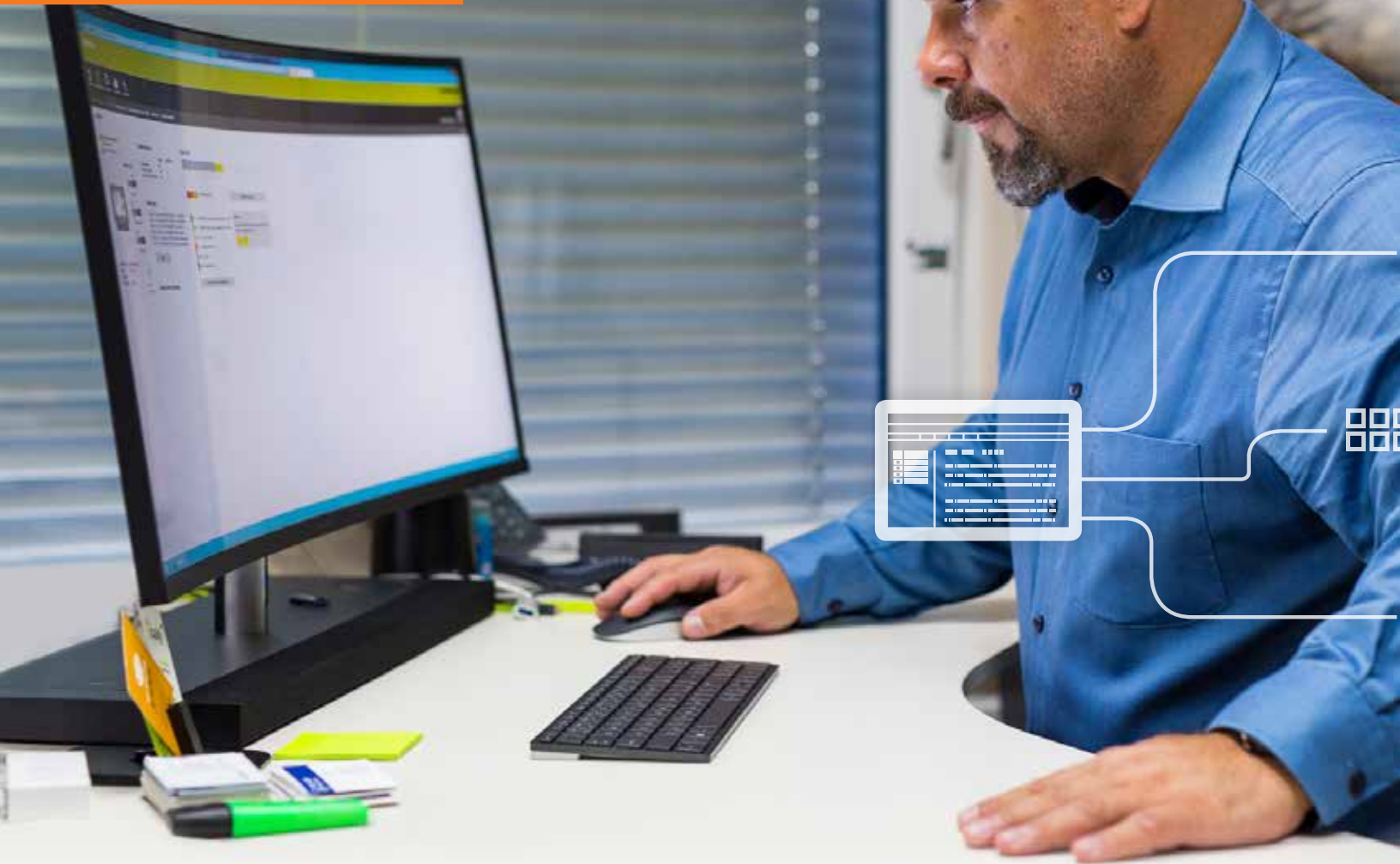
+ Configuring, testing and executing NC programs:

http://content.heidenhain.de/doku/tnc_guide/pdf_files/TNC640/34059x-09/einrichten/1261174-20.pdf#page=38

+ Cycle programming:

content.heidenhain.de/doku/tnc_guide/pdf_files/TNC640/34059x-09/zyklen/892905-27.pdf#page=51

Freedom



New machines and technologies are meant to open up new perspectives. That is why Václav Huta, owner of the Czech tool builder NAFO, has networked his machines with the StateMonitor software from HEIDENHAIN.

The morning fog is still hanging low over the Czech industrial city of Strakonice as Václav Huta parks his dual-sport motorcycle next to the main entrance at NAFO. NAFO stands for "Nástroje a Formy," meaning tools and molds. The company has been producing aluminum die-cast tools since 1992 and added injection molding tools three years later. The location is not a coincidence: Strakonice has a long tradition of manufacturing tools for aluminum foundries. From here, NAFO ships its products to the suppliers of Europe's large automobile manufacturers.

The second door on the left leads directly into Huta's office. While the espresso machine is warming up, Huta checks his e-mails and, since recently, the status of his machines as well. Click! "It's what every owner dreams of," he says, pointing to the overview of his machines as it appears on the screen. "It's just fantastic being able to see at any time whether and how the machines are running." Click! A circular diagram appears on the screen, showing ten machines: three are colored yellow and the rest are green.

"StateMonitor provides freedom. And not just for me, but especially for my employees, who can now monitor their machines from anywhere during unattended operation."

Václav Huta, owner of NAFO Strakonice s.r.o.



StateMonitor networks the core machines

The data is provided by StateMonitor from HEIDENHAIN. Huta has connected all ten of his core machines to the system, from the eighteen-year-old Spanish CME to the modern SAMAG TFZ 3L and FPT DINOX 350. "The FPT was a Christmas present to myself," he says with a sparkle in his eyes. With the SAMAG (a roughing and deep-hole boring machine) and the FPT (which has a spindle changer and can therefore perform dynamic roughing and finishing), NAFO is well equipped. After all, these machines permit the complete manufacture of very large die-cast and injection molding tools, which NAFO mainly produces for the automotive industry. NAFO's products are used by suppliers such as Magna, KSM, and Gruber & Kaja, who in turn produce parts for BMW, Audi, Škoda, and WABCO. "The larger the machines, the less competition there is," says Huta with a laugh.

Václav Huta was twelve years old when his grandfather bequeathed him a moped in the firm belief that it would never run again. However, the grandson consulted his older neighbor and started tinkering. It smoked like crazy, it stank to high heaven, and it worked! "Bringing a wreck like that back to life is a phenomenal feeling. The experience had an impact on me." Being able to resurrect the moped ignited a boundless enthusiasm in Václav Huta for machines and motors. He studied them in college and then left his hometown of Prague to join Webasto in Vienna. After ten years, he went to CAG Holding and then became director of the subsidiary NAFO 2 in Slovakia.



Despite the StateMonitor software, Václav Huta's enthusiasm for machines continues to draw him back to the shop floor.

Exploiting hidden potential for growth

After the Slovak toolmaker was sold along with its foundry, Huta moved on to NAFO 1 in Strakonice. He led the company for eight years before assuming complete ownership three years ago. "I built NAFO up and became the owner because I wanted to see what the company was capable of." Yet becoming head of the enterprise didn't change his style of leadership. "I just have more freedom," he says. If Huta wants to invest in a SAMAG or an FPT, then he simply does so without further ado. The same goes for introducing new programs, including StateMonitor. His company was the first in the Czech Republic to have it. "Nowadays you have to act quickly in order to get ahead," he says. For NAFO to grow, Huta needs to uncover hidden potential.

In the end it is all about transparency: where are the reserves in the company hidden, and how can they be utilized? "We work in two shifts here, but an unattended third shift would be possible," he says. The StateMonitor software would play a major role

here. The software could monitor the autonomous operations at night and on weekends, and could record and present malfunctions and machine downtimes. "That's freedom. I have my machines at my fingertips no matter where I am. And my employees no longer need to stand next to the machines in order to keep an eye on them."

He repeatedly speaks of "freedom" and how much courage it takes to use it as a business owner, particularly when it comes to making big investments. "Sometimes I'm living on the edge," he says, selecting each word carefully and adding: "But to keep moving forward, you have to take your courage in your hands." When he needs a break from the pressure, Václav Huta gets on his motorcycle. As soon as he takes the first curve, he's forced to switch-off. "I'm physically exhausted after a ride, but my mind is as clear as a bell." That's when the ideas and ambition return, just as back then, when at age twelve he brought a wreck back to life.

StateMonitor – The features



StateMonitor
Your machinery
at your fingertips



DID YOU KNOW . . .

- . . . that **10 minutes of undetected machine downtime** at an hourly rate of \$80 per shift and five machines running in three-shift operation over 264 days cost **\$52,800 a year**?
- . . . that you **get an additional 3,168 hours out of your spindle** if the productive machine time is increased by 15% for five machines in two-shift operation?
- . . . that it **takes just three minutes to connect your equipment to StateMonitor** via HEIDENHAIN DNC if your machine is addressable over the network?
- . . . that your equipment can be connected to StateMonitor via **four different interfaces**: HEIDENHAIN DNC, OPC UA, MTConnect, or Modbus TCP?

What StateMonitor has to offer

StateMonitor lends greater transparency to your operating processes and optimizes your production procedures. The monitoring software provides a real-time view of your machines' production status. You maintain an overview at all times and can react quickly in the event a malfunction. If you can avoid unnecessary downtime and bottlenecks, you increase the productivity of your machines.

The comprehensive notification and evaluation functions of StateMonitor provide the basis for uncovering hidden potential for machine availability and increasing machine utilization. With StateMonitor, you can also access your operating data from a smartphone or tablet, so it doesn't matter whether you are in a meeting, working in your office, or even outside of your company network. Thus, you always have an overview of your machines' productivity.



+ For everything about StateMonitor, visit:
www.heidenhain.com/statemonitor



Access over a web browser from various devices, such as smartphone, tablet, PC, or TV



Real-time notifications upon machine standstill, fault, or individually defined events



Visualization of your machinery including the machine status and the program currently running



Assignment of jobs to production facilities, job entries, and feedback on production quantities



Evaluation of machine downtimes and program run times as well as processing of metrics



Machines connected over the HEIDENHAIN DNC, OPC UA, MTConnect, and Modbus TCP interfaces



Relaying to an external SQL database for processing of machine data in an MES or ERP system

Status overview of the machinery



20.0 % Productive (Overrides \geq 100 %)
20.0 % Productive (Overrides $<$ 100 %)
40.0 % OK, but not productive
0.0 % Not ready for operation
0.0 % Delay
20.0 % Machine not in use

98.8 % Availability
27.5 % Utilization rate



USER INTERVIEW

Transparency

SMW AUTOBLOK is testing the new StateMonitor software version 1.2 in its special production facility. First experiences...

At its special production facility, SMW AUTOBLOK Spannsysteme GmbH in Meckenbeuren near Lake Constance primarily manufactures single parts and small series of customized chucking systems. In two-shift operation, 48 employees stand at 23 machines for turning, milling, and grinding.

Most of the machines are connected to a server from which job data and CAM programs are retrieved, but there is not yet a real network as such. One reason is that all sorts of different controls are being used on the machines.

With its four interfaces, StateMonitor version 1.2 opens up new perspectives. Frank Arnold, who is responsible for production planning, reports on his experiences.

Mr. Arnold, why are you thinking about increasing the digitalization of your special production facility?

Frank Arnold: At first glance, we really do seem to be well situated. With its CAM system, central server, ERP system, etc., SMW has well-established and very useful tools. But to date none of that has given us a real-time view of our production.

What do you expect from this real-time view?

The important point for us is to make our production transparent. We would like to know as early as possible where we can make improvements and immediately exploit this potential. Based on the machine status provided by StateMonitor, we can directly identify ways to optimize processes.



**"Working with StateMonitor
is downright fun."**

Frank Arnold, Production Planning, Special
Production Facility, SMW AUTOBLOK

Frank Arnold (right) and TNC user Sandro Pletz enjoy testing StateMonitor.

Do you have a specific example for us?

I would like to give you two. One regards a running machine on which a part is in the process of being manufactured. For production planning, StateMonitor gives me insight into how things are going with the job. If it's running faster than planned, then I can prepare and schedule the next job earlier than anticipated. If it's taking longer, then I can reschedule and reassign tasks. I can thus avoid standstill time, optimize setup times, and save time in general.

And you save yourself from having to ask multiple times at the machine.

That's right, my colleague at the machine doesn't have to remember to inform me of the status, and I don't have to run around gathering information.


One glance at StateMonitor is all I need, and every job is transparent for me at all times. Transparency is also the decisive factor in my second example. StateMonitor also helps us recognize and analyze events that occur repeatedly. Imagine that a problem arises with two similar parts during the same machining phase with the same tool. The worst case scenario would be tool breakage accompanied by machine standstill. But suppose that this problem arises only after an interval of several weeks. The colleague at the machine doesn't give a thought about the second occurrence because the first was weeks ago, and maybe it didn't even happen to him or on his machine. It wasn't documented at the time either, which can of course happen.

And so, the second occurrence wouldn't be a matter of particular interest.

Exactly. But with StateMonitor, I immediately get all of the information along with complete job data. This allows me to quickly notice the pattern and look for its cause with the help of the operators, CAM programmers, tooling staff, and any other parties involved. Then, most importantly, we can look for solutions.

This helps you prevent such events from occurring in the future.

And significantly improve my processes. Not only can I prevent tool breakage, but I also protect the tool and the machine while achieving greater production quality. And that's not to mention the scrap that I am then able to systematically reduce.



"With a single glance at StateMonitor, every job is transparent to me at all times."

What did this support look like in practice? For example, why did you turn to the Haas team during the installation phase?

The reasons for working together with Haas as early as the test version lie in the future and involve very practical considerations. Our goal is to connect all of the machines in the special production facility via StateMonitor. Networking with our tool presetter would also be great. We also definitely expect a challenge or two because of the many different interfaces. At least by that point, I will need a competent partner for support. And that's what Haas Werkzeugmaschinen GmbH provided. When needed, Mr. Rubes even comes to me in the shop with an electrician to help with installation.

What do you expect from the complete networking of your production environment via StateMonitor?

At some point, we would like to link our production planning (i.e., our ERP system) with the real-time view provided by StateMonitor. But that makes sense only if all of the machines are connected. Then we'll have a perfect view of all the nominal and actual statuses of our production machines. That will save us a lot of questions, legwork, and nasty surprises in the follow-up calculations. And we'll also have a completely new method of communication here in the department.

How are your staff and colleagues reacting to the fact that you now have everything at your fingertips?

It's not at all about monitoring employees and their work but rather about trying to find out where we can make improvements. And this is the goal we are all aiming to achieve. By the way, we also all agree that there is no way around the digitalization of production. This development is a marathon run at a continuous sprint. If you don't get going now, you'll be overtaken and find yourself unable to catch up.

Mr. Arnold, thank you very much for the candid interview!



+ Everything about StateMonitor:
www.heidenhain.com/statemonitor



+ Services in your region:
www.heidenhain.de/de_EN/service/services/services-in-your-region/



+ Information about SMW AUTOBLOK:
www.smw-autoblok.de

All-rounders

DMT has developed a conventional lathe with a HEIDENHAIN lathe control based on the MANUALplus 620, which is opening up very unconventional perspectives for training at the Gewerbeschule Lörrach (Lörrach vocational school).

A vocational apprenticeship continues to require training on traditional manual machines during the first year, before moving on with automatic machines in the second and third years. Now, with the KD 400 lathe from DMT, both types of training can be performed on one and the same machine, because this new machine can be operated both manually and automatically in cycle mode. Martin Meier, senior technical instructor and metalworking supervisor at the Gewerbeschule Lörrach, is excited, as are his colleagues Andreas Schreck and Jürgen Sperling: "The apprentices have ultramodern machines at their fingertips."

A total of 14 new KD 400 machines are on hand in various labs and shop rooms at the Gewerbeschule Lörrach for teaching apprentices in every training year how to operate lathes. In addition, the master craftsman school, the technician apprenticeship program, and the technical secondary school, as well as the chambers and guilds, also use the machines for their training offerings and exams. The instructors in charge of equipment can hardly complain about the machines not being used to capacity.

In the lab, the apprentices work in manual mode.

One machine for all phases of the training program

However, the machines are primarily used for teaching lathe operation to apprentices on their way to becoming industrial mechanics, machinists, and mechatronic technicians. In total, 370 apprentices from the metalworking vocational school and 70 students from the technical college flock to the labs and shops of the Gewerbeschule Lörrach for one or two days per week. And they love the new machines with their state-of-the-art touch operation on the

HEIDENHAIN lathe control. "The level of sophistication of the training machines in the companies varies from leading-edge, fully automatic machines to manually operated classic models," explains Andreas Schreck. "With the new machines, we can now offer all of the apprentices real added value in the vocational-school component of their training."



The apprentices have no difficulty using the new machines.

Apprentices find it easy to switch from the new DMT machines with their HEIDENHAIN control to cycle lathes or CNC lathes. At the vocational school, they learn how to operate the same cycles and typical user interfaces of a full-fledged lathe control. For apprentices from companies with manually operated machines, the DMT machines are an ideal stepping stone into the world of automated machines. And apprentices who learn on CNC machines at their companies can easily make the leap from CNC machining back to manual operation.



"Now we can make vocational school training more innovative and forward-looking."

Martin Meier, senior technical instructor and metalworking supervisor at the Lörrach vocational school

Very appealing technology

The apprentices weren't at all timid about using the new machines and the new lathe control. "We were worried that the apprentices would be overwhelmed by the plethora of options," Martin Meier recalls. "But our concerns turned out to be unfounded. The apprentices could handle operating the control very well. It is after all highly intuitive and self-explanatory."

Manual operation provides a good feel for things

As to why the syllabuses and examination rules for basic-level vocational training still require manual machines while the rest of the world is talking about digitalization, networking, and automation, Meier has a compelling explanation: "To gain a deep understanding of machining processes, an apprentice needs to have physically felt the actual forces at work." And you can only do that by turning a handwheel, which creates a mechanical connection between the cutting edge and your fingertips."

Thanks to their sophisticated mechanical system, the DMT machines can provide this experience. In manual mode, the handwheel drives the ball screw of the given axis via a toothed belt, whereby the motor rotates as well. This also enables position measurement through the motor encoder. During motorized operation, the handwheel is decoupled with a clutch. Another special feature of the KD 400 comes from its two drive motors on the longitudinal and transverse axes, which allow the slides on these axes to be moved using interpolation.

An investment in safety

But why did the district of Lörrach invest all at once in 14 of these machines for its vocational school? The machines were intended to replace the majority of the old inventory, which were machines dating from 1950 to 1980. Back in the day, these older machines were supplied by Kern in Lörrach, DMT's predecessor. "Many of these machines no longer met the current safety standards and had to be replaced," says Meier, explaining the reason for the sweeping modernization.





"Now we are absolutely up to date with the new machines. They meet all of the relevant safety requirements, such as through their chuck guard and additional safety guard in automatic mode."

In addition to improved operating safety, the machines provided the school with investment security and readiness for the future: "We'll be well equipped if the syllabus ever changes in favor of training exclusively on automatic machines. Ultimately we expect a life cycle of at least 15 years here at the school."

Theory visualized

Improved training for manual and automatic operation isn't the only benefit of the DMT machines. This is because the syllabus also requires that process knowledge be taught in ways that go beyond the level of pure theory. In highly practical experiments, the apprentices test the effects that a different setup has on the tolerances of their workpieces or how the machine's power consumption changes in response to various machining factors. "Now that the HEIDENHAIN lathe control also includes an oscilloscope, we can wonderfully demonstrate such effects," says Meier about the new capabilities.

Is there anything left to be desired? "Yes, of course, there is always something," admits Meier with a laugh: "At the moment, we can only run single turning cycles in automatic mode, but no real programs. That's fine enough for the apprenticeship program, but it would be great to have a full-scale CNC operation. Then we would really have the Swiss Army knife of the machining world for lathe training."

From a technological standpoint, this would be feasible. Since it is based on the MANUALplus 620, the HEIDENHAIN lathe control on the DMT KD 400 would allow for it. In fact, DMT has received requests from instructors and is already working on a solution. An ISO programming capability is also in preparation.



Traditional mechanical handwheels allow you to feel the forces at work during machining



+ The lathe control MANUALplus 620:
www.klartext-portal.com/MANUALplus620



+ Everything about DMT lathes:
www.dmt-kern.de





REPORT

North American Manufacturers See HEIDENHAIN In Action During European Technology Tour

Looking for new technologies or ways to improve their own businesses, 40 manufacturing executives from 18 North American companies traveled to Europe in April for the 2019 International Technology Tour. This “Munich to Milan” five-city tour chose HEIDENHAIN in Traunreut, Germany (near Munich) as its first stop.

HEIDENHAIN

Upon arrival at HEIDENHAIN’s world headquarters, guests were greeted by HEIDENHAIN senior management and given a company history and behind-the-scenes overview of the company. The history included noting that the company began in 1889 in Berlin. This included an explanation of HEIDENHAIN’s role in redefining the meter in 1960 to the worldwide standard that is used today.

HEIDENHAIN’s core product lines in Traunreut were discussed, consisting of linear scales, angle and rotary encoders and CNC controls. Over 6,000 employees worldwide now support these lines that offer motion control feedback solutions for various industries. These include machine tool, semiconductor, electronics assembly and test, metrology, automation, medical, energy, biotechnology and other global markets.

5-Axis Machining

With over 40 North American executives in attendance, HEIDENHAIN's Head of Marketing and Product Management for Controls, Dr. Jens Kummetz, then shared information about "How to Improve Machine Shops with 5-Axis Machining."

"HEIDENHAIN's controls allow machining maximization by minimizing the machine time necessary, even down to a lot size of one," said Dr. Kummetz. He went on to highlight the many unique and beneficial features offered in the HEIDENHAIN TNC control. This includes an operator-friendly HMI, the ability to do Virtual Machining in test mode and 3D Tool Comp to allow for tool compensation.

Lastly, Dr. Kummetz addressed how HEIDENHAIN supports Connected Machining and Industry 4.0 with strong products now being found in applications all over the world. Of particular note was HEIDENHAIN's StateMonitor, a software that allows users to collect machine data from multiple assigned remote locations in real-time and conduct intelligent and useful data analysis. Machines of all makes and models can be connected utilizing MTConnect, Modbus or OPC UA protocols with this system.

" HEIDENHAIN was a memorable experience. Learning about the history of the company, its humble beginnings and evolving to a force in the controls industry was an eye opener for myself. The 'campus' that we toured was impressive from a perspective of cleanliness, organization and commitment to progress. "

Ted Rosts, President of Densmore Tool & Die Works Ltd. in St. Catherines, Ontario



NTMA-CTMA Group at HEIDENHAIN



TNC Training Center

With that, the tour group moved on the HEIDENHAIN's TNC Training Center to visit three machine tools in action, equipped with the TNC 640.

The first skiving demonstration included a HEIDENHAIN Applications Engineer who discussed how the TNC 640 control can manipulate a machine to handle gear machining in a single set up, which is now a current shop trend. Three new cycles of the HEIDENHAIN TNC 640 for the skiving and hobbing of straight, helical and herringbone gear teeth are now altering this perception.

The second machine demonstration included the making of three precise workpieces utilizing the Batch Process Manager tool programs in the TNC. This function enables precise planning and execution of upcoming jobs right on the control, of particular importance for unattended shifts. This includes evaluation of each job such as if/when manual intervention is required and how long a machine will be in use.



Machine tool in action at HEIDENHAIN TNC Training Center

And the third demonstration enclosed in its own room showcased Connected Machining and Industry 4.0 in action. Here, a machine tool equipped with a TNC 640, HEIDENHAIN's StateMonitor hardware/software and utilizing MT Connect showed how seven machines (most remote) were being monitored and analyzed simultaneously and shown on a single screen. This system allows the operator at the TNC control to become the director of the process chain.

Apprenticeship Program

Following lunch, the group toured the building that houses HEIDENHAIN's Apprenticeship program with approximately 300 teenage students on site. "The investment in the younger generation through your Apprenticeship Program was very unique and one practice we really need to adopt here in North America," said Dino Bavetta, owner of Ramstar in Oldcastle, Ontario.



HEIDENHAIN TNC Training Center



Batch Process Management demonstration via TNC 640

HEIDENHAIN Mechanical Production

The last stop of the HEIDENHAIN tour included a walk through one of the large Mechanical Production buildings. Here, the group watched experienced employees handle long production lines producing a large variety of component parts from scale end caps to long linear extrusions, to name only two.

The combination of trained staff and automated systems was shown, and questions were answered as they arose. "The tour of the plant and the presentation were done really well," said Bavetta. "The history is amazing with the building structure and what goes into making such precise measuring instruments."

"We discovered something new every day. Not only about the products and expertise offered by our National Associate members, but also how manufacturers around the world approach our common challenges. They gave us new insight into training, improving workflows and integrating automation, for example," said James Mayer, NTMA's National Accounts Manager.

Even the remaining four other company stops had HEIDENHAIN in action:

- GROB Systems (near Munich)
- BIG KAISER (near Zurich, Switzerland)
- Blaser Swisslube (near Zurich)
- Speroni SPA (near Milan, Italy)

The trip was organized by the National Tooling and Machining Association (NTMA) and Canadian Tooling & Machining Association (CTMA), with support from management of the five visited companies.

"We discovered something new every day. Not only about the products and expertise offered by our National Associate members, but also how manufacturers around the world approach our common challenges."

James Mayer, NTMA's National Accounts Manager

+ Complete article available at www.heidenhain.us/resources-and-news/european-tech-tour/



A skiing demonstration via TNC 640



Following the tour, HEIDENHAIN treated the group to dinner on the island of Fraueninsel.



RETROFITTING

Overhaul

Apprentices love the new ND 7013 digital readouts with intuitive touch operation

Training couldn't get more practical at the Robert-Gerwig-Schule technical college in Furtwangen. The precision machinist apprentices made a school project out of retrofitting their training machines with HEIDENHAIN linear encoders and new ND 7013 digital readouts.

Born out of an old clockmaking tradition, Furtwangen in the Black Forest is home to a renowned university and a series of international market leaders in technology. Less known outside of the region, but unique in its category, is the Robert-Gerwig-Schule technical college, or RGS. It is one of the few technical colleges to offer a complete three-year technical program with both theory-based and practical instruction in precision machining and other fields. The strong prospects of the school's graduates derive in part from its extensive collection of machines.

In the training room for precision machining, a very old manually operated milling machine stands right next to one of the latest CNC machining centers. "In practice, we can teach all of the machining processes from drilling and turning to milling," says Jörg Faller, head of the machine shop and metalworking supervisor, as he proudly shows off the equipment. "Until just a few years ago we still even had a shaping machine here," he recalls. The RGS thus provides a nearly complete cross section of metalworking technologies. "Thanks to our machines, we are able to provide excellent, in-depth training courses," he says, explaining the considerable amount of investment. "The companies in our region greatly appreciate this, and our graduates are in great demand."

(Retro)fit for today

New purchases are not always necessary to keep the level of training and the machines up to date. Sometimes a clever retrofit suffices to catapult a machine from the past into the present. "We have had eight machines fitted with new position display units. Four of them had never been equipped with an electronic display and were positioned manually using a vernier caliper and scale rings," notes Faller, explaining the work. On the other four machines, older HEIDENHAIN position display units and linear encoders were replaced with newer models.



Jörg Faller, workshop manager and metalworking supervisor at the Robert-Gerwig-Schule, Furtwangen



Altogether, eight conventional, manually operated machines were converted as part of the retrofit.

Expect the unexpected

Once again, experience showed that a retrofit is always good for surprises. Even when you think you know the machine inside out, unexpected discrepancies suddenly crop up. For example, an additional grease nipple or a screw in a different position can quickly throw the original plan overboard. Particularly on machines that had never before had a linear encoder, it was necessary to make adjustments before mounting was even possible.

Training doesn't get more hands-on than this

The precision machining apprentices made these alterations their project. They assisted the assembly technician from Haas Werkzeugmaschinen GmbH, the HEIDENHAIN agency responsible for the RGS, by delivering new parts and modifying old ones. The mounting of three linear encoders per machine (the LS 388 C or LS 688 C, depending on where they were mounted) was thereby turned into an opportunity for real-world instruction. This experience included the design and production of

Many alterations were necessary for mounting the new linear encoders—a task that the apprentices turned into their project.

new guideways for the scanning units and new covers for the linear encoders to prevent contamination from chips. "On the machines without electronic position measurement, we even had to remill the top slide to fit the scanning heads," explains Faller, describing the extensive measures taken (the old machines were just not built for linear encoders). He adds, "we even had to design and manufacture the holders for the digital readouts ourselves."

A good feeling

During class, the new possibilities opened up by the position display units in conjunction with the linear encoders have been well received—particularly their touch operation. "Our apprentices became familiar with the new devices within just a few days. The first-year students don't want to know anything more about scale rings," says Faller, describing the new feeling in the classroom.



+ For complete information on HEIDENHAIN digital readouts, visit: www.heidenhain.de/readouts



+ Visit the Robert-Gerwig-Schule on the Internet at: www.rgs-furtwangen.de



At the stroke of a key

Innovative programming options make the CNC PILOT 640 the perfect lathe control for the shop floor. A particular strong point is its intelligent support of the user, who can write a program with it at the stroke of a key.

Fast and effective NC programming is a hallmark of the CNC PILOT 640 lathe control. It's particularly in the shop-oriented programming that the control opens up exciting perspectives for greater efficiency. The CNC PILOT 640 relieves you of conventional standard programming tasks and frees up more time for the trickier work of optimizing your processes.



+ Intuitive operation and efficient turning in a networked manufacturing environment—see the CNC PILOT 640 video:
www.klartext-portal.com/cnc-pilot640





TURN PLUS can save up to 90 percent of conventional programming time and thereby opens up perspectives for greater value added.



Because program generation is accompanied by a highly realistic simulation of the machining process, you can also use TURN PLUS as a reliable calculation tool.

Interactive contour programming

The basis for every production process is the workpiece drawing. With the CNC PILOT 640, you can easily transfer the drawing to the control via interactive contour programming (ICP) or by importing it directly from a DXF file. The ICP function requires only a description of the workpiece blank and finished part contour via the contour elements as dimensioned in the drawing. Depending on your individual preferences, you can either enter the dimensions and data into an intuitive dialog screen or reproduce the workpiece through graphical programming. Alternatively, if the drawing is available in DXF format, you can simply import the contour.

During data input, you can decide how you want to describe the contour elements. For example, you can input the coordinates absolutely or incrementally, define the end point or the length of a line, specify the center point or radius of an arc, and define whether there is a tangential or non-tangential transition to the next contour element. While inputting the data, you can also always choose to display a graphical rendering of the inputs just made.

The CNC PILOT 640 automatically calculates missing coordinates, intersections, center points, etc., provided that they are mathematically defined. If there are multiple possible solutions, the CNC PILOT 640 shows you the mathematically viable options in a dialog screen. You simply choose the desired solution, add or modify the contours, or enter your own solution.



From a simple turned part to complex workpieces: the CNC PILOT 640 also masters drilling and milling operations on front face and lateral surfaces, as well as rear-face surface machining.

TURN PLUS automatically generates the NC program

After programming the workpiece, you simply press a button, and TURN PLUS generates an NC program in very little time. All that remains is to select the material and clamping devices. TURN PLUS does everything else automatically, including analysis of the contours, selection of the machining strategy, tools and cutting data, and generation of the NC blocks. During program generation, the CNC PILOT 640 provides a graphical simulation of exactly which work steps it is currently processing. You thereby get a very accurate picture of the NC program. Since TURN PLUS incorporates all the data into the NC program, a 3-D model of the workpiece becomes available after program generation, even if you originally imported only 2-D data from a DXF file.

The result of automatic program generation with TURN PLUS is a thoroughly commented smart.Turn program. And this program can include more than just the classic turning processes. This is because TURN PLUS also generates the units necessary for drilling and milling operations with the C axis or Y axis on front face and lateral surfaces. On machines with counter spindles, even machining on rear-face surfaces can be included in a program. This merely requires that the machine manufacturer has already installed a corresponding cycle for workpiece transfer between the spindles.

The fast program generation with TURN PLUS leaves time for other value-adding activities. For example, after defining the geometry, you can benefit from

time savings of up to approximately 90%—time otherwise needed for the programming of the machining operations. At the same time, the automatically generated program assures greater safety when breaking in the NC program.

But TURN PLUS is also useful for job planning calculations. TURN PLUS belongs to the standard package of the DataPilot CP 640 programming station software, which you can install on any PC or Notebook. Because program generation with TURN PLUS is accompanied by a very realistic simulation of the machining process, you can also use TURN PLUS as a calculation tool that provides reliable information about the expected machining time.

The CNC PILOT 640 is the ideal control for lathes like the EMCOTURN turning centers, which have proven their worth in shop environments.



Structured programming with smart.Turn

A smart.Turn program generated by TURN PLUS is divided into easily readable machining blocks called "units." A unit completely and unambiguously describes a machining step. These units are based, in turn, on the well-known ISO codes. You can see the tool, technology, contour, and cycle parameters all at a single glance. All of these parameters are included in clearly structured forms and are illustrated in context-sensitive graphics.

The smart.Turn function also ensures that each machining block is defined correctly and completely.

You can also quickly and simply edit open smart.Turn programs at any time. This enables you to use and reuse the created programs. All you have to do is modify the programs to suit the new conditions, either by changing the input values directly in the smart.Turn program or by

using the graphical programming feature. For special machining tasks, you can use this method to apply your specialized knowledge about machining, materials, and tools to optimize the program. In addition, the CNC PILOT 640 also naturally provides powerful turning, milling, and drilling cycles for your programming. Thread cycles or milling and drilling patterns are also standard.

This is how the CNC PILOT 640 helps you during programming:

- The ICP (Interactive Contour Programming) function enables graphical programming of the turned part.
- TURN PLUS automatically generates a complete NC program at the stroke of key.
- Convenient programming in smart.Turn with clearly defined units permits the NC program to be modified at any time.
- The intuitive touchscreen displays context-sensitive dialogs, graphics, and 2-D or 3-D simulations. It helps users check the NC program and quickly add any missing data.





SERVICE

Knowledge pool

Experienced experts on the HEIDENHAIN Helplines respond immediately and competently to customer inquiries.

When you call or write to a HEIDENHAIN Helpline, you're looking for a fast solution to your problem. After all, problems cost both time and money. That's why the HEIDENHAIN Helpline staff always aim to find a solution.

Typical callers to the HEIDENHAIN Helplines are service engineers from machine manufacturers, development engineers working for plant constructors, or TNC users. Some need technical assistance for installing, connecting, or configuring encoders, inverters, and motors. Others have questions about programming their controls. The Traunreut main office is also closely networked with HEIDENHAIN subsidiaries and HEIDENHAIN representatives throughout the world.

What do these high standards mean for HEIDENHAIN? The helplines are staffed by more than 50 highly qualified service engineers who know their stuff. And they're not just sitting in offices with a telephone and a PC. The helpline area of the HEIDENHAIN Service department looks more like the mixture of a machine shop, lab, and communications center. With equipment such as programming stations, the experts have the necessary means to realistically grasp programming questions and immediately run through solutions.



We provide meaningful help to each and every one of our customers!

The helpline staff are also in close contact with all of the technical departments and with R&D; when important information comes in from inquiries to the helplines, this is passed on immediately to the relevant product managers. In return, the product managers and developers are at the ready to help respond to particularly complex questions.

To ensure that the helpline experts don't lose touch with what's going on in practice, they are frequently sent out

into the field. About 50 percent of their working time is spent on these practical assignments. They provide support to machine manufacturers in commissioning new plants, repairing or replacing HEIDENHAIN components in machines as on-site service technicians, and in holding training courses at the HEIDENHAIN Training Center. As a result, the helplines are staffed by total experts and, in many cases, the callers hear trusted voices that they know personally from past service assignments or training courses.



+ Which particular helpline can help you with your specific questions? Our Helpline finder will guide you to the right contact person: www.heidenhain.de/helpline





StateMonitor

Your machinery at your fingertips

Acquire, visualize, and evaluate machine data



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