

DECO

Magazine

35

4/05

DECEMBER

ENGLISH

THINK PARTS – **THINK TORNOS**

DECO 20s
Two lathes in one

DECO 8sp
The myth has
changed to reality

MULTIDECO 20/8d
Complex parts at
a better price

Turning to Asia:
TORNOS gives
China and Asia
added value technology!





Summary



Think **parts** –
Think **TORNOS**

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Boost efficiency with GAP 10

TORNOS' evolving commitment to your success

The subject of continuous improvement is like a computer game. You can never really beat it because whatever goal you reach, the idea is to keep stretching beyond it and set a new one, ad infinitum. However, the sweet rewards of better efficiency and profitability along the way make the effort worthwhile.

GAP 10, which is an acronym for "Gain a la Production" in French, is TORNOS' continuous improvement program for customers. Our goal is to help you improve the efficiency of each of your TORNOS machines by a minimum of 10 percent each year. These can be relatively new DECO machines or ones you've had on the shop floor for years. Bringing your machines up to speed to improve profitability and meet market demands is smart business. To assist you in those efforts, contact TORNOS. We encourage an ongoing exchange of information and ideas. We talk to many people every day who are trying to improve their businesses and production efficiency. Chances are good that whatever you are experiencing, we have worked through it with someone else and can quickly make positive suggestions to you.

In turn, we need to hear what's happening in your business, the markets you serve, and what your customers are demanding of you. Only then can we pass along that knowledge to our R&D people who can get to work on developing advanced technology suited to market conditions. It's this mutual, reciprocal exchange that spurred us to create a host of specialized attachments and continual software updates. There is likely a TORNOS solution for your particular challenge available right now. Here are sever-

al attachments to consider for more complex work:

- ◆ Multiple live spindle units – available with 3 to 6 live spindles, ideal for parts such as lock cylinders and spinal screws.
- ◆ High frequency spindle – up to 80,000 rpm.
- ◆ Gundrilling/high pressure coolant combination with multiple port control – can be used in main and counter operations.
- ◆ Live spindle unit with interchangeable arbors.
- ◆ Angular drilling and milling unit – perfect for angled dental implants.
- ◆ Quick-change turning toolholder.
- ◆ Threadwhirling heads with interchangeable insert tooling.
- ◆ Counter operation threadwhirling unit.
- ◆ Milling with offset spindle for machining long flats at the guide bush.
- ◆ Broaching attachment.

Several software add-ins to consider are:

- ◆ Automatic tool offsets to accommodate tool wear.
- ◆ Macros for elliptical milling.
- ◆ Macros for angular machining.
- ◆ Check this website deep link to <http://www.tornos.ch/tech-tips-e.html> TORNOS' Tips and Tricks page. It's full of practical solutions for every day situations and challenges. It's worth reviewing that list immediately.

Consider a few popular ones, such as quicker programming, saving time when machining a long part, optimum use of the polygon function, and so on. It is comprehensive. Check it out now.

Coming soon:

- ◆ Gearhobbing unit.
- ◆ Threadwhirling for external threads with large inclination angles.

Again, I encourage you to either contact your local distributor, TORNOS regional manager, or myself in Brookfield, Connecticut to put GAP 10 to work for you. A tweak here and there might be just what you need to keep inching that bar upwards in the efficiency game.



Mark Saalmüller
Marketing and Communications
Manager TORNOS USA

WML Engineering

Buys Worlds First

DECO 20s

WML Engineering Ltd has always been an innovative company looking to progress in the continually competitive UK subcontract market – so when TORNOS launched the new DECO 20s at EMO, the Swansea based company was on hand buy the Worlds first DECO 20s.



Predominantly a sliding head lathe machine shop, WML serves the medical, electronic, automotive and general subcontract sectors. The company felt it needed to alter its manufacturing strategy to improve its competitiveness in the UK's continually changing marketplace – with this in mind it bought the new DECO 20s.

WML Director Jason Meir comments: "The market is always changing and we found our machine

shop was suited to batch runs of 500 plus, the new DECO 20s enables us to meet the needs of the small batch runs from 20, 50, 100 parts upwards. The changing marketplace meant we were missing out on small jobs that often came with larger contracts, this will not happen with the DECO 20s in place".

The DECO 20s was procured by WML not only because of its ability to suit the needs of WML's changing customer base but for its en-

hanced tool setting, control option and machine rigidity. This combination provides WML with a significantly improved machine set-up time. The new TORNOS control designed in conjunction with Fanuc has proven a major selling point to WML. Mr Meir continues: "The DECO 20s has the option of switching the control from the TORNOS TB-DECO programming software to the industry standard ISO code – and this makes the machine very appealing. The TB-DECO configuration will enable the machine to interface with our current range of TORNOS DECO 20a machines and allow us to programme offline and connect the machine via our Ethernet set-up. Whilst the ISO set-up on the new Fanuc 30i control enables us to become more flexible and competitive with the market needs. If a job is required immediately, the ISO set-up enables us to program from raw on the shop floor. For applications requiring batch runs of 1,000 plus we would use the TB-DECO as it fits the application much better".

Developed from the [a-line] series of machines, the DECO 20s has been designed to maximise set-up capacities and flexibility in the range of mid-complex parts. An aspect that TORNOS has paid consideration to with regards to set-up time is the tooling. Mr Meir continues: "The power tooling on the new DECO 20s is very easy to bolt-on and bolt-off. This is ideal for setting up batch runs of 20, 30 or a 100 parts. The [a-line] really is the all singing and all dancing machine that is built for power, strength and it can do anything. However, the new [s-line] uses the same philosophy of power, strength and rigidity. It enhances our the ability to set-up a machine for an emergency batch of 20 or 50 parts".

The short set-up times of the new DECO 20s now enables WML to offer customers a sample service. "The DECO 20s is configured with less complexity than the [a-line] of machines; however the [s-line] machine can produce a wide part of the components that the [a-line] can manufacture. The [s-line] doesn't have a number of characteristics that are on the [a-line] of machine such as the balanced turning feature and independent feed rate drilling. On a longer batch run these are key performance variables, but we want the machine for what it was predominantly designed to do – short batch runs with short set-up times. We now have the [a-line] of machines for batch runs of 500 plus and the [s-line] for the small batches from 20 upwards. With the DECO 20s we now have the capability to competitively meet the needs of the changing marketplace", says Mr Meir.

Despite being the first company in the world to purchase the new DECO 20s, WML has no doubts regarding the capability of the machine. "I have full confidence in the machine; it has the same barfeed technology and interface, wireless program transfer technology and TB-DECO technology as the current [a-line] machines. The axes of machining are similar but slightly less, so I have full confidence in my purchase. We went through our requirements with TORNOS engineers and the machine has been configured to suit the market we plan to attack. The [s-line] is so modular that we can add bolt-on after bolt-on if we require – but we have the "crème de la crème" [a-line] machines for the purpose of highly complex work", concludes Mr Meir.



<http://www.wml-eng.co.uk>

The new generation of pentacut inserts

written by Moshe Goldberg Ph.D. and Baruch Books

The current trend of using the Iscar PENTACUT on TORNOS machines, either single spindle or multispindle lathes, proved to delivered countless advantages. The favorable responses, received from end user, have indicated a reliable product with improved efficiency features, particularly when used on TORNOS machines.

The employment of the PENTACUT leads to great economical savings in terms of shortening machining cycle time and minimum machining idle time, particularly on mass production applications. By using this tool, the end user can reduce the number on tools attached to the turret, but most important, save on wasted raw materials in a form of removed chips. This feature is extremely critical when parting precious materials.

The ISCAR PENTACUT is a most advanced multifunction tool, which not only performs precision groov-



ing, parting, recessing and chamfering, but also can serve as a forming tool, for applications such as multi-tooth threading. These new concept PENTACUT inserts can now be ground to the required profile in order to suit the enduser's requirement. Consequently, the PENTACUT can now superimpose the shape of its cutting edge into the OD face of the workpiece, producing a multitude of complicated shapes and profiles.

The cost effectiveness of an insert with 5 cutting edges has long been recognized by the mass production industry. The ability of the inserts to be mounted on a variety of modular adapters, blade adapters for large overhangs or mini-turrets for turn-mill machines has tremendously increased the potential for manufacturing flexibility. The short head of the holder also provides

minimum overhang and high stability, which results in a more prolonged tool life.

Each cutting edge on the pentagonal shaped insert is equipped with a unique chipformer that can be selected out of a wide range, in order to competently machine different types of materials, while obtaining excellent chip control in grooving, parting and light side turning applications.

When considering the insert geometry it can be noticed that the central recess on the rake face promotes chip narrowing and curling, ensuring minimal interaction with sidewalls of the machined groove. This chip deflector efficiently performs in a wide range of workpiece materials and machining conditions, resulting in excellent surface quality on grooved bottoms and sidewalls. Furthermore,



the insert is tangentially mounted and pressed against two peripheral contact surfaces, in order to ensure center height accuracy.

An additional human engineering feature is the frontal and back clamping mechanism, that enables convenient access to the torx screw from either side of the holder. This is an advantageous feature particularly for automatic and Swiss-type machines, when considering the small confined space available for tool maneuvering. This clamping mechanism offers insert indexing by rotation, while eliminating the need to remove the holder from the machine turret. Another human engineering fea-

ture is the unique design of the insert that prevents misplacement when mounting into the tool pocket, in order to avoid any errors or failures.

The PENTACUT inserts are available in grade IC1008, which is based on an advanced submicron substrate with PVD coating, consisting of TiAlN and TiN layers. The PENTACUT tools have ISCAR's Hard Touch coating, with enhanced resistance to abrasion damage.

Grooving

For grooving and recessing applications, precision ground inserts are available in a width range of



0.50 to 3.18 mm with a tolerance of +/-0.02 mm as a standard tool with chipformer and a variety of standard corner radii.

With regards to form grooving, special shapes can be ground according to an enduser's specifications, on an insert width of up to 8.25 mm. Super positive chipformers can also be implemented in order to machine a variety of workpiece materials.

Parting

For parting-off applications, inserts are available in a width range of 0.5 to 2.0 mm and designed for maximum machining depths of 12.5 mm.

These inserts offer the most economical solution for machining miniature parts, with a great potential for time and cost savings.



www.iscar.com

Two lathes in one



TORNOS has just launched the DECO 20s with a view to completing its range of single spindle lathes and meeting market requirements for the mid-range. This exceptional new automatic lathe includes a non-standard counter-spindle.



standard length and fairly delicate, meaning that appropriate lathes must be used for the particular applications.

The tolerances demanded by these market sectors are frequently less than one hundredth of a millimetre. The consistency of this tolerance over the entire production run is critical. It goes without saying that a "simple part" is not an "imprecise part". Despite all these requirements, the cost of the parts is of utmost importance.

The DECO 20s is able to meet all these criteria 100%. In order better to respond to market demands, this automatic lathe is fitted with specifically adapted equipment. Its nominal capacity is 20 mm diameter for a standard part length of 220 mm. However, lengths of up to 500 mm are possible.

TORNOS now has the complete range of single spindle lathes; this includes the DECO 10a and DECO 20a. With these lathes, the Swiss machine-tool manufacturer has already covered the demand for complex to extremely complex parts. Still missing from the portfolio was a lathe to produce relatively simple to fairly complex parts. The new TORNOS philosophy led the company on a mission to provide the customer with a complete range of machines. This task begun with the new DECO 8sp, which was

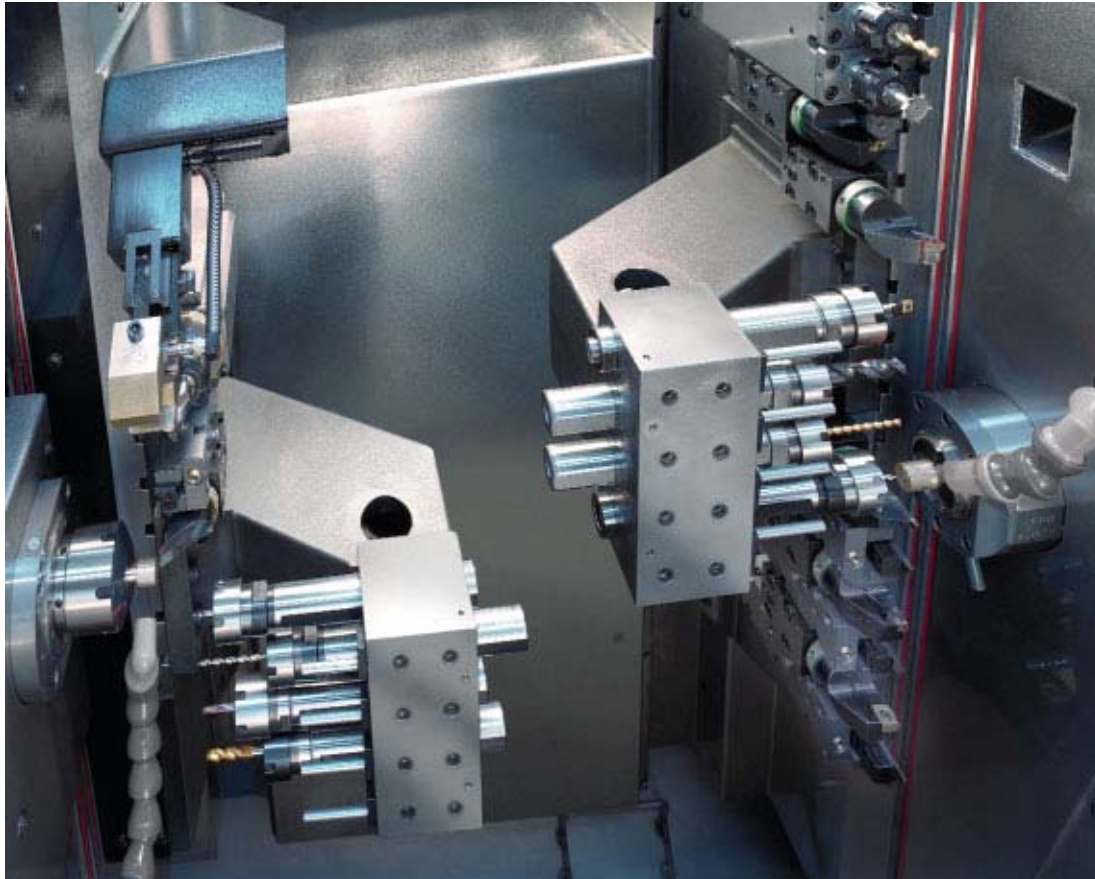
launched in the summer of 2005 and now the new DECO 20s launched at the EMO exhibition.

Simple yet complete

The new automatic DECO 20s lathe with loose tailstock is intended for the automotive, electro-technical, electronics and hydraulics sectors to name but a few. These sectors often produce fairly short series runs of medium complexity parts or pre-series runs. By virtue of their function, some parts are of a non-

Strong and precise

The cast iron machine frame guarantees the great stability and strength of the DECO 20s. Ball screws and generously dimensioned linear guides provide for fast movement without loss of precision. An innovative shock-absorbing system is another key element that guarantees the quality of the lathe.



The counter-spindle – a lathe in its own class

The key feature of this new lathe is its counter-spindle. In the majority of single spindle lathes, the counter-spindle is only used for secondary operations and hence only has a limited range of operations. The counter-spindle on the DECO 20s is on a par with the main spindle meaning that operations can be executed on the main spindle or counter-spindle, without

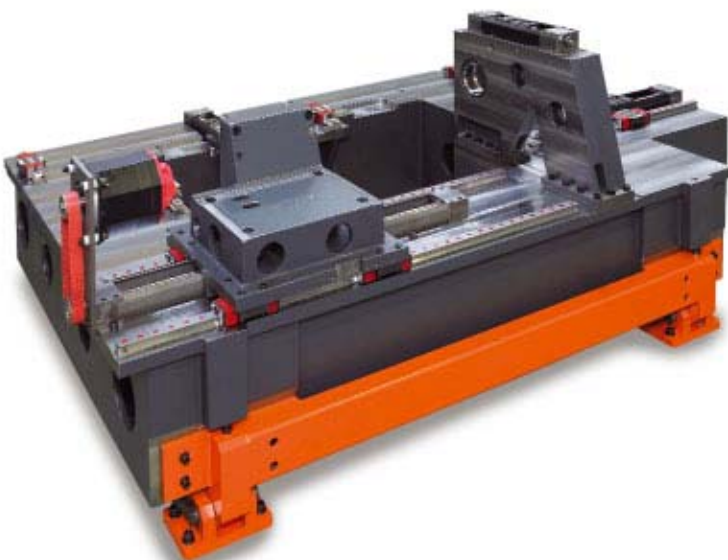
jeopardising performance and quality.

The two spindles are designed as split spindle type motorised spindles with a hollow shaft motor located at the rear of the spindle. This particular design contributes towards optimum bearing kinematics and the dynamic and thermal influences are much reduced.

The two spindles offer vast tooling potential and the tooling can easily

be changed between the main spindle and counter-spindle. The stability and strength of the counter-spindle are completely identical to those of the main spindle and the specialist manufacturer would even be tempted to say that in the same frame the machine consists of two independent lathes. The DECO 20s is the only lathe on the market whose two spindles have completely independent kinematics, meaning the main and counter-spindle work wholly independently in relation to one another. The two sides are absolutely identical from a mechanical and electrical point of view. The DECO 20s is the only machine in its range to have a counter spindle whose power equates to that of the main spindle.

The only synchronisation required takes place when the part is being cut. The synchronisation is perfectly controlled by a macro contained in the control. One benefit of this system is that it is easier for the



Two lathes in one



operator to distribute the various operations on the machine, thereby reducing operation times and achieving considerable overall saving in time.

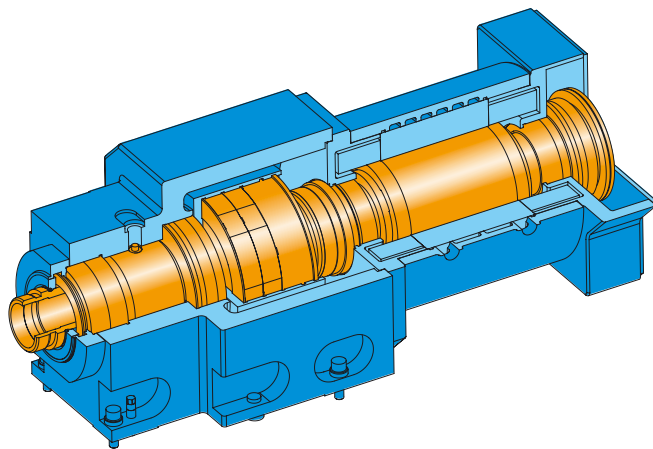
Easy to program

Like the previous TORNOS models, the DECO 20s is fitted with a FANUC numeric control. This latest version produced by the Japanese manufacturer is the FANUC 31i and it provides standard programming in ISO



as well as the option for the renowned TB-DECO format. Given the simplicity and configuration of this lathe, TORNOS adopted this option to make it very easy to program parts using this programming method. The machine responds to the market trend of using less experienced lathe operators and also provides the facility if required of intervention by a monitoring team without having to call upon the services of a specialist.

The new DECO 20s is a simple machine, comprising two fully independent tool systems, which reduce the risk of collision to almost zero with a programming system that is easy to use. Consequently, there is no need to use any special programming software.



Upon request TORNOS will also provide this lathe with its own well-known TB-DECO programming software. An operator already familiar with the TORNOS software will be able to continue with his work in the way he has become accustomed.

Two complete ranges of tools

The DECO 20s has two tool systems, each has three fully independent axes. This demonstrates the ma-

chine's versatility and exceptional flexibility with the machine being designed as a reflective design. The strength of the lathe frame incorporates both the main spindle and counter-spindle to guarantee consistent results for both lathes from all aspects. The machine comprises two motorised spindles fitted with a standard sprinkling system for cooling. This provides the machine with thermal stability. Given the mirror kinematics, the two tool systems need not be synchronised ex-

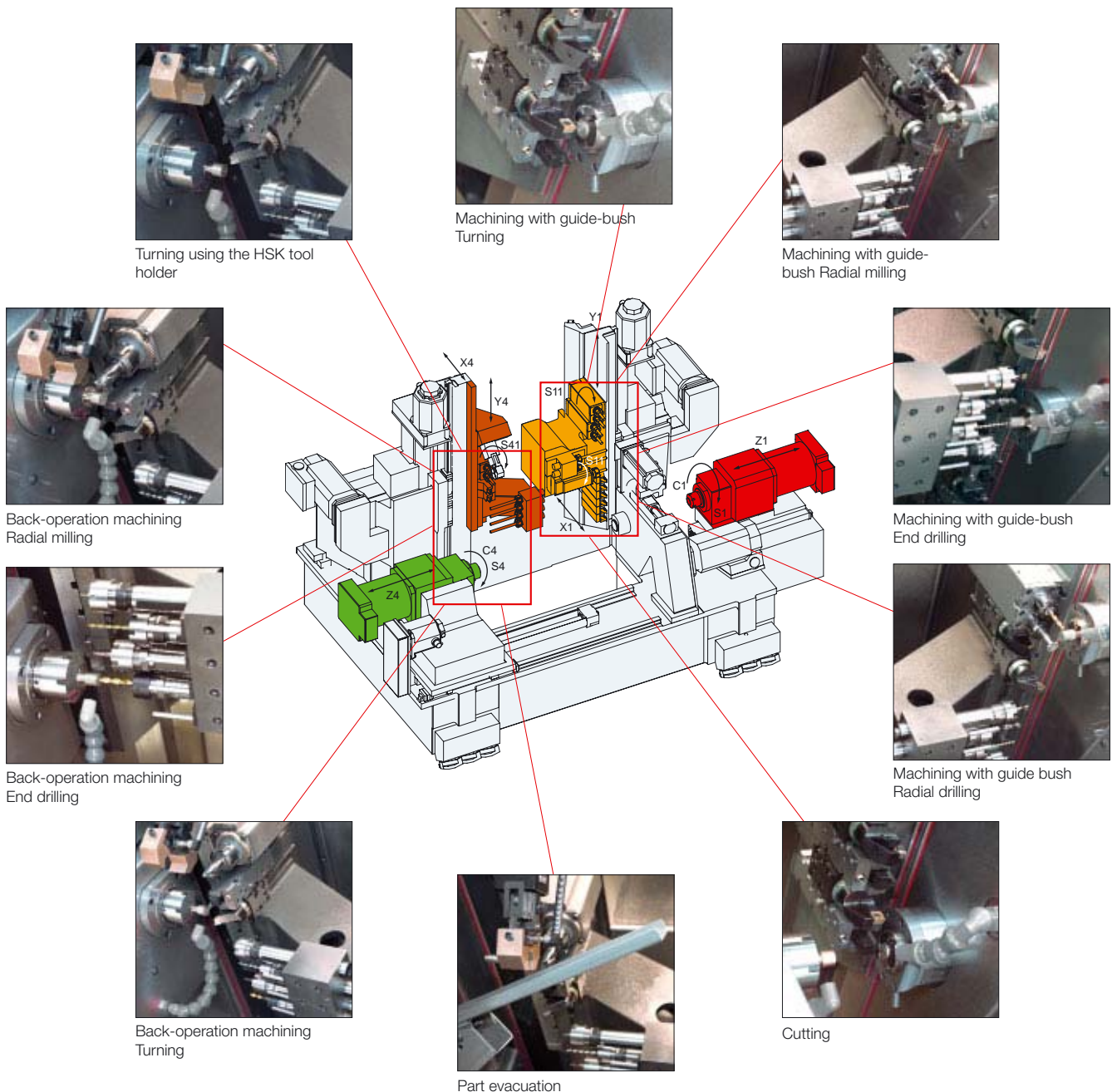
cept during cutting, in which case the macro contained in the control comes into play.

The tool system for the main spindle can accommodate 14 different tools whilst the tool system for the counter-spindle can accommodate an additional eight tools. This provides the operator with 22 available tools. The TORNOS engineers designed tool holders for both systems that are fully identical to ensure the versatility and simplicity of setting-up work.

At tool level, the operator has the facility of fitting turning tools both on the main spindle and counter-spindle.

On the DECO 20s the operator can use the tools of the two tooling systems to execute up to 15 different operations, such as internal and external turning, drilling along the axis, offset drilling, axial and cross milling and even thread whirling. In a few words, all conventional operations can be fully executed on the two spindles. Although

there is a different number of tools, the same operations can be executed either using the main spindle or the counter-spindle – the power of both is identical. Therefore, there are no limits to the execution of operations. If necessary the operator can distribute the work over both spindles in order to achieve considerable time savings. The DECO 20s therefore ensures production of completely finished parts and provides a pertinent response to those clients



Turning using the HSK tool holder



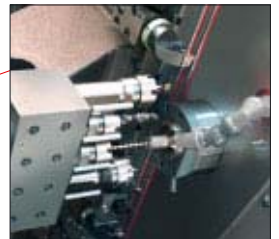
Machining with guide-bush Turning



Machining with guide-bush Radial milling



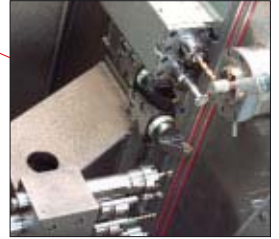
Back-operation machining Radial milling



Machining with guide-bush End drilling



Back-operation machining End drilling



Machining with guide bush Radial drilling



Back-operation machining Turning



Part evacuation



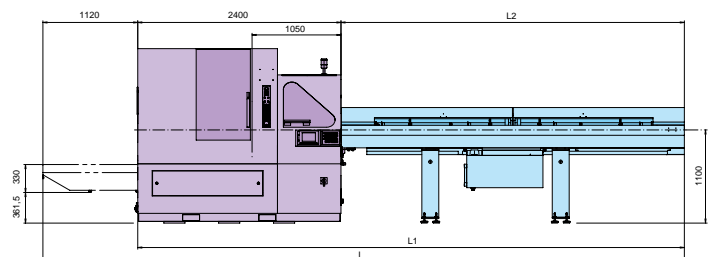
Cutting



wishing to manufacture without having to rework the parts.

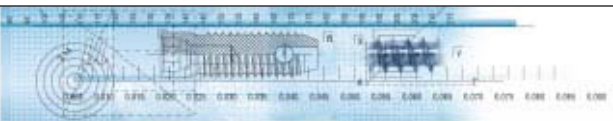
Guaranteed accessibility

For this machine, the engineers had to consider two vital criteria: simplicity and accessibility!! The result is a well thought-out machine with generous access to the machining area provided by an optimum swarf evacuation system. The operator also has easier access to the tools because the lathe is inclined for-



Max bars length	L	L1	L2
3200	7575	6455	4055
4200	8575	7455	5055

Two lathes in one



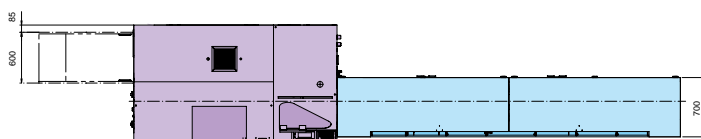
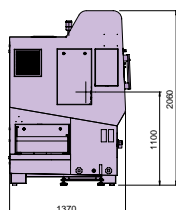
wards at an angle of 30°. All the tool systems are designed to allow for rapid tool changes. This also applies to the turning tools, which also have a fast change system. The operator can now take his time in pre-setting the machine remotely to reduce machine down-times to a minimum. Accordingly, this results in increased productivity and precision. The DECO 20s was designed to accept a large volume of swarf. It goes without saying that swarf removal has been carefully adapted to ensure perfect and reliable operation.

Solutions on request

The DECO 20s is a high-performance product that executes fully completed parts from the bar feeder. In some cases, the operators request a more sophisticated environment incorporating customised solutions such as part feed or evacuation devices. Customers regularly request TORNOS to incorporate relatively short bar feeders or forged parts i.e. chucks.

The design office works with clients looking for specialist solutions, such as the incorporation of a robot or additional handling devices. In such cases, the design office proceeds with a preliminary study to assess the feasibility of the request. TORNOS also involves external suppliers, which are specialists in their fields and have been working with TORNOS for quite some time. This enables the user to be aware of the precise conditions governing his

request and there is no risk of carrying out work that is inconclusive. According to TORNOS specialists, the fully integrated systems are not yet in great demand and therefore are not supplied as standard for the single spindle machines. Nonetheless, such requests can be made and already point towards a future trend. TORNOS is already working with customers on these innovations, even for the DECO 20s.



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Program Your DECO with

PartMaker SwissCAM!

You can now program your DECO Swiss-type lathe directly from PartMaker SwissCAM from IMCS Inc. This major breakthrough in Swiss programming technology means you can use PartMaker SwissCAM to output a program that can be directly imported into TB-DECO. These integrated software solutions work with all DECO Swiss machines including DECO 7, DECO 10, DECO 13, DECO 20 and DECO 26 models.

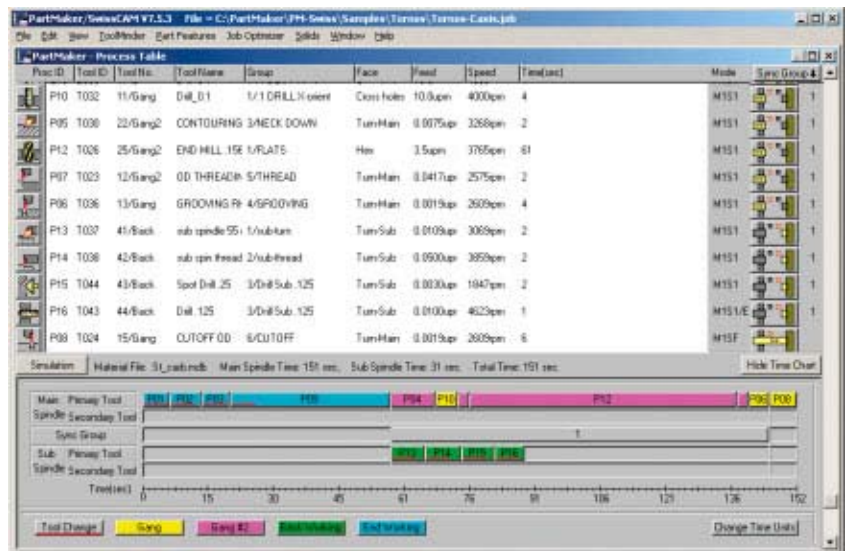


The integrated PartMaker SwissCAM/TB-DECO solution has been available since July of 2005. Already, a number of leading TB-DECO users have acquired this solution and are putting into use for programming their DECO machines.

"The TORNOS and PartMaker engineering staff have collaborated to integrate PartMaker SwissCAM and TB-DECO ADV software in a truly robust and seamless manner", says Mr Tom Dierks, President of TORNOS Technologies USA. "We here at TORNOS USA are excited about the opportunity to give our users the ability to program their TB-DECO machines automatically through PartMaker SwissCAM".

The Benefits

The integration of the PartMaker SwissCAM and TB-DECO product are beneficial because they allow TORNOS users to integrate TB-DECO with external CAD data, perform 3D machining simulation and program all their DECO machines in the same intuitive manner as their other CNC machines, whether they be Swiss-type or conventional CNC mills and lathes. Using PartMaker SwissCAM, a program can quickly be switched from one TORNOS model to another.



PartMaker's Process Table uses Patented Visual Synchronization Technology to simplify process synchronization for DECO machines. A time for each process is displayed, with a total time for main spindle and sub-spindle machining, along with a total machining time. A Time Chart visually shows how much free time is being achieved using process synchronization.

Additionally, with the PartMaker SwissCAM/TB-DECO interface, a program from any other CNC Swiss-machine model (i.e. Citizen, Star, Tsugami, Maier, Hanwha, Nomura, Gildemeister, Hardinge, etc.) can be converted to run on a DECO with just a few mouse clicks. Integrating these two technologies allows DECO users to create and validate CNC programs easily. Additionally, DECO users will more readily be able to take advantage of TB-DECO's unique process opti-

mization features because, when working through PartMaker, they will be starting from a part that has already been programmed and synchronized across the multiple axes of the TORNOS machine. Once in TB-DECO, the user can further optimize his part's cycle time using TB-DECO's many cycle time reducing capabilities.

How it Works

PartMaker SwissCAM is the leading CAM system on the market for pro-

gramming CNC Swiss-type lathes. As such, PartMaker SwissCAM was the first CAM system that TORNOS chose for integration with TB-DECO. Many of the leading users of Swiss-type lathes both in the United States and around the world have standardized on PartMaker SwissCAM for programming their machines.

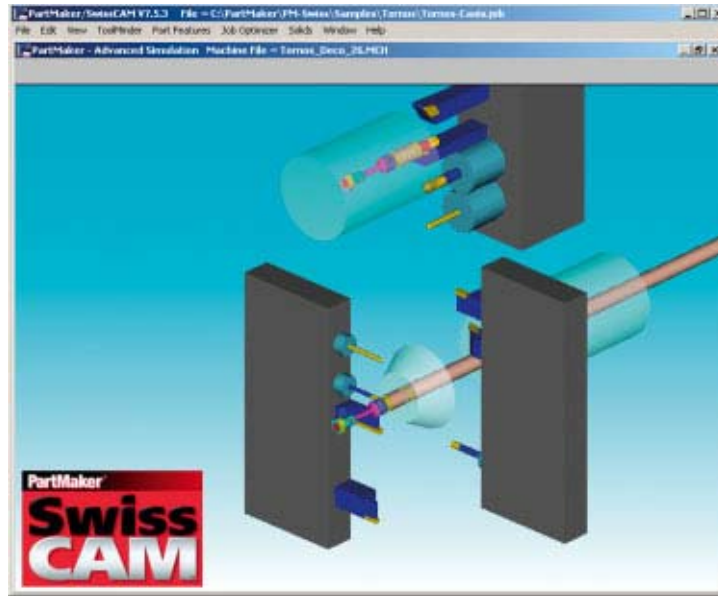
Patented Technology Assures Productivity

PartMaker SwissCAM employs a patented "Divide and Conquer" programming strategy that simplifies the programming of parts on Swiss-type lathes with a number of turned and milled features by breaking down a complex part into a number planer operations. Each machine surface is programmed in a separate window as a much simpler operation. As each operation is programmed, it is verified graphically on screen.

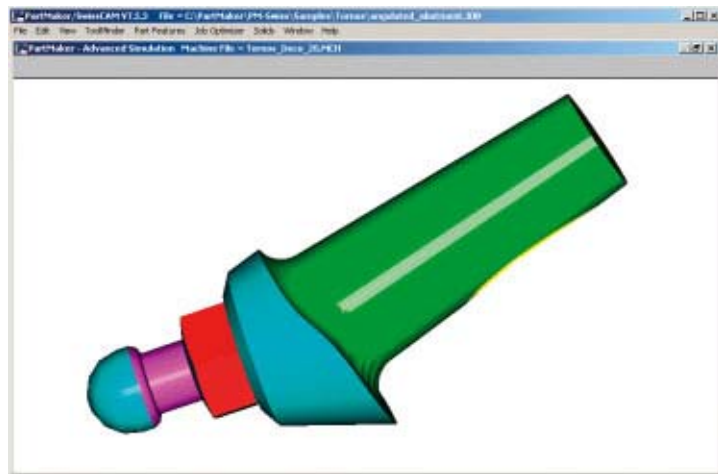
PartMaker SwissCAM uses Knowledge Based Machining to assure that the machinist's knowledge about such issues as tooling and feeds and speeds are saved within the system. This knowledge can be used over and over again, thus automating the programming task.

PartMaker SwissCAM produces a process table that displays a complete summary of all the work that has been done. Each operation has speeds and feeds automatically applied for the material used and the time for each operation is calculated and displayed. The total time is shown for both main and sub-spindle machining.

PartMaker's Patented Visual Synchronization Approach makes programming process synchronization an easy task. Process Synchronization can be done by



PartMaker SwissCAM allows the user to see a full machining simulation of his part on a DECO machine before sending the program to TB-DECO to assure there are no crashes or collisions.



PartMaker make's programming even the most complex parts easy to program. Above, an angled abutment programmed with PartMaker is shown.

just pointing and clicking by choosing from a variety of graphical synchronization strategies. Once the operations have been synchronized, a time chart shows the operations in bar chart format, showing the main and sub-spindle times side by side and how much machining time the user is getting for free by overlapping synchronous operations.

PartMaker SwissCAM includes integrated, fully dynamic 3D machining simulation which allows the user to see the entire machining process on screen and check for any tool collisions before machining.

PartMaker®
CAM Software That Knows™
Developed by IMCS, Inc.

For further information, please contact:

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web: www.partmaker.com
E-mail: imcs@partmaker.com

The myth

has changed to reality

During the middle of 2004, the TORNOS single spindle business unit decided to launch a major project by building a CNC lathe, capable of machining small turned parts very precisely, within the order of one micrometer.



Market studies mainly in Asia, where TORNOS is hoping to acquire significant market share, show that there is a real need for this type of machine by manufacturers of small turned parts. These manufacturing companies are waiting for the lathe manufacturers to come up with new technological solutions, so that they can be even more efficient in producing parts that are technologically increasingly difficult to execute on account of their small size and extreme precision.

In April 2005 after much development work, a machine that met these requirements was unveiled to the public at Moutier, Switzerland and then in May in Asia. This machine found immediate appeal because of its concept, technology, small size and its facility to finish parts without reworking. TORNOS developed the product whilst taking into account the needs of the market. The company also involved part manufacturer's right from the outset, this enabled

TORNOS to arouse immediate interest with its latest lathe.

Looking back, TORNOS Product Manager Mr Villard, comments: "We couldn't wait to present our product. The development work was carried out on the basis of a serious enquiry, which was then transformed to a clear and accurate machine specification. The initial market responses were highly encouraging. We were proud to be able to present what we had announced several months ago, especially with regard to the lathe's capacity of guaranteeing parts to within very severe limits of precision that were normally reserved for grinding machines".

"The business unit then laid down two major objectives to the Research and Development department. We had to acquire the necessary know-how to validate the machine by performing several machining tests on carefully selected parts, deploying the measuring and inspection technologies

capable of measuring to within one tenth of a micrometer."

"The other aspect our engineers immediately concentrated on was the machine's ergonomics. We made the machine much more flexible by creating modular tool supports that were adapted to user requirements and we also made tool access and adjustment easier, with a view to reducing machine set-up times. The machine was given even more features to make it really attractive to the parts manufacturers who were becoming increasingly demanding with respect to flexibility. At the EMO trade fair in Hanover, we presented a new version of the machine already incorporating several of these upgrades. On this occasion, we also had illustrated customer documents, which showed that the machine could machine parts of very demanding quality, under working conditions that were almost identical to those found in our clients' workshops".



Mr Villard explained that the team involved in this project, spared nothing to achieve the targets laid down.

With a view to finding out a little more, DECO Magazine conducted an express interview :

DM: *Good day Mr Villard! You indicated that the ergonomics of the machine was vastly improved. Could you explain how, exactly?*

SV: Our clients are very demanding, and quite rightly so. Some already

pointed out that the weakness of the first model was poor accessibility to certain tools, which made very accurate setting work very difficult. This was a very important point that had to be rectified immediately. By changing the X1/Y1 tool system and in particular, the tool support, we provided the operator with improved access to the tools. We did not hesitate to modify the machine frame so as to free up the machining area, with the prime aim of increasing tool accessibility and facilitating swarf

removal. We also used this opportunity to fit stops at the rear of the tools as standard, so as to improve setting and adjustment work, thereby reducing machine downtime.

DM: *You mentioned modular tool holders. Could you give us some more details of these?*

SV: The series produced machines leaving our plant from January 2006 onwards will all be fitted with a linear tool system made up of several modules, which the client is at liberty to purchase, depending on the actual machining requirements. This versatility allows for the machine to be finely adapted to the parts being executed, which is something our clients really appreciate.

It goes without saying that all the basic functions required for this type of lathe will be available. In addition to using the slide with utmost precision, we can also execute drilling, tapping or axial and radial milling operations. In all 20 tools can be mounted on both the tool systems making up our machine. With respect to tool setting, we opted for the conventional



[S-line]

The myth

has changed to reality



method of setting at machine as opposed to doing this off the machine, as is the case with the [a-line] lathes.

We wanted to maximise the space available by using tools with a 12 x 12 section to achieve increased strength when evacuating large volumes of swarf. What is more,

part precision can only be guaranteed if the tools are very precisely adjusted, which can only be achieved by the conventional method of setting on the lathe itself. Our engineers are also working on solutions to facilitate highly precise setting of the axial tools in particular.

DM: So this machine is very similar in terms of flexibility of products to the [a-line]?

SV: The DECO machines are the formula 1 in terms of speed of part execution. The kinematics of the DECO [a-line] machines make it possible to machine highly complex parts by several simultaneous operations, because of their two spindles and four tool systems.

The DECO 8sp lathe is not within this same category. It is fitted with a spindle and counter-spindle and two tool systems, which with its 5 linear axes and 20 tools allow reasonably complex parts to be ex-



ecuted, with the facility of simultaneous machining at the front and rear of the part, thereby conferring on the machine far greater versatility than is found amongst its competitors. Its large number of tools distributed over two independent systems is another major feature of this machine.

DM: If you agree, can we talk a little more about this almost mythical precision you referred to?

SV: I'd be delighted! With the DECO 8sp we all kept our promises and we can now prove this! Dozens of tests were necessary before we dared to say that the machine could achieve a remarkable degree of precision to within a micrometer during slide operations. Our clients know full well that TORNOS makes no habit of announcing airy-fairy results – on the contrary. Nowadays, we can stand back and tell our clients that a precision of ± 1 micron diameter and less than one micron circularity in hard materials have been achieved with this machine.

DM: But surely under experimental conditions?

SV: If that were the case, we would not be talking about this and you wouldn't be able to write your article. Let me just tell you of the con-

ditions under which we performed a test and the results obtained.

The machined part, a 303 stainless steel shaft is used in the mechanisms of hard disks. The dimensions were an external part diameter of 3 mm, the precision diameter was 1.5 mm and the overall length of the part was 4.2 mm. The cutting conditions applied were a spindle speed of 8,000 rpm; feed 0.01 mm per revolution, cutting depth 0.2 mm. The temperature in the workshop varied between 21° and 25° Celsius during the test. The purpose of the test was to produce 1,000 parts, which represents more than 9 hours production at a rate of 1.8 parts/min. We measured the machine drift over a diameter of 1.5, with the machine having a tolerance of ± 1 micron.

The test proceeded as follows:

- ◆ The machine had been set beforehand. We started producing parts with a cold machine and sampled all the parts to analyse the drift during the heating phase.

- ◆ The first astounding fact: it took almost 35 minutes to bring the machine up to temperature and ensure machining stability. During this phase, the machine only deviated by 2 microns! We then took several samples after every 50 parts or in half hourly intervals and did this over a period of 9 hours.

Several things happened during this production phase, such as bar changes and machine shut downs, once for 30 minutes and another time for 15 minutes, with the machine cowl open, simulating work in the machining area. I must point out that at no time, were any tool offsets made.

- ◆ Second remarkable fact: the machine drift over 9 hours' production, taking account of these downtimes, was 1.4 microns.

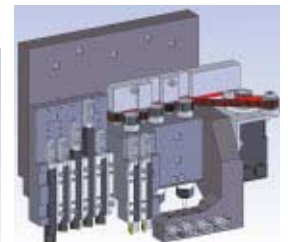
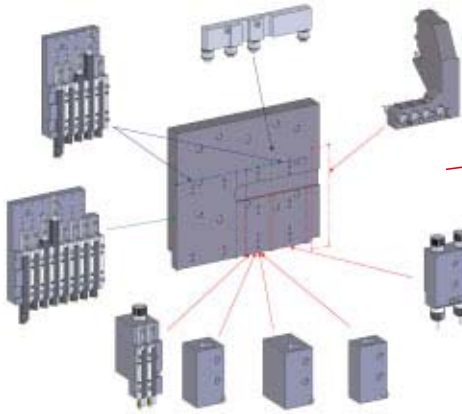
These results prove that the DECO 8sp lathe has exceptional thermal stability and can guarantee extreme machining precision under industrial production conditions.

DM: What about the form tolerances? I have been told that they are even better than the diameters?

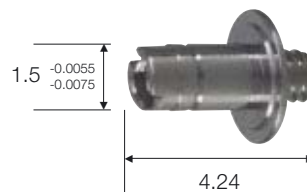
SV: The part has been produced to within very stringent form tolerances, with respect to surface evenness, perpendicularity, parallelism, run-out and circularity, in the order of a few microns and even 1 micron with regard to circularity.

We naturally also checked that these geometric tolerances were also respected during this test. We discovered that this was the case. The circularity tolerance of 1 micron was fully respected.

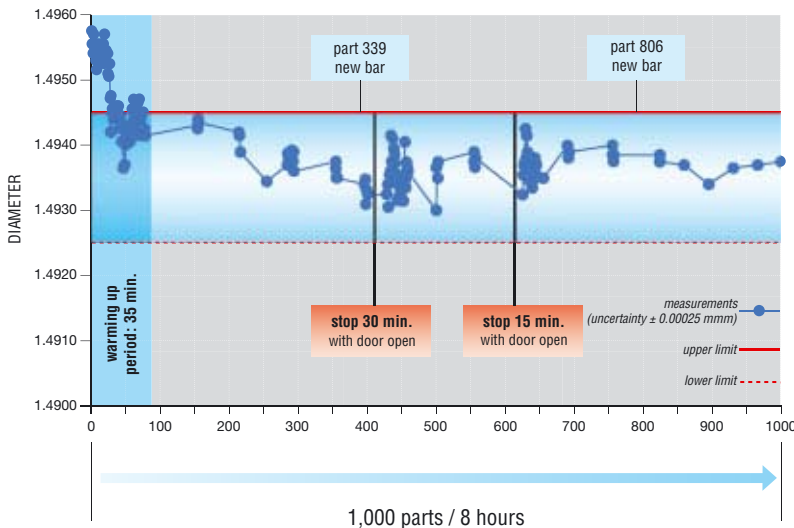
The myth as changed to reality



Laboratory



Measurements during 8 hours production



Test Conditions

Ambient temperature	21-25°C
Material	SUS 303 cu
Oil	Mineral oil
Measured diameter	1.5 mm
Cycle time	34 sec.
Spindle speed	8,000 rpm
Feed rate	0,01 mm/rev.
Depth of cut	0,2 mm
Number of parts produced	1,000

Results

Total deviation after warm up <i>Including stops and bar changes</i>	1,4 μ
--------------------------------------------------------------------------------	--------------

In this context, it should be underlined that only one lathe working without guide bush is capable of guaranteeing dimensional and especially geometric tolerances to within one micron during continuous production.



DM: Thank you Mr Villard. Can I now ask you a somewhat naïve question, but before the launch of the DECO 8sp, how were such parts produced ?

SV: With respect to hard disk components, an area we examined before developing this machine, the majority of such parts are produced during several successive machining processes. Typically, a machine worked predominantly on the outside, as is the case with a shaft. Initially it undergoes small part turning on a CNC lathe and is then finished by grinding. A part, such as a dowel which is highly worked on the inside, is often machined as a blank on a CNC lathe. The interior is then completed on a reworking lathe before the part passes to grinding. Sometimes even, such operations like slotting or threading are then executed on the reworking machines. It doesn't take much to realise that these reworking operations are very tricky and represent sources of error, which are very costly to the manufacturers. As you said at the outset, everyone is looking for a means of production so that they can simplify their machining process and derive improved benefits.

Dispensing with reworking operations is not an aim purely of manufacturers of hard disk components. There are many manufacturers of small turned parts and sub-contractors who have to face

these problems on a daily basis and who immediately see the benefits they could achieve with a new solution, as offered by the DECO 8sp lathe.

DM: So what happens now ? I assume that the entire project team is always very active, given the fact that the first series-produced machines will be ready in January 2006.

SV: Since it was presented last April, this machine attracted wide interest. We took our first order in May. It is true that many of our traditional clients waited for the new machine to be launched at EMO before really reaching an opinion about the machine. I personally noted an increase in offers for this machine from last month onwards, after EMO. At present, 25 machines

are on order, with a lead time during the first quarter of 2006 (Note: interview conducted at the end of September 2005).

We shall actively continue with promoting this product, whether in Europe or Asia, at the THAI METALEX in Bangkok. We also anticipate presenting this machine in the United States. To conclude, I would say that we are encouraged by the market to pursue our efforts. The project team is fully aware of the interest generated in this new lathe and is very keen to produce what we had dared hardly imagine less than one year ago.

DM: Thank you Mr Villard for your explanations. We wish you all the success with your new product.

If you would like further information on the DECO 8sp, do not hesitate to contact your current TORNOS dealer or myself
Mr Serge Villard, Product Manager,
villard.s@tornos.ch.



Programming personalised Macros

We already had the opportunity of showing you many benefits of TB-DECO ADV. Today, we shall go one step further and look at personalised Macros.

The example below corresponds to the one dealing with parameterized programming, as featured in DECO Magazine no 34.

We shall now program a recess with the aid of a Macro, as opposed to parameterized programming for one operation.

The contents of the Macro, written in PELD programming (Programming Extended Language for DECO) will be entered in a special clients' file.

For the machining operation, we only write the name of the Macro used, together with its parameters. It is the program itself that reads the ISO code within the Macro.

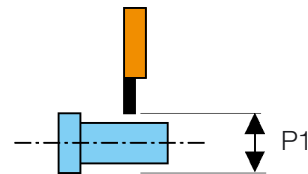
The big advantage of programming with macros is that it can be used not only several times within the same program, but also for any other program written for the same machine. The following example was executed for a DECO 13, but it can equally well be applied to a DECO 10, DECO 20/26 or a MULTIDECO.

The user may enter the following data using the parameters of Macro G995:

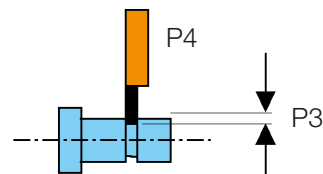
- P1 Initial diameter.
- P2 Feed diameter (base of recess).
- P3 Depth of hobbing between each back movement.
- P4 Rate of feed for the various hobbing passes.
- P5 Feed for the final pass (finish).

Continuation of operations and contents of the Macro G995 parameters.

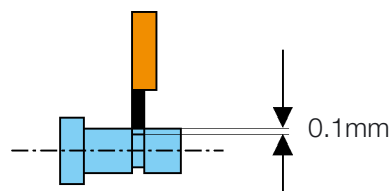
- 1) P1 → Initial diameter (mm)



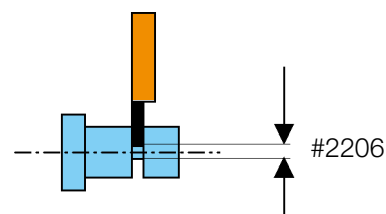
- 2) P3 → Depth of hobbing between each back movement (mm)
P4 → Feed value during hobbing (mm/t)



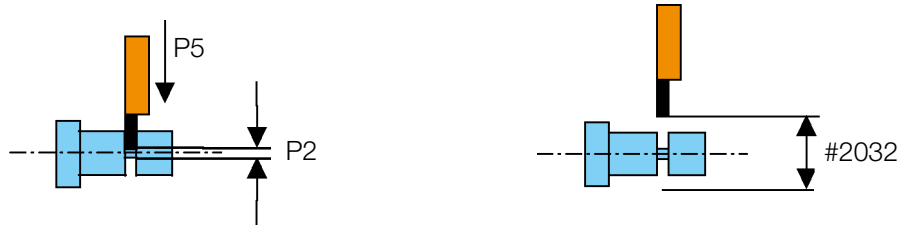
- 3) 0.1 mm back movement to crush the swarf



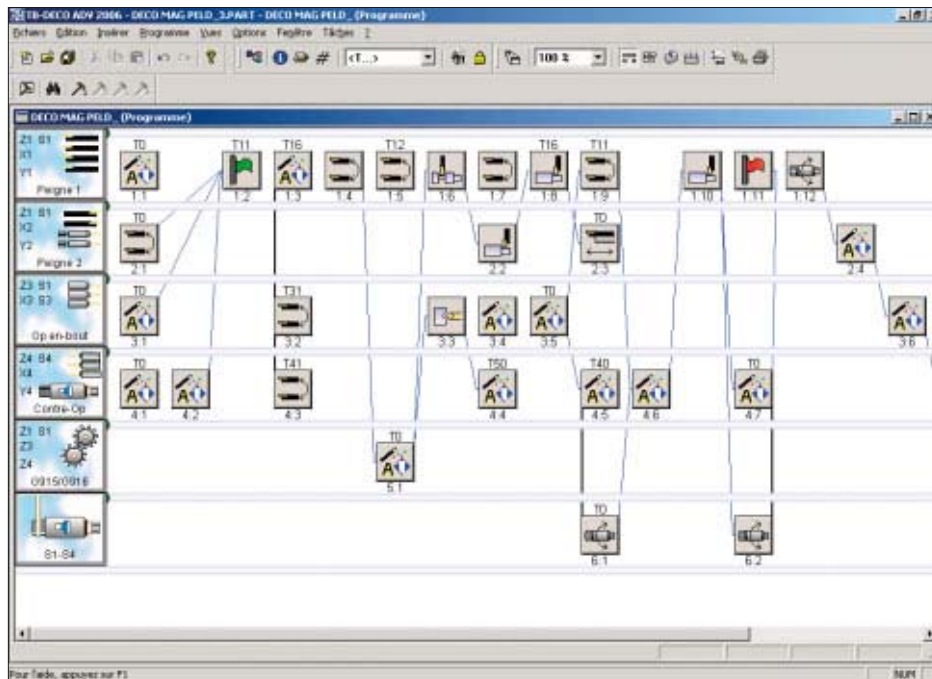
- 4) #2206 → Diameter at the base of the recess + 1 mm (blank)



- 5) P2 → Diameter at the base of the recess (finish)
 - 6) #2032 → Back movement to bar diameter + safety distance
- P5 → Feed value for finishing (mm/t)



Program:



Operation 1:6

G995 P1=10 P2=2.8 P3 P3=1 P4=0.04 P5=0.015

- P1 → Mandatory parameter.
- P2 → Mandatory parameter.
- P3 → Mandatory parameter.
- P4 → Optional parameter.
- P5 → Optional parameter.

If the optional parameters are not added after G995, then the default values will automatically be entered by the system.

- P4=0,03 mm/t (default value)
- P5=0,01 mm/t (default value)

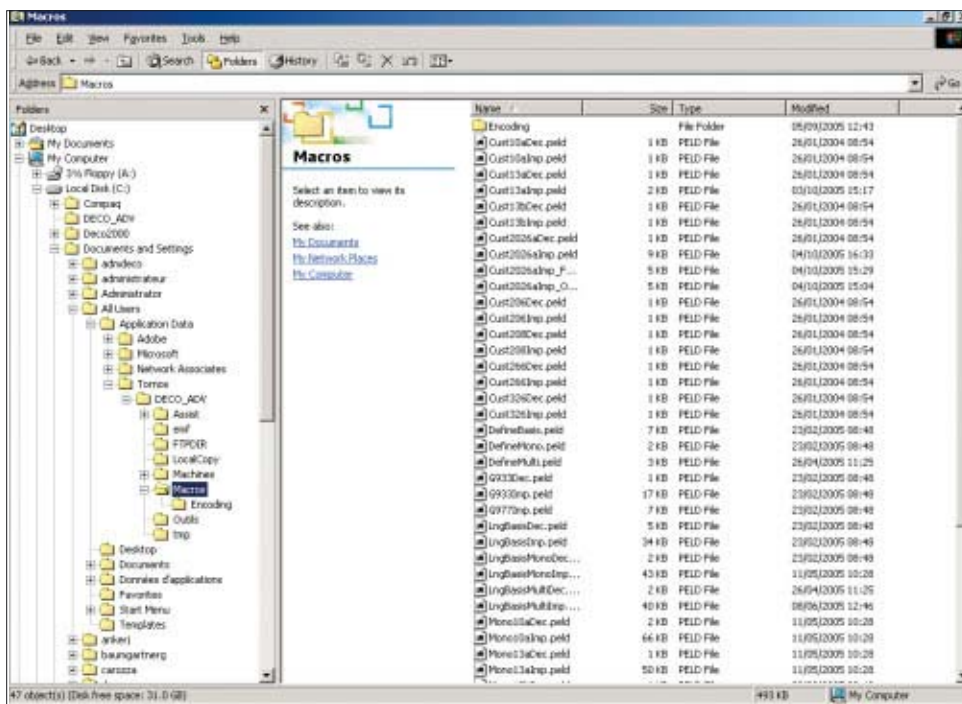
Programming

personalised Macros

Access path to the file containing the DECO 13 Macros reserved for clients clients:

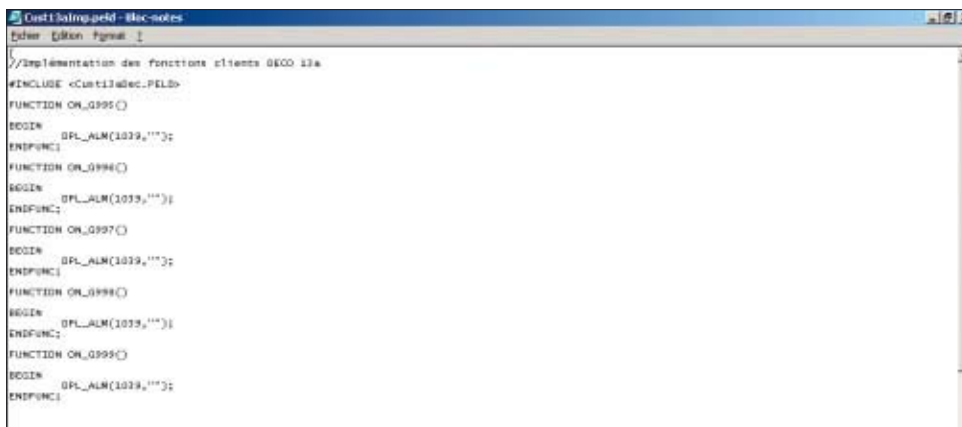
C:/Documents and Settings/All Users/Application Data/Tornos/DECO_ADV/Macros

Cust13almp.peld is the file we shall be using to write our Macro G995. If you wish to write a macro for any other machine other than the DECO 13, you must select the Cust... file corresponding to the machine for which the Macro is written.



Remark: This file can also be found using the Windows "Search" function.

The figure below shows the file as it would appear before writing the Macro.



Macro G995 :

The following 4 lines are reserved for the Macro G995.

```
FUNCTION ON_G995()
BEGIN
    DPL_ALM(1039,"");
ENDFUNC;
```

Explanations:

FUNCTION ON_G995() → Declaration of Macro G995
 BEGIN → Start of the Macro
 DPL_ALM(1039,""); → Defines the alarm message (see below) which will appear if you call up the Macro in the program, without having defined it beforehand.



ENDFUNC; → End of Macro

When writing the Macro, the **DPL_ALM(1039,"");** line must be replaced by **the code written in red** below.

```
FUNCTION ON_G995()
BEGIN
```

```
#2150:=GET_P_LIM (Inch, "G995", "P1=",1,16); // external diameter of the recess (between 1 and 16 mm)
#2151:=GET_P_LIM (Inch, "G995", "P2=",1,15); // diameter of the base of the recess (between 1 and 15 mm)
#2152:=GET_P_LIM (Inch, "G995", "P3=",0,4); // depth of pass (between 0 and 4 mm)
#2153:=CHECK_P (Inch, "P4=",0.03); // hobbing rate (mm/t) default value: 0.03 mm/t
#2154:=CHECK_P (Inch, "P5=",0.01); // finishing rate (mm/t) default value: 0.01 mm/t
]
G1 X1=#2150 G100
[
#2205:=#2150;
#2206:=#2151+1;
WHILE(#2205>#2206)DO

]
G1 X1=#2205 F#2153
G1 X1=0.1 G100 G91
G90
[
#2205:=#2205-#2152;

ENDWHILE;
]
G1 X1=#2151 F#2154

G1 X1=#2032 F.5
[

ENDFUNC;
```

Programming

personalised Macros

Studying the GET_P_LIM and CHECK_P functions

1. GET_P_LIM

GET_P_LIM is a function that must contain 5 parameters. These parameters are symbolised by the letters a,b,c,d,e in the example below. This function allows you to test whether the Macro has a P parameter and its value. If there is no P parameter, an alarm will come on when generating the tables. **P is a mandatory parameter.**

GET_P_LIM (a,"b","c=",d,e);
 a: Formatting
 b: Name of the macro
 c: Parameter number being tested
 d: Min. permitted value
 e: Max. permitted value

Description of the GET_P_LIM function applied to our example:

GET_P_LIM (Inch, "G995", "P1=",1,16);
 a: → Inch. (this means that the value entered can be in inches)
 b: → G995
 c: → P1
 d: → 1
 e: → 16

Remark: Parameter a: may adopt 2 other forms - Abso or Rnd. These parameters can be combined by using the | symbol (cross bar). For example, if the parameter has to be converted to inches and absolute values, you would write GET_P_LIM (Inch|Abso, "G995", "P1=",1,16);

- Abso means that the system only adopts the absolute value of the parameter entered.
- Rnd means that the system will round up/down the parameter entered to the nearest full value.

2. CHECK_P

CHECK_P is a function that must contain 3 parameters. These parameters are symbolised by the letters a,b,c in the example below. This function enables you to test whether the Macro has a P parameter and its value. If there is no P parameter then no alarm will appear when generating the tables. **P is an optional parameter.**

CHECK_P (a,"b",c);
a: formatting
b: parameter number being tested
c: default value

Description of the CHECK_P function applied to our example:

CHECK_P (inch,"P4=",0.03);
a: → Inch (this means that the value entered can be in inches)
b: → P4
c: → 0.03

Remarks: This Macro can be entered directly in the Cust13almp.peld file or in another text editor, such as WordPad or Notepad. With regard to "automatic formatting", it would be preferable to use Word software only. If you use a text editor, it is sufficient to Copy and Paste the text to the area earmarked in the Cust13almp.peld file.

No compromises – not even for volume production!

Erich Lacher is a manufacturer of high-quality mass-produced turned parts – To achieve success in this highly specialised industry Erich Lacher uses TORNOS multi-spindle sliding head lathes

Using innovative ideas, high-precision products and fully automated production, Erich Lacher Präzisionsteile [precision parts] of Pforzheim is holding its own against international competition. Currently exporting 40 percent of production world wide, the company consistently relies on the technology of the Swiss lathe manufacturer, TORNOS, to achieve maximum precision.



Mr Ralf Petrawitz and Mr Ernst Beuttenmueller (TORNOS Germany)

"We are not afraid of competitors from low wage countries". This statement by Mr Günter Neuner, reflects the healthy self-confidence of a successful entrepreneur. The toothed gears and worms produced by Lacher, for example, are of such high quality that many European companies, which produce in Asia, insist that their Asiatic partners fit them.

Mr Günter Neuner is proud of the high percentage of exports to China, Vietnam, Hong Kong, Korea and Taiwan commenting: "The manufacturers there simply cannot achieve the necessary high quality and precision needed in mass production, therefore we can supply millions of toothed gears each year, for example to Vietnam or worms to Hong Kong".

At Lacher every order is meticulously calculated, taking account all

relevant factors. Even at this stage, the machines including lift and drop curves are decided upon and duly scheduled in. With more than 100 lathes and 50 gear cutting machines, this is a new challenge every time for Mr Ralf Petrawitz, the Technical Manager. Added to this is the fact that Mr Günter Neuner always has his ear to the ground and new solutions are constantly being developed.

Anyone who has to achieve maximum performance on a daily basis inevitably makes the same high demands of his own machine-tool suppliers. The machinery comprises exclusively top quality special machines. For turning and multi-spindle turning, Mr Günter Neuner undoubtedly selects TORNOS machine tools. The first machine was purchased as long ago as 1966 and the company now has 13 multi-

spindle machines up to 14 mm diameter and seven multispindle machines up to 17 mm diameter. Numerous CNC single spindles, automatic screw machines complete the portfolio.

Neuner appreciates the craft skill with which the Swiss produce their machines. Added to this is the good price to performance ratio and the many years of experience in building single and multispindle lathes. This is why the first CNC machine Mr Günter Neuner bought was a TORNOS Elector. He still remembers the early years and the countless teething problems with which this new technology was beset. However, the experience he has gained with TORNOS in this time still has a positive effect: "Like no other company, the Swiss have taken the trouble to overcome problems and start-up difficulties

and in close co-operation with us have also succeeded in doing so", he explains. "Service, spare parts supply and the high level of commitment of the TORNOS workforce are factors, which even today I still rate very highly".

This is why he decided on TORNOS as the brand for him. "We don't want a mixed bag but a standard fleet of machines with all the resulting advantages. The integrated nature of the control, the multiple use of tools and clamps, the identical automation and the facility to operate several machines – all this benefits our productivity and efficiency", he explains.

Added to this is the good performance data of the machines. Mr Ralf Petrawitz is particularly impressed by the drilling performance. The turning precision achieved is very good and it is no surprise to him that the TORNOS multispindle lathes enable machining operations such as thread whirling, hexagon slotting, cross or eccentric drilling and the milling of complex contours to be con-

ducted. "Given our aim of fully machining complex geometries in one setting, we are well served here by the TORNOS machines".

The programming of a MULTIDECO 20/8b with 23 axes represents a special challenge for every operator. "But with a TORNOS, this is no problem", explains Mr Ralf Petrawitz. "The software is clearly structured and anyone who has any idea about Windows can manage it". The TB-DECO programming soft-

ware is supplied with a company licence, without any limit to the number of workstations, so that every employee can download the latest version even onto his private computer, and usually program it from home. In addition, TORNOS supports the setters with programming aids and downloadable program parts from the Internet.

During production at Lacher, the company has placed great emphasis on achieving full automation to



No compromises – not even for volume production!

reduce manufacturing costs and improve component quality and productivity. The manufacturing expertise of Lacher is often utilised by customers at the product development stage. "We know to what tolerances toothed gears, worms and turned parts have to be manufactured or designed. Often it is just a few small design changes that enable our customers to save a lot of money whilst maintaining quality", says Mr Ralf Petrawitz. The Lacher development team is continually working to provide customers with solutions that will



Mr Günter Neuner



Mr Ralf Petrawitz

assist their manufacturing operations. "If necessary, we also make possible what appears to be impossible. In exceptional cases, production of the first specimen parts can then begin on the TORNOS machines a few days later", concludes Mr Ralf Petrawitz.

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E-mail: mail@tornos.ch

Profile:

Erich Lacher Präzisionsteile GmbH & Co.KG

Erich Lacher Präzisionsteile GmbH was established in 1925 and specialises in turned parts up to one inch diameter. The manufacturer of precision parts for the watch-making industry employs 130 people. The company also supplies the automotive, building services management and security systems, medical engineering, electrical engineering and the toy indus-





tries. Barely a year ago, the production area was extended by 1,800 m² and the signs indicate further expansion. The company has been certified to ISO/TS 16949 since 2003. The production programme comprises turned parts, toothed parts and small gears. All materials, ranging from stainless steel and free-cutting steel, through brass, aluminium, titanium, copper and bronze through to exotic special alloys are machined.

Verdict of the user

The user:

Erich Lacher Präzisionsteile GmbH & Co.KG.

The technology:

CNC multispindle machines and single spindle automatic lathes from TORNOS.

Benefits:

- ◆ High degree of availability of the machines.
- ◆ Very precise.
- ◆ Excellent productivity.
- ◆ Integrated control.
- ◆ Highly efficient thanks to magazine loading.
- ◆ Identical automation.
- ◆ Multi-machine operation possible.
- ◆ Excellent machine quality.
- ◆ Excellent service.
- ◆ Intensive co-operation based on partnership.

Turning to Asia: TORNOS gives China and Asia

This month DECO magazine interviews Mr Daniel Hess, the General Manager of TORNOS Asia. With China being such a vibrant and exciting challenge, Mr Hess discusses the progressive strategy that will see TORNOS steadily increase market share on its way to becoming one of the significant players in Chinese and Asian markets.



From left to right: Sun Wei Min, Sales Director - Catherine Shen, Secretary - Huang Xin Chun, Sales Account Manager - Peter Zhang, Field Service Engineer - Claire Feng, Administration Manager - Emmanuel Deville, Field Service Manager - Frank Jia, Field Service Engineer - Wu Ming, Field Service Engineer

DM: Could you please comment on your sales performance in 2004 & 2005 and what additional improvements you have made this year?

China is the largest worldwide consumer in the machine tool industry and this demand has been growing constantly for several years. Today, China mainly imports high added value technology and material. The high-end products and solutions now offered by TORNOS are tailored exactly to these trends and will offer exceptional opportunities

to Chinese customers as they strive to improve their own businesses.

To strengthen the presence of TORNOS in the Chinese market and ensure that TORNOS customers are going to be served in the best possible way in terms of advice, sales and service, TORNOS opened an office in Shanghai in April 2004. The official opening ceremony was held on July 8 at the Peace Hotel in Shanghai.

Since opening the Shanghai office the company has consolidated its

current sales and service to its customers and extended the sales coverage by appointing new agents covering different sales areas and segments. Each agent has an industry or regional specific strength. This is vital for success as the country is so diverse. China's diversity is similar to an American doing business in Europe – each region/country has to be dealt with in a different manner.

This new organization has been generating new customers and qualitative contacts with new

added value technology !



MT&AI Saigon 2005. Daniel Hess, General Manager, Asia and Darren Way, Application Engineer, Asia Pacific Region

prospects that are impressed by the solutions provided by the company. The TORNOS solution encompasses the machine tool, necessary peripherals and the professionalism and know-how of the TORNOS staff. This potential solution has been rewarded quickly with incoming orders, and we can say that by end of 2005 we will have more than doubled our order intake from China compare to 2004.

DM: What do you think are the significant elements on improving sales results? And what are the challenges for you to reach the target?

Service and customer satisfaction is one of the key elements to be successful in China (and Asia). To provide fast and professional sales service to the network of agents and direct customers is also part of that "satisfaction" point of view. The after-sales service to our customers is also part of that concept. The Chinese market is perceived as very important to TORNOS. The growth in very precise fields of activity like electronics, automotive and medical will provide a very bright future for dedicated solu-

tions such as those provided by TORNOS machines.

DM: For the Chinese market, what changes did you see with turning applications in 2005? What are the most favored products among your product line-up?

With rapid growth in the automotive industry in China and the increased need for flexibility, precision, productivity, reliability and quality; the ultimate production tool is the MULTIDECO lathe. With the MULTIDECO multispindle turning solution customers can benefit from multispindle productivity and single-spindle accuracy with the flexibility of numerical control.

One MULTIDECO, depending upon the part to manufacture can replace 5 or more single spindle lathes. When thinking of how to produce a large batch of the same part, it is more economical to use the TORNOS multispindle machines. Some TORNOS customers in Europe use the multispindle machine to produce batches of 10,000 parts or even less as it still has considerable flexibility.

With over 5,000 machines running under the DECO concept around the world, TORNOS can provide the best possible solution to customers also in China.

DM: Do you forecast any technological breakthroughs in the field of turning field and what trends do you foresee with regards to technological development?

One of the main concerns in the machine tool industry is the accuracy of the machines and their capacity to guarantee 100% high quality parts. This requires an evolution in the machine tool concept toward better thermal stability and possibilities to finely tune all the involved elements to suit micromachining.

Another very important element is what happens once the part is produced. The means of production is moving toward full integration or a global solution. For example, this will encompass palletizing, part checking during the production process and so on. It is also foreseen that machines will become more tailored to very precise needs.

DM: What do you see as the main technological challenges facing micromachining from TORNOS' viewpoint?

A breakthrough in micromachining is to achieve an accuracy of less than 3 mm for geometrical dimensions as in demanding applications such as hard disk drive manufacturing. The challenge is to maintain long term stable precision especially for turning small parts in "hard turning" applications.

Turning to Asia

DM: What do you see as the micromachining trends in Asia?

Growth in the hard disc drive sector can be foreseen in countries such as Thailand, South China, Singapore and Malaysia. Although not as precise as the hard disk drive industry, watch making also demands very high precision. I do not see a significant increase in watch making machines in Asia as it is a stable market. However, there will be the replacement of existing machines that have reached the end-of-life period.

It is for this reason that TORNOS' extensive market research will have seen the company launch 6 new products within one year to keep up with the market demand, especially in Asia. Out of the six new products one is predominantly dedicated to the hard disc industry, the "DECO 8sp" whilst the "DECO 7s" to be launched in March 2006 will target the watch industry.

There is also growth potential in the medical implant sector in Asia. TORNOS is the number one in Europe and USA for supplying machines for these applications. We see Asia becoming more active and demand for high technology machines is growing. We have recently sold machines for the medical devices industry in areas such as Japan, China, Taiwan, and Malaysia. Medical devices such as dental implants and screws demand very good traceability, quality and finish. TORNOS machines achieve these objectives.



CIMT China 2005



Medtech China 2005



12th South China Machine Tool Show



From left to right: Sylvia So, Administration & Accounting Manager – Carrolline Au, Sales Administrator Yuen Chun Ming, Field Service Engineer – Jason Kwok, Junior Field Service Engineer

DM: What is your strategy to further boost your market share in 2005/2006, and what is your goal?

The current philosophy of TORNOS is summarized by the slogan "Think PARTS - Think TORNOS", customers' think of the part to be executed and TORNOS will think of the solution to enable them to do this; now and in the future.

Nowadays the single-spindle range is mainly adapted to parts for fairly complex to highly complex manu-

facture with diameters from 3 mm to 32 mm. The aim of the company is to strengthen its current position in this field by increasing clients' productivity and efficiency whilst further exploiting the vast potential offered by the DECO concept.

In addition, 2005 and 2006 are very exciting year for TORNOS with new products involving solutions to answer the trends of finely honed markets (more precision and more global solutions for example). TORNOS is now also able to provide solutions dedicated for medium complex parts with an unbeatable price-quality ratio with the Is-line.

DM: We have heard that TORNOS opened a second office in Asia, more precisely in Hong Kong, can you confirm and give us some more details?

In fact we have created the new office in Hong Kong to benefit from its excellent logistics infrastructure platform and its ideal location in the middle of the Asia region and just beside China.

This will hold spare parts and will be the TORNOS spare part center for

the Asia Pacific region. The aim is to ensure that services and spare parts are perfect to match the growing demands of the region.

The new office has also a demo room where we will be able to have up to 3 machines for demonstrations and tests, and also is set-up to conduct customer training on both machines and software.

Sales in the region is growing by two digits a year for TORNOS and our aim is to supply the growing market demand with the best possible service.

DM: Thank you Mr Hess. Would you conclude with a message to your customers?

Yes! We are going to be very active on the market in 2006, we are going to attend a lot of exhibitions (you can see an updated programme on the TORNOS website) and we would be very happy to meet you there.

Contact for TORNOS Asia
Hess.d@tornos.ch



Mayfran chip conveyor

for the DECO 20a and DECO 26a

This conveyor has no option number. If you are interested, please contact your normal TORNOS sales person.

Application

Depending on the type of material and machining operation, a high-performance chip filtration and evacuation system is essential.

It is more than a mere separator. The Mayfran conveyor is a filtration system that can handle all types of chips – even the toughest ones – for the evacuation systems.

Strong points

- ◆ Good capacity to clean cutting liquid.
- ◆ Dual evacuation system to process all chips.
- ◆ Self-cleaning system.
- ◆ Minimum maintenance.

Remarks

The deployment of a system, which guarantees that the cutting oil is always clean and filtered results in increased productivity and optimum tool life.

Constantly filtered and purified oil guarantees the reliability of all moving machine parts.

Technical characteristics

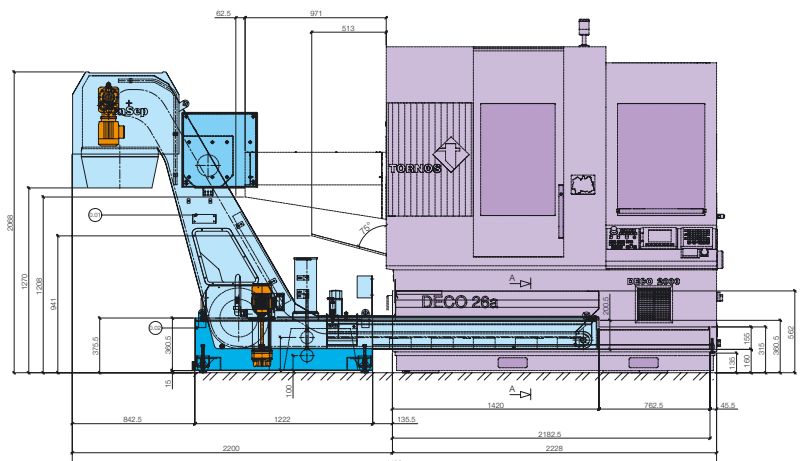
Filtration : 25 microns.

Compatibility

DECO 20a and DECO 26a.

Availability

Immediately available ex-works and can be adapted to all existing machines.



Dual milling unit

that tilts during back-operation

This unit has no option number. If you are interested, please contact your normal TORNOS sales person.



Application

A specific unit is needed when machining inclined implants in back-operation mode. Depending on the type of implant, a second tool holder is required, either to execute the rough/finishing work or additional operations, such as drilling, for example.

Strong points

- ◆ Easy to set up and adjust.
- ◆ Extremely strong.
- ◆ Operating stability.

Remarks

This unit has three back-operation positions.

Technical characteristics

Assembly: positions T51 to T53.
Adjustable angle: ± 30 degrees.
Max. speed: 8000 rpm.
Max. torque: 2Nm.

Compatibility

DECO 13a.

Availability

Available.

Complex parts

at a better price

Considerable attempts are being made in the various sectors of industry throughout the world to reduce the number of parts per complete unit. Consequently, the functionality and complexity of parts are constantly increasing whilst prices are taking a downward turn. What can we do ?



Manufacturers, both of industrial products and consumables, are constantly facing the pressure of a merciless market and unbridled competition, where price is of the utmost essence whilst the quality of the product is barely an issue. The example of the automotive industry, where vehicle recalls can cost vast sums, even for outside suppliers, shows that zero tolerance prevails. At the start of the supply chain we have the sub-contractors, which have to deliver parts of impeccable quality at a ridiculously competitive price that is constantly under downward pressure.

Numbers that pay

Whilst it is mandatory for each supplier to guarantee product quality and given the fact that labour costs cannot sustain a significant drop, the only option remaining is to improve the productivity of manufacturing facilities. Sub-contractors are constantly researching production facilities with high output. This is something TORNOS, as a machine-tool manufacturer completely understands. TORNOS machines must meet a number of increasingly demanding criteria. At the same time, pressure is increasing for machines to improve their output figures. This is illustrated by

a simple calculation: if at the outset, the production rate of a part was ten seconds, and assuming this could be reduced by one second, then the increase in productivity and the advantage over the competition, becomes very significant especially for the large series runs.

Increasing operations on a machine

Machine tool manufacturers understood that their machines could help sub-contractors produce parts at a better return. To this end, automatic lathes are becoming ever more adept at executing mul-

tiple operations. This can be witnessed by the TORNOS MULTIDECO 20/8d lathe. This automatic, multi-spindle lathe not only executes high-precision turning operations but a multitude of other functions, thanks to its positioned stop system, fitted to each of the eight spindles. The result: thanks to this range of operations, the part – even with complex geometry – can now be produced completely without any additional reworking or transfer to another production machine. This dispenses with the need to execute operations on other machines and superfluous part handling. Reduced handling has a positive and direct influence on the cost of the part.

Increasing the machine capacity

The engineers did themselves proud with the MULTIDECO 20/8d: the eight work stations each have an independent motorised spindle. With this machine, the operator can even program the nominal speed in relation to the operations to be carried out on this spindle. An undeniable increase in quality has been coupled with a considerable time saving.

However, the engineers did not stop there: the MULTIDECO 20/8d has two counter-spindles, each capable of working with five different tools. With this means of production, the operator is not only in a position to work the part from all sides and hence complete it according to the drawing, but he can also distribute the various operations either over the eight main spindles or over the two counter-spindles. Operator know-how and skill coupled with the facilities of this automatic unit provide the user with the facility of shifting certain operations thereby gaining ad-

ditional time without losing anything with respect to quality. A saving in time equates to increased output of the automatic lathe. Let it be said that increased productivity simultaneously reduces the cost per part.

Control – an essential component

Numeric controls first of all make it possible to prepare the program away from the machine and even provide a virtual demonstration of the operations being executed on the computer screen. This provides



Complex parts

at a better price

The present

the operator with the assurance that any tool collision can be ruled out. Loading the program takes little time thereby reducing the machine down-time.

An important feature on the MULTIDECO 20/8d is the Fanuc 30i control. It has the facility to correct setting up offsets without having to stop production. What is more, one of the logical requirements of the market is ongoing quality. Tool wear and other factors go against this demand where offsets had to be made during production. These offsets are now executed by the control without having to stop the lathe. This too results in an increase in quality and a saving in time.

Standard tooling

The recommended tooling for the MULTIDECO 20/8d is standard tooling that is freely available on the market. No more need for the special tools produced at a considerable price – the operator can now take his time and select his preferred supplier. At the end of the day it is the quality of the tooling that determines the quality of the part and not its cost. However, when working out the cost price for the parts the quality must also be entered into the equation so as to arrive at the best possible price.

The option to meet even more demands

The MULTIDECO 20/8d has an option that will please a good number of operators – the palletizer. This pal-

letizer, which is fully incorporated into the automatic lathe, is designed to pick up the completed parts from the machine and deposit them directly onto the pallets, thereby complying with customer requirements. In fact, the increased automation in more and more assembly lines means that spare parts can be supplied with a robot or other handling system picking up the part and conveying it to the assembly worker. As a feature vis-à-vis the client, this palletizer removes the finished parts from the machine in as short a time as possible and under improved conditions. Another positive feature regarding machine arrangement is that the incorporated palletizer takes up no extra space around the machine.

Summary

As explained above, the cost of manufacturing a part depends on many factors. The operator's know-how is of course vital when it comes to looking for ways to increase output; but the latest automatic lathe is an essential tool that allows operators to achieve his goals. The engineers at TORNOS deployed all their know-how in the many details developed to provide the operator with effective assistance. Not only did they succeed, but they are now on the look-out for any improvement that reduces the production time of parts without sacrificing quality.

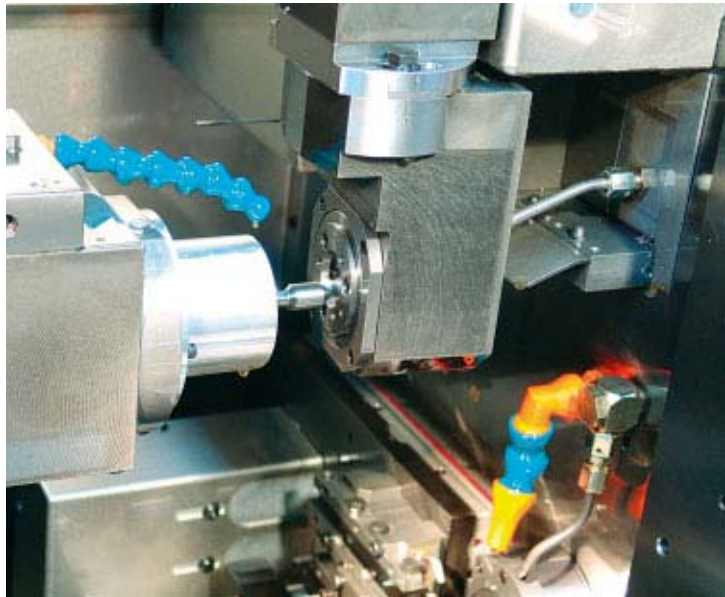


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Thread whirling makes all the difference

Good process reliability accompanied by falling costs highlights the case for thread whirling as opposed to thread milling. However, for parts made from stainless steel or titanium, thread whirling makes great demands on whirling tool and cutting oil.

Today, around 90 % of all threads in the dental and medical industries are whirled. This form of modern thread application has also become established in other sectors, such as precision parts turning and the horology industry. But let us stay with the machining of materials that are difficult to work, such as the INOX 1.4441 implant shown. Together with the parts manufacturer, Stuckenbrock Medizintechnik GmbH of Tuttlingen, Germany, MOTOREX tested the use of the high-speed MOTOREX ORTHO NF-X cutting oil.



Schwanog® special carbide tools

Modern whirling tools incorporate many years of know-how. The application technology, the complex alloys and the hardening processes for the tool cutting edges play their part in the success of whirling. The clever form tool exchange system from Schwanog®, Siegfried Güntert GmbH of Villingen, Germany, offers benefits such as:

1. High efficiency through rapid changing of the inserts.
2. Clear increase in tool life.
3. Cost reduction through not having to rework.

The Schwanog® WEP system offers the great advantage in that it works with replaceable inserts. This ensures not only the maximum precision required but also significantly reduces tool changing costs.

The external thread of the part shown can be whirled to its final dimension in one pass without re-

cal. This can only be achieved through the use of more precise technologies and by reducing unit production times.



working. This produces the entire depth of thread in one pass! In surgery the demand for high-quality implants is still increasing rapidly. However, the prices are only moving slightly sideways. As a result, production must be even more precise and more economi-

Away with swarf and down with unit production times

Efficient metalworking is impossible in today's manufacturing process without the use of the machining fluid that is ideally matched to the machining process.

Hence the machine operator prefers to choose a rate of production that will not cause him any problems whatsoever during series production. Process reliability certainly but with today's technology reductions in unit production times that are not utilised, really have a huge impact. The implant shown was produced at Stuckenbrock using MOTOREX ORTHO NF-X. Attention was drawn to the whirling stage.

Because of its outstanding high pressure characteristics and its flushing and cooling performance, the cutting oil was able to convince

straight-off. It is also excellent for high cutting speeds because of the tough lubricating film and complete temperature stability over a very wide range. Without making sacrifices to dimensional stability and surface quality, the unit production times were measurably reduced in the test series runs.

More precise and reliable with MOTOREX "max technology

Only if the potential of the influencing factors of machining centre, tool, material and machining fluid are fully utilised, will it be possible to play in the first efficiency



league. It is a well-known fact that higher temperatures occur at a higher production speed. This is a fact that MOTOREX has specifically made use of with its "max technology. A clearly defined high temperature can trigger desirable chemical synergies during the machining process running at maximum manufacturing rate, thereby making possible, at the appropriate time, an exponential increase in performance.

However, it is not only reducing unit production times that is at the forefront. Process reliability was also increased as a result of good cooling and lubrication and the number of machine downtimes is therefore drastically reduced. This is a particularly convincing argument for night and phantom shifts.

We would be pleased to provide you with further information:
www.motorex.com and
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Photos: Schwanog



1.

The Schwanog whirling tool is set-up in front of the workpiece and turns at high speed. The spindle and workpiece turn at lower speed in the same direction.



2.

Thread whirling begins. The thread is manufactured by a rotating movement of the C-axis and a longitudinal movement of the Z-axis, and only one cutting edge of the whirling spindle is ever in use.



3.

The defined thread length is reached. The Schwanog whirling spindle initially moves radially and then back axially. End of the whirling process.

TORNOS,

the flexible friend

Southco UK, Farnham facility, is a world-leading provider of quick access fastening solutions. The company's product range extends to over 14,000 parts with customers including ABB, Boeing, Ducati, Ford, BMW, IBM, Kodak and Sony to name a few.



The product range of quick release fasteners, bolt bushings, aircraft receptacle strips, toggle latches and special purpose latches and fasteners is complimented by a capability to providing a multitude of customer solutions. A capability recently increased by the company's investment in shop floor technology.

The latest acquisitions were two DECO 20a, 10 axis CNC sliding head lathes. The TORNOS machines were

purchased to free up workshop capacity and provide flexible manufacturing on batches from 1,000 to 10,000. However, the two DECO machines have far exceeded expectations as Engineering Manager Mr Ben Goater comments: "The TORNOS machines have enabled us take on previously impossible projects. The additional capability, flexibility and speed have now enabled Southco to manufacture complex parts at

very competitive prices. Our capability has increased tremendously and labour has been taken out of many processes".

Productivity Benefits

An example of the DECO's speed is demonstrated by a component that previously underwent machining on a 6 spindle auto lathe with second and third operations on a (removed M48) special purpose



milling machine and a Wurth & Gruffat machine. The process had a cycle time of 24, 16.5 and 16.5 seconds respectively on each machine totalling 57 seconds per part, prior to heat treatment and plating. The TORNOS machine takes 45 seconds per part eliminating two set-ups; reducing cycle time by 21%, cutting lead times from 5 weeks to 3 and eliminating the need for second operation machines and operating staff.

Mr Goater continues: "On some components, second operations would include two manual milling operations, drilling and deburring. The DECO machines have removed second operations and with it the need for machines and labour".

Another example of the benefits could be seen with a product, which previously underwent operations on the 6-spindle auto lathe plus manual slotting, milling and drilling machines. The cycle time for the four machines was 17, 9, 16 and 13 seconds respectively

making a combined cycle time of 55 seconds excluding changeovers. The TORNOS now completes all tasks in 35 seconds reducing WIP and cycle times by 36%. This saves three set-ups, ultimately reducing lead times from 6 to 3 weeks.

The Southco UK facility in Farnham looked for flexibility and productivity in a machine tool and the ability of the DECO to carry out two milling operations simultaneously provided this as well as significantly cut cycle times for the company. During investigation, Mr Goater found that competitor machines needed significant modifications to conduct this operation. Mr Goater says: "This operation has improved productivity and eliminated problems, especially when machining stainless steel cams. The manual method broke cutters and introduced orientation inconsistencies. The TORNOS is 100% accurate and consistent, improving our quality and reducing our tooling costs".

TORNOS,

the flexible friend



"The TORNOS machines have been a revelation. The quality of the part is much improved and we can consider materials that we could not machine before. This adds to a plethora of benefits already realised. We hope to have another two or three TORNOS machines in the future", concludes Mr Goater.

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