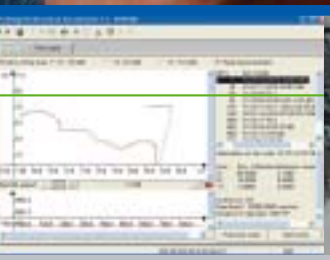
DECO Magazine 33
2/05
JUNE
ENGLISH

DECO reveals new prospects to the multimedia...

TB-DECO 2005: Save 10 % on programming time!

The Iscar SWISSCUT tooling system...

MOTOREX Technology meeting




Summary

Think **parts**
Think **TORNOS**

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TORNOS SA
Rue Industrielle 111
CH-2740 Moutier
Internet: www.tornos.ch
E-mail: contact@tornos.ch
Phone +41 (32) 494 44 44
Fax +41 (32) 494 49 07

Editing Manager:
Pierre-Yves Kohler
Communication Manager

Graphic & Desktop Publishing:
Georges Rapin
CH-2603 Péry
Phone +41 (32) 485 14 27

Printer:
Roos SA, CH-2746 Crémines
Phone +41 (32) 499 99 65

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Ideas to be adopted...

The TORNOS week of innovation

From 19th to 23rd April TORNOS held a large-scale event which combined the general meeting of shareholders, a press conference attended by 40 journalists from around the world and an internal exhibition. The purpose of the exhibition was to launch the new DECO 8sp and the MULTIDECO 32/6c as well as additions to the well-known TORNOS DECO [a-line] and MULTIDECO range of products. The company also took the opportunity to introduce the latest features launched by the manufacturer - the MULTIDECO 20/6be. During the week, more than 1000 visitors from 17 countries came to Moutier in Switzerland to discover the new TORNOS innovations.

Innovations to provide better solutions to customer requirements

In our previous issue, we discovered from the interview with Messrs. Nef and Cancer that innovation at TORNOS was based on stringent analysis and listening to customer requirements, so that new solutions could be discovered and validated, thereby giving TORNOS customers the competitive edge.

How can this concept be applied to DECO Magazine?

We repeated a survey finalised at the end of 2004/beginning of 2005. Its main objective was to validate our choices and point us in the right direction. It related to the different readers of the magazine, mainly clients but also our partners and opinion leaders. The results are highly encouraging since they show that the magazine is well received in the trade and it actually meets specific requirements.

A few comments

- There is a very strong demand from readers for information relating to solutions associated with TORNOS products (for example, the articles on «Amsonic», «Utilis» and «Motorex» in the latest issue, and on the «Iscar» article in the present issue).
- With respect to the advertising pages, you requested the publication of targeted adverts providing much information. We shall continue in this direction without increasing the advertising pages to articles ratio.
- As for distribution, this is regarded as progressing satisfactorily!

The future

I am extremely pleased with the large number of people who participated in our survey and would like to thank them for having spent the time so that we can improve the DECO magazine. Thank you!

We are working towards achieving editions that offer good value and we are always open to receiving your ideas, criticisms and observations. Hence, with the passing issues, you will see new headings and new items. Would you like to say something? This is your magazine – do not hesitate to contact us at decomag@tornos.ch

We look forward to your comments.

Pierre-Yves Kohler
Chief editor

PS: New! From today you can download all DECO magazine numbers from 3 to 33 at the following Internet address:

www.tornos.ch/dnld-decomag-e.html (in French, German and English. Please ask if you require Italian and Swedish).

Innovation:

The current topic at TORNOS for 2005!

Following the presentation of the TORNOS DECO 8sp, MULTIDECO 32/6c and MULTIDECO 20/6be, lathes during a week-long exhibition at Moutier at the end of March, TORNOS would now like to announce other innovations, but first of all…

MULTIDECO 20/6be

Let us go into more detail about the MULTIDECO 20/6be. This machine was presented to the international press on 19th March and to all TORNOS customers on the 20th March. To find out a little more about the very positively received machines, we met Mr. Rocco Martoccia, the product manager of the multispindle division.

DM: Good day Mr. Martoccia! You have just presented the MULTIDECO 20/6be. Can you tell us something about this new product?

RM: We started on the basis of market demand and the ability to execute simple parts. We looked for solutions that would enable our customers to produce such parts under the best possible economic conditions. For us, the solution was quite simple. Based on a MULTIDECO 20/6b, we were able to offer a version without all the usual properties of the machine that were intended for complex operations.

DM: So in other words, this is a special offer to produce simple parts but what about the normal properties of the MULTIDECO – did you have to sacrifice certain parameters to produce this "e" version?

RM: Absolutely not! We are looking at a machine that is less highly equipped but the base is a MULTIDECO fitted with all its strong points. To quote a few examples, we carried out precision tests. By machining a test piece with a diameter of 8 mm for 16 hours production, without any corrections, we obtained a diameter dispersion of 0.006 mm!

As regards the rate of productivity for simple parts, we were able to increase this by simplifying the part holder. This meets a specific market demand for simple parts and during our internal exhibition we were able to achieve a production rate of 32 parts per minute for one piece of steel. We have the capacity to produce up to 40 parts per minute with brass.

Neither precision nor productivity was sacrificed. On the contrary, this machine is "light" with respect to price.

DM: What markets are you aiming at?

RM: Many sectors of activity are producing simple parts, where a machine tool that does not have all the characteristics of a "normal" MULTIDECO 20/6be is quite adequate. Initial interest was mainly from two sectors. The first from the industrial fluid sector (liquid and gas), since we have the facility to produce connections at a high output at highly competitive unit prices. And secondly, we were approached by the automotive sector to execute simple parts, which nevertheless still require a high degree of precision.

These sectors are constantly under pressure to lower unit prices. For them, it meant finding the most cost-effective solution to produce the best price-to-productivity ratio. The MULTIDECO 20/6be provides the perfect solution.

DM: In concrete terms, what are the differences between the two MULTIDECO 20/6b models and what are the benefits to the clients ?

RM: The technological bases and tooling are the same, as is the programming system.

The light version is fitted with single spindles and the end-machining facilities are limited. On the display model, we also had a simplified part holder that depends on the length of the part being produced. We sell this option as a package for a net price. This really is a solution to execute simple and precise parts at a very competitive price.

DM: What is the availability of this machine ?

RM: It is already on sale! We shall also exhibit it at the EMO exhibition.

DM: Mr. Martoccia, thank you very much.

At the EMO Show in Hanover, the company will present the following innovations: the 2nd lathe of the [s-line] range, the DECO 20s lathe with tailstock – and the MULTIDECO 20/8d, the machining solution for highly complex parts.

DECO 20s

The DECO 20s lathe was designed on the basis of market studies for small turned parts of average complexity, to a diameter of up to 20 mm (25.4 mm). Its development was guided, amongst other things, by the requirements of companies producing parts for the car industry. It also has all the properties to produce parts of mean complexity for the medical, appliance, electronic and connector industries. During the design stage special attention was paid to the ergonomics and to optimising series change and setting times.

To find out more, DECO Magazine met Mr. Alain Flury, the car product manager at TORNOS and the man responsible for this product.

DM: Hello Mr. Flury. I know its still a little early to discuss your new machine in detail, but could you let our readers have a little more information ?

AF: The DECO 20s is the second machine of the [s-line] and consequently has the main properties. It is a lathe with 6 linear axes to produce parts of average complexity and for which the price-to-performance ratio is very good. A common element of all [s-line] products is the rate of productivity. For example back-operations can be fully carried out in hidden time.

DM: You are presenting the DECO 20s as a highly productive solution for the automotive industry in particular but what other requirements could such a machine fulfil ?

AF: Basically, a large machining capacity that is guaranteed by the high strength of the lathe and the power available. Another important element is its versatility – a machine that produces simple parts need not necessarily be stripped.

Innovation:

The current topic at TORNOS for 2005!

The DECO 20s has 22 tool positions and offers excellent inter-changeability.

DM: And what about its use – you said that the ergonomic aspect was considered right at the design stage.

AF: Everything was done to simplify the use of the DECO 20s. The machining area is large and well ventilated and all the tools are pre-set and easily accessible. At programming level we've improved its versatility to meet customer requirements, they can now select the program to suit their preferences.

DM: Well that's a scoop, Mr. Flury. Are you telling us that the DECO 20s is programmable with and without TB-DECO – is this right?

AF: Absolutely! For products of the [s-line] we decided to leave this choice to our clients.

DM: Thank you Mr. Flury. Would you like to add something to conclude this first presentation of the DECO 20s?

AF: We took account of numerous market requirements when producing our latest DECO. We are convinced that it will provide accurate and concrete solutions and I very much look forward to meeting your readers at the next EMO in Hanover (from 14th to 21st September 2005)!

See you soon.

We shall discover more about the DECO 20s in the next edition of DECO magazine.

We shall also be given the very first presentation of the MULTIDECO 20/8d.

DECO 20s: Main characteristics

Max. diameter	20 mm (25.4 mm)
Max. part length (1 clamp)	220 mm
Spindle / counter-spindle power	3.7/5.5 kW
Motorised spindle	Yes
Collets	F20, F25, F30
Max. speed	10,000 rpm
Max. number of tools for operation	14
Max. number of tools for back-operation	8
Numeric control	Fanuc 30i
Programming	ISO/TB-DECO

MULTIDECO 20/6be: main characteristics

Max. diameter	20 mm
Max. length of part (1 clamp)	100 mm
Spindle power	11 kW
Max. speed	6,000 rpm
Torque:	70 Nm
Number of axes	12 (15)
Max. axes for end units	2
Max. end drillers	4
Numeric control	Fanuc
Programming system	TB-DECO

DECO reveals new prospects to the multimedia…

…as well as to the other sectors!

The multimedia sector is always confronted by requirements for smaller, higher performance units running at lower costs whilst achieving increased precision.

The new TORNOS DECO 8sp automatic lathe is the most appropriate response to this request.

Familiar to users of office PCs, hard disks are now finding their way to other applications. As a key element for storing data, the hard disk has not yet found a match to equal the price-to-performance ratio. It is therefore hardly surprising that engineers are now investigating its use in other sectors. Nowadays, the hard disk is not only a high-performance storage area for notebooks and other portable PCs but also serves games consoles, camcorders, MP3 portable players and other gadgets. To achieve this, its size and weight had to be reduced. The current minimum diameter of hard disks available on the market is 1 inch but there are even some with a diameter of 0.85 inches (21.6 mm). Their manufacturers are of the opinion that on the one hand, the hard disk will have no serious competitor for capacities exceeding 1 GByte for many years to come and its uses will increase.

One of the key elements of the hard disk is the series of disks fitted to a shaft and the speed of which may achieve (approx 7200 rpm) depending on model. Today, this type of memory may contain more than 100 million data bits per square inch and the reading head floats at just 0.014mm above the disk. These figures allow you to see that the hard disk is not only a high-capacity data storage tool but also a very high precision technical achievement.

A high precision drive

In order to respond to the technological requirements of storing and reading data and to ensure silent running as well as high speeds of hard disk rotation, the drive with its shaft and bearing must respond to precision criteria that exceed the very demanding requirements of the horological sector. The tolerances for these parts are in the order of one or two microns of error in geometric form: circularity, backlash, flatness and even the perpendicularity of a diameter in relation to a surface. With respect to the 2 maximum dimensional tolerances, 4 microns are permitted for the diameters and specific lengths.

Conventional three-stage manufacture

Nowadays, these parts are manufactured on different types of machines, especially the CNC single-spindle lathes, with headstock or tail stock, working with a guide bush. Up to now, a single process stage would be wholly inadequate if you were to start with a bar made from untreated material and end up with the finished part of the required precision. In most cases, these parts would have to be reworked because of the highly stringent dimensional and geometric requirements. Consequently, immediately after the first machining operation parts would have to be reworked on precision lathes to finish the internal machining before being passed to the centreless grinding machines for external finishing.

The difficulty lies in the fact of having to pass through three processes, thereby entailing higher manufacturing costs owing to the increased production time and additional handling operations. What is more, these handling operations are quite tricky owing to the size of the parts, which rarely exceeds 2-3 mm.

Square parts

Machine tool manufacturer TORNOS is acknowledged as being a supplier of automatic lathes used in the manufacture of long and often very fragile parts. Were this to apply to the DECO product range, hard discs demanding the utmost precision with lengths and diameters up to 8 mm and 3 to 5 mm respectively would undoubtedly require a suitable machine. For such products, TORNOS is offering a new CNC single-spindle automatic lathe working without guide bush to meet all the criteria specified by the suppliers of shafts and bearings for small hard discs.

A complete lathe for compact parts

Before launching into the design of the DECO 8sp, TORNOS conducted an in-depth market survey. Visiting the main components manufacturers in Asia enabled the design engineers to see how these parts were being manufactured today, what current manufacturing means were being deployed and what future means were required. They were also able to establish the criteria these machines had to meet. One of these criteria was that the machine had to be very compact. What the design engineers discovered was that clients were looking for machines that required the smallest amount of floor space for reasons of cost and workshop organisation.

With its new lathe, TORNOS targeted a specific market for parts with precise dimensions. Consequently, the concept as a whole was geared to part dimensions for hard discs. The first feature of the DECO 8sp is the shortened length of travel. In fact, long working strokes serve no purpose whatsoever – the risk of error is greater both in the servo-controlled and mechanical section. The structure of the machine was conceived to provide outstanding strength – the backbone of accuracy. It comprises a minimum of large

DECO reveals new prospects to the multimedia… …as well as to the other sectors!

sections and inertia. The new machine is very compact with a length, depth and height of 1200 mm, 800mm and 1600mm respectively. This size corresponds to the dimensions of the old cam-operating machines.

Despite its small size, nothing has been left to chance with respect to design and technological innovations. The mechanical parts used in guiding the axes and spindles mean that this lathe can guarantee the best quality both from a surface quality and precision point of view. All elements – from the base to the thermal stabilisation system – have been refined to obtain ultimate machine stability.

Increase quality to reduce reworking

The aim of industrial parts manufacture is to minimise handling and finishing work. The designers took this on board with the DECO 8sp. Increased precision in turning results in reduced or the elimination of reworking.

Precision first and foremost

The new DECO 8sp automatic lathe is shown as being a very high precision lathe. In order to be able to produce parts nudging towards tolerances of one thousandth of a millimetre, it has to be strong. To this end, the monoblock frame was made from grey cast iron, a material that eminently absorbs vibrations whilst increasing strength. Another element that increases the strength of the machine is the tool system support; the size of its monobloc tool holder plays an active part in achieving this strength by absorbing any vibrations generated by turning. The machine is fitted with 2 independent tool systems – one comprising a cross slide with 2 numeric axes and a pair of precision tools controlled by a third independent numeric axis, which alternatively controls the tools by way of a precision cam.

Thermal stabilisation of the structure

Another important aspect of this lathe is its thermal stability. The cutting oil system that circulates throughout the machine helps to minimise the effects of heat when the machine undergoes a cold start-up following a day's downtime to change the tools or work in the production area. The cutting fluid is thermally controlled keeping the lathe at a constant temperature. With a conventional lathe, warming up can sometimes take half an hour or more. The cutting oil circulation system means that production temperature is reached far more quickly and parts can be produced immediately without dimensional change caused by the effects of heat – thereby immediately improving the productivity of the lathe.

Conventional tooling

The design engineers of the machine do not specify any particular tooling. The design allows for the use of standard, commercially available tools. The aim is to simplify the use of tools as far as possible, without having to have recourse to special tooling. The machine operator may use the throw-away carbide inserts that are widely available. The same also applies to the tool holders and other auxiliary elements required for turning.

In the hard disc sector, part production is based on very large series runs. Consequently, the machine is designed to meet these requirements of precision and productivity.

The machine has 5 numeric axes with twenty one tools. This means that fairly complex parts can be produced. Thanks to the large number of tools, it is possible to proceed with rough and finish machining during the part machining cycle. This architecture of 5 independent, numeric axes and one reworking spindle means that machining operations can be carried out at the rear of the part, without this necessarily leading to an increase in part production time.

Achieving more without the guide bush

Another feature of this lathe: The designers dispensed with the guide bush. Whilst it was important for the horological sector to have a tailstock with guide bush to prevent long and delicate parts from bending, the new lathe is designed for short parts. With such parts, the problem of bending is not an issue. From now on, the machine will have a very high technology spindle of ultimate strength without the guide bush. Here too, the operating architecture is made up of fewer elements but its strength and reliability are far superior.

As this lathe works without a guide bush, this means that one can make maximum use of the entire bar length. It should be pointed out that a lathe operating with a guide bush loses a relatively significant amount of material of each bar. Turning operations without guide bush result in this loss being reduced to at least 35 mm. This is quite an important consideration, because, for the markets targeted, the cost of materials represents roughly half of the production costs of the parts.

If, for long parts, the principle of a tailstock operating with a guide bush is the only possible solution, then for parts of small, very precise dimensions and short lengths, the same principle of a tailstock for bar feeding but excluding the guide bush, is completely unrivalled.

Spindle with integrated motor

The new automatic DECO 8sp is designed for large series runs. It offers another feature created by TORNOS: a spindle with integrated motor for the spindle and counterspindle. This concept is yet another element in finding the ultimate precision required for producing the parts described. The use of motorised spindles leads to another marked reduction in moving parts on the machine. This upholds the efforts needed to obtain the precision required. What is more, the cutting oil circulating around the motors means that the latter are maintained at a low and constant temperature to avoid the effects of thermal expansion, which would have a negative influence on lathe precision. This technology coupled with an ingenious spindle guide, largely contributes towards achieving the extreme precision obtained from this lathe. The choice of integrated spindle motors also leads to greater simplicity whilst reducing acceleration and deceleration times to further increase productivity. Another important aspect is the quiet operation of this high-speed machine – do not forget the spindles can turn at a rate of 15,000 rpm thanks to the use of the spindle motors.

Control and motors from the same source

To control the DECO 8sp, TORNOS chose a numeric control manufactured by Fanuc. As a result, TORNOS remained involved in the range of numeric controls which are used in all the DECO and MULTIDECO ma-

DECO reveals new prospects

chines. As the lathe was essentially destined for the Asian market – where 70 to 80 % of components for hard discs are manufactured – this control meets the expectations of these customers, who are familiar with this type of numeric control. Fanuc is also well known and respected in the European and American markets.

The control selected for the 30 series is the latest version of Fanuc numeric control. The spindle and axes motors and other amplifiers are also supplied by Fanuc. By deciding to use a single supplier for

the control and servo-control of the lathe, TORNOS dispensed with the risk associated with conformity, which proved very beneficial both at machine operator level and for maintenance purposes.

For short and complex parts

The DECO 8sp was originally designed to meet the requirements of manufacturers producing hard discs. Seeing the stringent demands of this sector, it goes without saying that any other application from other sectors, like the electronics, medical, automotive and horological sectors can be executed on the new TORNOS lathe, provided that the parts have a morphology adapted to working without a guide bush – in other words having a diameter to length ratio not exceeding 1:3.

Considerable know-how

TORNOS has a range of machines available, which are able to cover a broad range of parts in terms of dimensions or machining facilities. Unlike the European market, the Asian market is geared towards simple machines that are dedicated to specific applications. Their means of production must provide a targeted solution to the specific requirement of the moment. TORNOS is responding to this demand with its DECO 8sp, its technology and extremely competitive price.

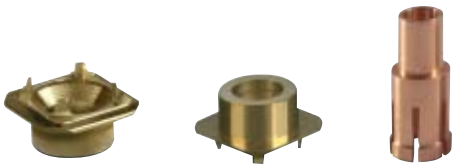
TORNOS has an R&D facility at its works and teams of specialists who are achieving specific market demands as a result of their know-how. TORNOS also co-operates with local companies and specialist university faculties.

to the multimedia…

…as well as to the other sectors!

Medical technology

Electronics industry



Watch industry

HDD

Automotive industry

E

TB-DECO 2005

Save 10 % on programming time!

Nowadays you can simply change from TB-DECO V6 to TB-DECO 2005.

TORNOS is offering a new basic TB-DECO software version, available free of charge when you purchase a new DECO or MULTIDECO from May 2005.

If you would like to transfer to this intuitive new programming environment with improved ergonomy, version 6 can always be ordered.

The time required was measured during tests carried out in actual programming situations. The new TB-DECO 2005 functionalities revealed their superior qualities, purely from a quantitative point of view – the time needed for programming could be reduced by 10 %. From a quality aspect, the operators experienced a marked feeling of convenience and found the program to be very user friendly.

TB-DECO 2005 is much faster and user-friendly, as demonstrated below:

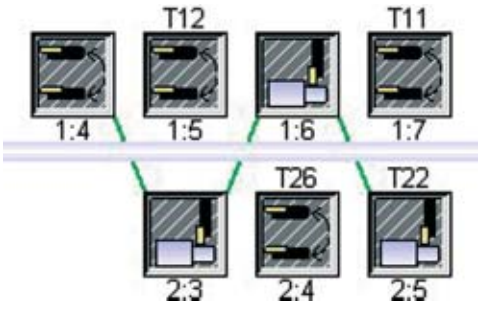
More Microsoft Windows® functions

Make full use of the user-friendly Windows® environment using:

- The undo / redo functions.

- The "Select all" function applicable to both the ISO code and to the program (operations + synchronisations).

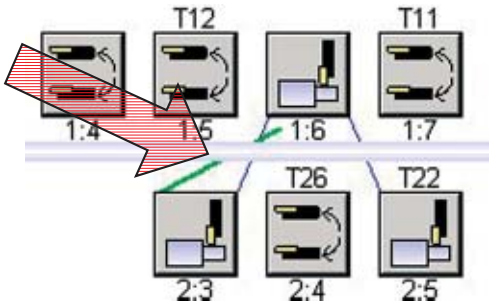
- The copy/paste functions that not only apply to the operations, but also to theirs synchronisations.



TB-DECO 2005

Save 10 % on programming time!

◆ Synchronisation change using the mouse and the "Shift" key.



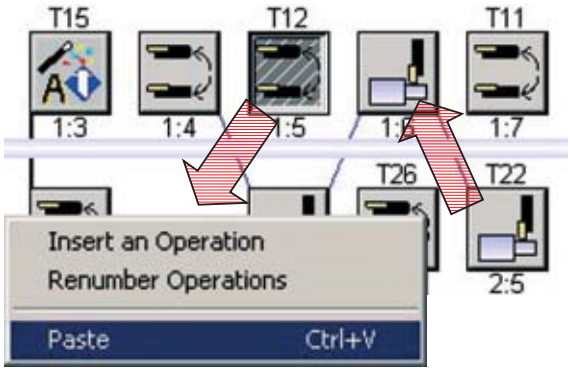
◆ Deleting a synchronisation with the "Delete" key.

Writing the high-performance ISO code

Benefit from simple and more automated ISO code management:

◆ Rapid entry of shifts thanks to the automatic display of axis identification. Instead of entering "G1 X1=", write "G1 X", TB-DECO will automatically complete the "1=".

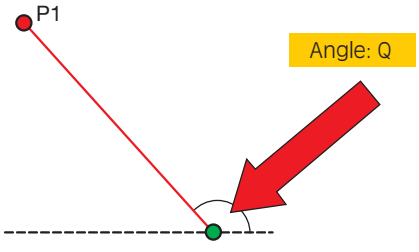
◆ Automatic axis identification change when copying an operation to another tool system.



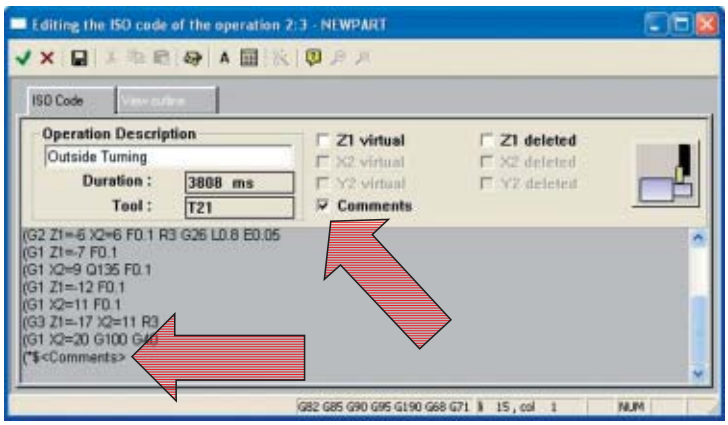
For example: X1= becomes X2= or Y2= becomes Y1=

◆ Opening several operating windows in the same program.

◆ Programming an angle directly in the ISO code.
For example: Q135.



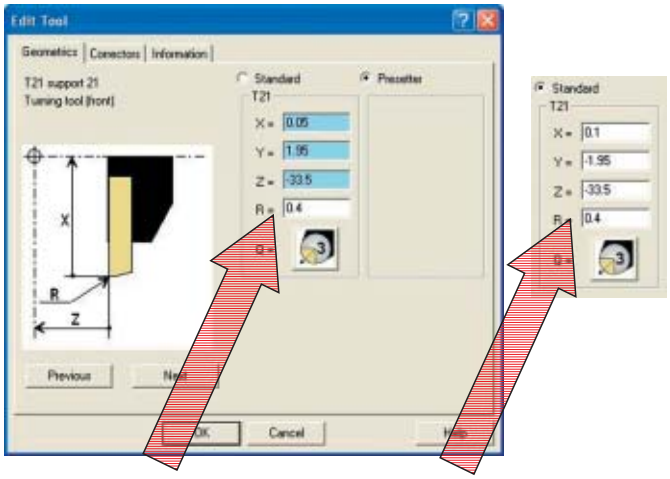
- Definition of excess thicknesses for facing in the global variables, so as to avoid programming original changes for the operations.
  See TB-DECO tips in the last DECO Magazine.
- Complete or partial ignoring of an operation by a mere "click" to facilitate setting-up, for example.



Intuitive tool geometry management

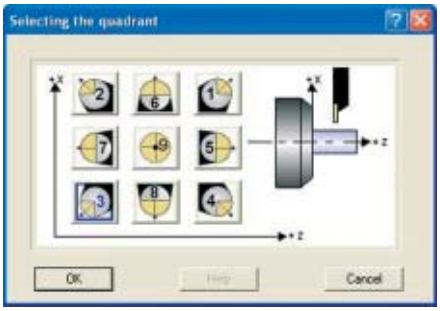
No need to search for tool geometries for your DECO machines:

- Standard geometry display when creating a tool.
- Direct entry of tool geometries displayed on the pre-setter.



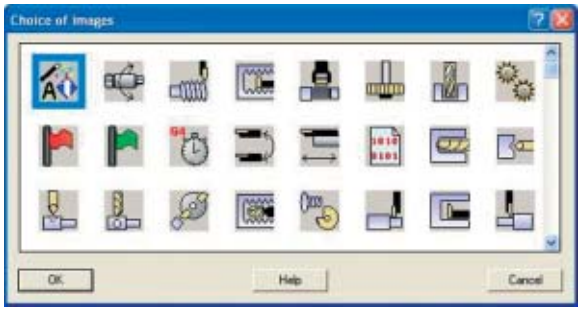
Values entered Values calculated

- Graphic selection to compensate for the radius.



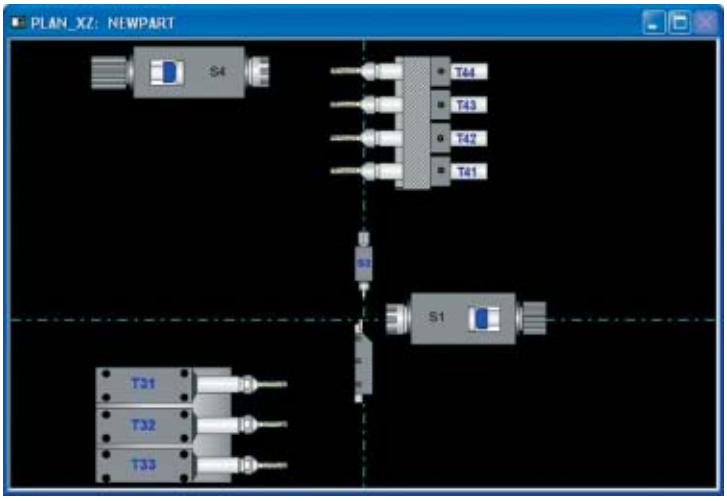
And what's more ...

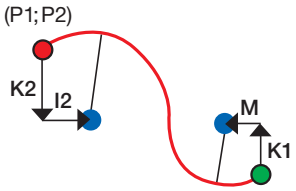
You will find dozens of other improvements in the new 2005 version, such as a greater choice of icons for your operations.

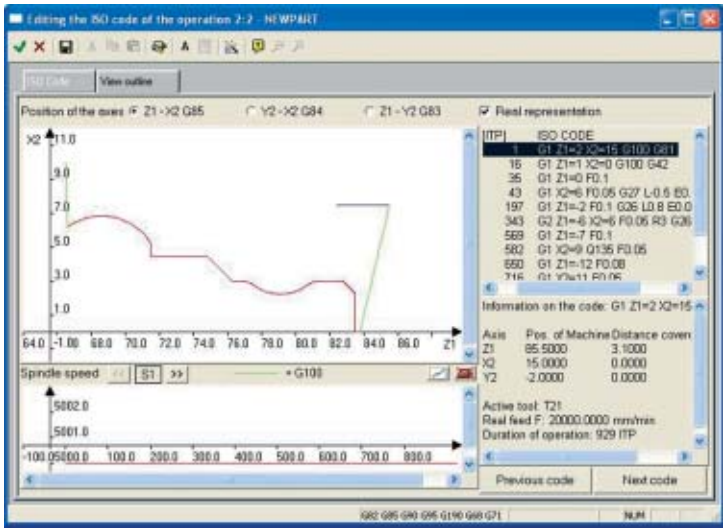


TB-DECO ADV 2005

Together with the TB-DECO 2005, TORNOS is also offering the TB-DECO ADV 2005 as an option. This additional software has many extra functions to allow you to go that bit further.







If you want to go for a solution without compromise then choose the graphic assistants with the TB-DECO ADV option.

- Graphic assistant to program the contour (for example: calculating a tangent point).
- Assistant to program the macros (for example: thread chasing).
- 2D simulation.
- Graphic display of the programmed contour.
- Sharing only one tool catalogue for several parts.
- PELD: Extension of the programming language for the DECO and MULTIDECO machines.
- Essential tool for easy programming of:

  a) A part family.
  b) Complex parts.
- Interface for commercially available pre-setter with incorporated PC.

The TB-DECO ADV 2005 is now available. If you have any questions or comments, Mr. Wyss, head of product software, is available at the following address:

wyss.m@tornos.ch

New options:

Greater potential!

Since 1999 DECO Magazine has presented countless options and this served to illustrate the desire of TORNOS to continue to offer its clients more. In this edition, you will learn how to clamp parts delicately on the DECO 13a and how to extract the chips whilst milling with the DECO 20a.

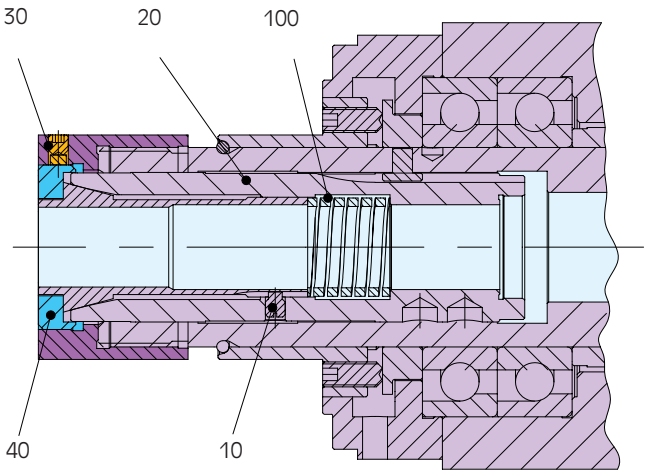
Adjusting the clamping force of the counter-spindle on the DECO 13a.

Option: Collet adjustable from the front

This new device does not currently have an option number.

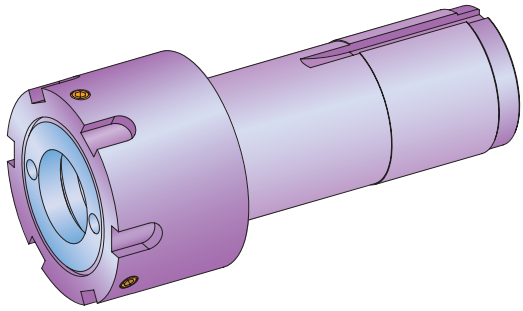
Application

When back-machining parts that are not optimally clamped (for example, on a thread) and where the material is susceptible to deformation (pipe with a thin wall, for example), it is necessary to adjust the clamping force of the counter-spindle. The device presented allows this to be done directly and simply from the front of the counter-spindle.



Strong points

- The clamping force is mechanically reduced thereby guaranteeing perfect repeatability (as opposed to a pneumatic solution).
- The device is fully compatible with mechanical spindle locking, which was not the case with the previous unit used to reduce the clamping force by adjusting from the rear.
- All adjustment operations are executed from the front of the counter-spindle – hence providing easy access!



Technical characteristics

The clamping nut comprises two sections to allow for simplified adjustment from the front.

All types of chucks can be used with this particular device.

Compatibility:

DECO 13a and DECO 13b. Additional machines on request.

Availability:

Ex-works and immediately retrofittable.

DECO 20a, DECO 26a: radical drilling and milling!

Option: ultra-rigid milling and drilling unit

This new device does not currently have an option number.

Application

In order to make full use of the power of the DECO 20a and 26a when removing vast quantities of chips, TORNOS is now offering an "extreme" milling and drilling unit.

Strong points

- Extremely rigid – built unit for milling operations using a steady to increase precision and strength.
- Enables fast feed rates to be set.
- Guarantees high surface quality.
- Can be deployed in operating and back-operating modes.

Technical characteristics:

Max. torque: 20 Nm.

Max. speed: 4000 rpm.

Reduction ratio compared with drive motor: 2:1.

Use of ESX 25 clamps (max. outside chucking diameter 16 mm) or mandrel,.with diameters of 8 and 13 mm for circular millers.

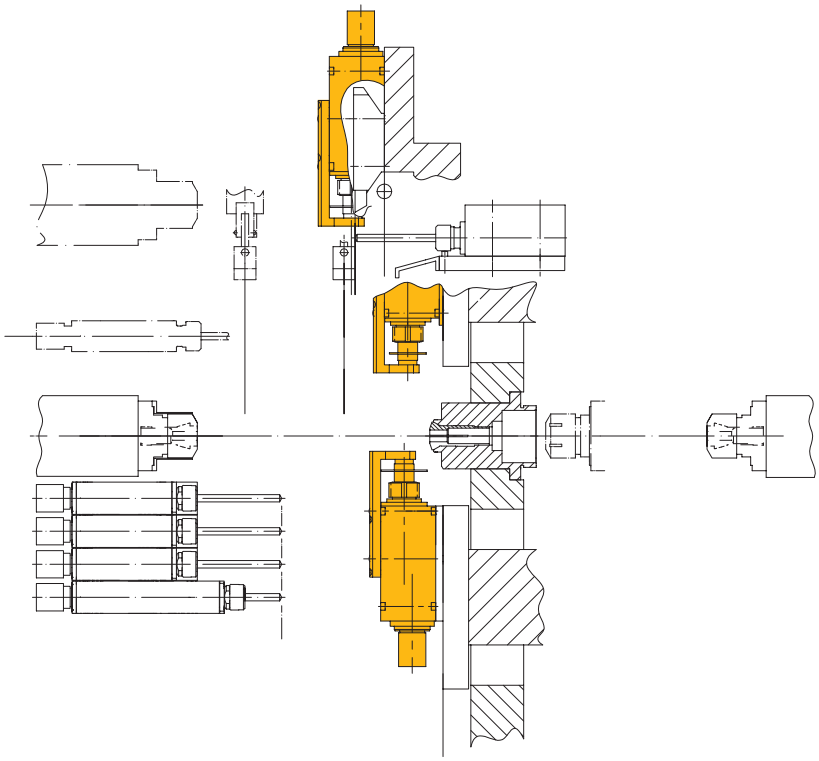
Max. miller diameter: 63 mm.

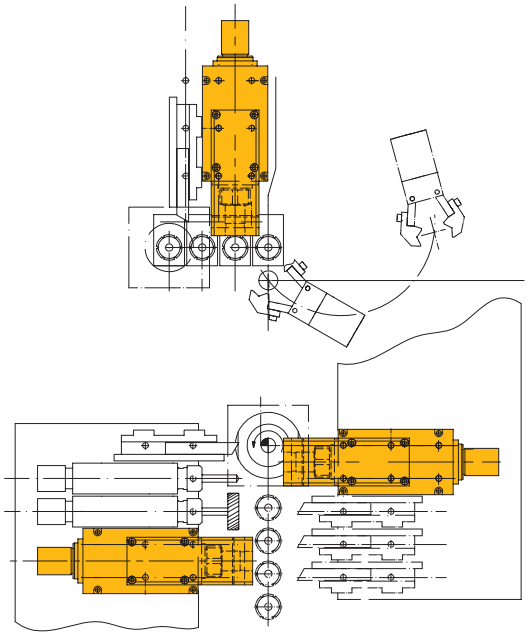
Support

This unit has 2 tool positions.

Availability:

Available with immediate effect! If you are interested, please contact your usual TORNOS dealer.





Parameterized programming

In DECO magazine number 23 we discussed a parameterized programming example that could be used for version 6 of TB-DECO. We will now return to the same example, but this time we will apply it to the TB-DECO ADV.

The PELD (Programming Extended Language for DECO) programming language applied to the ADV version is not only more simplistic but also more powerful than the one we used in version 6 of TB-DECO.

PELD programming helps simplify the work of operators who have to program part families. Only one program is required to execute several similar parts. The use of variables significantly reduces programming errors.

Reminder: **S**ome variables can be modified by the operator. These are:

The global variables #3048 - #3090

Other variables can be used but are automatically modified when using PELD language. These are:

Variables #2129 - #2255

For information: **T**he scope of variables #3000 is the part. Their values are saved when the PART file is shut down.

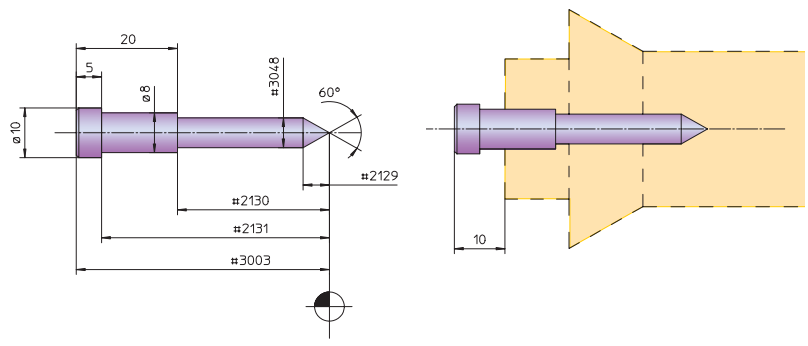
The scope of variables #2000 is the program. This is why it is essential to work out these variables at the start of the program (op. 1:1)

Comment: **I**n this example, the user must change the contents of variables #3003 (part length) and #3048 (pivot diameter).

Programming the contour in operation 1:7 is not done using the values but rather with the help of variables, the value of which was previously worked out in operation 1:1.

The part pick-up distance contained in variable #3009 will also be calculated in operation 1:1.

Part being executed



Variables to be modified by the operator

#3003: part length

#3048: pivot diameter

Variables calculated by the system in operation 1:1

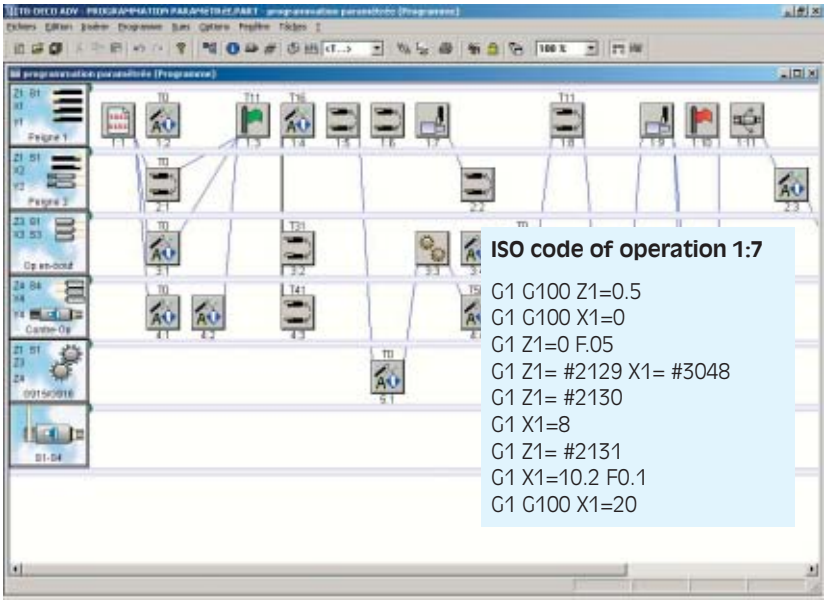
#2129: $\frac{\#3048/2}{\text{TAN } 30°}$

#2130: #3003 - 20

#2131: #3003 - 5

#3009: #3003 - 10

TB-DECO program



ISO code of operation 1:7

G1 G100 Z1=0.5
G1 G100 X1=0
G1 Z1=0 F.05
G1 Z1= #2129 X1= #3048
G1 Z1= #2130
G1 X1=8
G1 Z1= #2131
G1 X1=10.2 F0.1
G1 G100 X1=20

Contents of operation 1:1

The program can be executed in two different ways:

1st solution:

```
[                              // " [ "      → start of PELD programming
#2200:=RAD(30);                // #2200      → 30° radian conversion
#2201:=TAN(#2200);             // #2201      → 30° tangent
#2202:=#3048/2;                // #2202      → pivot radius
#2203:=#2202/#2201;            // #2203      → cone length
#2129:=-#2203;                 // #2129      → cone length - negative
#3049:=#2129;                  // Enables a check on the precision of the calculation in
                               // the global variable #3049

//
#2130:=-(#3003-20);
#2131:=-(#3003-5);
#3009:=(#3003-10);
]                              // " ] "      → end of PELD programming
```

2nd solution:

```
[
//
#2129:=-((#3048/2)/TAN(RAD(30)));  // #2129      → cone length - negative.
#3049:=#2129;                      // Enables a check on the precision of the
                                   // calculation in the global variable #3049

//
#2130:=-(#3003-20);
#2131:=-(#3003-5);
#3009:=(#3003-10);
#3049:=#2129;
//
]
```

In the 2nd solution, the entire calculation is executed on the same line. It is therefore not necessary to memorise each intermediate calculation for the variables.

IMPORTANT: The syntax must be scrupulously adhered to
PELD programming and comments must be separated by: //
PELD programming starts with: [
and ends with:]

In the next DECO magazine, we shall show another example of parameterized programming.

The UK market benefits from

In the highly competitive UK market the cost of products is often the most distinctive attribute when purchasing. This can provide a false economy as quality can sometimes be compromised for cost. The key to success for the UK manufacturer is to provide very high quality with a competitive price.

The successful balance can be achieved by developing strategies to add value to customers and a good quality to price ratio. Another option is to benefit from the evolution of technology that allows companies to keep the pace of the markets needs! The DECO magazine met two very different TORNOS customers to demonstrate how this second approach is benefiting UK customers.

WATSON MARLOW Bredel PUMPS

All pumped up!

Part of the London Stock Exchange listed Spirax-Sarco group; Watson-Marlow Bredel Pumps of Falmouth is the worlds leading manufacturer of peristaltic pumps. It has obtained this enviable position through product development, company acquisitions and above all investment in technology.

Technology the company has purchased in recent years includes a TORNOS DECO 26 (32 mm) and a DECO 20a single spindle turning centres. The acquisition of the DECO 26 in 2001 was the result of the company subcontracting almost £80k per year in turned parts. The DECO 26 enabled Watson-Marlow to bring this work in-house, fully justifying the TORNOS purchase. Since the purchase of the machine the workload gradually increased with the general batch runs varying between 500 - 7,000 parts.

The arrival of new orders made the company realise it needed another single spindle automatic lathe. In depth feasibility studies complimented by the flexibility, rigidity, productivity and overall success of the DECO 26 influenced the company into installing another TORNOS over competitor machines. In July 2004, Watson-Marlow installed a TORNOS DECO 20a.

Production Engineer Harvey Crook comments: "The company looked at various machines and the TORNOS had more tool stations and significantly more power in the driven tooling units than competitor machines. This was a major factor for selection as we conduct a significant amount of milling on our turned parts."

TORNOS technology

"**A** major component we produce is a Stainless Steel drive shaft, which has a slot machined with a slitting tool. The speed, power and rigidity of the DECO significantly reduced cycle times on this difficult operation," says Mr. Crook.

The introduction of the DECO 26 and DECO 20a has reduced machining times throughout the machine shop. This can be seen with a stainless steel hexagonal component that was previously machined on an alternate single spindle automatic lathe at Watson-Marlow. Previously machined in 3 minutes, the DECO 26 completed the part in 89 seconds. Another example is demonstrated on a Stainless Steel shaft previously machined in 2 minutes 19 seconds, a time reduced to 65 seconds on the DECO 26. This productivity is mirrored on the DECO 20a; it produced a counter bored roller from Nylatron in 22 seconds compared to the previous time of 56 seconds.

"**T**he acquisition of the DECO 26 also gave us the additional flexibility that enabled us to make better use of lights out running. Our machines always could run lights out, but the DECO can run for longer, producing more components and this has given us valuable extra capacity" continues Mr. Crook.

"**A**nother bonus of selecting the TORNOS was the operating software. The TB-DECO software is very user friendly and our operators picked it up in no time. Both machines run off the same software. This has enabled operators to have familiarity with both machines. It also makes inter-changeability more feasible with two machines running the same software."

"**T**he increasing familiarity with the TORNOS machines has led Watson-Marlow to consider alternative machining methods to reduce cycle times. This has been fully supported by the TORNOS team that is always on hand to provide sound technical advice," says Mr. Crook.

"**T**he quality of products from the DECO's is exceptional; we previously had an operator continually checking the quality of the parts coming off the machine. It has been a cultural change but employees had to walk away from the machines. Now they inspect parts every 30 minutes," concludes Mr. Crook.

The UK market benefits from TORNOS technology

North East Assemblies (NEA) Ltd

Turning to TORNOS Brings Growth

Another company that has found significant benefits and advantages for its business by using TORNOS machines is North East Assemblies (NEA) Ltd. The companies may be hundreds of miles apart and have completely different manufacturing plants and production set-ups, however the benefits from TORNOS technology remains constant.

From its beginnings as an assembly factory, North East Assemblies (NEA) Ltd of Durham has always kept abreast of technology. In 1997 to increase its competitiveness the company diversified its services to include the production of machine turned parts.

Whilst still assembling components for companies such as Flymo, Sanyo, Black and Decker, and Electrolux many of which included turned parts, fasteners and mouldings, NEA decided to offer the manufacturing and supply of turned parts as an additional service to the existing customer base.

John Smith the Managing Director of NEA realised very quickly that there was a niche market available to suppliers of quality, complex turned parts, the type of components that would be successfully produced only on a sliding head machine.

NEA purchased it first sliding head machine in 1999 a TORNOS ENC164. The success of the ENC164 has since seen NEA purchase three TORNOS DECO 13bi, one DECO 20/26 and a TORNOS DECO 26/32 with another DECO 13bi on order. This success has seen a completely new line of business open up for NEA with its turning of steel, stainless steel, titanium, brass and aluminium.

Managing Director at NEA, John Smith comments: "When looking for machines I needed the ability to produce extremely complex parts without the headache of difficult programming. The TB-DECO programming system is simple and user friendly and because it is Windows based it is very flexible. Another important feature of the TORNOS machines is the powerful driven tooling, which is not found on other sliding head machines."

"**W**e machine in batch sizes from 250 to 100k with bar sizes from 3-32 mm, so flexibility was a key issue and TORNOS give us that critical element. We have also fitted a long parts facility to a DECO 13bi to enable us to turn up to 560 mm in length. Quick turnaround is also important. We can re-set a machine and have it running an alternate job in less than two hours, further catering to our customer's rapid turnaround requirements. There is nothing we cannot make below 32 mm diameter."

"**W**e have been using TORNOS machines for six years; in that time the machines have increased company turnover by 15 % year on year. DECO machines have played a huge part in the success of our production of turned parts. This is partly because the sliding head machines have saved an additional 30-40 % on cycle times in comparison to a CNC turning centre," continues John Smith.

An example of this was the first TORNOS DECO 13bi machine introduced to NEA; The DECO 13bi eliminated 30,000 second operations on one rod component alone each month. The rod required threading at both ends. On original equipment to accomplish this task the operator had to remove the part from the spindle and turn it around for additional threading. The DECO 13bi works both ends simultaneously giving a cycle time of 32 seconds while the previous time was 80 seconds.

Part of the reason the TORNOS machines have contributed so much to NEA's success is the capability and the confidence it has given the company to quote for jobs previously outside its scope. The company now supplies parts to companies nationally thanks to the capacity and capabilities the TORNOS machines.

"**T**he engineers at TORNOS are also very accomplished and can solve the majority of problems over the phone, however if an engineer needs to be called to site they arrive within hours. The technical support is excellent too; they will help solve any technical or programming problems that arise. All these elements combined, show why the TORNOS machines are such an invaluable asset. It is also all the justification I needed for the purchase of the forthcoming DECO," concludes John Smith.

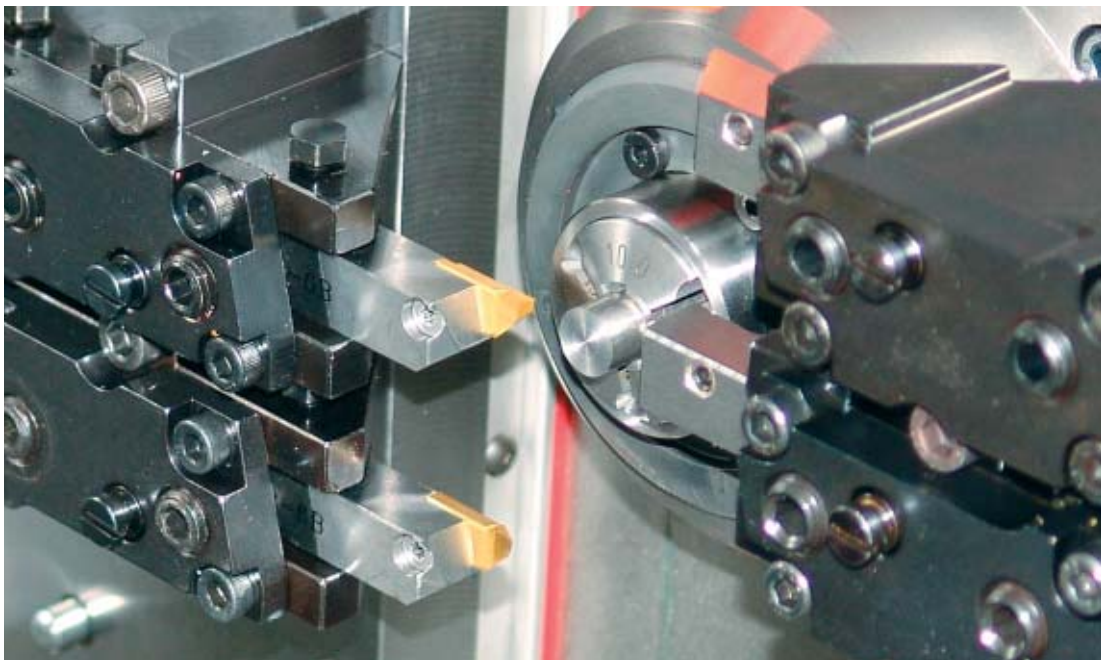
The eagerly awaited arrival of yet another TORNOS DECO at North East Assemblies is a measure not only of the confidence the company has in TORNOS products; it is also a measure of the successful working relationship established between TORNOS Technologies UK and NEA. This relationship has blossomed over recent years and long may it continue into the future.

PUB
Quinx

1/2 verticale

The Iscar SWISSCUT tooling system…

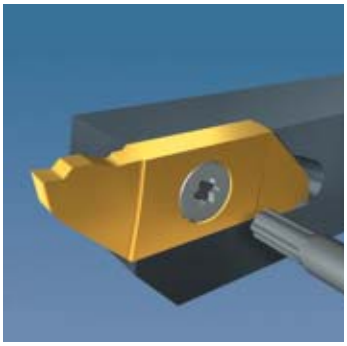
…designed for Swiss-Type lathes, is gaining popularity worldwide. These tools are known for their ergonomic clamping mechanisms and ease of handling. This high precision tooling system is designed to work reliably in a confined space and tough workloads without colliding with other tools on the turret while in operation. Taking all these benefits into account, justifying the great success of the SWISSCUT family.

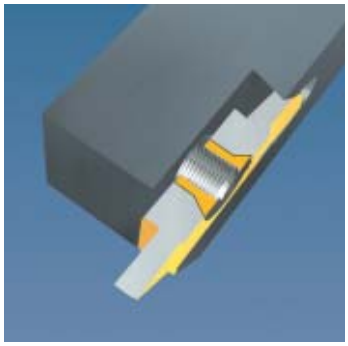


With respect to the SWISSCUT tool holders, a vast amount of human engineering had been invested in their design, in order to guarantee easy and ergonomic engagement with the gang plate. The toolholder has back and front clamping features, both holding the unique designed inserts in an accurate position. The bottom and back prisms on each toolholder, provide better stability and precise positioning of the insert, particularly when applying high shearing loads, or when turning in alternating directions. The major advantages of using these tool holders are their ability to be clamped without removing the toolholder from the machine turret, as well as the ability to clamp and release the insert from either side of the toolholder.

The Iscar back clamping mechanism for the SWISSCUT comprises a threaded bush and a screw which pulls the insert back into the pocket, using the threaded bushing. Moreover, the tightening screw is locked, preventing it from falling out of the pocket during indexing. An alternative option for SWISSCUT clamping is a frontal one, comprising a semi-standard version for toolholder without the bushing element.

The SWISSCUT inserts are made of IC1008 grade, consisting a submicron substrate with TiAlN and TiN PVD coated layers. This combination guarantees excellent performances during the machining operation, as well as prolonging the





tool life. The IC1008 grade demonstrates high toughness coupled with relatively high hardness, which is ideal for machining exceptionally small applications. In addition, the grade also presents remarkable notch wear and built-up edge resistance.

The Iscar SWISSCUT family offers seven unique geometries, which are embedded in the nsert for improved machining performances:

◆ **SCI... 6...-NP SWISSCUT** insert for Groove-Turn.

The insert is designed for grooving, longitudinal turning to one direction, facing and parting applications, on parts up to 16 mm in diameter.

◆ **SCI... 6...-A SWISSCUT** insert for longitudinal turning.

The inserts are equipped with an open chip deflector, which provide superior chip control when machining steel alloys and soft materials.

◆ **SCI... 6...-B SWISSCUT** insert for back turning of steel.

The rake face, superimposed on the insert, is equipped with a chip deflector coupled with a positive rake angle for optimal chip control during longitudinal and profiling operations, applied on steel and stainless steel.

SCI... 6...-E SWISSCUT insert for back turning of non ferrous materials

The back turning insert for longitudinal and profiling operations on non-ferrous materials has a flat rake face with a high positive rake angle.

◆ **SCI... 6...-MT SWISSCUT** insert for threading.

The Insert is designed for left and right-hand threading applications with 60° metric thread (MT standard).

◆ **SCI... 6...-...R/L SWISSCUT** insert for parting.

The Inserts are designed for parting applications, utilizing a

The Iscar SWISSCUT tooling system…

frontal approach angle and a deep chip deflector for efficient chip control.

◆ **SCI... 6...-...N SWISSCUT** insert for grooving

The Inserts are designed for grooving applications with outstanding performances, due to the special rib-type chip deflector.

The recommended machining conditions for undertaking turning and facing operations of components no wider than 16 mm with SWISSCUT tools suggest low to medium cutting speeds, coupled with low to medium feed rates, depending on the insert geometry and the required surface finish quality. This wide range of machining conditions covers all options of machining carbon steel, hardened steel, austenitic stainless steels, heat-resistant alloys, including interrupted cut and other unfavorable conditions. Further information can be obtained by referring to the tooling catalogue or contacting your local Iscar sales representative. For larger overhang, deep grooves and parting of large diameters, DO-GRIP or CUT-GRIP systems are recommended.

In summary, inserts changing 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-style 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 addition, the Iscar SWISSCUT family offers the most effective, superior performances and economical tooling for the Swiss-type machine shop floor. The SWISSCUT family is considered worldwide as best engineering solution for machining small parts, up to 16 mm diameter. Machining of applications exceeding that size require the use of other Iscar families.

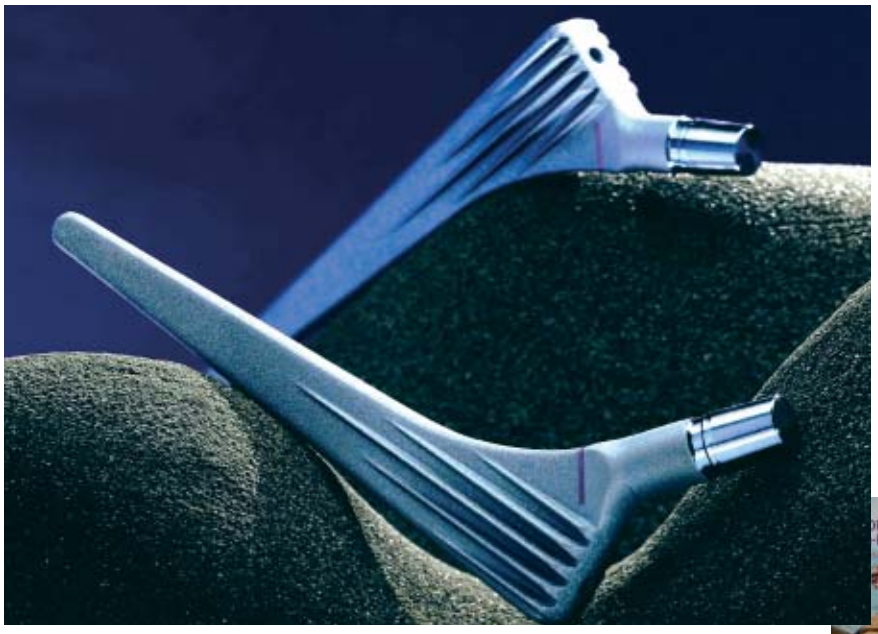
Member IMC Group

www.iscar.com

Network provides solutions:

MOTOREX Technology meeting

We all know that a commercial and technically outstanding solution is made up of several factors. At a recent medical engineering technology meeting MOTOREX highlighted the fact that only an efficient hardware and software network will make the desired result possible.



Only too often a commercially minded entrepreneur puts very high emphasis on the individual technical factors in an organisation. He may buy from the cheapest tool supplier, lubricant or machine manufacturer and once the conditions have been created, it would appear that one hurdle has been overcome and nothing else can stand in the way of successful completion of the order.

Greater and greater demands

However, appearances can be deceptive. Low costs for tools, raw materials, lubricants and machines are suddenly no longer the decisive success factors when a customer from the USA suddenly makes his order dependent on the FDA (U.S. Food and Drug Administration) requirements for validation and documentation. Companies in medical engineering are aware that before, during and after the production process, many requirements have to be considered and accompanying measures taken.

To give attendees of the MOTOREX technology meeting a general overview of the stringent demands on production companies in the medical engineering sector, MOTOREX has organised an international medical engineering meeting at the vocational training centre in Tuttlingen, Germany. More than 140 participants were present at the occasion and the message was clearly understood:

"Only a network of competent suppliers and specialists from all areas can offer solutions to a challenging future"

Faster, more precise and even cheaper

It is not only companies turning small parts that are under pressure. Fortunately, technological development in the industry has not stood still and is making a measurable increase in productivity possible through innovative solutions. The combination of more efficient machine tools, new tools and materials and the high-performance cutting oils of the ORTHO family of MOTOREX make it possible to produce more rapidly, more precisely and even more cheaply.

FDA and other regulations are placing new but extremely stringent demands on the validation and documentation of production orders. Dr. Jürgen J. Stüber presented interesting comments on this subject in Tuttlingen and demonstrated that nowadays, the entrepreneur has a duty to tackle these and other subjects. This will constantly extend his knowledge base. Where necessary, it is always worthwhile consulting a specialist in order to prevent costly mistakes.

The comprehensive subject of parts cleaning

In medical engineering, correct parts cleaning and storage has, for years, been a highly topical subject. This also includes the area of biocompatibility, as well as traceability, documentation and validation. The company, Amsonic & Riobeer, supplied some very interesting facts on this subject at the MOTOREX technology meeting. Today, component cleaning is just as important as dimensional stability!

MOTOREX is planning further specialist technology seminars. The company has set itself the task of creating a platform for the exchange of the latest information from all-important areas. Success-oriented solutions in a production company need a multi-layered network in addition to innovative products and specialist knowledge.

From raw material to parts cleaning and administration: each activity is part of a success-oriented solution.

The processes and requirements of the FDA have been precisely recorded as regulations leave no room for manoeuvre. A much discussed topic at the MOTOREX-technology meeting.

Do you have any questions about a potential solution in your company? MOTOREX will be pleased to offer practical help and advice in the area of lubrication technology. **F**urther information can be obtained from:

MOTOREX AG Langenthal
Customer service
Postfach
CH-4901 Langenthal
Tel. ++41 (0) 62 919 74 74
www.motorex.com

Companies such as Amsonic & Riobeer AG (cleaning systems) and TORNOS SA provided practical presentations on the latest technologies at the medical engineering meeting.

The American Market for Medical Technology [1]

Growth factors for companies

The American health care industry accounts for an increasingly large share of the nation's gross domestic product. On a per capita basis health care expenditures averaged $5'317 per person in 2002. In the same year each household spent $5'373 for food. In 2003 health spending per person was up $353 averaging $5'670 per person. What are the factors that will make the market for medical devices to grow significantly over the next years ?

Among the most important factors to promote the industry's growth ranks an aging population. People 65 and older represent less than 15 % of the total population but account for over 40 % of total health care expenditures. People between age 41 – 59 (the "baby boomers") represent 23 % of the American population. The U.S. Census Bureau estimates that the age group 65 and over will experience a growth rate of 25 % by 2075. This being the case real per capita spending for health care could increase by 24 % over current levels by the year 2030. Demographic trends will ultimately heighten the demand for medical products, especially in the areas of cardiology, orthopedics, urology, neurology, and diagnostic imaging.

Product innovation is fueling the industry's growth. Typically, new medical products are developed to increase benefits for patients, to improve labor productivity, and to reduce patients' hospital stays. According to Standard & Poor's manufacturers of cutting-edge high-tech medical technology will spend an average of 9 -11 % of annual revenues for research and development, versus an indicated national average of 3-4 % of all U.S. manufacturers. Areas with such intensive R&D include cardio-vascular devices, such as stents or implantable defibrillators, orthopedic and orthodontic implants. These high-tech manufacturers can greatly profit from the outstanding quality of Swiss production machinery and of OEMs and suppliers that use Swiss machinery. It should be noted that the number one motif to purchase new machine tools is cost reduction. It is, therefore, no surprise that according to Gardner Research medical technology is the second most important industry when it comes to expenditures for metalworking machinery.

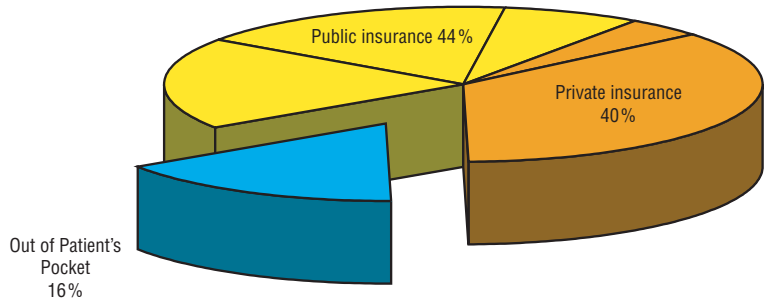


Figure 1:
Where the National Health Dollar comes from. Public and private insurers contribute 84% of Health care expenses.

Reimbursement is an other important driver that can affect the successful introduction or failure of a product. Since most patients cannot afford to pay for medical devices and procedures on their own, they rely on insurance to pay 84 % of all health care expenses *(see Figure 1)*. This being the case, public insurance as well as a large number of private insurance companies

have a major voice in deciding which medical devices and procedures they agree to pay for, and how much they are willing to pay. The public and the private sectors both operate independently of each other, and each arrives at its own decisions which devices and procedures are going to be considered eligible for reimbursement. Medicare, the public health care program for elderly, will increase its payments for orthopedic procedures to hospitals from $100 to $105 Billion for fiscal year 2005. Implantable cardioverter defibrillators will get an increase of 2.1 %. In order for a Swiss medical device manufacturer to successfully introduce new products on the American market, it is important that he understands the various major components, entities, and market dynamics that affect the payment and reimbursement of his products.

The increasing per capita expenditures and the aging population will result in a greater scrutiny of reimbursements in the health care sector. Insurers will intensify pressure on health care providers to reduce overall costs by increasing productivity. Expensive new technologies will have to provide an array of benefits for patients in the sense of major therapeutic breakthroughs on one hand and, an attractive cost-benefit profile such as shorter hospital stays on the other hand.

Challenges

The marketing costs associated with entering into the U.S. medical device sector can be substantial and time-consuming. It is critical to understand how to access potential customers when plotting out market entry strategies. Many elements contribute to defining the distribution channels of the industry. First, there is the need to define the purchasing process and to identify the decision makers that are involved. Understanding the vehicles of communication that are most commonly used by companies to inform potential customers will also contribute to the defining of distribution channels. Specifically scientific citations, presentations and conferences as well as traditional advertising play an important role in communicating to potential and current customers.

Before market entry medical products need approval from the Food and Drug Administration (FDA). This approval is granted for products evaluated as safe and effective. It is important to note that CE marks are not recognized in the U.S. A good starting point for foreign medical device processors who wish to export devices to America is the Division of Small Manufacturers, International and Consumer Assistance (DSMICA). DSMICA is mandated to provide technical and regulatory assistance to small and foreign manufacturers in order to help them comply with the detailed provisions for device standards contained in a law known as the FDCA. Approval can be either by two procedures: If a device manufacturer can prove that a device is equivalent to approved products already on the American market, he will usually obtain FDA clearance via the agents' pre-market notification process known as 510(k). By contrast, the Pre Market Approval Application (PMA) requires a showing that a device is reasonably safe and effective. Such PMA submission typically contains a significant quantity of clinical and animal testing, as well as manufacturing data, all of which is carefully scrutinized by the FDA.

One other important hurdle is represented by the U.S. product liability which differs largely from Swiss standards and requires careful consideration. As a consequence the

The American Market for Medical Technology [1]

Swiss manufacturer needs to fully meet all design standards set by the FDA, make sure that comprehensive quality control is implemented, provide carefully formulated warnings and instructions, follow-up with customers, and file a complete set of records. Issues related to product liability insurance need careful consideration.

Position of the Swiss Industry

The Swiss industry is well positioned to compete in the American medical device market. Zimmer's recent decision to move production capacities from Austin, Texas, to Winterthur, Switzerland, illustrates clearly the competitive edge of Swiss production in a globalized economy. But not only the exceptional quality of Swiss medical devices is in high demand on the US market; U.S. producers who account 43 % of their reported sales on non US markets are among the best customers for Swiss investment goods such as machine tooling.

Martin von Walterskirchen [2]

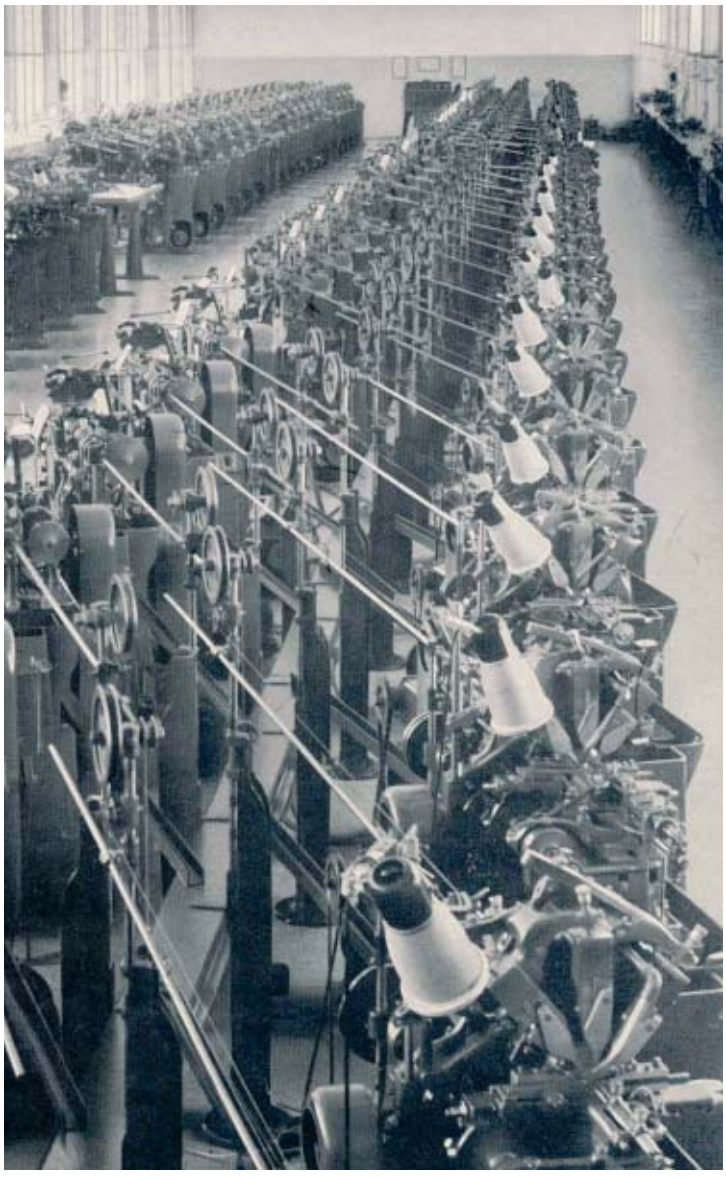
swiss medtech

[1] *„The American Market for Medical Technology – Opportunities and Challenges for Swiss companies" available at www.swissbusinesshub.org*

[2] *Martin von Walterskirchen, Director of Swiss Business Hub USA, previously councilor of the Swiss embassy in Moscow, Swiss chief negotiator for services (GATS) during the Uruguay Round of the GATT, general secretary of the Swiss federal office for foreign economic affaires, personal advisor to the Swiss minister of justice and police and to the Swiss President. The Swiss government conferred him on September 21, 2001 the title of Minister. MA economics (honors) of the University of St. Gallen, Switzerland.*
Contact: martin@swissbusinesshub.org

Our industry is a transformational industry

We transform simple materials into complex, precision machined, highly engineered components. Application of technology is our process. 'Technology' answers the simple interrogative "How?" New technology is the essential question that we face today. Here's why implementing new technology is today's organizational 'Must do.'



1. The skilled and knowledgeable people who know the old technology are retiring or preparing to in the next few years. Young people today want to make their future using today's technology, not to make a living doing things the old way. New technology engages today's talent.

2. New technology improves the organization's portfolio of offerings- broader range, improved capabilities, greater flexibility, higher quality- all of these are the direct payoff of your company's competent implementation of new technology.

3. Shop processes, just like a neglected customer list, will age and diminish over time. Without constant replenishment, eventually we will find ourselves working in shops filled with out-of-date equipment. Museums are nice to visit, but they should never be mistaken for factories.

Our industry is a transformational industry

4. Requirements from our customers continue to get increasingly difficult to achieve with our existing processes and equipment. Tolerances used to be multiple thousandths of an inch. If a shop isn't working today in microns (millionths of a meter) they are behind the time. New technology is necessary to get you there.

5. No-quotes! Look at that stack of orders that you have no-quoted. That is where today's and tomorrow's customers are, and based on your current process capabilities, you aren't with them. Our customer's expect us to say "Yes," today. Often that means stretch capability. New technology gets us "stretch capability" by increasing our range, flexibility, and quality.

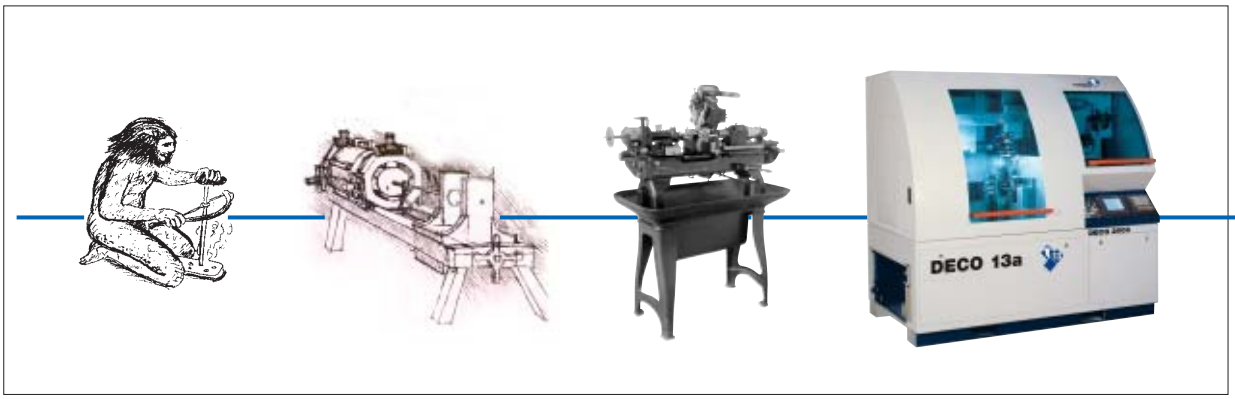
6. Cheaper. Faster. Better. That's what the market demands. How do you get there and still maintain a profitable business? By innovation of your current processes? Perhaps. But new technology may deliver both improved methods of production and catalyze additional improvement throughout your organization. "If you always do what you've always done, you will always get what you've always got…"

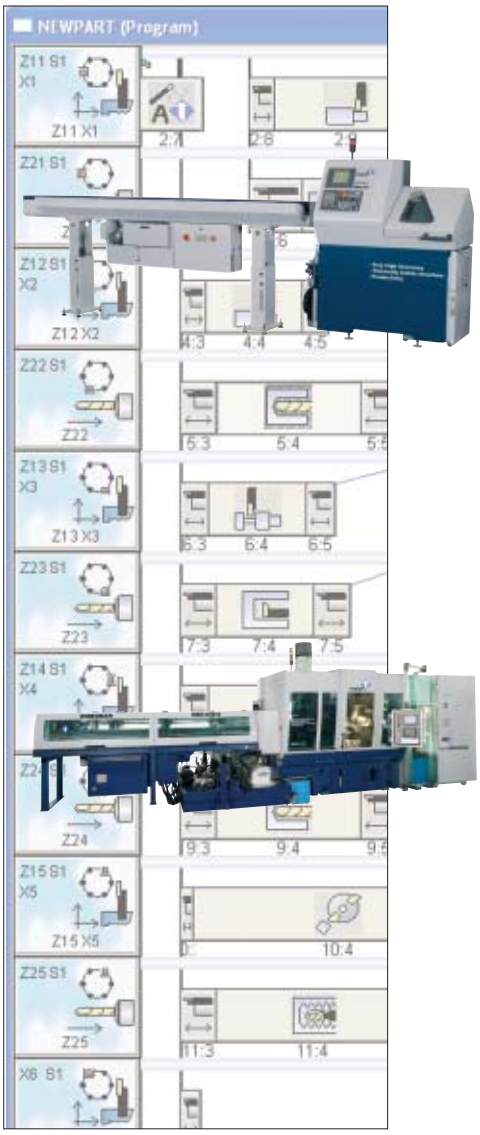
7. Plan, for a change. Plan for a change. Most of us are where we are because our organizations reacted to our customer and market pressures. Why not take a step toward planning our destiny?

8. New technology helps you anticipate your customer's future needs, raising the bar for them to exit your business relationship. It is easy for a customer to depart when the supplier says "Sorry, no we cannot at this time." There is no reason and a high bar to departing for a customer when your organization tells him "Yes, we are capable of doing that, no problem."

9. You cannot benefit if you don't have it. Everyone knows that the best time to invest was 'yesterday.' Today is tomorrow's yesterday. We manage and work in shops filled with the risky investments of the past. Surely we are capable of intelligently managing today's risks by investing in appropriate new technology to assure our shop's continued success.

10. Grow or die. You cannot grow a business by standing still. New technology leverages your existing investments, assets, and institutional knowledge. What does 'doing nothing' do for you ?





We have work, tools, and processes today, because years ago, regardless of the challenges of that day, someone had a positive vision, and the courage to implement it. "If I saw further than others, it is because I stood on the shoulders of giants," applies to each of us today, just as it did in Isaac Newton's day. We are up to becoming today's giants for our business's sustained success.

Our business's greatest assets are the combined knowledge of our people and our institutional knowledge. The role of new technology is to secure yet another dividend from these organizational strengths. Investing in and implementing new technology is not just critical for our industry- it is one of the things that we do best. The high value parts that we make today are not being made on the machines that we used to make cash register parts in the 1960's. Today's airbag, anti-lock brake, electronic, and implantable medical products are being made with recent technology. How will tomorrow's parts be made ? That is up to us. Either we 'walk the talk' about continuous improvement, or the next guy will. I'm for continuous improvement of all of the organizations capabilities, processes, and services. That means new technology. How about you ?

Miles Free
Director, Technology Services
Precision Machined Products Association
mfree@pmpa.org