DECO MAGAZINE 30

3/04
SEPTEMBER
ENGLISH

Think parts
Think TORNOS

CITIEFFE:
technology serving man!

Innovation:
a key element of success

TORNOS open its new Shanghai Representative Office

MOTOREX:
high precision reaming



Summary

Think parts
Think TORNOS

Aerospace

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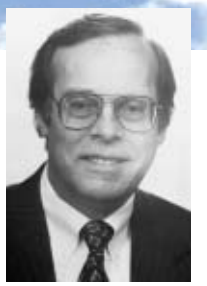
Key U.S. markets need parts



Tom Dierks

As I write this at the beginning of July 2004, the manufacturing economy is making a healthy comeback and forecasts are sparkling for the key markets you serve. It's pleasant to have a feeling of hopefulness at last after the dark days of the last few years. The American psyche was severely affected by 9/11, which devastated the financial markets and the economy in general. As with major grief, recovery has been slow, painstaking, and cautious first steps were only taken last fall. Now, this summer, it's as though many feel it's safe to go back in the water, are jumping in wholeheartedly, and relishing the cool splash of renewed energy.

Aerospace and Defense – no surprise here

The events of 9/11 and the war in Iraq have certainly spurred growth in this market. According to Mindbranch®, an industry forecasting company, the budget increase for the Department of Defense and its R&D is expected to boost several technological advancements in satellite communication and surveillance and reconnaissance equipment. Further, with federal, state, and local authorities expected to spend approximately $45 billion annually through 2006, both large and small companies are cashing in on the booming market for cutting-edge Homeland Defense products and services. The government will continue to scout for companies to enter into collaboration for conceptualizing, developing and delivering security technologies for both the military and commercial markets.

Automotive – driving ahead

America's love affair with the automobile is alive and well. A sure sign of consumer confidence, new car sales have been robust this spring and summer thanks to manufacturer incentives. Although analysts expect a decline in sales, the industry as a whole has been investing profits in new production models and technological developments. Last January almost one million car shoppers and other show-goers at the North American Auto Show in Detroit confronted a vast number of vehicle choices. More than 70 new production models and concept cars made their debuts. Noticeable trends at the show included the resurgence of new products from Detroit automakers, along with a shift of focus to cars from trucks; the unveiling of new truck-type products from Japanese manufacturers that have traditionally focused on cars; a proliferation of hybrid technology, especially from Japan; and, at the opposite end of the spectrum, an abundance of supercars – super fast and super expensive. What this all means for you, of course, are new programs for parts from OEMs and tier 1, 2, and 3 suppliers which filter down to thousands of contract shops.

Electrical / Electronic – computers and telecommunications

This market is being driven right now from the increase in automotive activity. Electronics already constitutes 25 % of the content and production cost of today's average car. This percentage will even increase in the next several years. Telecommunications and electronic data processing markets closely follow automotive for electrical and electronic components.

Medical – no grass growing under seniors' feet

This market is the one that has been maintaining many of your businesses during the downturn in other areas. The first wave of baby boomers turns 60 this year, and these are active folks who want to stay that way and look good, too. No canes or wheelchairs for this group if there's an option to replace joints, and there are many choices in today's high tech medical field. Many of you produce a host of bone screws, dental implants and other medical devices for this lucrative market that is certain to remain strong for years to come.

Machinery – the last to recover is recovering

Machinery manufacturers have posted modest gains in orders, production, shipments, and exports since last fall, and are now set for their best year in four years in 2004, and an even better year in 2005, according to Jim Haughey, director of economics for Reed Business Information. These manufacturers, which include companies like TORNOS, and which also need component parts from contract suppliers, always have their strongest sales in the mature phase of an economic expansion. In the past six months, industrial machinery manufacturers have increased their sales at an 8.5 % annual pace, aerospace manufacturers at a 4.5 % pace, and motor vehicle manufacturers at 3 %. Defense, aircraft, construction and mining equipment, and heavy-duty trucks have been the strongest markets.

Go out and get it while the getting is good!

Barring any world disaster between now and when this is published, business is back and you are most likely experiencing a more positive bottom line. If not, consider tailoring your sales efforts to the markets that are active right now. Of course, just because they are doing well, doesn't mean they are going to be any less demanding of you on price and delivery. If you are continuously being outbid, you might seriously take a look at new manufacturing technology, such as ours, that can completely produce complex parts requiring several types of operations in a single setup. The IMTS show will be in Chicago September 8 – 15, 2004. That's a good place to start. But whether you are in a buying mood or just looking around, please stop by, say hello, rest your feet and have a refreshment. We will welcome you in booth A-8140.

CITIEFFE

technology serving man !

CITIEFFE was established 42 years ago at a time when one of the most prestigious international schools of orthopaedics was founded in Bologne. This was a laboratory, which specialized in producing the instruments required by renowned orthopaedics, who, over the course of time, were involved in this school.

Mr Franco Mingozzi, one of the co-founders, explained that from the outset, the instruments produced by CITIEFFE were widely acclaimed amongst the scientific community, with which the company enjoyed excellent relations, both at the project and design stages of the items being offered.

Thanks to the company's ability to understand and implement the latest requirements of orthopaedic surgeons and given the great demand for new solutions to keep pace with ongoing scientific developments, CITIEFFE has now become a major trusted partner in supplying top of the range instruments both at national and international level.

Fig. 1

CITIEFFE has always kept pace with the increasingly urgent demands of modern science, not only with new instruments but also by offering a series of special parts and aids used in surgery to mend fractures and for applying bio-medical prostheses.

The main strength of CITIEFFE lies in the utmost attention to quality, which is not only based on complying with current standards but is also experienced as an inspired principle, which is transferred to all the activities and processes in the day-to-day running of the company.

Given such a specific and significant technological context, one can only work with a partner like TORNOS. This latter company, which is also an expert in the medical sector, could provide a fundamental contribution during the initial stages of each production process of titanium pins, orphopaedic screws, aids to mend fractures and prostheses… namely, precision turning.

Mr Mingozzi very quickly understood that the world-wide experience of TORNOS in this sector, coupled with the high-quality aids produced with the machines manufactured by the company, could mark the beginning of important co-operation, which would put TORNOS in an even greater light in the market whilst enabling CITIEFFE to achieve the ultimate in quality and solutions.

The importance of the far-sightedness of Mr Mingozzi lies in the fact that he immediately understood that the human body, just like a machine or car, can and must derive benefit from the technological progress in small parts turning.

In the medical sector, progress in genetics, biology and biochemistry tend to obliterate the mechanical side, where precision and the extreme requirements to execute components is absolutely essential to obtain concrete results.

During an implant or surgery on an injured part of the body, the surgeon's actions and instruments are quite mechanical. Screwdriver, forceps, drill and, of course, all the surgical instruments are, both unfortunately but also fortunately, part of the daily routine!

The research conducted by TORNOS in all areas of precision turning, was also of direct use to the medical sector.

Items, such as surgical screws, bone implants, and screws for jaw, mouth and face surgery, all implants produced by CITIEFFE, as well as surgical instruments, must now fulfil even more stringent requirements when used on humans, than is the case for many other sectors of activity.

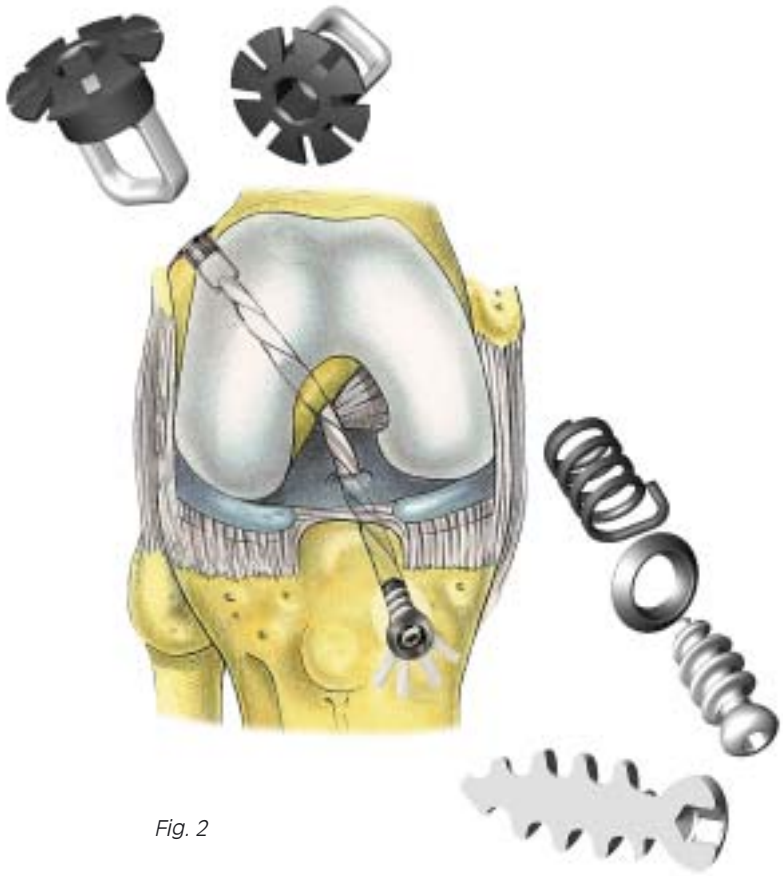


Fig. 2

The specific, tried and tested solutions that TORNOS supplies with its DECO 2000 machines for this particular sector, enabled CITIEFFE to manufacture such products as fixatives for fractures (see photo 1), swing-bridges for ligaments (see photo 2) and spinal systems (see

Fig. 3

photo 3). These were completely produced on the TORNOS DECO 2000 machines.

By obtaining these results, to which the professionalism of the operators has contributed, shows that the TORNOS machines, such as the DECO 13a, 20a and 26a have proved themselves to be highly instrumental in problem-solving in the areas of quality and production. This applies in particular to the production stages, which were designed for the titanium fracture nails for the thigh bone and tibia (see photo 4) and the small blocks for the spinal system (see photo 5).

Fig. 5

Completely manufactured parts were produced from these machines, without having to repeatedly rework them as was the case previously!

This proves that a partnership, which combines the design activities of the customer and the technology of TORNOS, will achieve great opportunities in the following:

- Product quality.
- Production costs.
- For marketing: initial product launch.
- Maintaining market supremacy.

In this specific case, effective co-operation between CITIEFFE and TORNOS could be achieved quite easily because Mr Mingozzi, who always closely monitored current market trends, was very conscious of the parts and their requirements whilst TORNOS offered the various solutions, which even today rank amongst the forerunners.

In fact, the DECO concept no longer has to prove anything with regard to reliability, precision and productivity. It upholds its fundamental quality, which was shown to

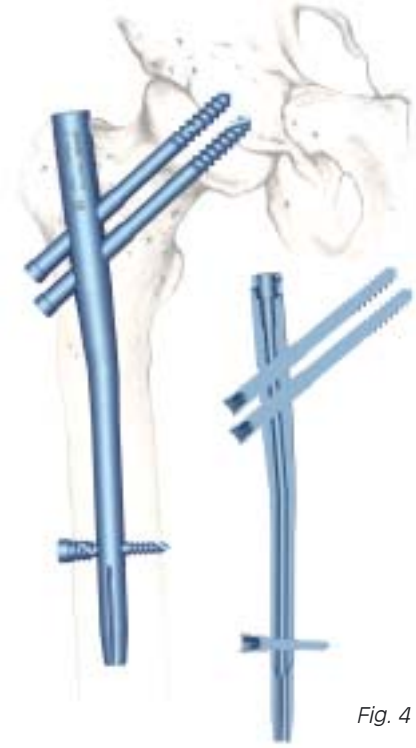


Fig. 4

be the ideal solution for the just-in-time manufacture of parts.

One can firmly state that CITIEFFE is a world leader in its sector – a statement that is confirmed every day by the market! TORNOS, for its part, has confirmation, that yet again, it directly contributed towards this success with its machines and know-how.

E. Pitton
Commercial Manager
TORNOS Italy

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www.citieffe.com

New concept

of turning tool holders for the DECO ranges

Parts being executed today are becoming more and more complex and occasionally, the number of turning tools on the die stock chaser is somewhat limited, in order to produce all the drilling, tapping or milling operations on locks and their components, for example.

Concept

Up to now, the solutions adopted to increase the number of turning tools available for the DECO, included the fitting of the "S6 motorisation" option on die stock chaser 1 and/or the installation of high-frequency spindles.

The new concept does not dispense with these options, but rather complements them quite remarkably by tool holders operating at three, four or even six positions, mounted on the die stock chasers, thereby increasing the number of operating positions. For example, the rear die stock chaser of the DECO 20a can accommodate 6 revolving tools plus one turning tool.

Applications

Without changing the kinematic concept of the machine, it is now possible to increase machining capacity quite considerably. A 6-spindle drilling and cutter head can be fitted to die stock chasers 1 and 2 on the DECO 20a and 26a. This novelty, which deploys 4 positions, helps you "gain" two turning spindles. The drilling heads can be replaced quickly and are pre-adjustable, thereby considerably simplifying start-up. For the DECO 20a, the company offers a unit comprising 3 turning spindles that uses 2 positions.

Based on the same concept, TORNOS also offers a head with 4 turning spindles, which can be rapidly changed for the DECO 13a. This option uses 3 positions on the die stock chaser.

Comments

All these items can easily be retro-fitted on request. The machine does not have to undergo any transformation and the parts are 100 % interchangeable with "normal" tool-holders.

Summary

6 turning spindles using
4 positions: DECO 20a and 26a

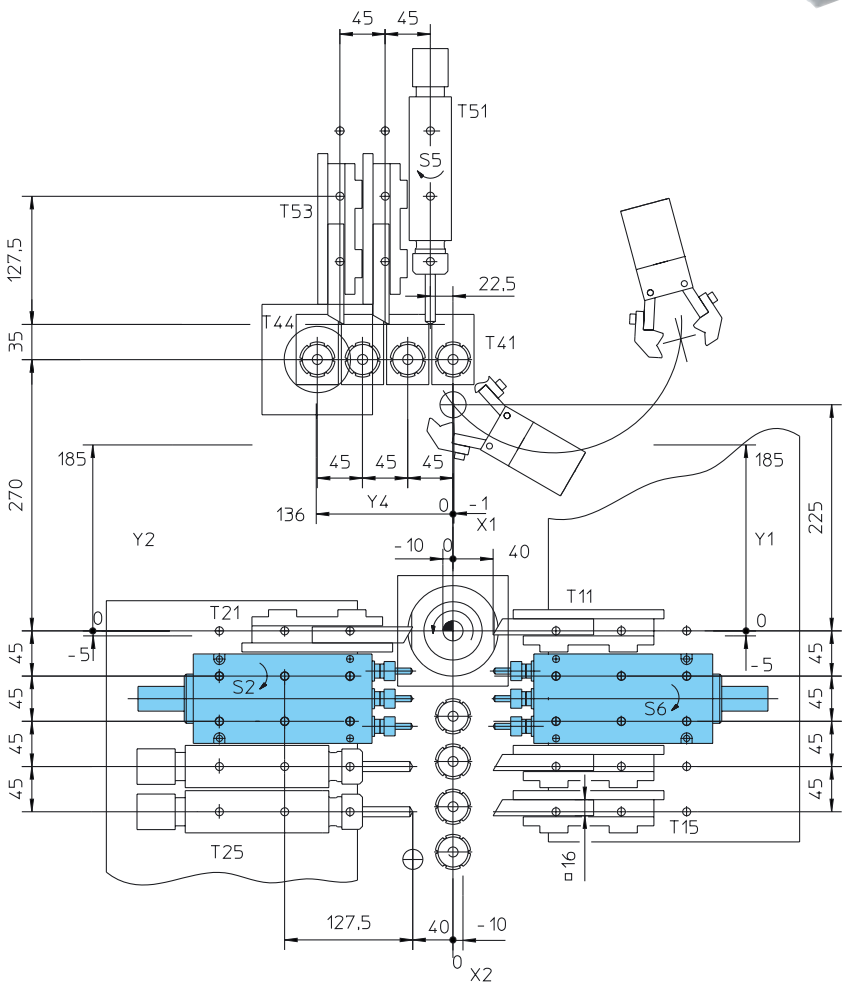
3 turning spindles using
2 positions: DECO 20a and 26a

4 turning spindles using
2 positions: DECO 13a

These new features have not yet been allocated option numbers. Should these meet with interest, please contact your normal TORNOS agent.

Availability

These tool-holders will be available from September 2004.



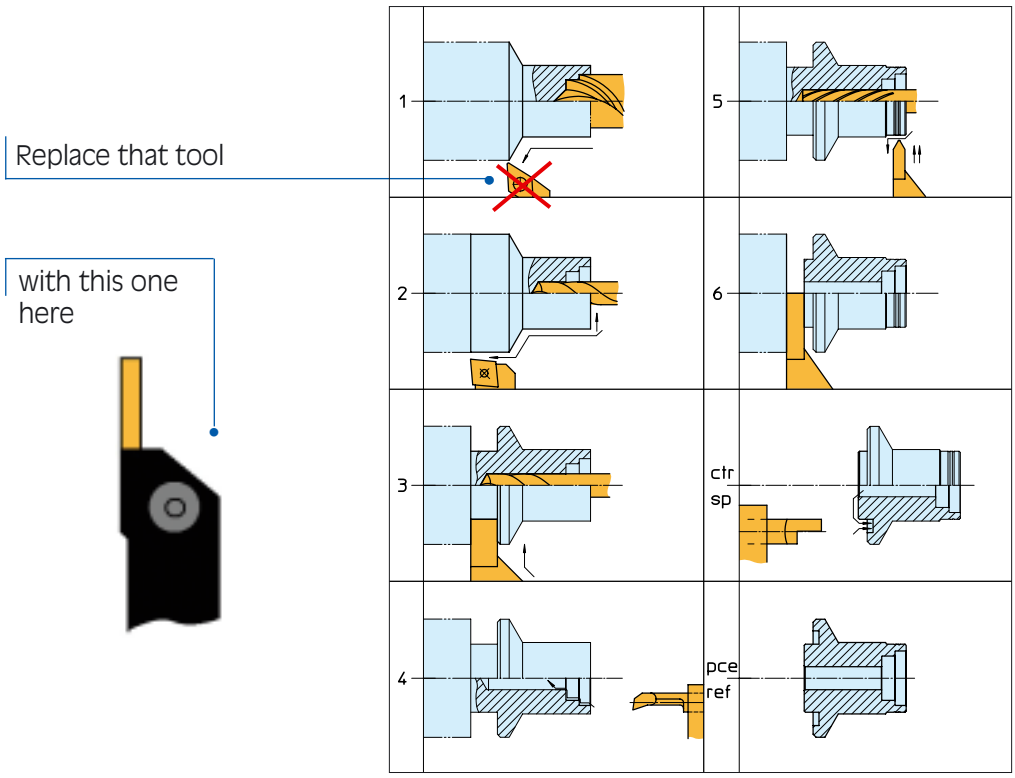
New tip for the MULTIDECO

How to guarantee the quality of the first part using a bar that has not been properly prepared beforehand!

When loading a new bar into the spindle, the bar feeder usually offers two alternatives with respect to the distance of feed in the chuck:

- Bar feeding at cutting level.
- Bar feeding against the bar stop.

This choice of options is governed by bar preparation and the types of parts being executed ; each of these alternatives has its advantages and disadvantages (see table below).



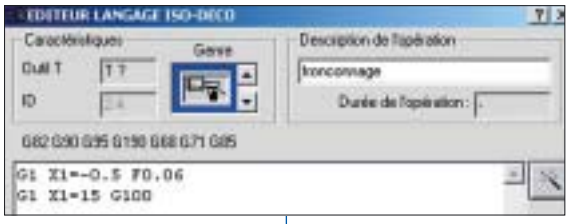
Bar feeding at cutting level

Advantages	Disadvantages
Prevents execution of an initial, non-compliant part where the bars have not been prepared	Loos of production of one part in the first lathe
	Risk of tool breakage

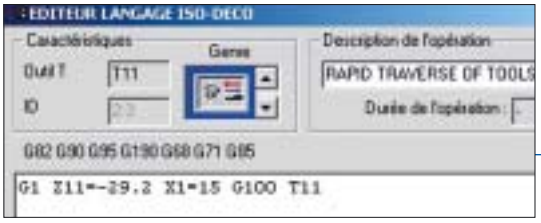
Bar feeding against the bar stop

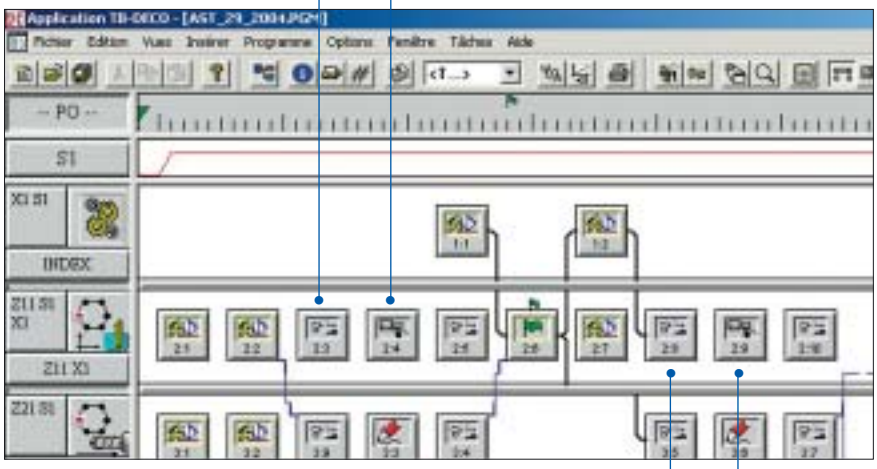
Advantages	Disadvantages
No production loss in the first lathe	First part does not comply in the case of non-prepared bars
	Risk of tool breakage

Program a cutting (or facing) movement



Position the tool at the rear part face level (cut)





Position the tool normally for the operation provided at station 1

Program normally the operation provided at station 1

The tip we are proposing today is a third alternative, which avoids tool breakage and the execution of an initial, non-compliant part owing to poor bar preparation. This is achieved by using a tool in position 1, which is capable of carrying out both the operation required and part cropping.

With the TB-DECO, we shall program the facing in the operation boxes before the green flag and normal machining in the boxes that follow (see illustration). With respect to the bar feeder variables, it will be necessary to program the bar feed distance, so as to stop the bar a little further than the cut. This means that when the machine resumes production with a new bar, the tool in position 1 will start by cropping the front of the bar, thereby providing us with a prepared surface to machine the first part in a proper and sure manner.

Important comment: The operations programmed before the green flag, for purposes of facing the new bar are executed each time AUTO mode starts up, provided a RESET has been executed beforehand.

This tip can only be used provided the following two conditions are met.

- MULTIDECO machine with a cross slide in position 1:
  - MULTIDECO 20/6
  - MULTIDECO 20/6b
  - MULTIDECO 32/6i
- Tool on support 11, which is capable of executing the necessary operations in the program loop and in the operations preceding the green flag (a special tool can be provided).

Innovation:

a key element of success

For a company like TORNOS, technological or strategic innovation is a driving element of success. Without innovation, the DECO, for example, would never have seen the light of day.

In order to see how things currently stand at TORNOS in this respect, DECO-Magazine met Messrs. Cancer and Nef, Managers of the single-spindle and multispindle Business Units.

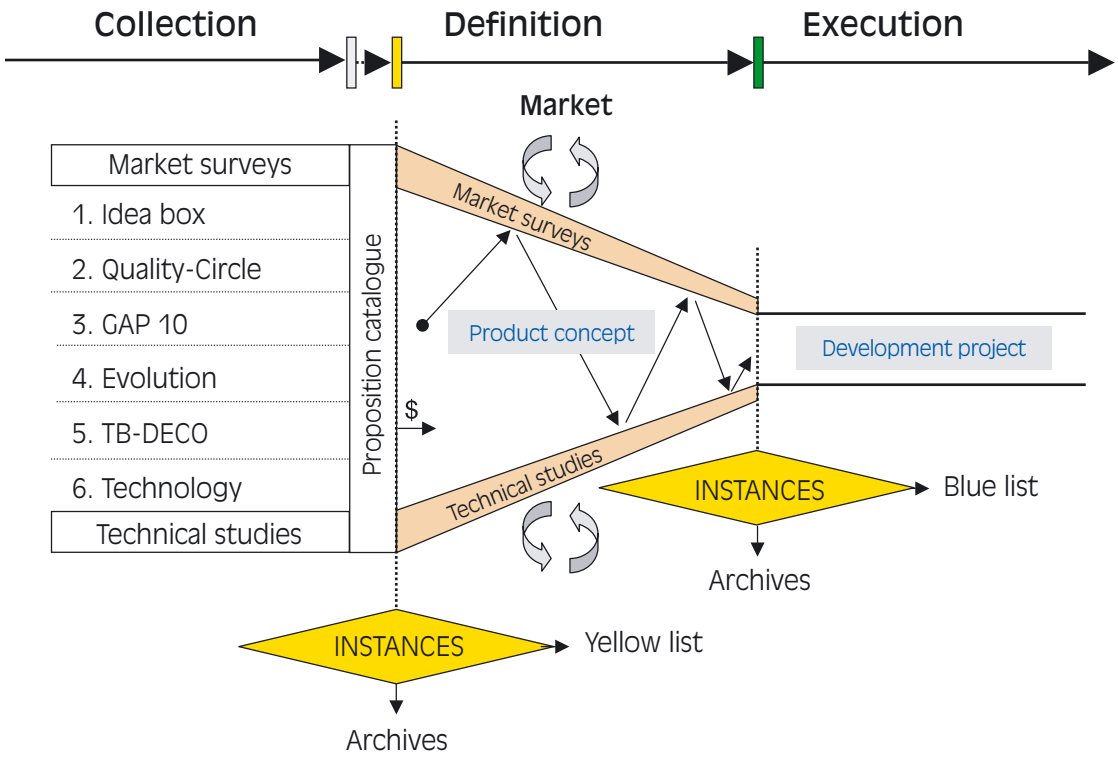
DM: Good day gentlemen! We know that the TORNOS company has experienced some difficult times recently, but now that this is behind you, how do you regard this period in terms of innovation? Has the company's situation had some effect on the development of this process?

CC: TORNOS has always been innovative. If we look at the years between 1997 and 2001, the company launched two new products each year. These products replaced the previous ones or were developed to create new machine lines. Nowadays, apart from the SAS 16.6 machine, all the products proposed are of recent origin, given the fact that the oldest, the DECO 10, was launched 7 years ago.

DM: Does this then mean, for example, that this machine has not been upgraded since its launch?

CC: Absolutely not ! Over the years, the DECO 10 has undergone several improvements. In fact, a new version was introduced during the course of this year. This shows that our solutions are not set in stone and that we are constantly looking at ways of serving our clients better.

DM: In other words, the company did not slow down its process of innovation over these recent years?



Innovation:

a key element of success

CC: It goes without saying that customer requirements are always considered and that numerous campaigns have been carried out to guarantee the delivery of products that always meet customer requirements.

In other words, innovation is ongoing with respect to fine-tuning our products, so that they can be adapted to all needs. Having said that, between 2000 and 2002, there were no real innovations in terms of completely new products or platforms.

DM: So basically, you consolidated the area occupied by existing products but did not work on creating a new revolution?

CC: Correct. However, things have changed since 2003! Coupled with our new business unit organisation, we have now relaunched the process of innovation and worked out a strategic growth plan.

DM: We all know that innovation work is very important, but proposing efficient solutions is just as essential for our customers. Would the new process of innovation not possibly slow down the work of adapting or marketing the solutions proposed by the company, for example, because of a lack of resources or for fear of bringing about "product conflict?"

WN: The competitive advantages provided by TORNOS to its customers are not the product per se, but rather the value it achieves! The aim of this recently relaunched process of innovation is to maximise this value, whether this is achieved by new products or by upgrading existing ones. We work on several development levels in parallel with several teams, thereby ensuring that we do not compromise any of our current ranges and hence our customers.

DM: You say that you work at several levels – could you outline some of the benefits of this?

WN: Our process of innovation consists of several different programmes with different lead-times. Broadly speaking our process can be described as follows: we collect the information, analyse and validate it by way of technical and marketing studies so as to reduce any uncertainties. This then leads to a product concept, which will form the specifications for future developments.

CC: Nowadays, our single-spindle range is mainly adapted to parts that are fairly complex to highly complex, with diameters from 3 mm to 25.4 mm. The aim of the GAP 10 programme is to strengthen our current position by increasing client productivity and efficiency, whilst further exploiting the vast potential offered by the DECO concept.

The "S" programme is a completely new platform, which will enable us to extend our coverage of market requirements with respect to complexity of parts, for which our current products are not fully adapted.

Innovation:

a key element of success

DM: Are you perhaps talking about a new machine or new range? Can you tell us a little more?

CC: It is too early to give you further details, but what I can say is that we are actively working on a new platform to complement the current DECO range. This will meet segment requirements, which we currently do not cover.

DM: Would you be able to give our readers a schedule of events?

CC: No. But without revealing any secrets, I believe that 2005 will be an important year for TORNOS.

DM: Thank you Mr Cancer. What is the innovation with regard to the multispindle?

WN: We are also working on new technological solutions to provide our machines with different capacities. Last year we launched the MULTIDECO 20/6b and are now directing things towards the future…

Other types of parts are also being studied, i.e. more complex parts or parts with even shorter cycle times. The work we are currently involved in, is in helping our customers extend their scope of action with the MULTIDECO machines.

DM: And regarding lead times – can you give us some more specific ideas?

WN: Like Carlos said a short while ago, I can't go into any road-map innovation details. What is important is that they exist. We have some quite demanding targets and very tight lead-times, but we will keep to these…

DM: Thank you gentlemen for providing us with this information, showing that TORNOS will continue to surprise us with its new market solutions.

CC: Our current philosophy is summarised by our slogan: "Think parts – think TORNOS". You think of the parts to be executed and we'll think of the solutions to enable you to do this… both today and tomorrow.

Following this interview, we were given the opportunity of visiting the recently renovated offices of the Business Units and R&D. Opened to make communication easier, these also clearly show that TORNOS is once again spearheading the dynamics of success.

New functions of the Fanuc 16i NC

Apart from the DECO13 bi, all multi- and single spindle lathes have been fitted with the latest Fanuc NC technology since the beginning of this year.

The upgrades to the NC system coupled with the functional developments achieved by TORNOS engineers now provide the operators with new facilities, both at setting-up and machining level.

This upgrade is most apparent in the single-spindle, tailstock lathes, since it is with these machines that the new functions can be most used.

The new features include:

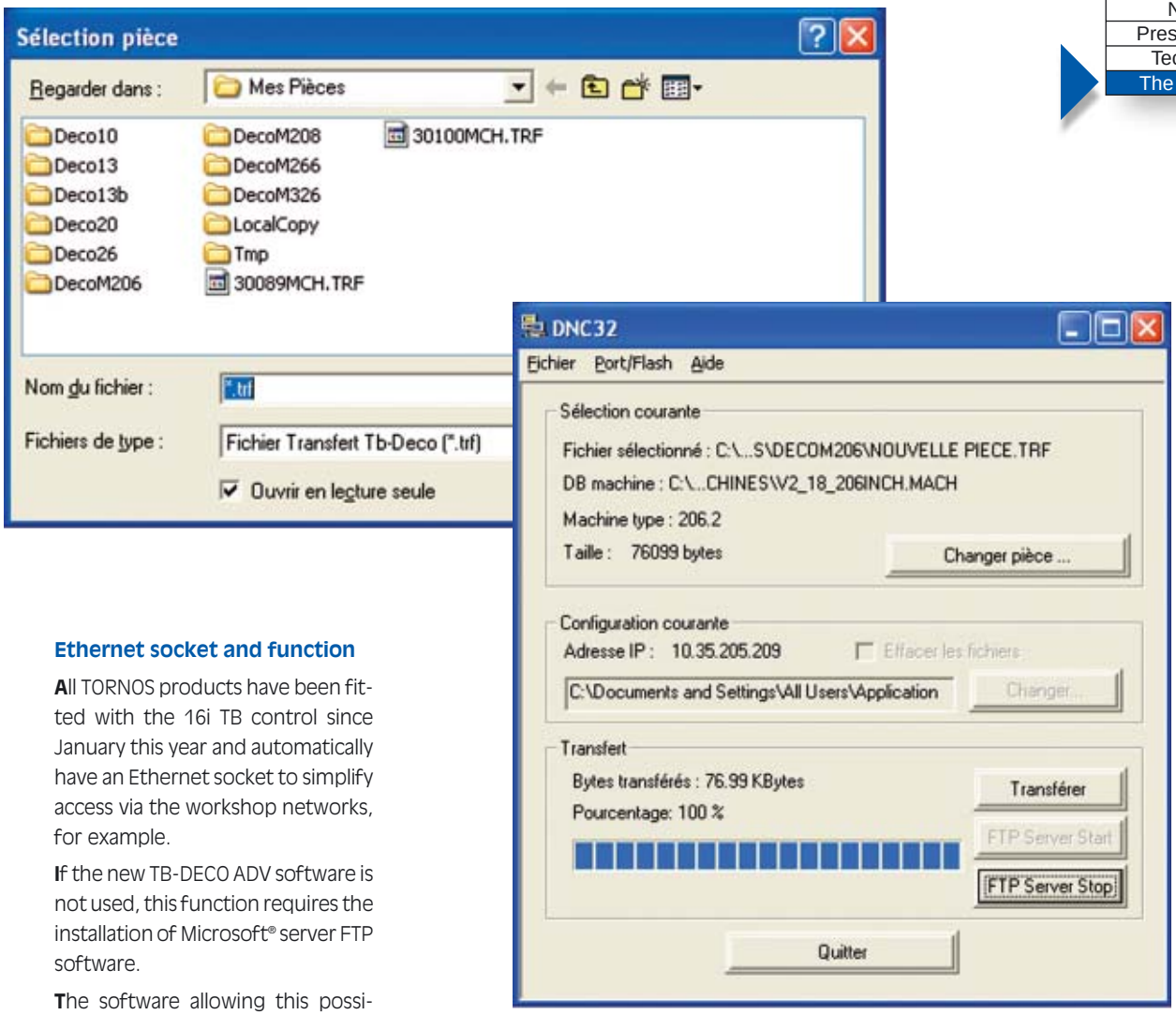
- "Unlimited" part time of 138 min.
- One touch program loading.
- Ethernet socket and function.

Before looking at the various implications and benefits of these new functions via the menu, it must be pointed out that in order to benefit from the entire range of facilities offered, the TB-DECO ADV is essential (available from the second half of 2004) for the first two new features described below.

"Unlimited" part time

By the end of 2003, 65,000 ITPs could be controlled in 8 ms, meaning that it was possible to machine parts in a maximum of 8 minutes 40 seconds (without using the G902 function). The complexity of parts being executed, especially for the medical and dental sectors, sometimes forced programmers to achieve "miracles" to take account of this restriction. Given this increase, it is now possible to execute parts with cycle times of up to 130 minutes!

The following two new features are not coupled to the TB-DECO version, meaning that they are available to all operators of machines supplied from 2004 onwards.



Ethernet socket and function

All TORNOS products have been fitted with the 16i TB control since January this year and automatically have an Ethernet socket to simplify access via the workshop networks, for example.

If the new TB-DECO ADV software is not used, this function requires the installation of Microsoft® server FTP software.

The software allowing this possibility is delivered as standard since August 2004 on every version of TB-DECO.

For the users of versions 5 and 6, an upgrading "patch" is available for downloading on the website of the company in French, German, English, Italian and Spanish (http://www.tornos.ch/e/tbdeco/TDPT2.html).

One touch NC function

Program transfer and management demand the utmost precision. Various "configuration" operations for NC "program acceptance" had to be performed at the time of loading, either by RS 232 or by PCM CIA card.

In order to reduce the transfer and setting-up times and with the assistance of Fanuc, TORNOS engineers developed a new function at control level, thereby considerably simplifying NC preparation when it comes to loading new programs. Program acceptance mode can be configured at the press of a key!

This automatically generates preparation by way of the following:

- Deleting all programs in the CNC memory (0-9999).
- Loading the new program from the serial port, memory card or Ethernet.
- Converting the program to tables (convert 1).
- Restoring tool wear values (restore).

This new feature, which considerably simplifies the work of operators, is also available as an option for the 16i TA controls by changing the software machine.

The close co-operation between TORNOS and Fanuc meant that TORNOS engineers could develop new solutions whilst availing themselves of the vast power of the new Fanuc NC. The aim is to provide the operator with more power and simplicity.

This provides the company with yet another means of providing its customers with enhanced performance!

If you require further information on the TB-DECO ADV or about these new functions, do not hesitate to contact your normal TORNOS agent or send a message to:

software@tornos.ch.

ISCAR Cutting Tools for the Miniature Industry

by Moshe Goldberg Ph.D. and Baruch Books

A constant demand for manufacturing thin parts with a small diameter in mass production at a minimal cost for the miniature industry has prompted the invention of the screw machine. This innovation with subsequent demand for greater accuracy and adequate surface finish, has contributed to the development of the generation of Swiss-type machines[1].

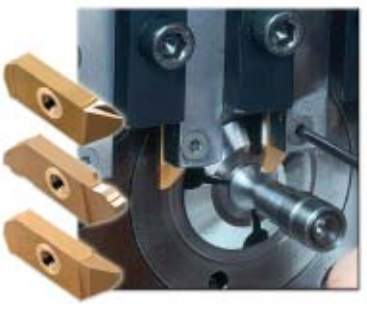
The Swiss-type operates automatically, feeding a stock lengthwise through the head stock and turns it immediately by using radially mounted tools next to the head stock bushing, producing long, thin parts.

The new trend and technological developments within the miniature industry has encouraged many manufacturing plants to invest a vast amount of capital and to purchase sophisticated machinery with equally sophisticated cutting tools. ISCAR had risen to the challenge and developed dedicated tools for the miniature industry.

Changing inserts on a Swiss-type machine used to be a time-consuming process due to the confined space and the tight arrangement of the tools inside the machine, an impediment that required removing the gang plate. Taking the current conditions into consideration, ISCAR has developed a system that accelerates the interchange operation of carbide inserts on the Swiss-type machines. The ISCAR technique facilitates easy access to the inserts with the ability to tighten them effortlessly from the side or front panels of the holder.

In response to a growing demand for tools dedicated to the miniature industry, ISCAR has developed a wide range of innovative cutting tools for Swiss-type lathes, operated either automatically or controlled by CNC. These tools can be divided into four categories; external machining, hole making, internal machining and milling applications.

For external machining applications, such as turning, grooving, threading and parting, ISCAR has developed the SWISSCUT tooling family. The SWISSCUT tools were predominantly designed for the automated SwissCam machine type. However, these tools can also serve the Swiss-type CNC machine. Due to the small confined spaces inside these machines, the SWISSCUT tools are designed for being assembled in such an array that would prevent collision with



SWISSCUT

[1] *The cams operated sliding headstock lathes have been marketed all around the world since the Fifties under the generic name "Swiss-type".*

other tools on the turret while in operation. Furthermore, the SWISSCUT guarantees reduced set-up time and easy ergonomic insert clamping without having to remove the toolholder from the machine. Clamping and releasing the inserts can be performed from either side of the toolholder with the additional advantage of accurate cutting edge replacement.

SWISSTURN

PENTACUT

The SWISSCUT inserts are available in the IC1008 grade with TiAlN and TiN PVD coated layers for excellent notch wear and built-up edge resistance. Due to the very small SWISSCUT insert shape, it is ideal to use the IC08 substrate grade, which is a submicron grade with high toughness and hardness attributes. The inserts are also equipped with chip deflectors that were designed for machining small parts.

The IC1008 grade can be used for machining carbon or alloyed steel applications, as well as heat-resistant alloys, austenitic stainless steels and hardened steel, even at interrupted cut or other unfavorable conditions.

In contrast, external applications on a Swiss-type CNC machine, exclusively, can be done by employing the ISCAR SWISSTURN family, as well as the ISO standard turning tools. These insert geometries exhibit sharp and positive cutting edges. Furthermore, an accompanying line of toolholders with a unique clamping device has been developed for replacing the standard Swiss-type screw clamped holders. Additionally, ISCAR offers the ISOTURN family that is comprised of small shank sizes with insert cutting edges "in line" with the shank, suitable for a variety of the ISO standard inserts.

For parting applications on a Swiss-type machine, ISCAR has developed the DO-GRIP tooling family with a variety of inserts on ISCAR's short head, small shank holders that can perform parting operations in an economical way. The inserts are specially designed for parting small diameters and thin walled parts. Moreover, ISCAR has also developed new adapters for the economical DO-GRIP inserts, which minimize setup time and reduce tooling costs.

Another alternative for parting applications is the innovative PENTACUT with 5 cutting edges – a substantial economical feature – available in sizes of 0.5 mm to 32 mm. The PENTACUT is designed for multifunction applications including grooving, shallow grooving, recessing, chamfering and parting of small solid bars up to 12.5 mm (0.492") in diameter. Each cutting edge on the pentagonal-shaped insert is equipped with a unique J-type positive chipformer that provides excellent chip control.

Clamping the insert is done by a torx screw from either side of the holder in order to enable insert indexing without having to remove the holder from the machine turret. The short head of the holder also ensures minimal overhang and high stability. The inserts are available in grade IC1008 with an advanced submicron substrate and PVD coating with TiAlN and TiN layers.

DO-GRIP

Furthermore, when an application of external grooving combined with parting is required, using the CUT-GRIP tool family would be the most suitable option. ISCAR's CUT-GRIP line incorporates bars and double-ended inserts for internal/external grooving, undercutting, threading and turning applications. Applications with specific form grooving requirements, on the other hand, should employ the ISCAR V-LOCK tool. ISCAR's V-LOCK special profile inserts, in contrast to insert geometries previously discussed, feature wide inserts that are specially tailored for producing complicated profiles in a single plunge. Lastly, the ISCARTHREAD concludes the category of external

machining applications, for external threading operations with a wide range of threading standards.

For drilling applications in Swiss-type CNC machines, the following ISCAR hole making tools should be used; each tool with its specific function. The SOLIDDRILL, for instance, are drill heads in a diameter range of 3 to 20 mm (0.118" to 0.787") in length, to a diameter ratio of 3xD & 5xD, with or without internal coolant nozzles. The drill bits are made of ISCAR grade IC08, a submicron substrate with advanced TiAlN coating for optimal hole quality, reliable and economical output. The CHAMDRILL, in comparison, is a unique system that uses a simple key to index drill heads, eliminating setup time for indexing. The shank body of the CHAMDRILL remains clamped into the machine. A half-twist removes the old head and another half-twist installs a new one. The CHAMDRILL can carry IDI heads in a diameter range of 7.5 to 20 mm (0.295" to 0.787") with drilling depths of 3xD and 5xD. An improved version of the CHAMDRILL is the ISCAR CHAMDRILLJET, a phenomenal drill body that can carry four different types of drill heads designated for

V-LOCK

use on four different material groups; carbon and alloy steel, stainless steel and high temperature alloys, cast iron and aluminum. With the CHAMDRILLJET the coolant is applied directly on the cutting edge, resulting in excellent performance on high temperature and aluminum alloys, with improved chip evacuation and surface finish. Another innovative drilling solution developed by ISCAR is the GUNDRILL, a single-piece carbide head with a streamlined shank and coolant flowing to the working end where it is most needed. Chips are evacuated along the V-shaped external flute. The ISCAR GUNDRILL can achieve drilling precision of IT7 to IT9 tolerances, with excellent straightness concentricity and precision hole center alignment.

CHAMDRILL

For internal machining applications such as boring, internal threading and internal grooving for the Swiss-type CNC machines, ISCAR has developed an innovative and economical system, named PASSPORT. The PASSPORT is a new universal holder bar designed to hold a variety of solid carbide bars and steel shanks, called the VISAS, for internal boring, turning, back turning, profiling, undercutting, grooving, and threading applications in small diameter holes. The solid carbide shanks provide rigidity, high stiffness, and resistance to bending and deflection, all of which contribute to dimensional accuracy and high surface quality. The PASSPORT is available in diameters of 16, 19, 20 and 22 mm. It has two different bore diameters, 6 and 8 mm (0.236 and 0.315"), one on each end of the tool, thereby enabling the use of different carbide shank sizes. The overhang of the carbide bars can be adjusted according to the required depth of the machined bore.

The PASSPORT system can accommodate CHAMGROOVE inserts for grooving, boring, chamfering, threading, undercutting, and profiling. Alternatively, the system can accommodate MINICHAM PICCOMF/PICCOMFT PICCO-CUT and PICCOFACE solid carbide bars, capable of penetrating bore diameters as small as 2.8 mm (0.11"). Furthermore, The PASSPORT can also use a range of standard boring bars with small ISO inserts for turning and threading. The multifunctional ISCAR PASSPORT system improves performance and significantly reduces stock requirements.

The MINICHAM family is designed to perform boring applications as small as 4 mm. The system features secure, self-clamping inserts and thus eliminates many of the problems associated with very small inserts. The MINIGROOVE, in comparison, performs turning, threading and grooving operations in bores as small as 8 mm (0.315"), using the same shank for either right- or left-hand inserts. The new PICCOMF was designed in particular for use on Swiss-type and all other machines that produce miniature parts. This family of tools provides a unique cutting geometry and machining abilities that combine the work of a few tools into one. PICCOMF can perform a combination of drilling,

turning and boring applications. PICCOMFT performs the same applications, with the addition of threading. In addition, ISCAR ISO tools can also be employed for internal machining applications.

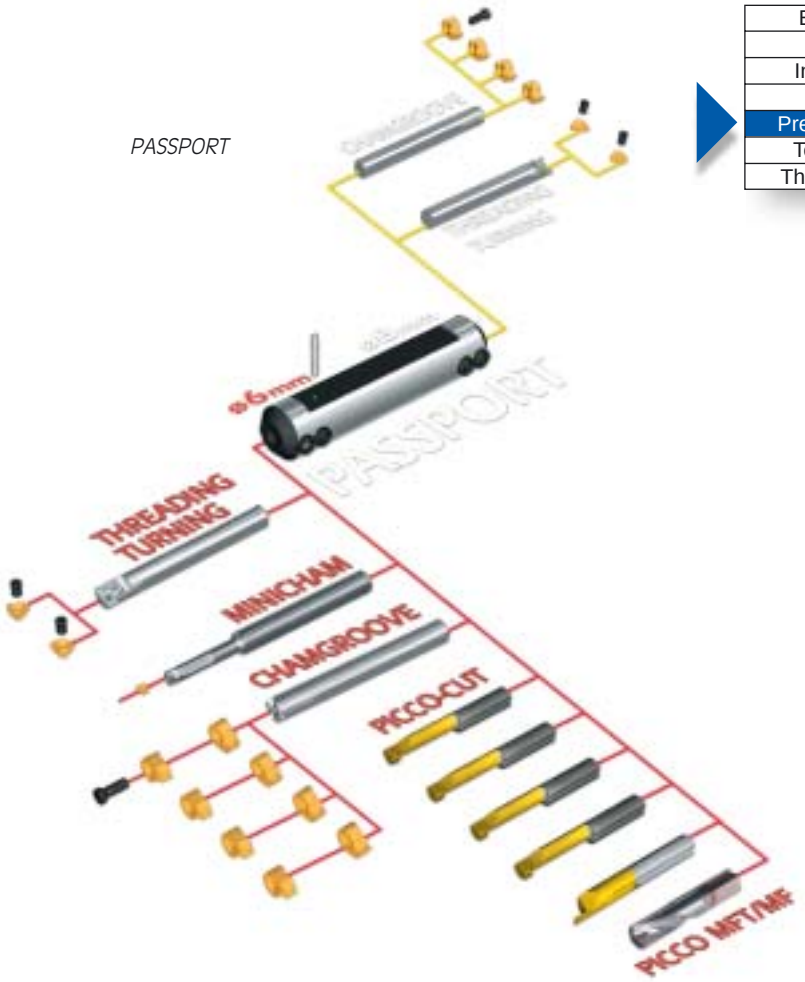
The ISCARTHREAD, to conclude the category of internal machining applications, can be used for internal threading operations with a wide range of threading standards. The smallest triangular laydown insert can be used for internal threading in a minimum bore size of 7 mm (0.276"). Alternatively, machine operators can use other ISCAR threading systems, such as: the PICCOCUT, a solid carbide bar for minimum bore diameters of 4 mm (0.157"); MINICHAM, specially designed miniature inserts for minimum bore diameter of 6 mm (0.236"); or CUT-GRIP and CHAMGROOVE for a variety of innovative internal threading applications.

As far as milling is concerned, the ISCAR SOLIDMILL and the MULTI-MASTER are the most advantageous tools for milling applications on Swiss-type CNC machines.

PICCOMFT

The SOLIDMILL, micro-grain solid carbide endmills with extended tool life are available with the most advanced TiCN or TiAlN PVD coatings. ISCAR's mini-collet chucks are also available, both in single- and double-ended versions and with attachments for tapping and reaming with straight shanks that can also be engaged to Swiss-type automatics.

PASSPORT



Alternatively, the MULTI-MASTER can be used for various milling applications. The MULTI-MASTER is a family of tools, comprising shanks and interchangeable heads for a variety of milling applications. The versatile system allows shoulder milling, slot milling, small-surface face milling, profiling, drilling, chamfering, and rampdown operations, all designed for the miniature and mass production industries.

In summation, ISCAR offers countless tools and endless solutions for the miniature and the mass production industries, with an aim to increase productivity and improve surface finish at minimum costs.

Recently TORNOS joined Iscar, who organized a conference dedicated to machining miniature components. The conference took place at Tefen, Israel, and demonstrated the Iscar tools specially designed for the miniature industry.

TORNOS, very courteously, offered at no cost a Swiss-type machine model DECO 20a and a machine operator for a period of a week, in order to support the technical side of the conference.

The demonstrations at Iscar Technical Centre displayed the Iscar tools in operation, which proved again that the combination of TORNOS with Iscar always delivers satisfying results.

Should you need any further information, do not hesitate to contact ISCAR LTD at the following address:

ISCAR LTD
Box 11, Tefen
24959 ISRAEL
www.iscar.com

New techniques to benefit the client

For the past two years, Walter Dünner SA has been deploying a new technique to execute various parts in counter-operation, despite the difficulty of working with diameters up to three millimetres more than the actual clamping diameter.

www.dunner.ch

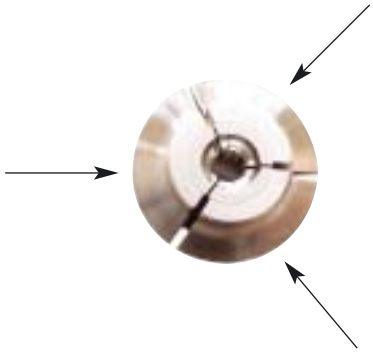
This new technique has been patented and is characterised by the absolute precision that must be guaranteed both with respect to the tooling and the final execution of the collet. Close co-operation with the customer concerning the part in question, ensures perfect execution.

In practice, we have produced collets for the connector and car industries and also for finishing medical screws. Producing collets is a difficult operation, which first has to pass through the design office and entails the execution of various inspection tools as well as a rigorous production process. From preference, the collets are produced with an internal carbide coating or even in HSS if the operation is likely to be tricky from the point of view of operating impacts.

Nowadays, we have many customers who are satisfied with the collets produced. They also appreciate the fact that the collets are produced with the minimum of clamping, thereby avoiding any marking or deformation of the part when it has to undergo reworking.

We always guarantee the product and would be pleased to assist the client to ensure that he is fully satisfied when using the collets.

The following illustrations explain the work sequence: the medical screw is fed into the collect and is clamped at the head and retraction diameter.



A guide can also be positioned at the rear of the collet for long parts. This facilitates post-machining extraction and avoids the risk of wobble during turning. In the example shown, the clamping must be limited in order to avoid any deformation or marking of the screw during stamping of the hexagon head.

This technique has been tried and tested with numerous implant manufacturers and is now spreading quite rapidly to other sectors of small parts turning.

This new challenge means that the operation on the DECO machines can be optimised even further, which is a benefit to the customer, because he can now operate the machine at full capacity without having to rework the parts.

INTERCHUCK: this name was first used two years ago at SIAMS 2002. It is the new clamping system that has been adapted for the DECO for all parts that have to be reworked from the internal diameter.

The Interchuck system was first developed by the SIRON company in Israel, which operates the DECO 20 system. The current version is more complete, since the long and short parts can now be clamped from the inside.

The system is highly versatile, since the standby collets are supplied with the basic system, thereby enabling the client to fit the chucks onto the machine immediately.

To fit the INTERCHUCK system, simply remove and replace the original machine collet bush. If you want to machine parts, it's very easy to fit the system to the machine – a five minute job – and you can get on with machining. The system has a collet bush. Insert the collet into the bush, taking care to pass it correctly through the key and then insert the clamping piston with the extraction spring and the brass clamp-limitation bush.

This clamp-limitation bush can be shortened to increase the clamping force. You can therefore limit your clamping force at any time, simply by modifying the length of the bush. Brass bushes are standard consumables that are always available. This means that the brass limitation bush can be stored with the specific tooling used to produce the parts.

INTERCHUCK has also been patented and will be available for the DECO 26 from September 04 onwards.

By November 2004, the entire DECO range will benefit from this equipment (apart from the DECO 10).

We are still currently researching into yet further improvements to the long clamping system, meaning that there will be a slight delay in offering the Interchuck for the DECO.

It should also be pointed out that the INTERCHUCK system is designed to be cooled by the tailstock thereby preventing the chippings from penetrating the collet slots. What is more, the fluid helps eject the part. It is possible with the INTERCHUCK to produce parts that cannot be reworked from the external diameter, which would be an undeniable benefit for your DECO. We would also point out that parts, which must not have any marks on the external diameter, can be finished with the INTERCHUCK system without problem.

If you require further information on this latest feature, please contact:

Walter Dünner SA
2740 Moutier

Hole for cooling

TORNOS open its new Shanghai Representative Office

On July 8, 2004, the official launch of the TORNOS Shanghai Representative Office was held in the Peace Hotel in Shanghai.

Fm. left to right: Sun Weimin-Sales Director, Emmanuel Deville-Service Manager, Claire Feng-Administration Manager, Raymond Stauffer-CEO, Daniel Hess-General Manager Asia, John Chen-Senior Service Engineer

The about forty attendees representing customers, partners and authorities had the opportunity to discover the TORNOS strategy through presentations given by R. Stauffer – CEO of TORNOS and Daniel Hess – General Manager of TORNOS Asia.

China is the first worldwide consumer in the machine tool industry. This market has been growing constantly for several years. Today China mainly imports high added value technology and material. The high-end products and solutions offered by TORNOS are exactly tailored to these trends and will offer very good opportunities to Asian customer to improve their own business.

To be sure that TORNOS customers are going to be served in the best possible way in term of advices, sales and services, TORNOS has decided to act! This has been done by establishing a Representative office in Shanghai to service the Chinese and Asian customers.

Raymond Stauffer – CEO of TORNOS says that this operation is an important step in the development of TORNOS. "TORNOS had been active mainly in Europe and USA. With the opening we aim to balance our market portfolio and to really bring the DECO Technology worldwide with a very active strategy. There is no reason why Asian customers could not benefit from the DECO technology".

TORNOS Shanghai Representative Office
Rm. 512-513, B Tower, Far East Plaza, No. 317, Xianxia Rd. – Shanghai200335
Tel: +86-21-6235 1235 – Fax:+86-21-62351938

Daniel Hess – General Manager of TORNOS Asia add "Shanghai is the industrial and financial centre of China and its economy is expanding, all of which means that we have a huge potential market here, and we will surely benefit from this and expand our business locally in Asia. We, at TORNOS always believe that Sales and Service go together, good after sales service are determent to generate additional and new sales, and on the customer perception Service doesn't mean only after sales service, but everything, including response time of sales and service inquiries, availability of engineers when needed, delivery of machines and many others".

The opening of this office represents an extension for providing professional and first class services to the TORNOS valuable customers in China wherever they are, in Shanghai, Beijing, Sichuan, Guangzhou, Shenzhen, and all other provinces where there are already TORNOS customers.

Having now in place a strong base team to build on, with Messrs. Sun WeiMin for Sales, Emmanuel Deville and John Chen for Service, the partner "Shanghai Caigan Machinery Equipment Co. Ltd", (a company operated by Orient International Holding) for the sales of spare part in China, TORNOS is ready to continue to develop and growth its business in China and beyond.

Daniel Hess
General Manager
TORNOS Asia

50,000 hours

24 hours a day,
7 days a week for 5 years, 9 months and 15 days!

A feat achieved by Hugard from Magland!

Obviously this performance has not run non-stop, but given the fact that the machine was installed in December 1996, i.e. seven years and five months ago, its operating ratio is quite exceptional (75 %, i.e. 18 hours/day on average).

From left to right: Messrs Robert Hugard – Chairman and Managing Director of Hugard SA, A. Tappaz – Commercial Manager of TORNOS France, R. Stauffer – CEO of TORNOS and Maurice Hugard – General Manager of Hugard SA.

In 1999, Hugard took the gamble of completely changing over its fleet of cam-operated machines to a 100 % fleet of DECO machines, immediately before the crisis struck the connector industry, which was the company's main market. Was this an opportunity or a threat?

To find out more, the DECO-Magazine reporters visited Magland on a nice, sunny day.

We were warmly welcomed by Mr Robert Hugard in the reception area, the walls of which were covered with awards and certificates. This set the scene! We were in a company that was geared towards quality and the future… the visit appears to be promising…

DM: Good day Mr Hugard. Thank you for seeing us. The competitive environment has changed quite a lot since 2000, how have you survived this trend?

RH: We have, in fact, gone through a period of a lot of upheavals. As soon as we completed the changeover to a new fleet of machines by adapting to a very specific requirement, it almost seemed that from one day to the next, this requirement disappeared. Some machines were in the process of being supplied, others were still at the order stage and our markets were falling apart…

DM: Against this background, did you think of cancelling the order at that time?

RH: Well, we had two ways of looking at the situation. We could either opt for the "critical" route –

with a single DECO machine:

in other words only see the threats caused by the changes we had just implemented, or look at things in an optimistic light by considering the opportunities that these machines could offer.

The situation we had to face up to, showed we made the right choice.

In order to respond to the sudden and extreme volatility of the markets, we had to be in a position to adopt new steps, such as:

- New materials for machining.
- New lead-time constraints.
- New batch sizes.

In short, we had to become very flexible and extremely reactive. This is precisely what our investments in the DECO enabled us to achieve.

DM: You therefore had to carry out small operations on the DECO. Afterwards, what was the outcome of your analysis and what were the limits of the system?

RH: At Hugard, our experience was extremely positive. Having as its starting point a very well conceived program, the DECO system demonstrated its full versatility. Just to give you an example, we sometimes get orders for new parts on a Friday afternoon and are able to ship them to the USA on the following Friday morning!

DM: So you're telling us that this was a new opportunity for you?

RH: Well, with lead-times of more than 20 weeks, we were, to a certain extent, prisoners of our markets. This change in our financial environment provided us with the opportunity to expand our horizon. Paradoxically, the problem was not in having new machines that had to pay for themselves but rather not having sufficient competent operators to handle them.

DM: Training is, of course, very important. What steps did you take and how do you see the future of training?

RH: Training to upgrade to the DECO has never been a problem at human level. Initially, training was off-site but very quickly it was transferred in-house. Each new operator is assigned to a "tutor", who helps to familiarise him with the machine by showing him all the operational finesses. Throughout this period of turbulence, the priority decision-making point for our customers was the lead-time. We had to be in a position to comply with this and only perfectly trained operators could make the difference.

DM: So in your opinion, this training is absolutely vital, but is it not somewhat cumbersome?

RH: It is an essential investment. By reinforcing the skills of our operators, it allows us to face market trends. We have also been financing English courses over the last few years for those who are interested. 80 % of our company's activities are geared to the American market and we believe that it is of utmost importance that our employees are familiar with the language and culture of our customers.

DM: Talking of the USA: Hugard has a production plant over there. What is the difference between that company and the parent company? Are there any particular difficulties being in the USA?

RH: We set up an exact replica of our European workshop in the USA,

The company Hugard: talking of the USA

Hugard – USA

as part of our development strategy. This is not a relocation. This site enables us to produce certain lines at a much reduced cost compared with Europe. We still mainly supply the North American market from Europe. Much of the production from the American site is exported to Asia.

DM: What about exchange rates and macro-economic problems?

RH: The fact that we have two production sites – one in the dollar zone and the other in Euroland – means that we are not so exposed to exchange rate risks. It's a very useful strategic position enabling us to benefit from the best of both worlds.

DM: Coming back to the machines, what do you think of the USA operators compared with the French? Are there any differences in approach or skill?

RH: Our precision turning setters are highly qualified and skilled on both sides of the Atlantic, perhaps operating with a little more autonomy in the USA.

The DECO system operates at full power when the "critical limit" is reached in a company. A single DECO machine in a workshop remains an isolated element that cannot demonstrate its entire potential. A workshop full of DECO machines on the other hand, creates a synergy and DECO culture, which, once incorporated, works absolute miracles!

DM: You have been active in the USA for 19 years. Talking of the international scene, we are now hearing a lot about Asia. Is Hugard also thinking of setting up there as well?

RH: This is not currently on the agenda. Our European and American production is still competitive. For small and medium series runs, using highly automated processes, the impact of low-cost labour is still slight.

It is true that a lot of small precision turned parts have "left" for Asia during the past two to three years, some of which have returned to Europe or the USA. This is not to say that these parts have no future in Asia – it's quite simply that the "labour" aspect is not a determining factor for these products.

Hugard: Our philosophy regarding the use of our fleet of machines is quite simple – we want to use them to a maximum within a minimum of time.

DM: So Asia isn't on the cards for the moment...

RH: We are active in micro-precision turning with strong added value. The transport costs are limited and operations are highly automated. For the time being, we don't believe that there are competitive advantages in the short-term but it is obvious that with a more far-sighted vision, the transfer of technology that has been ongoing over the past 3 years will change the state of affairs. We must remain open and act at the opportune time.

DM: If I can come back to staff and training, would this not also be a potential problem in Asia?

RH: Everywhere in the world it's the quality of the workforce that makes the quality of the company stand out. To manage a company, whether it is local or 6,000 km away, you must have efficient teams, a fail-safe organisation and a concept of service and reactivity. This is achieved through training, motivation and the company culture. Twelve years ago, Hugard expanded and doubled its size in 24 months and our main challenge was to build up and structure our team. In the USA, which is culturally similar and has vast industrial experience, the task was probably far easier than would be the case in Asia, where communication problems and differences in mentality are far greater.

DM: Nowadays you are working with a lot of different types of materials. If I have understood correctly, are these always complex parts?

RH: Absolutely, but we also execute parts with simple geometry which, for various reasons, entail complex processes, such as in cases where "cosmetic" requirements make what looks like a simple part difficult to execute.

DM: Ever more stringent requirements. Does that mean that parts are getting more and more complex and making things more difficult for you?

RH: Yes, the engineering offices are always on the look out for machines that have improved capability of producing more highly complex parts.

Fm. left to rignt:
Messrs Robert Hugard - Chairman and Managing Director of Hugard SA and Maurice Hugard - General Manager of Hugard SA

DM: How do you operate with regard to research and development?

RH: We are sub-contractors! R&D is made up of challenges provided by our clients in terms of the parts to be executed. We research precise and durable solutions involving material (for specifications), tooling and lubricants that respond both to our customers' requirements and our criteria for profitability. Sometimes these challenges are very interesting! Here too, the value of our teams comes into its own.

DM: If we now come to your fleet of DECO machines, today you have 28 all coloured blue, the first of which has just crossed the 50,000 hour threshold. How do you consider this machine?

RH: Paradoxically, this particular machine has not produced the most parts – it only produced roughly 6 million. It is a machine, which worked well, executed complex operations and utilised all its capacities. We had no special worries with maintenance and it really worked like a Swiss-made clock!

Our philosophy regarding the use of our fleet of machines is quite simple – we want to use them to a maximum within a minimum of time. What is remarkable about the DECO is that the first one, which is nearly 8 years old, and the latest one, which has only been with us for a couple of weeks, operate with the same software, the same programming and the same power!

DM: So what you seem to be saying is that this machine (as well as the very first ones) could more or less be replaced now!

RH: Our standard calculations are as follows: depreciation of the machine over 5 years, then an additional 3 years to help finance the replacement. It is therefore likely, that we'll start to replace some of these machines in the short term.

DM: But if the difference between a recent machine and the oldest is not obvious, why bother changing?

RH: We always like to move with the times. For example, we're thinking of changing from the DECO 7 mm to the 10a and DECO 13a for some of these replacements. Quite simply so that we can more fully meet the requirements made of us.

A feat achieved by Hugard from Magland!

Fm. left to right : Messrs Hugard in company of Messrs R. Stauffer - CEO of TORNOS and F. Koller - Sales Director of TORNOS during the visit.

DM: I would just like to come back to the blue DECO machines used in your workshop. Why did you opt for this colour in particular?

RH: The machines decorated in this manner provide a certain character to our workshops… but this isn't the real reason. We believe that the hammered blue effect gives a more solid impression and it ages less quickly than the standard off-white. I also challenge you to pick out the first DECO when you visit our workshop.

DM: Fine! I'll take you on! Thank you Mr Hugard for the interesting presentation of your company. This clearly demonstrates that the constant of change is full of opportunity. Before visiting the plant, which will be accompanied by TORNOS General Managers, do you have any concluding comments?

RH: Everything can always be further improved upon and sometimes I find myself dreaming of a DECO that will send all its operating information right across the company through a wireless network… But in all, I must say that we have never regretted changing from the cam-operated technology to the DECO – in fact the complete opposite is the case.

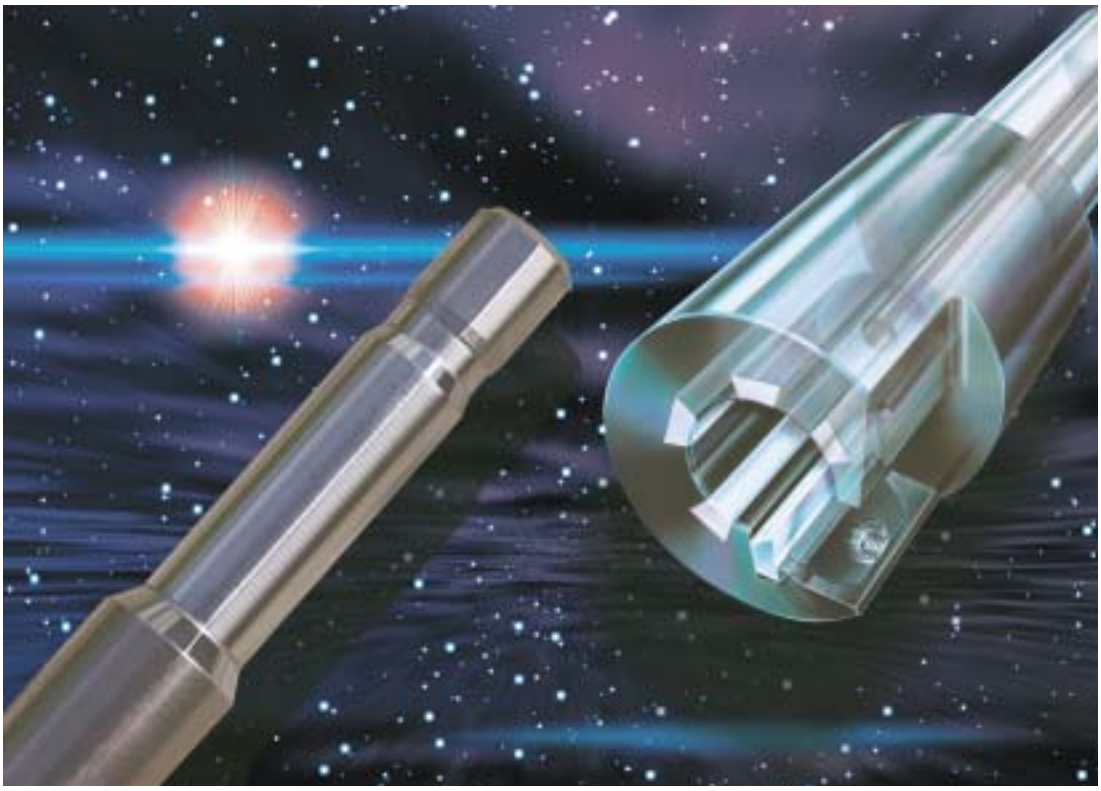
Whether we are in a phase of economic buoyancy or suspension, the versatility of these machines enabled us to adapt to market conditions thereby allowing us to develop our business.

PS: Our journalist lost the bet! He just could not identify the "birthday" machine

www.hugard.com

High precision reaming – a technology with a great future

Nowadays, it is an undisputed fact that virtually anything is technically possible. However, if you analyse the costs of the machining stages, you quickly track down the perpetrators. The recipe for success in modern-day small parts turning is speed, precision and continuity. Where previously, for example, grinding was used, it is now possible to ream precisely to within one micron (µm).



This means that in the testing department of TORNOS, a shaft made from INOX 1.4305 hitherto produced in the conventional way, is no longer ground, but rather reamed at the end of the machining process. Having to comply with precise dimensional accuracy to within a micron, part machining time, tool life and, of course, dimensional stability are also of particular interest to everyone concerned.

External reaming

In order to achieve tolerances of less than 0.02 mm, an additional process – namely grinding – was still necessary only a short time ago. The additional time and cost incurred each time was comparatively important. With the MAPAL external reaming tools, this process could be dispensed with completely and much faster throughput times were clearly achieved. This is due to the ingenious MAPAL machining principle: all the cutting and machining forces

High precision reaming – a technology with a great future

The tolerances demanded from the customer are within the micron (µm) range and all dimensions required were met or even improved upon in some cases. A result to be proud of.

are absorbed by the tool through the guide shoes. Hence, even very small diameters can be machined without any variations in dimensions and shape. And all operations can be performed in a single chucking process!

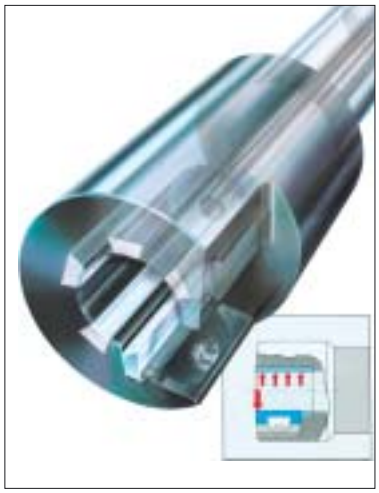
As regards the INOX 1.4305 shaft shown, the latest generation MAPAL external reaming tool was used. This tool is convincing principally because of the precise machining of the diameters and the extremely tight roundness and parallelism tolerances. The tool has a precisely adjustable cutting edge and several guide shoes. Based on a well thought-out tool concept, which also incorporates a special tool holder, the tool can be optimally inserted in automatic multi-spindle lathes or sliding lathes – in our case, in a TORNOS DECO 20a.

Requirement: high-performance cutting oil

For the required machining operations, the lubrication specialists from MOTOREX decided on the high-performance cutting oil, SWISSCUT ORTHO NF-X 15 (viscosity ISO 15). MOTOREX ORTHO NF-X has proved successful in the market in its current formulation for more than one year and has made an impression on account of its universal application. It is suitable for

The advantages of reaming:

- Replaces grinding.
- Greater precision achieved than with turning.
- Tolerances in the micron (µm) range.
- Far more economical than grinding.
- More reliable production owing to reduced inspection times and fewer rejects.



Only as a result of the close co-operation and intensive exchange of know-how between machine tool and cutting oil manufacturers can real innovations be achieved today.

machining all current materials, i.e. from steels that are difficult to cut, through non-ferrous metals to cast parts ! This is an absolute innovation in modern machining technology and is the result of the revolutionary ᵛmax-Technology from MOTOREX (optimisation of cutting parameters and hence, productivity).

This was made possible by a precisely matched package of additives, the active agents of which are ideal for high-speed machining in all different temperature ranges. A special high-pressure additive assists the complex chemical processes and thereby brings about the desired result.

ORTHO NF-X, together with the new MOTOREX CONTACT products for all machining processes, is the result of the continuous research and development of MOTOREX AG.

Convincing: the end result

The attention of those involved was particularly drawn to the machined workpiece and the condition of the tool. Both were measured and assessed for their precision. In the case of the manufactured shaft, all the dimensional specifications were complied with or even improved on. Even the high surface quality of Rz 1 convinced the specialists.

As regards the tool, the use of the cutting oil, ORTHO NF-X considerably improved the useful life of essential components, such as the inserts, through the application of an exceptionally thin and extremely temperature-stable lubrication film between the guide shoes and the tool body.

We would be pleased to provide you with further information on:

www.motorex.com and
www.mapal.ch

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