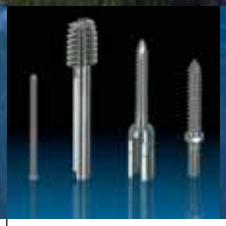
decomagazine

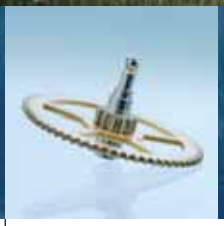
THINK PARTS THINK TORNOS 46 03/08 ENGLISH



How to raise productivity levels when machining orthopaedic and dental implants!

Performance enhancement: Small parts with great potential.

An ever more communicative machine.



We have no wish to do everything, but what we do take on, we always want to do well!

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Tornos Delivers Productivity Gains at Arterial.

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Delta: More tools, more targeted lubrication, more presetting…

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User-friendly start up.

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CNC versus CAM.

Our cover story: **You have to see it to believe it!**

The promotional action being taken by Tornos to launch its Delta family is based on the concept of improbability – it being highly unlikely on the face of it for this manufacturer to be unveiling a new family of machines equipped with 3, 4 or 5 axes, all at very attractive prices for the production of simple components. Almost 40 000 companies have already been contacted in Europe and a programme is currently being mapped out for Asia and the USA. See article on page 43.

IMPRESSUM

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CONNECTING WITH CUSTOMERS ON A NEW LEVEL

Tornos has always tried to connect with our customers to deliver what they really want. But how close are we to meeting that objective on a yearly, monthly, or daily basis? How can we make sure our mission doesn't become marketing fluff? In today's fast moving economy, we think the best way is to really listen to what our customers are saying about their day to day business and their plans for the future – and then act fast!

Scott Kowalski
President Tornos USA

Our customers are competing on a global scale – the changes are happening rapidly and they are causing margins to shrink. To help alleviate these concerns, Tornos has introduced twelve new machines (6 Deltas, 4 "e-line" machines, and 2 Micros) in the last year – all designed to meet the very specific new needs of our customers competing in this global market. These machines all do one important thing – help our customers face price pressures on production parts.

As you know, Tornos has a long history of making machines that produce the highest quality parts of medium to extreme complexity. This capability attracts customers like you, the best in the business, who appreciate a solidly built machine. (One customer I talked to recently said his Tornos had "50-year build quality"). Tornos customers don't shy away from complex parts and this has historically given them a profitable edge in the marketplace. But today – with increasing frequency – even the best parts manufacturers and producers like you are finding a need for perfect simple parts too. Thus, the introduction of the Delta product line – dedicated to cost-effectively machining simple parts. The Delta is an exciting venture for us – taking Tornos for the first time into the "entry level" machine market.

Instead of beginning a multi-year R&D project to design a machine for this market, we formed a partnership with Tsugami to have them build the machine you wanted to our specifications in their production facilities. This allowed us to deliver the Tornos machine our customers needed in the fastest possible timeframe. In the US and across the world, the Tornos sales force is receiving extensive training to help all of us better prepare end users for the demanding jobs and deliveries that brought this machine line into existence.

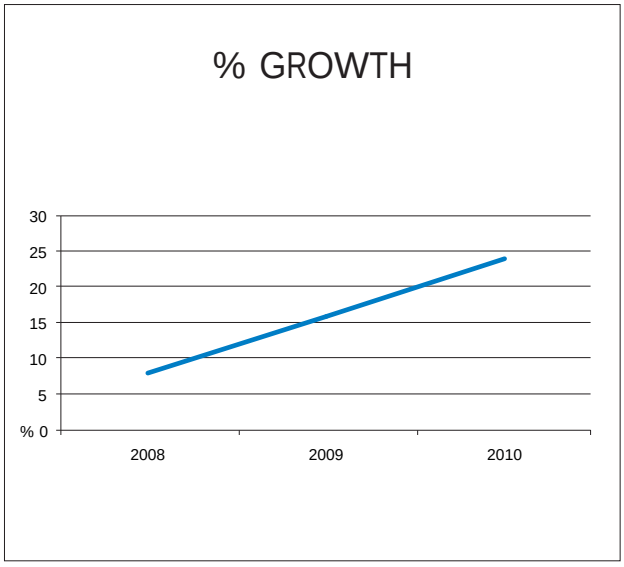
For our customers who hate to part with their old mechanically-driven cam systems but feel they must to compete globally, we offer the new Micro 7 and 8 – modular machines ideal for parts under 8 mm diameter. They have a very small footprint and take up about the same amount of room as the old screw machines they were designed to replace. But they achieve precision of ±2 microns for the Micro 7 and ±1 micron for the Micro 8! They can be programmed in TB-DECO or ISO; and they are built with 20 interchangeable tool positions.

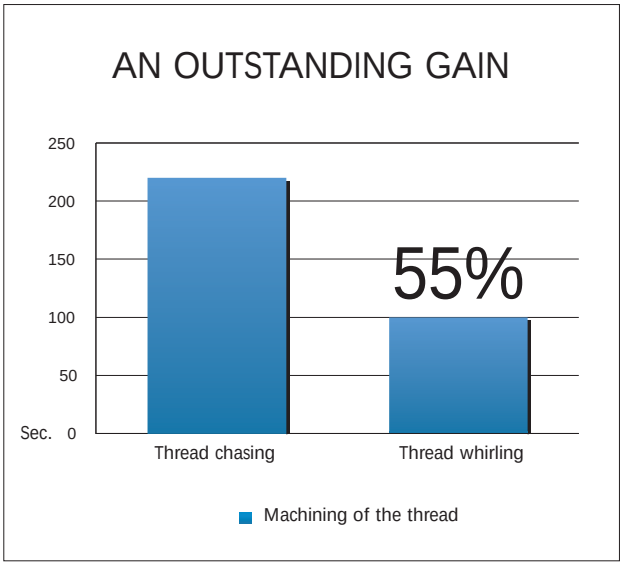
Another recent introduction by Tornos is the DECO "e-line", a cost-effective alternative for the production of parts. Designed to help our customers win every price war, the cost-effective e-line can produce 10 to 32 mm diameter parts of medium complexity. It's sold as a package featuring a standard number of options which streamlines the manufacturing process in Moutier. Compatible with the Tornos "a" line, these 7-8 axis turning centers let you engage 3 tools on the bar simultaneously.

Our objective in introducing these new machines is not to create "marketing fluff" and taglines. We're adapting to our customers changing needs so we can continuously build and nurture long-term customer relationships. The term customer service at Tornos is not a slogan, it's the mantra we live by. Proof is that we're connecting at a new level with machines for simple parts, simplified purchasing choices, and new training and service programs to help you make the most of opportunities in this new global economy.

HOW TO RAISE PRODUCTIVITY LEVELS WHEN MACHINING ORTHOPAEDIC AND DENTAL IMPLANTS!

Meeting with Mr Philippe Charles, "Medical Market Segment Manager" at Tornos.





A (still) expanding market

The Medical Technology market has been growing sharply for several years. Sales volume forecasts for the USA, Europe and Asia for the orthopaedic and dental sectors are pointing to average annual growth rates of around 7-10 %. These figures depend on geographics and the sectors concerned: orthopaedics, traumatology, spine and dental, for instance.

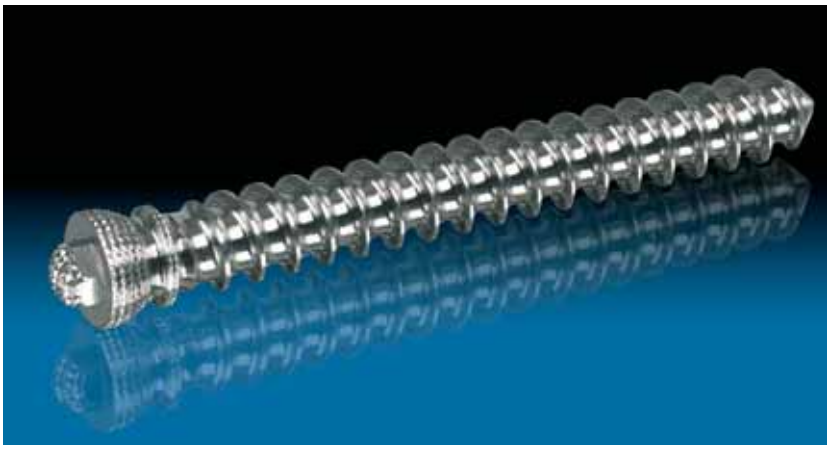
This growth in the markets will soon enable global annual sales to hit US$30 billion! Different factors are behind this success: the main ones being demographic, technological and social change and even purely aesthetic reasons. Two additional developments have also come in to play. First, these kind of prospects and a 'guaranteed' growth over the next few years mean that more and more manufacturing companies (sub-contractors) are drawn in and 'start up' in the sector. Second, the world's leading OEM companies are looking for skilled sub contractors to meet the increasing demand for machined components.

swiss medtech

Simplified access to the market

"For many years now, Tornos have specialized in the different growth sectors: automotive, electronics, micromechanics and the Medical sector. By virtue of the experience and expertise built up over the years, Tornos has become the world's number one supplier of machining solutions to the medical and dental markets" explains Philipe Charles.

The Swiss manufacturing company proposes a diverse range of solutions for the production of all types of implants, from the very small to the medium-sized and for different complexities. The technology involves machining bars of material with diameters ranging from less than 1 mm up to 32 mm using automised processes. *"With over a hundred years of experience in the field of sliding headstock automatic turning machines (Swiss type) including multispindle turning machines, Tornos is a leading company which benefits from considerable expertise in machining high-precision parts, often highly complex and in some of the toughest materials such as those in the Medtech or aerospace sectors, for instance. This experience also enables our company to design the best automatic turning machines with the specifications and functions tailored to the specific requirements of these different markets"* (Philippe Charles).



Turnkey solutions

Built around an automatic turning machine, Tornos propose a complete solution including the different peripheral equipment and tooling required for high-performance machining in terms of part quality productivity. The process is optimised for every customer based on standard machines, meaning the Tornos expertise is built in to each individual solution. Nowadays, the same components from the orthopaedic and dental sectors in different countries made to the same quality levels and the same level of care. *"To do this, you need the right products and in this respect, the Tornos presence in all the principal markets enables us to meet the requirements and demands of customers and manufacturers of orthopaedic and dental implants while benefiting from a wider experience"* explains Philippe Charles.

For Tornos, providing solutions is above all building up practical experience in order to master the various key elements of any machining process, i.e the machine-tool, the cutting tools, the liquid tools (cutting oil), materials and peripheral equipment. Thanks to this "wider vision" Tornos can continue proposing process improvements to their customers. They are faced with the following constraints: The overall precision, both dimensional and geometrically of the machined parts, the general quality of the finishes after different operations and machining procedures, the optimisation of cutting parameters and the tool life cycle, the best possible productivity (the workpiece machining time) and finally the guarantee that the product is perfectly adapted to its needs and that it meets the customer's functional requirements.

Partnership for the Medtech sector

Fully aware of the expertise required in all areas in order to be able to reach their objectives, Tornos, in collaboration with different specialist companies in their fields, have been carrying out practical tests in their Techno-Center in Switzerland. The objective is to continually improve the command over the entire process and bring together the specialist expertise of each partner.

To date, over 200 companies in 34 countries have chosen Tornos for the machining of different types of implants. This represent over 1000 automatic turning machines on the different DECO, Micro and Sigma product lines.

Technical limitations

Machining materials such as different grades of titanium including vacuum-arc re-smelted stainless steels or certain cobalt alloy steels involves special procedures. The manufacture of implants requires a command of the different operations by swarf removal. In addition to the turning operation, milling, drilling/tapping, deep-hole boring, stamping, thread-whirling or thread chasing/threading operations often all need to be carried out. *"We aim to always provide sound advice for our customers, including the key aspects around machining"* (P. Charles).

Above all, every operation requires practical expertise, along with the theory in order to be able to optimize the final machining process. One of the most complex but equally one of the most critical of the different operations in terms of quality is the operation that enables the machining of different shapes of small and large threads on medical and orthopaedic screws and dental implants.

Threads used in the implantology sector are generally very fine and sharp with complex shapes enabling the best possible penetration with minimal effort and heating into the patient's bone. The threads used in this sector have very little in common with the standard metric threads we are all familiar with. There is zero burr tolerance during machining and even if the threads are very fine and sharp, they are equipped with rays of a few hundredths of a millimetre on their tips in order to prevent the slightest burr. Machining this type of thread shape is virtually impossible using standard and traditional procedures including threading with a cutting screwing die or deformation or by burin thread chasing.

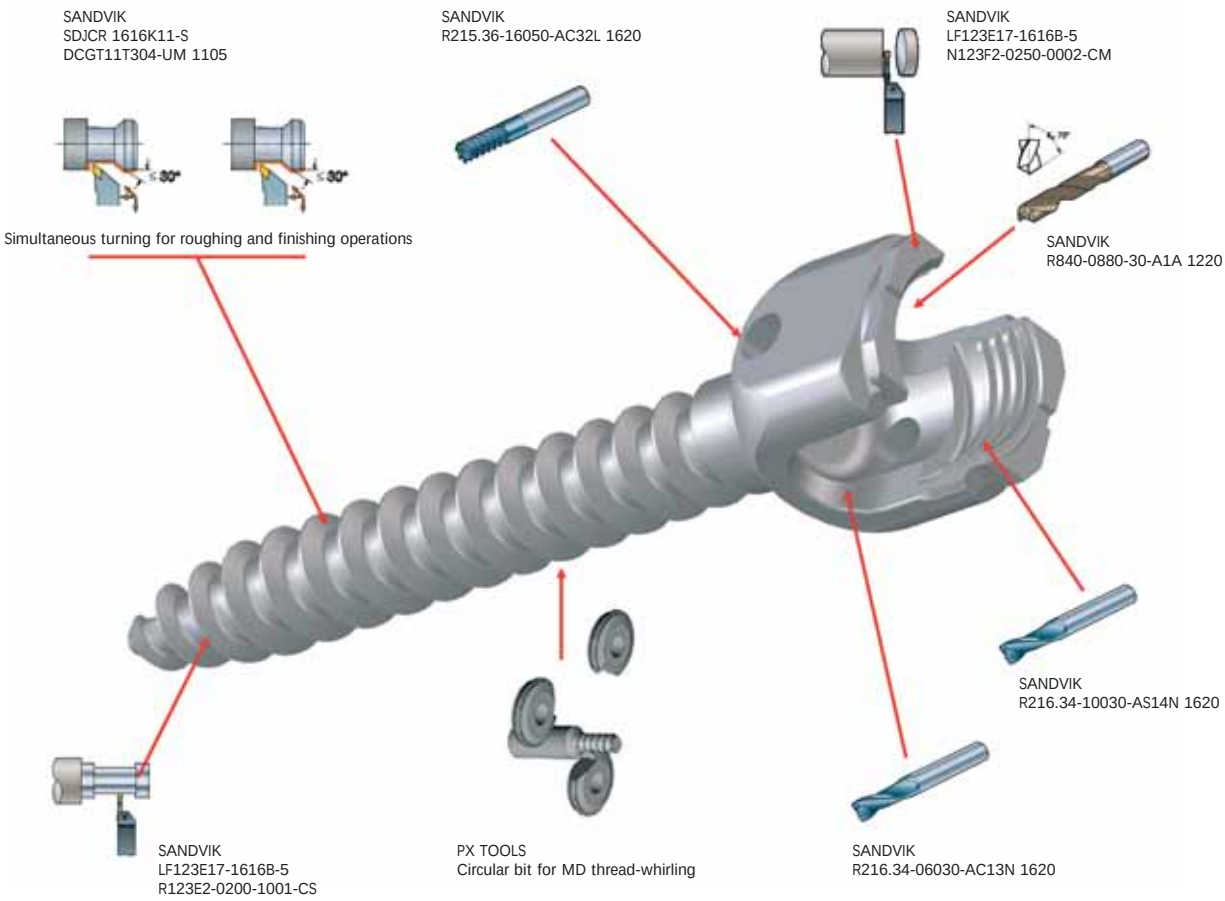
Thread-whirling

"Tornos is the world's first company to have adopted and applied the threadwhirling process (external and internal) on an automatic sliding headstock turning machine and we haven't stopped improving it for over 15 years". (P. Charles) Alongside the specific equipment developed by Tornos, threadwhirling requires a complete command of the cutting tools (use of continuous profile resharpenable blades or disposable removable inserts). Using the specific threadwhirling process is a guarantee of an excellent machining quality while improving productivity at the same time. This also includes ensuring excellent tool life cycles.

Test in a working situation

Carrying out practical tests on a real part from the market on a DECO 20a turning machine fitted with 10 numerical axes enabled Tornos to confirm that the threadwhirling process is indeed one of the "keys to the success" in this sector.

The thread on the monoaxial screw in the spine sector we selected was produced by thread chasing cycles.



Specifications of the analysed part

Material	Grade V ELI titanium
Reference DIN	3.7165D
Bar diameter	16 mm
Bar length	3 m
Total part length	65 mm
Approx. thread length	50 mm
Thread diameter (on tips)	6.8 mm
Diameter of thread base	4.4 mm
Thread depth (value from ray)	1.2 mm

"By working closely with our different partners on this project, we have achieved extraordinary gains in productivity. We have mainly replaced the traditional thread chasing by threadwhirling using continuous profile resharpenable blades". P. Charles

PXTOOLS SA

Threadwhirling tools specifications

Supplier	PX TOOLS (Switzerland)
Continuous profile resharpenable blades	diameter 15 mm
Grade	hard metal
Cover / coating	no

Additional benefits

"Apart from the thread, considerable improvements on cycle times were possible in the different turning and milling operations by optimizing cutting speeds with high-performance tools supplied by Sandvik, the world leader in the field. The excellent life time and the finish quality made possible by the selection of a lubricant specially suited to the demands of the medical sector also enabled us to significantly improve the operation, particularly concerning the finish of the threadwhirled sides" - P. Charles.

When asked about the partnerships and possible future exclusive rights, Mr Charles made it clear that this project has been implemented together with the partners listed in this article, and that as far as other projects were concerned, other partnerships would be considered.

"There is a vast amount of expertise available on tooling, liquids or material and Tornos intend to allow their customers to benefit from them".
P. Charles.

Blaser. SWISSLUBE

Liquid tools specifications

Supplier	Blaser Swisslube AG (Switzerland)
Cutting oil type	Blasomill 22
Flash point	180°
Viscosity at 40° [mm^2/s]	22

Tooling required for complete machining of workpiece on DECO 20a turning machine from Tornos	
Total number of tools	24
Number of tools for main operations	10
Number of tools for counter operations	14
Total number of powered tools	11
Number of SANDVIK turning tools	4
Number of SANDVIK drilling / milling tools	4
PX TOOLS tools	3

End result

Machining process	Customer data	Tornos results
Thread chasing machining time	**220 sec**	**–**
Threadwhirling machining time	**–**	**100 sec**
Productivity gains	**–**	**55%**
Productivity gains with SANDVIK tools	**–**	**12%**
Total productivity gains	**–**	**26%**

Conclusion

Threadwhirling and partnerships aimed at optimizing customer solutions have a bright future ahead of them! We should not forget that this practical result achieved through threadwhirling operations including the overall gain in workpiece cycle time must never be won to the detriment of the quality of the machined part. Different research carried out in OEM companies and their sub-contractors in the medical sector confirm that the machining quality is the number one requirement, way ahead of the reduction of machining costs and production time.

These practical tests are proof that a range of factors influence the possibilities for improvement in productivity on an automatic turning machine. Cutting tools, lubricants, material and the process make up just a relatively minor part of the overall production costs. This is often overlooked during cost reduction programmes. This is a shame – Tornos have proved that such a programme correctly implemented can bring with it considerable productivity gains and therefore reduce production costs significantly.

"Tornos has a genuine grasp of these strategic aspects and we continue to work in this way to improve the quality of machined parts and to offer the most rational, high-performance and productive machining solutions possible…" P. Charles

If you have any questions concerning machining with Tornos turning machines for the medical technology sector, Mr Philippe Charles can be contacted at the following address: charles.p@tornos.com

To find out more about Medtech, the Swiss Business Hub USA publishes a complete report on the market every year. Although mainly focused on the American market, this document is a "must" for any company interested in this sector. It can be downloaded here:

http://www.swissbusinesshub.com/common/news/reports/detail.cfm?Classification=report&QID=3529&ClientID=11062&TopicID=0

TORNOS DELIVERS PRODUCTIVITY GAINS AT ARTERIAL

Since its inception in 2003, Arterial UK has expanded beyond all comprehension and this has been credit to its investment in high specification machine tools and in particular Tornos sliding head turning centres. In its first two years of business with limited machine tools and capability the company was subcontracting out upwards of £ 20,000 of business each month, until the delivery of its first Tornos DECO 20a.

Arterial Acquisition of Sigma 20 at Simodec 2006. From links to right: MM. David Ross (Director), John McBride (Tornos UK), David Allen (Production Manager) and Ian Lake (Managing Director).

It was a complex injector for the food industry that was sent to up to five specialist subcontractors for completion. "This part gave us cost and logistics nightmares and it was the acquisition of our first Tornos in April 2005 that enabled us to bring the part in house. All of a sudden we could machine the complete part on one machine with the exception of one brazing operation. From that point onwards we haven't looked back as the Tornos not only solved a problem but opened new doors for us," states Arterial UK Director Mr David Ross.

Based in Sturminster Marshall near Poole the company has expanded from initially working within the food and aerospace industries to developing successful partnerships with manufacturers in the defence, medical, oil & gas, hydraulics and electronics sectors. This growth has seen the Dorset based BTMA member move from a garage to a 10,000sq/ft facility within 5 years. The forward thinking company now has a dedicated line of machine tools committed to sub-spindle machining as well as a string of single spindle turning centres.

The second Tornos that forms part of the new line of machines was purchased in April 2006 at the Simodec exhibition, a Tornos Sigma 20. With a specification below that of the DECO 20a, the more cost effective Sigma 20 was a strategic move for a machine capable of producing components of relative complexity and the lesser complex parts. As Mr Ross states: "We looked at the Tornos DECO 20a but it had too much capability for our needs, so we opted for the machine with the specification to meet our exact needs. As the Sigma 20 is not "fully loaded" it has the capacity for longer parts in the 200 to 225 mm length range and this now sees us using the machine for rods and spindle components. It was also available with the GE Fanuc 31 control as opposed to the Tornos TB-DECO software and this proved appealing as the TB-DECO has more capability than we required."

The Tornos machines increased the capability range of the ISO 9000:2000 registered company to the extent that it won new customers and orders. The ability of the Tornos turning centres to run unmanned also increased capacity with the sub spindle section of the workshop moving to 24 hour running. With Arterial's capabilities, delivery times and product quality winning the attention of an increasing number of aerospace manufacturers the company gained AS: 9100 (aerospace manufacturing standard) accreditation in November 2007. The same month noted the acquisition of a further two Tornos turning centres.

"Prior to AS:9100 accreditation we purchased a fixed head turning centre for machining up to the 42 mm diameter range, however our workload continued to increase and we acquired our third Tornos, a DECO 26a with 32 mm diameter capability. We bought this to release some of the capacity from our larger fixed head machine. The Tornos proved an excellent purchase as it further reduced our lead times and with greater accuracy levels than the fixed head machine, it improved our quality and confidence still further," states Mr Ross.

Simultaneously Arterial acquired a Tornos DECO 13a as Mr Ross continues: "Our first two Tornos machines and the larger 42 mm diameter capacity machine were dedicated to batches in the range of 50 to 5000 parts off. The DECO 13a was specified for machining larger batch sizes up to 100,000 parts plus. Machining nuts, spindles, bolts and rollers with complex milling and drilling operations the workload

for the DECO 13a is now shared with the larger 26a that also releases capacity from the larger turning centres."

The benefits of the Tornos line of machines have been immeasurable to Arterial. The company has increased its capability with the extensive milling capabilities of the Tornos machines releasing work, capacity and staff from the milling section of the company that previously conducted secondary operations on turned parts. The elimination of secondary milling procedures has improved the quality of finished parts at Arterial as well as improved the company's capabilities to meet its customers supply chain requirements such as JIT and Kan Bans whilst meeting its in-house SPC and "right first time" culture.

"With our sub-spindle and sliding head section we can put bar stock into one end of the section and the machines deliver finished parts out of the other side. With complete parts rolling out of the machines we have impeccable quality levels and with our 24 hour running we can comfortably meet the lead time demands of the market with cost effective solutions," concludes Mr Ross.

arterial UK

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PERFORMANCE ENHANCEMENT: SMALL PARTS WITH GREAT POTENTIAL

A diesel injection pump requires no fewer than three of the spring plates shown here. To enable the production facilities of a renowned automotive supplier to be supplied on a continuous basis, Aeschlimann AG Décolletages, a company based in Lüsslingen, manufactures 15000 high-precision small parts every working day. Recently, they started doing so even faster, to higher standards of precision and even more cost-effectively.

Aeschlimann Décolletages AG was founded over 70 years ago and, as an entrepreneur-managed bar-turning business, has over the last seven decades built up a great deal of specialist expertise and a loyal customer base. Now, the 160 staff applies their skills and knowledge to serving an international clientele. The company also recognized at an early stage that ongoing innovation was essential, and achieved this through close collaboration between specialists with backgrounds in raw materials, tools, machine tools and machining fluids. Their success has proven the company was right to do this – it is now without doubt one of the leading bar-turning businesses in Switzerland.

On cam-controlled automatic lathes

For small parts manufactured in large quantities, cam-controlled multispindle automatic lathes continue to be a good choice. At Aeschlimann, many components such as the spring plates illustrated are produced from bar stock with diameters of up to

16.0 mm on Tornos SAS 16.6 automatic lathes. However, with these NC-controlled (NC = Numeric Control) multispindle automatic lathes, the NC system is only able to alter speed and cam control. This means that every spindle runs at the same speed during all six operations. It is therefore necessary for the optimum speed to be established for the following operations:

1. Centering / planing step
2. Roughing / profile cutting step
3. Pre-reaming / transverse cutting step
4. Final reaming / chamfering step
5. Pre-cutting for main cutting step
6. Main cutting and gripping step

Critical final phase for tools

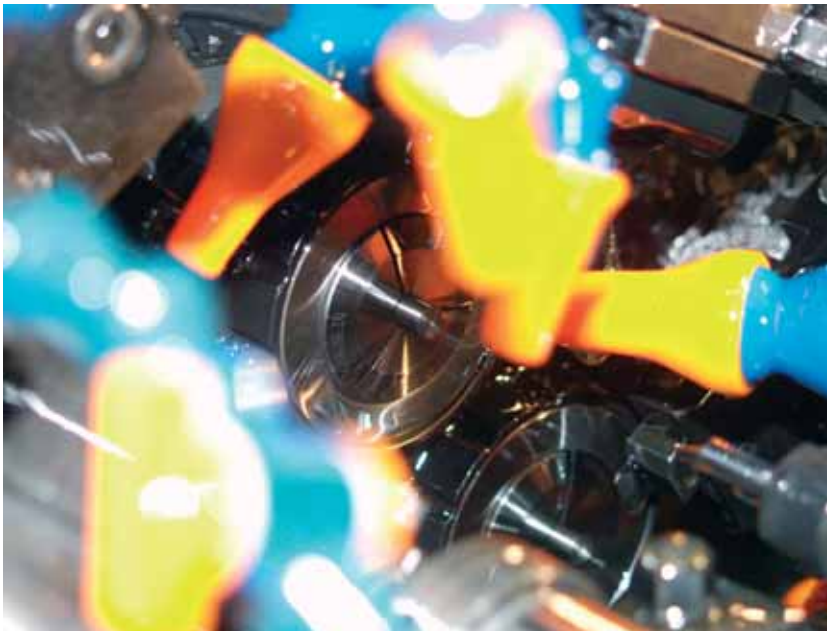
It was the Team Leader for multispindle machines, Carlo Secchi, a man who has worked for the last 35 years at AE-Décolletages, who made MOTOREX aware of the need to optimize tool service lives. Towards the end of a production run, often during the night shift, the cutting edges on tools were often so badly worn that dimensional accuracy and, above all, surface quality, became adversely affected. After about 12 800 units, the two cutting blades became «round», i.e. worn. This affected the R_a value and the variance could even be detected by running a fingertip across the workpiece.

Change to MOTOREX ORTHO

All machining parameters were checked once again – but without success. The only parameter left to modify was the cutting oil. Following the conversation with the technical after-sales service at MOTOREX and a visit from their regional manager, the company switched to the universal high-performance cutting oil ORTHO NF-X.

Another beneficial effect on production operations proved to be the decision to cool the oil and the machine to a stable 30°C. Once the machine had been filled with MOTOREX ORTHO NF-X ISO 15 – its first 8 hours working on a range of operations greatly enhanced tool service lives convincingly. Mr. Secchi looked on with eager anticipation as the measurement results for the outer taper of the first spring plate manufactured with ORTHO NF-X made their appearance.

Carlo Secchi, Team Leader for the multispindle machine shop, is a master of the bar-turning trade. He has worked at the company for 35 years and can bring his profound knowledge to bear on every job he does.



This Tornos SAS 16.6 machine tool has 6 spindles. Today, a great many of these cam-controlled and somewhat traditional machines are still in active service.

A leap ahead in technology terms

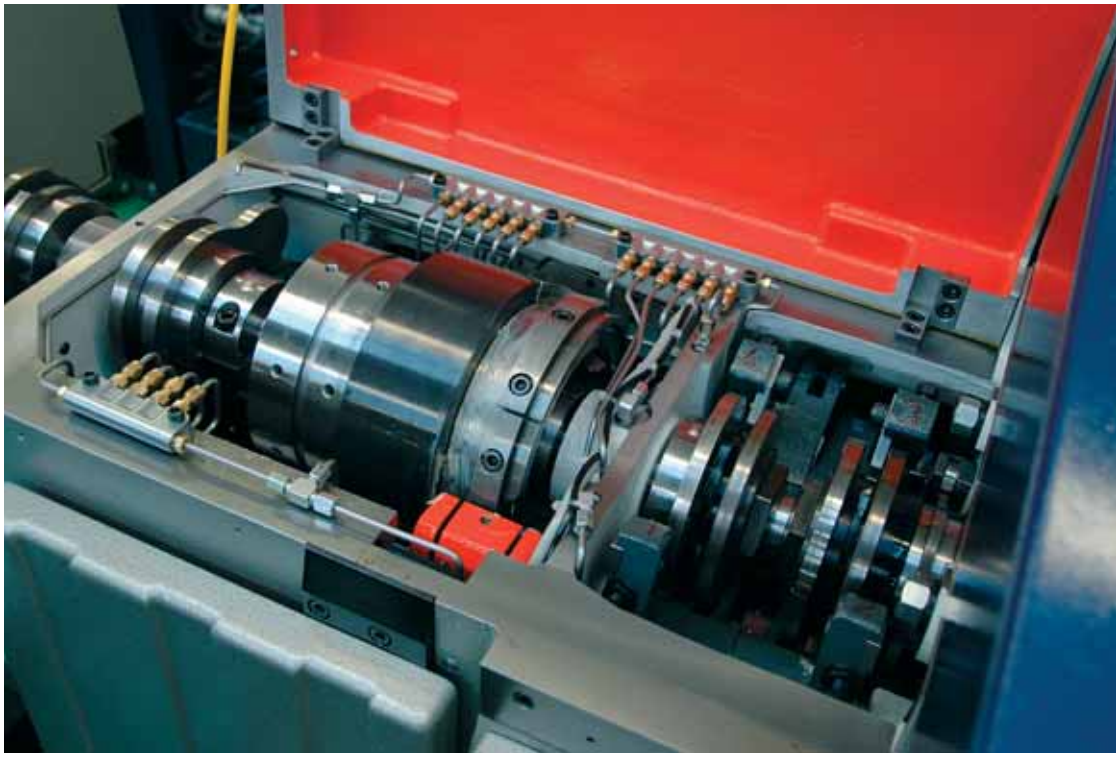
"The results achieved with MOTOREX ORTHO NF-X impressed me. Previously, I got the feeling that the cutting oil, apart from just dissipating heat and carrying away swarf, only coated the workpiece and provided some form of general protection. Now, the performance capabilities of these complex formulations can be demonstrated to great effect directly on the machine tool. I also consider the universal character of ORTHO NF-X, suitable for all commonly used materials, to be another major advantage. We will shortly be converting more machines to this new technology."

Rolf Bläsi –
Director at AE-Decolletages/
Lüsslingen

Improved number of cycles, from 10 to 11

The outcome of these measurements demonstrated high standards of precision – a highly encouraging result. The excellent surface quality on this part, made from case-hardened 16MnCrS5 steel, was very satisfactory. Now, the speed was altered in steps making it possible to increase the number of cycles from 10 to 11. The heat generated between workpiece and tool tip by the higher cutting pressure and increased cutting speed is used deliberately to improve stability at high pressures, all made possible by a special formulation in ORTHO NF-X. This delivers truly substantial benefits during chip-cutting machining operations. Expressed in pictorial terms, the absolutely homogeneous and stable film of lubricant between tool blade and workpiece acts like a cushion. Confirmation of this achievement is demonstrated by the 10 % increase in performance and the marked improvement in surface quality.

The six spindles are loaded in a fully automatic manner by the Robobar MSF 316 bar loader. This means that, even on unmanned shifts, the machine can continue producing in an unrestricted and efficient manner.



The control cams are located under a robust cast cover: it is these cams that transmit the required linear or radial control impulses to each tool and spindle.

Valuable teamwork with MOTOREX

The credible arguments and solution-driven way that MOTOREX employ to run their business demonstrated to the people in charge of Aeschlimann Décolletages that machining fluid justifies the high priority it is now given in 2008. After filling the machine with their oil, tangible changes were recorded during the measurement process. In the cost centre, it also emerged clearly just how great an influence the new cutting oil brought to bear, showing the improvement in productivity and its positive impact on profitability.

Over 15 000 of these parts, only 4 mm in height, are produced on a daily basis. They are inspected four times a day, with six parts being inspected on each occasion (1 turned part per spindle). The results are recorded accurately in the measuring log.

We would be delighted to provide you with information about the new generation of ORTHO cutting oils and the scope for optimization within your area of application:

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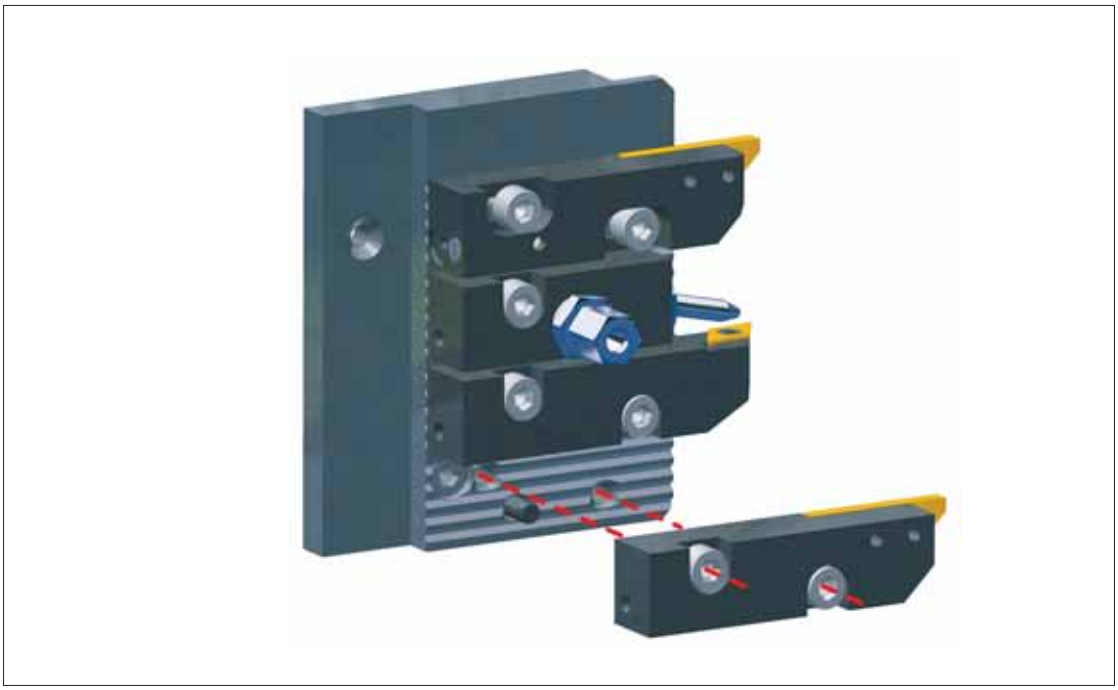
DELTA: MORE TOOLS, MORE TARGETED LUBRICATION, MORE PRESETTING...

The Modu-Line system offered by four well-known tooling manufacturers (Applitec, Utilis, Dieterle and Bimu) is now available for the Delta machine range from Tornos. To find out a little more about this major new development, decomagazine met up with Mr François Champion, sales manager at Applitec in Moutier.



The Modu-Line system already available for most sliding headstock automatic turning machines on the market is a pre-adjustable tool holding system featuring a simple and rapid changeover function. The positioning is ensured by two screws and a limit stop system. The rigidity is assured by the jagged profile of the contact surfaces. This system has been commercialized by the four manufacturers for about a year and a half and according to Mr Champion, it is being adopted as standard by several bar turning machine operators.

decomagazine: Mr Champion, you seem to be relatively satisfied with the Modu-Line system and your partnership with the other manufacturers. It looks like a great success!

François Champion: The demand for Modu-line is increasing sharply. We have reached a stage where we feel that the system is well-known and recognized.

dm: Do you think the fact that you are one of four manufacturers to offer it is a help?

F.C: Absolutely! Even if I have no doubts as to the quality and the performance of Applitec products, the fact we can use the Modu-Line system with other tool brands proves to customers that they are not reliant on a single supplier. It's very reassuring for

them. In addition, the manufacturers proposing Modu-line are four companies for which the culture of machining, bar turning and precision is perfectly integrated.

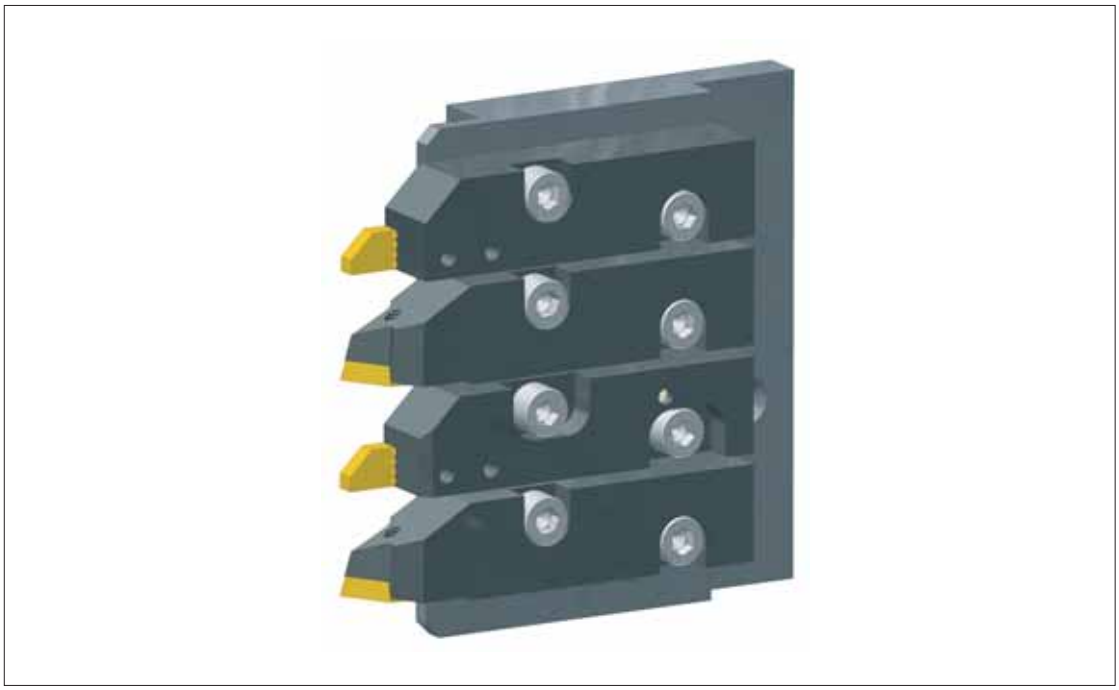
dm: What are the benefits of your system?

F.C: We offer a system of very rigid tools with bars of 12/15 mm or 16/16 mm for the largest. The system enables the number of tools available on the machines to be increased, space requirements are considerably lower and there is a gain of one or more positions compared to "basic" solutions.

system on all the Tornos machines and on those of other manufacturers.

dm: What have been the restrictions concerning the Delta?

F.C: Anyone can understand Modu-Line. The tool holders are attached with two simple screws. The space available on the plattens motivated us to develop new Modu-Line tool holders. Indeed, the length being limited to 85 mm, we chose to extend the tool holder to 20 mm (section 16x20) and therefore have one extra tooth to guarantee rigidity.



Another key advantage is the option of a very precise tool lubrication. We can aim the high pressure jet directly at the exact point where it is required. What's more, as Modu-line can be pre-set, we can also ensure the safety of the process for our customers.

dm: You are announcing the launch of Modu-Line on the Delta range from Tornos. Why so early? the machine has only just been released…

F.C: The new range of Delta machines looks very promising. Our objective is to offer the Modu-Line system for all the most common sliding headstock machines on the market. We already propose this

dm: Are there any benefits specific to the Delta for Modu-line?

F.C: First of all, the simple and precise repositioning of the tool after a plate changeover. Then, the presetting that meets the requirement of many operators and finally the increase in the number of tools. On the front platten we can add one or two additional tools and one on the rear platten. As always, we also have the possibility of "adding extra lubricant" where it is needed most.

Our solution is flexible, the customer can choose to fit an Applitec plate either above or below the front platten or on the rear platten. All combinations are

possible. It is also a guarantee of freedom for the customer.

dm: You mentioned presetting. Is it really useful in this type of machine?

F.C: It all depends on customer preference. Imagine a workshop with a selection of this kind of simple machines. In standard setting, you call up a "setting" tool position and the tool holder moves along the bar. Visually and manually you attempt to position it, of course you need to be careful not to damage the cutting blade. It's all a bit "basic".

With the Modu-Line, when your tools are preset, you untighten two screws, insert the new tool, retighten and you're ready to go. It's even simpler for a simple change of insert. Simply remove the tool, change the insert and put the tool back in place, which will be repositioned with precision.

dm: What types of tools are proposed?

F.C: We propose all ISO types including Applitec inserts. It's the same for our partners, so with Modu-Line all the ISO turning and individual tools such as Utilis, Applitec, Dieterle and Bimu are all available. Customers can choose depending on their preferences or affinities.

dm: You mentioned changing inserts. Is this also a Modu-Line standard?

F.C: No, each manufacturer has their own system for fitting the inserts. Applitec, for example, use the patented 700 range system. This system features an irregular tooth position that is highly rigid (this will be featured in a future issue of decomagazine).

dm: Coming back to Delta, when will the tools for this model be available?

F.C: Our tools will be on the market from October 2008. They will therefore be available for delivery at the same time as the first Delta machines.

For more information, please contact Applitec at the following address:

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THREADWHIRLING FOR ALL!

For Tornos and their customers, the threadwhirling unit fitted to the end device on the DECO 10a is a well-known and popular option, particularly for companies in the medical and dental sector. The demand for very long threads and the arrival of the DECO 10e coincide with the presentation of a new thread whirling unit fitted to the platten.

Option

Option no: 1900

Principle

The thread whirling unit (for more information see page 6) is fitted to the rear platten and enables the production of low dimension medical threads, particularly for screws in the maxillofacial sector, screws for motion systems (reduction of fractures in the hand and foot) and even traumatology screws in general.

Benefits

Thanks to this new option, threads can be thread whirled on the DECO 10e which is not equipped with an end device. Depending on the geometry of the workpieces, use on the DECO 10a allows longer threads to be made than is the case with the unit positioned on the end device. In all cases, thread whirling ensures high quality threads and enables "exotic" profiles to be manufactured.

For customers using DECO 10a, the blade-holder head and the re-sharpening unit are identical.

Technical specifications

Angle: +/- 15 degrees.

Blade diameters: 15 mm

Max thread whirling diameter: 6 mm.

Positioning the unit uses two tool positions.

Compatibility

DECO 10a and DECO 10e.

Availability

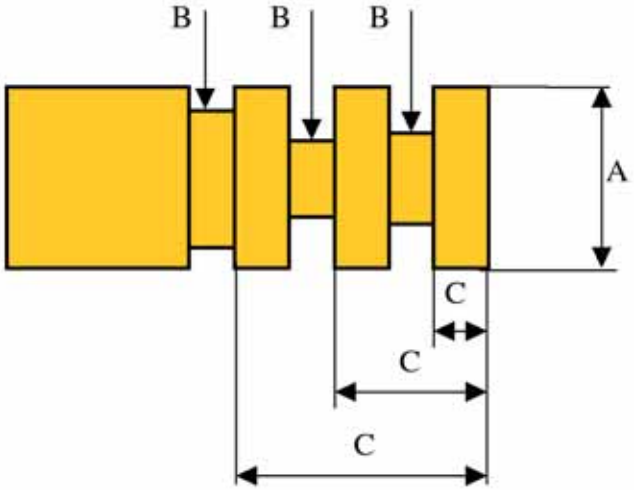
This unit is already available for delivery ex-works or as an option for machines already installed.

Comment

Installing high pressure cutting oil lubrication at the rear of the unit enables improved swarf evacuation.

TRICKS AND TIPS

In decomagazine No 45 we unveiled an example of a program produced with the Macro B language reserved for Sigma and Micro machines. It concerned making a kerf with an interrupted cut. In this issue, we are going to look at the program for a a workpiece comprising not one but three kerfs with different kerf base diameters. Machining will be programmed in a macro and called up 3 times from the main program using the G65.



Positions are as follows:

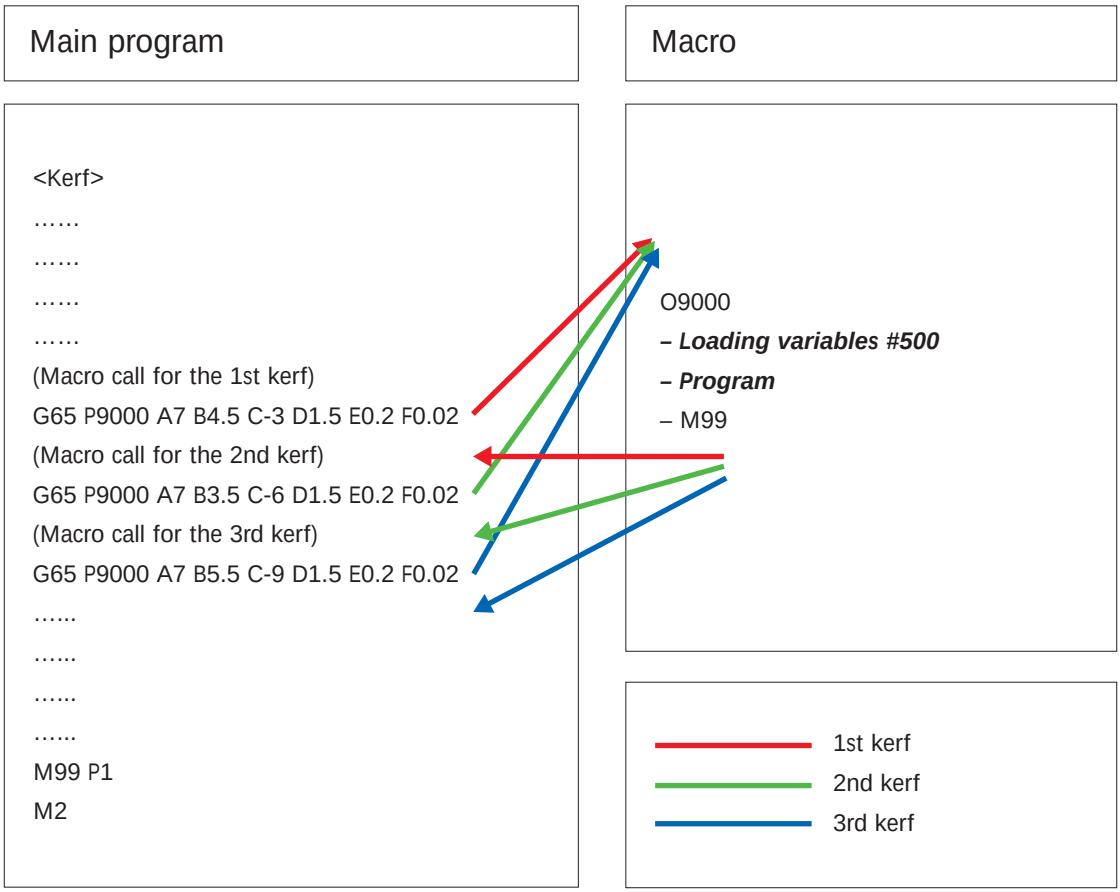
1st kerf:	(C) Z=-3	(B) X=4.5
2nd kerf:	(C) Z=-6	(B) X=3.5
3rd kerf:	(C) Z=-9	(B) X=5.5

Machining for each kerf is programmed in a macro.

The kerf should be made in the following way:

- Positioning of the tool in Z.
- Fast feed up to external diameter plus a security.
- Feed up to a cutting depth determined by a parameter.
- Swarf break back movement to a value determined by a parameter.
- Progression of feed and back movement up to kerf diameter.
- Movement in Z axis for the second kerf.
- Etc…

Program structure



Explanation of Macro call using G65

When G65 is programmed, the specified macro at the P address is called. Data (arguments) can be passed on following the program number.

- After G65, specify the program number of the macro to call at the P address
- When a repetition number is required, specify a number between 1 and 999999999 after the L address. If L is omitted, value 1 is used by default.
- By using argument specification, values are assigned to the local corresponding variables.

Example: G65 P9000 A7 B4.5 C-3 D1.5 E0.2 F0.02 ;

P: Address of the macro to call
A: Starting diameter
B: Diameter of kerf depth
C: Position in Z
D: Cutting depth between 0 and 3 mm
E: Withdrawal in X
F: Feed

Comment: The arguments (A, B, C etc…) are transferred automatically into local variables (#1, #2 etc…) according to the table below.

Address	Variables number	Address	Variables number	Address	Variables number
A	#1	I	#4	T	#20
B	#2	J	#5	U	#21
C	#3	K	#6	V	#22
D	#7	M	#13	W	#23
E	#8	Q	#17	X	#24
F	#9	R	#18	Y	#25
H	#11	S	#19	Z	#26

In the previous example:

A7 indicates the local variable #1 will contain value 7

B4.5 indicates the local variable #2 will contain value 4.5

Etc…

Visualisation of variables contents

Local variables cannot be read on the machine. If their contents need to be visualized, the local variables content needs to be transferred into (#1…) variables #500 according to the example below.

```
#500=#1   (Start diameter)
#501=#2   (Kerf depth diameter)
#502=#3   (Position in Z)
#503=#7   (Cut depth between 0 and 3 mm)
#504=#8   (Withdrawal in X)
#505=#9   (Feed)
```

Macro call for the 1st kerf

- ***G65P9000A7B4.5C-3D1.5E0.2F0.02***

Comment: The macro begins with **O9000** and ends with **M99**

O9000
LOADING VALUES IN VARIABLES #500

```
#500=#1          (Start diameter)
#501=#2          (Kerf depth diameter)
#502=#3          (Position in Z)
#503=#7          (Cut depth between 0 and 3 mm)
#504=#8          (Withdrawal in X)
#505=#9          (Feed)
```

KERF PROGRAM

```
G0 X10 Y0;
G0 X[#1+0.2]          (Start diameter plus 0.2 mm security)
G0 Z#3                (Position in Z)
#510=#1               (Loading start diameter in the variable #510)
N2
#510=#510-#7          (Target diameter = diameter reached - cut depth)
IF [#510 LE #2] GOTO 3  (If the target diameter <= final diameter, jump to N3)
G1 X#510 F#9          (Feed one cut depth)
G1 X[#510+#8] F0.2    (Back movement to diameter reached + withdrawal)
GOTO2                 (Return to N2)
N3
G1 X#2 F#9            (Feed to end of kerf diameter)
G4 X0.1               (Temporization 0.1 seconds)
G1 X[#1+1] F0.3       (Back movement to external diameter + 1mm)
G0 X12
M99
```

SOMETHING NEW INTO THE TERRITORY OF THE SHAPING TOOL!

DIXI Polytool S.A. is extending its activities.

A real success story…

One good year follows another for DIXI Polytool S.A., the Swiss manufacturer of monobloc carbide and diamond-tipped tools. The business has grown continuously at an annual rate of between 12 and 21% since 2004, which constitutes an average well above that of the market. Key human and hardware resources have been invested over the years to safeguard this rate of business growth. At the present time, the plant in Le Locle employs almost 180 people (115 in 2003) and the total workforce in the "cutting tools" division at DIXI numbers almost 300.

The R&D department has also benefitted from strong growth, ensuring the constant presence of new products in the pipeline, and this enables the company to grow into years to come while also maintaining its competitive edge on the technology front. In this way, DIXI Polytool has introduced many new products to the market over the last 12 months, especially with regard to thread-whirling, HPC drilling and a range of different NIHS-standard tools.

In 2004, DIXI Polytool also seized the opportunity to take a majority shareholding in Diamant Werkzeug GmbH, a German manufacturer of monocrystalline and polycrystalline diamond cutting tools. This acquisition has enabled the company to reinforce its presence in various sectors where it was already represented with its carbide tools, in particular in the watchmaking and medical instruments sectors.

…that just keeps on getting better!

At the present time, DIXI takes great pleasure in announcing the acquisition of Meca-Carbure, a company based in the French town of Gilley. The product range combined with the markets served by Meca-Carbure, are in perfect synergy with those of DIXI Polytool. With this buy-back, DIXI benefits from high-calibre expertise in the shaping tool business and also gains a team of highly skilled new employees.

Meca-Carbure retains its autonomy as a company and continues to focus its skills where they really count, while at the same time being able to count on the support of DIXI Polytool. The Swiss company wishes to maintain and/or consolidate the main strengths of Meca-Carbure, which are the ability to manufacture ultra-complex shaping tools to very high standards of quality. Quality that retains the high degree of responsiveness and flexibility which stem from remaining close to its customer base.

This acquisition constitutes a key strategic move for the existing and the future customer base of DIXI, giving the company an even broader range of carefully tailored products. These two companies share very similar philosophies, both in terms of the pursuit of technical excellence and also in terms of the emphasis they place on dynamism in their business operations and people. This means that the two companies will be able to develop on a collaborative basis to develop and to safeguard their long-term future together. There are many areas of synergy, specifically in terms of business sectors and even more notably in their shared interest in the watchmaking/jewellery, medical, automotive and aerospace sectors.

Would you like more information? Some advice on machining with precision hard metal and diamond tools?

MECA · CARBURE

DIXI polytool

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NEW GENERATION OF HIGH PERFORMANCE DRILLS

Every manufacturing company looks to enhance its productivity without reducing quality or the lifetime of its tools. DIXI Polytool S.A., the Swiss manufacturer of solid carbide tools recently presented two high performance drill families.

Lubrication hole model

The DIXI 1146 models with oil holes (L1 = 10xD1) offer several characteristics that put tools at the top of all performance analyses. The high-tech geometry enables perfect centring, efficient swarf fractionating and low cutting forces. The robust geometry permits maximum advances in steel and cast iron. All this is available without damaging the tool tip. The special coating offers excellent resistance to oxidisation, optimum heat resistance and a minimal friction coefficient enabling excellent swarf evacuation.

The new drills are available in a range of diameters from 0.80 mm to 10 mm. They outperform drills designed for drilling cast irons and steels but are also competitive in other materials such as special alloys like Nimonics.

The drills permit drilling without deburring cycles and this enables considerable gains in productivity to be made. Even with such parameters, tool life times are high.

Example of deep drilling Ø 5.8 mm, in 15NiCr13 steel (1.5752)

- Drilling without starting off on a milled surface
- Vc = 91 m/min.
- f = 0.23 mm
- Vf = 1150 mm/min
- Ap = 56 mm (9.7xD)
- Lubricant = cutting oil

Drill wear 1146 (Ø 5.8 mm) after 900 holes in 15NiCr13 steel remains very low despite very high cutting parameters.

Models without holes

The DIXI 1147 drill with a 6.5xD1 cutting length has also been developed specially for machining steel and cast iron. The features are very similar to the DIXI 1146 but these tools do not have oil holes.

Example of drilling Ø 2.5 mm in Ck45 steel (1.1191)

- Drilling without starting on a milled surface
- Vc = 71 m/min.
- f = 0.25 mm
- Vf = 2250 mm/min
- Ap = 15 mm (6xD)
- Lubricant = cutting oil

Lifetime exceeds 6000 holes systematically, despite very high cutting parameters.

With these two families, DIXI Polytool S.A. is strengthening its position as specialists in high performance drilling for steels and cast irons and in the entire range of diameters. For the manufacturer, the "large diameters" is to step outside the "micro zone" which is generally its preferred sector.

Please address any enquiries to:

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www.dixipolytool.com

MIGUEL LIBERTINI S.A. TOP QUALITY FROM ARGENTINA

Miguel Libertini S.A. is an automatic turning and machining company located in Boulogne in the San Isidro district of Buenos Aires in Argentina; the company specialises in the manufacture of machined parts for the "precision parts" market.
The company began operating in the 1970s using automatic cam-type lathes with fixed spindle turning centres. At the beginning of the 1990s, it began using CNC lathes and in 2002 acquired its first computer numerical control single spindle lathe with sliding head from Tornos (DECO 13).

Interview with Mr Libertini conducted by our correspondent in Argentina, Daniel Hauri.

decomagazine: Why did you choose DECO?

M. Libertini: On a day-to-day basis our customers were asking us for parts requiring increasingly complicated machining. We needed to manufacture parts that were machine finished in a single operation. We looked at the latest Swiss, Japanese and German machine models, but after in-depth analysis we opted for Tornos. The number of shafts that DECO machines have and the wide variety of tools means that it can handle any type of operation and perform complicated machining, making it a very versatile machine.

Additionally, the access to the workstation is more ergonomically designed and easy-to-use for the operator – it is essential that the operator has enough room to move around.

So many positive reasons!

dm: What was the impact of purchasing this machine?

M.L: We were so pleased with our purchase of the first DECO lathe that the company decided to make a significant investment in a further four DECO 13a

model lathes over subsequent years, acquiring the sixth machine in February 2008.

dm: What were the advantages?

M.L: One of the advantages we have noticed with Tornos is that the machining cycles are shorter than those achieved using conventional C.N.C lathes. Furthermore, parts can be finished by being machined at both ends.

Another reason why we chose Tornos is because we feel that their after-sales service offers us full support, both from Tornos itself and from its representative in Argentina, "Plamac Máquinas Herramientas S.A."

dm: What are the most important qualities of your company?

M.L: The most important qualities of Miguel Libertini are quality, precision and our ability to find machining solutions for our customers. Our priorities include ensuring the reliability of our equipment and delivering excellent technical support.

dm: Which industries do you work for and what are their technological requirements?

M.L: We machine all types of materials including brass, aluminium, steel, stainless steel and titanium. We work for different industry sectors including the automotive, aeronautics, pneumatics, electronics and medical industries amongst others. Argentina is no different to the rest of the world.

The technological requirements are based on the ability to manufacture products that can achieve quality certification at an international level. This is an ever-changing industry in which there are constant demands and pressure on products and their design. Demands for constant improvements and innovations means that any company striving to be competitive has to make a long-term investment in technological equipment and tooling.

dm: What expertise does your staff have and how do they undergo training and development to meet requirements?

M.L: We have 30 members of staff and this includes administrative staff, operators, controllers and pro-

The new Libertini factory on the verge of completion (still so new that logos have not yet been mounted on the façade), 1500 square metres dedicated to the goal of high precision.

Mr. Miguel Libertini, founder and director with his son Luis, the production director, standing in front of their first DECO unit.

grammers. In the machining sector, we have staff with experience in cam-type automatic lathes and knowledge of ISO programming. By combining these two groups, we have found a perfect balance for teamwork.

Training is given on an ongoing basis. Internally we alternate production time with technical training. Learning is much easier and enjoyable as a result. Having the latest modern production equipment encourages people to join our company. In Miguel Libertini we think that it is essential to have a motivated team, as staff motivation is one of the keys to success.

dm: As well as manufacturing for third parties, do you have any own brand products or ranges?

M.L: In addition to working for various markets, Miguel Libertini has developed a high quality product under the company's own brand name. We manufacture quick-connect couplings for all types of fluid, air, water and hydraulics under the brand name "Instantaire conexión de fluidos".

Owing to the demands of the market and its constant growth, we had to completely separate the manufacture of our own product and machining of parts for third parties, building a new plant with a total surface area of 1,500 square metres on an industrial estate covering 10,000 square metres.

In this new plant all the machining of parts (from 2 mm diameter) for third parties is carried out, leaving the previous plant solely dedicated to the manufacture of our own "Instantaire" product, also using the latest machinery.

dm: Is your work certified according to any quality standards?

M.L: To comply with market requirements and more importantly to meet our own requirements of perfection in every process, we decided to work towards ISO 9001:2000 certification and we achieved compliance to the standard in 2005, working with the certification company TÛV RHEINLAND GROUP.

Standardisation of processes therefore further supports Miguel Libertini's commitment to maintaining uniform quality, which builds on the trust shown to us daily by our customers.

dm: What are your plans for the future?

M.L: We usually manufacture very complex parts, so our key objective is to continue growing and improving our production capacity, to be better able to meet the needs and demands of our customers, in a market where there are constant developments, changes, and advances. To this end, we are counting on the collaboration of Tornos - a key ally in our drive to continue manufacturing all parts and products to a high level of precision, quality and durability.

For further information on Tornos in Argentina?

Please contact Plamac Máquinas Herramientas S.A. at the following address:

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INNOVATIVE CUTTING OIL FOR MEDICAL TECHNOLOGY… …AND OTHER DEMANDING COMPONENT MANUFACTURING OPERATIONS

Berucut 130 from Karl Bechem

An official zytotoxicity certificate for Berucut 130 has been obtained.

The mechanical manufacture of components is becoming an increasingly difficult field to work in. This is due to the fact that components are becoming ever more complex, and the materials employed are of ever higher quality grades. Stainless steel grades such as X50CrMoV15, X40Cr13 or «Monel», as well as titanium, titanium alloys, cobalt and nickel-based alloys are all materials now commonly used in the production of medical components.

These materials and their respective machining processes place great demands on their machining oils.

Quality improvement and cost reduction

Lubricant innovations have made it possible to achieve high productivity and at the same time to improve the quality of components.

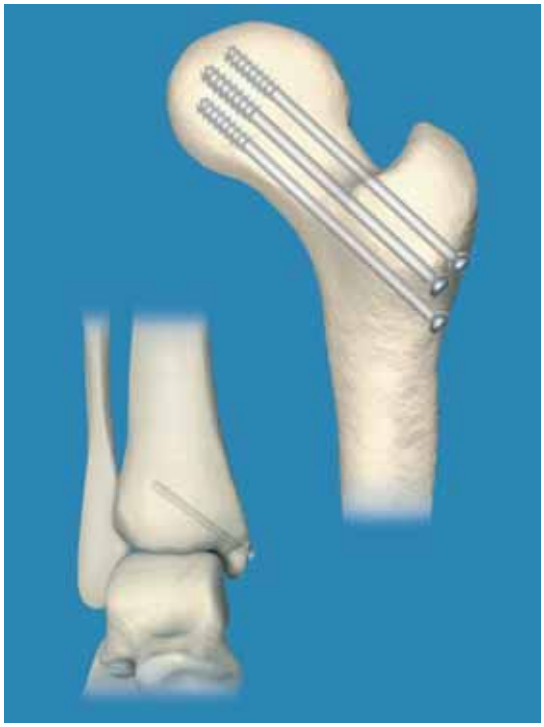
Production processes of this kind make it possible to run "unmanned shifts", which involve longer periods of continuous machine operation.

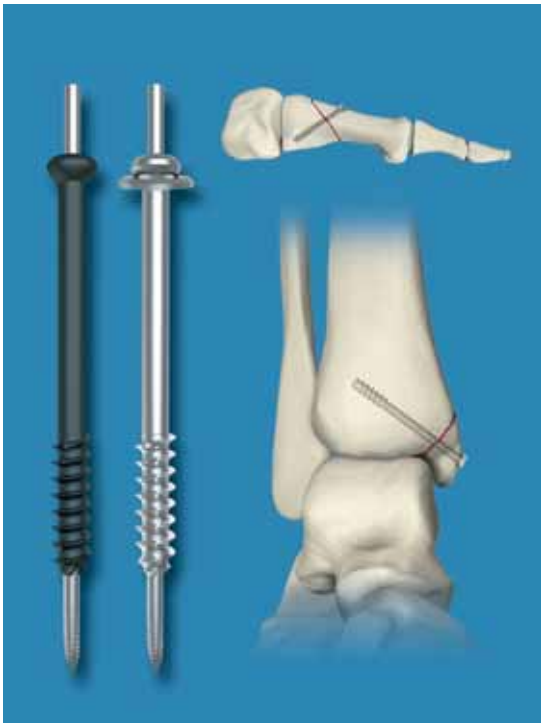
As continuous machine operations extend for longer periods, the Return on Investment (RoI) point is reached much sooner.

An important building block in this process is the right choice of machining oil.

Variety of components

Implants for mouth, jaw and facial surgery, hand and neuro surgery are now manufactured in the most





complex imaginable geometries, and the thinnest of wall thicknesses.

Very high demands are placed on standards of surface finish and tolerances, especially on implants for traumatology and spine surgery. These demands can only be satisfied by using a specialist grade of machining oil.

Tool variety

These different machining types mean that virtually no limits exist in terms of the sheer variety of tools involved.

To flush out bores, to cool the tool and the workpiece, and to extend tool service life, it is absolutely essential to define the machining oil very precisely.

Development

Faced with all these factors to consider, a specification document was compiled in close cooperation with the machining industry. This formed a basis for the development of Berucut 130 machining oil.

The Development department is in contact with users throughout Europe, quite literally on a daily basis. This closeness to our customers enables us to conjure up new developments, which take shape in response to this feedback and input.

The specification document has one paramount priority: the cost-benefit ratio.

This explains why commercial considerations closely accompany every step along the development process.

It is never possible to use every ingredient capable of satisfying these criteria, because due account also needs to be taken of factors such as the environment, workplace hygiene and the specific requirements of medical technology.

The Bechem vision is therefore...

...to create a highly resilient product for the toughest of machining challenges, specifically those associated with medical products. “We are prepared to satisfy our customers’ high quality standards and need for total precision by delivering customized cost-effective solutions”, states Mr. Richli, Head of Sales for Switzerland.

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USER-FRIENDLY START UP

Interview with Michaël Lanz from Tornos on the Delta start up system, a few days before SIAMS.

Delta 20/5 and Robobar SBF 320, a new production arm for components of average complexity.

Michaël Lanz lives and breathes bar turning, the head of a bar turning department and then of a company, he has worked on many methods of production. Joining Tornos just a short time ago as Software Application Engineer, he is in charge of the reception and start up of the machine.

decomagazine: Hello Mr Lanz, you are Software Application Engineer and are responsible for the commissioning of the Delta. Can you explain?

Michaël Lanz: My role consists of bridging the gap between mechanics and software. I also carry out a part of the fine-tuning of the product. It goes without saying that for the Delta, the validation process of the software and mechanics also had to be done. That's why I carried out the start up and the demonstration at SIAMS.

dm: Before discussing the start up, let's talk a little about the software. How do you program Delta?

M.L: The Delta range of machines with 3, 4 or 5 axes is programmed in European standard ISO (language C) in exactly the same way as the Tornos Micro and Sigma machines.

dm: On the subject of "software" and NC, any comments?

M.L: We use the new Fanuc 0i-td command which can manage up to 8 axes. Programmation is either done directly on the machine or with an ISO editor on a PC. In this case, the machine changes are done by MemoryCard or RS 232. The most noticeable difference with other machines is that the screen of the NC is a colour screen – an additional user benefit.

dm: Overall, what are first impressions of this machine?

M.L: The simplicity! The start up is really very simple. Of course, if you have never worked on an automatic turning machine, you will need to be trained. For all other uses, it's a real pleasure. Setting the collet and the guide bush, the installation, the start up… it's all

very intuitive. For example, setting the machine is supplied with a tool for rapid and precise setting.

dm: Does this category of machine feature pre-setting?

M.L: No, it isn't necessary. Setting is done quickly "on site".

dm: You mention simplicity. That means that "anyone" can set up this machine?

M.L: As with any machine, the kinematics have to be understood for the machining to be done properly. I don't think it would work so well in the hands of your local baker.

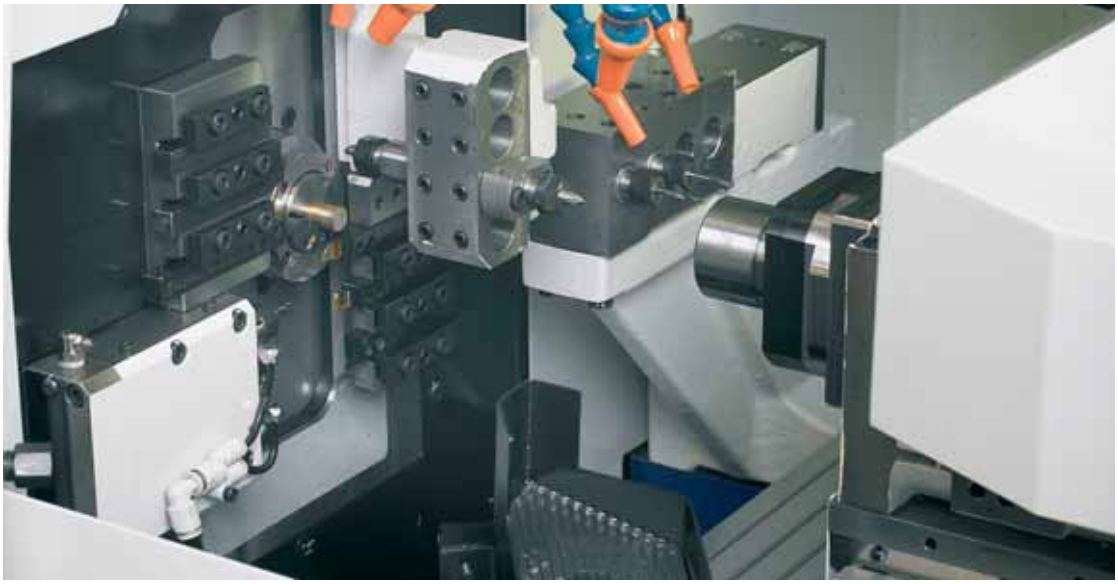
dm: You received the machine a few days before SIAMS. How did the arrival and the installation go?

M.L: An exhibition is never ideal. The electricity and the compressed air supply are not always reliable… but as far as the machine is concerned, no questions, no problems. We levelled it on four points like a Micro 8, then we connected it to the power supply, turned on the NC and we started to work immediately.

Simplified handling and streamlined design for the new Delta family.

dm: Listening to you, it's very simple, one button to press and it works…

M.L: Yes, but you need to know which button to press. As for everything else, if you buy a new car, you have to learn where the controls are for the headlights, the windscreen wipers etc..



Simple not to say stripped right down to the bare essentials - many visitors to the Siams trade fair were surprised at the kind of machine being exhibited.

dm: Coming back to the "pack" you received at SIAMS, any comments?

M.L: We received a perfectly equipped package: the tools required for the installation are supplied with the machine and everything is there.

dm: Simple is not the same thing as stripped down, then?

M.L: Not at all! It's absolutely perfect, for example during SIAMS all the equipment required came with the machine. We had everything to hand which meant we couldn't go wrong.

dm: To continue with the process, your machine is now programmed and up and running… what about the machining?

M.L: The machine is very quiet and reactive, the technology of the powered spindles makes a difference. Of course, in terms of machining options, we are fairly limited compared to a DECO 20a and its 10 axes. It's obvious that the machine is different, its range of operations particularly in counter–operation is less comprehensive.

dm: So it's a machine for producing very simple workpieces, then?

M.L: Yes and no… depends what you define by simplicity. The visitors at SIAMS were generally surprised at the quantity of machining carried out on the workpiece. We can make relatively elaborate parts at very good price.

dm: Before moving on to the visitor reaction, can you give us your impression concerning the performance of the machine?

M.L: I have nothing to add, the machine works "like clockwork".

dm: Finally, how did the show visitors react?

M.L: During the exhibition, we work "slowly" – there is no rapid advance on the axes, so that everyone can see what we are doing. The reaction was unanimous, the visitors were impressed by the workpiece produced on such a simple machine… very often, visitors were pushing each other out of the way to get a better look.

The reaction I often heard was "ah!" Tornos gives me the possibility to machine workpieces very rationally. The Tornos machines are the best and this new solution is the best performance-price ratio for workpieces requiring 3, 4 or 5 axes.

dm: Can you say the welcome was very positive?

M.L: Absolutely! First of all, as far as I'm concerned, I was won over by a Tornos machine which opens up new prospects for the company. Then, from visitor feedback, it was very well received. With its quality and simplicity, this range of machines is going to be a winner!

"At certain times, the spectators were standing four rows deep to wait their turn to take a look at the machining area": Mickäel Lanz

SIAMS: PERFECT SPRINGBOARD FOR A WORLDWIDE LAUNCH?

During SIAMS, visitors from about fifteen countries visited the Tornos stand and discovered Delta (amongst other products).

Several machines were sold, particularly in France and Sweden and dozens of offers are in progress.

When asked about this global participation, Mr Francis Koller, manager of SIAMS, talks about the very high standard of the 2008 exhibition:

"The SIAMS, trade fair for the automation, mechanics and outsourcing industries, took place for the 11th time in Moutier from 20 to 24 May 2008. This showcase for microtechnologies hosted 480 exhibitors. Over 15,500 professional visitors came to Moutier which became the global microtechnology capital for the duration of the exhibition. The 2008 edition was the best yet and is now the second largest Swiss industrial exhibition in the precision mechanical industry sector."

The next SIAMS exhibition will be held from 4 to 8 May 2010.

Do you need more information on SIAMS?

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www.siams.ch

YOU NEED TO SEE IT TO BELIEVE IT

Based on the idea of "you need to see it to believe it", Tornos is launching a Delta campaign that aims to show the machine "everywhere". You will have the chance to discover it at the following events in 2008:

IMTS	**in Chicago**	**from 8 to 13 September**
AMB	**in Stuttgart**	**from 9 to 13 September**
TORNOS T. IBERICA	**in Granollers**	**22 September**
MICRONORA	**in Besancon**	**from 23 to 26 September**
BIMU	**in Milan**	**from 3 to 7 October**
Viennatec	**in Vienna**	**from 7 to 10 October**
Metal Working China	**in Shanghai**	**from 4 to 8 November**
DMP	**in Dongguan**	**from 11 to 14 November**
EMAF	**in Porto**	**from 12 to 15 November**
PRODEX	**in Basel**	**from 18 to 22 November**
Thai Metalex	**in Bangkok**	**from 20 to 23 November**

* Company reserves the right to make changes.

AN EVER MORE COMMUNICATIVE MACHINE

There is really nothing remarkable about a company network. For years now, connecting production equipment to the company IT network has been commonplace. With their new MultiAlpha and MultiSigma machines, Tornos makes this operation more straightforward and not only provides more functions but also delivers huge potential. The main difference with other Tornos products is the control system that includes an integrated PC and offers a very user-friendly application on a large color screen.

With their integrated PC units mounted on a pivot arm,
the new MultiAlpha and MultiSigma machines take the pleasure of working to a new level.

To go into the features in more detail and to attempt to establish the benefits of this new way of controlling machines, **deco**magazine met up with Mr Ivan Von Rotz, head of the multispindle Business Unit and Mr Rocco Martoccia, head of multispindle technical sales.

decomagazine: You mention a PC integrated in the control unit. Does this mean the end of the DECO concept and the dual PC-CNC process?

Ivan Von Rotz: Not at all. TB-DECO remains an outstanding tool for programming our machines. This tool makes programming a multispindle turning machine equipped with 20 axes or more available for all operators.

Rocco Martoccia: We integrated a PC in the machine for reasons of convenience, but also to make it more communicative. We have facilitated access to different sources of available information. The user has access to all data directly on the machine which is the guarantee of excellent reactivity and increased efficiency.

dm: Before we talk about the enhanced communication, what about the TB-DECO and what's new for the operator?

Ivan Von Rotz: In terms of software, there is nothing new. The programming is done via the standard TB-DECO. The advantage that the new system offers is when you want to make a few small changes to the program, you don't need to return to a PC or to the programming department.

dm: I suppose this way of doing things is not fully integrated into a company structure where the roles are well defined. What hap-

Peripherals are integrated in an eminently transparent manner. Here you see the MultiAlpha 6x32 robot and the integral control panel with PC.

pens if the operator doesn't have the expertise to change the programs?

Ivan Von Rotz: No problem. Everything can be set accordingly and the administrator can decide on authorizations and limits. There is therefore no danger of "a programming free-for-all".

dm: You said that the programming can be done directly on the machine, but can it still be done externally?

Rocco Martoccia: Absolutely. The machine features two Ethernet ports and two USB ports. It offers maximum flexibility for customers. You can program it from any location and then load the program. In this respect, operation is the same as with the older machines. The NC and the PC are separate. This way, you can program the machining of one workpiece while the machine is producing another. You also have the option of consulting the information available. For example, you can consult the service instruction manuals or any other application installed while the machine is running.

dm: Because there is an integrated PC, two things immediately spring to mind. First, the risk of catching a virus and secondly the additional functions. Because it is a PC, we can "do it all". How do you keep on top of these issues?

Ivan Von Rotz: In terms of virus, there is no risk. The entire system is based on an industrial PC without a hard disk. You can do want you want with the PC, but when it shuts down, it is automatically rebooted in its factory settings. This is an essential security feature!

Concerning the second point, this is a very good question. Technically, we can load other programs or peripheral management programs in administrator mode. This will depend on the agreement between Tornos and the customer.

As already pointed out, the first item installed is the machine's documentation. All the service, user or maintenance instructions are loaded onto the machine. In the event of an alarm, for example, you can load the file instantly and read all information concerning the problem. Everything is available at the touch of a button, easily located – it's a remarkable service.

dm: Could we imagine your customer using it to display their information on the Intranet?

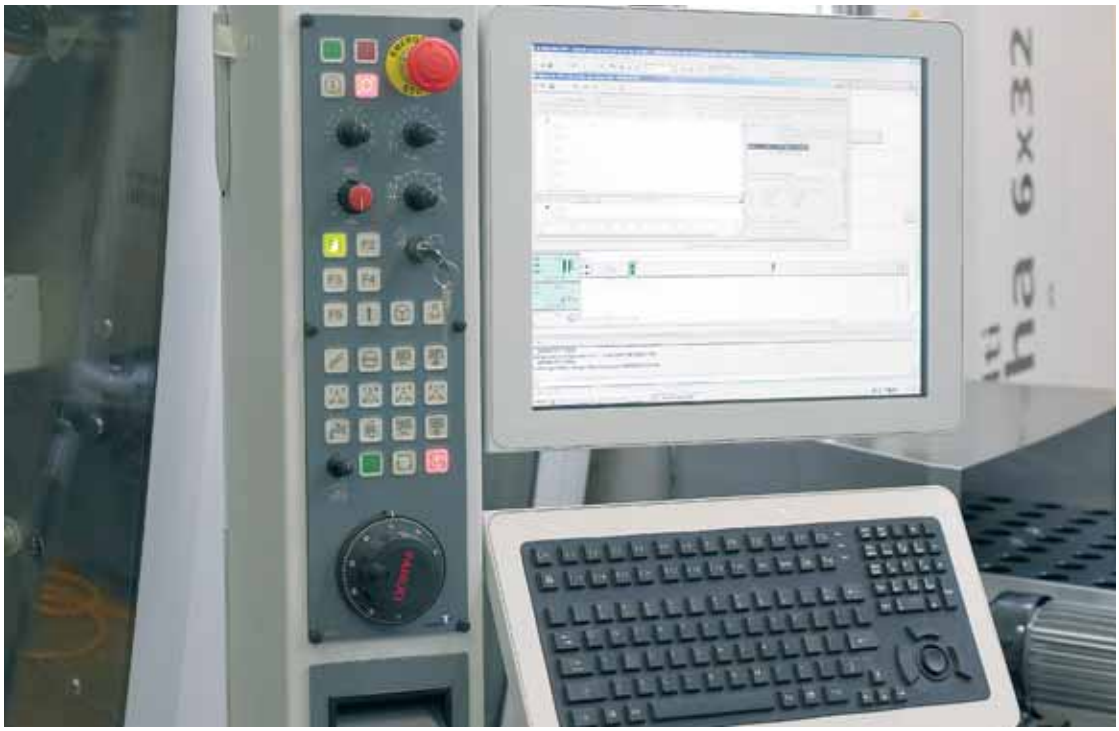
Rocco Martoccia: Absolutely. This requires the machine to be connected to the network and the Internet navigator loaded, but apart from this, there is no reason why not. As with the programming, everything can be set accordingly and the customer who chooses not to offer this option can forbid it. As far as intranet is concerned, the risks are small, as opposed to the Internet, an option we have decided not to propose.

dm: This idea of the Internet brings us to "telemaintenance" and taking control of the machine remotely. Do you currently offer this option?

Rocco Martoccia: Yes, we have the necessary tools to control the PC remotely, diagnose objects, inspect a program or even load updates onto the machine.

dm: It's extremely annoying when my PC downloads a Windows update and then warns me afterwards that a reboot is required… are your customers going to have to put up with the same thing?

Rocco Martoccia: It's clear that Tornos can not access the PCs on their customer's machines without their express authorisation. There is therefore no risk of Tornos disturbing their customers' production with remote operations on their machines' PCs. The opposite is true: the objective is to assist those who want assisting. The main aim of telemaintenance is



With its tilting keyboard and integrated mouse, the new Tornos control panel makes programming simplicity personified, even directly on the machine.

to come to the customer's assistance when required, without having to physically go on location, keeping costs down. We could also install new software more simply.

dm: I suppose this is just the start?

Rocco Martoccia: It's a good start! It remains true that the limits to this new development are those fixed by our own ideas. We are looking at several options: training course reminders, maintenance films, why not production management… we will be working on these areas over the next few months.

dm: You mention training. What's new as far as programming or using TB-DECO on this new order are concerned?

Ivan Von Rotz: Programming is done in a standard fashion, the touch screen is a little extra touch of user comfort, but in terms of training, nothing has changed. It is true that this new order paves the way for many new projects but they are not the only ones…

dm: I sense a scoop here! Do you have any other new developments you can reveal to us?

Ivan Von Rotz: Of course, we are working on the products of tomorrow and after tomorrow. We will soon be presenting "chucker" solutions as "standard packages" depending on the type of part manufactured. Our customers will be able to choose between different types of loading, unloading and peripheral systems. We have been producing chucker solutions since the earliest multispindle machines (BS 20 in particular) and the demand for this type of product is developing, several machines will soon be delivered in Germany, Spain and Switzerland… The market demands these solutions.

dm: So, shall we talk about these "chucker" versions in our next edition?

Ivan Von Rotz and Rocco Martoccia: OK. It's in my diary.

THE COMMUNICATIVE MACHINE AND "BIG BROTHER"

Is having a connected machine-tool with the manufacturer able to take control remotely (with all the possible guarantees) a good thing or do you think it's a risk?

We are inviting our readers to express their opinion on this subject and send their comments to redaction@decomag.ch.

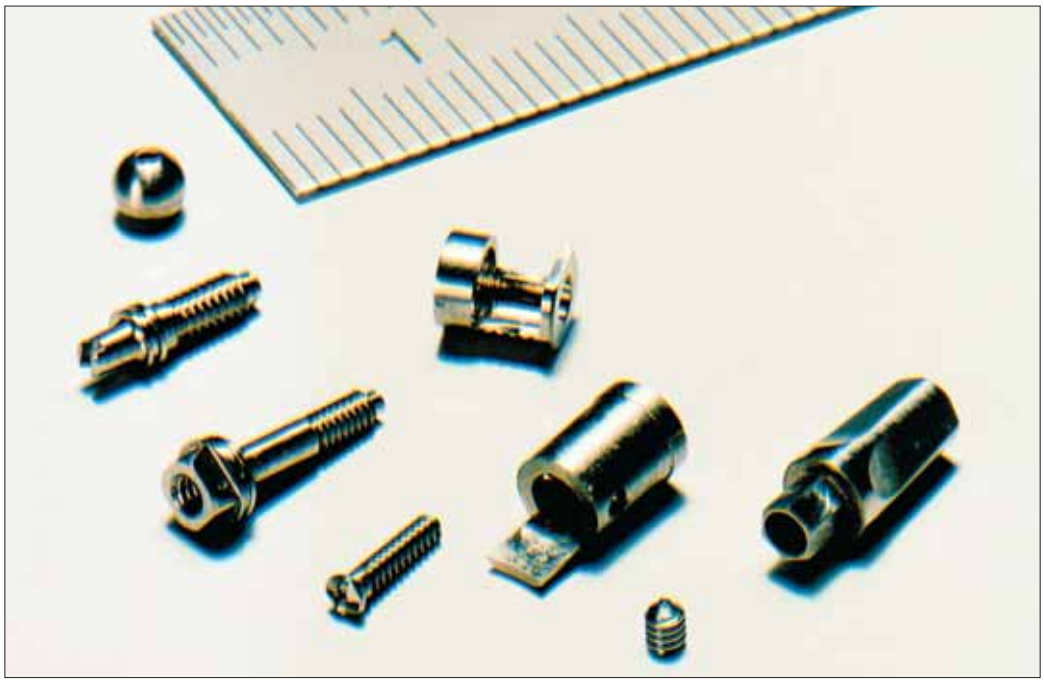
Do you have a positive or negative experience? Any ideas or comments? Tell us about it!

Depending on experience and interest, **deco**magazine will publish an article on the subject in a future edition.

CNC VERSUS CAM

A medium-sized bar turner weighs up the pros and cons

Dauchingen, about eighty kilometres south of Stuttgart, is not all that easy to locate on the map, but its known by virtually everyone in the medical sector. For it is the home of Josef Ganter, the world's leading supplier of disc holders. This successful organization is upholding the reputation of Germany as a production location in the face of widespread doom and gloom. The company's innovative ideas, high-precision products and a well-documented manufacturing strategy set standards for the international competition. The company di-rector, Roland Müller has painstakingly prepared the conversion from cam-controlled turning machines to CNC machines and made a detailed analysis of all the pros and cons. The success story of this company is closely associated with that of Tornos, the Swiss turning machine manufacturer.



High-precision products created by means of an ingenious production strategy: these are the secrets to the success of Josef Ganter the company.

The company was founded by Josef Ganter in 1926 in Saint George in the Black Forest and was bought by the father of the current owner, Roland Müller in 1980. He had been working at the company since 1985 and took over the helm from his father in 2004, expanding it further. A practical man, having learned the bar turning profession from scratch, Roland Müller implemented a constant growth strategy, employing modern management methods. "We do what we can to be better than the competition. This is why we focused on medical technology, a sector we supply with our own products such as milling discs and torque ratchet wrenches and highly complex turned parts, implants and screws". The company has been working with titanium since 1997 and has made considerable advances in the sector. High temperatures constitute the main problem with working in titanium. It requires robust machines operating at low speeds and equipped with special tools. On any given Saturday, Roland Müller can typically be found in the company, fiddling about with ways of optimizing production. He has therefore

Josef Ganter offers what is without doubt the world's most comprehensive range of disc carriers.

been able to sustain an impressive rate of growth. The first CNC automatic turning machine was purchased in 1996 and he now has 19 in service.

CNC-machine cost trap

Roland Müller went looked into the purchase of a machine in great detail. This presented him with the decision of replacing his 22 cam-controlled turning machines with CNC machines in spring 2003. At the time, he actually already had 11 CNC machines and was therefore able to fall back on experience. Back then, he used the CNC machines for complex turned parts and the "old-fashioned cam technology" for the production of more straightforward turned parts. Roland Müller predicted a trend here which has now turned out to be true. Parts are becoming ever more complex, series volumes are getting smaller and the demand for high precision is increasing. He analysed his current part range and reflected on which new market sectors would open up to him with CNC technically. He therefore asked himself the following questions:

- Would the turned parts have buttons or do I need machines with clamping spindles? It would clearly be an advantage here to aim for a mix of 5, 7 and 9 axis machines.
- How fast are the machines? The CNC machine is faster when the cycle times are longer than 20 seconds. If parts are turned on the cam-controlled machine in under 10 seconds, a CNC machine would not offer any benefit.
- Do I currently have any rework processes that could be eliminated by the CNC machine?
- Can I achieve round-the-clock production? Possibly with unmanned or low-staffed shifts.
- Can I preset jobs and save valuable set up time, because there is still huge potential for saving time during the set up process?
- How high does my minimum machine hourly rate need to be with a CNC machine? Can I handle €10 to 15/h?
- Can I propose new parts which I have had to turn down up to now with cam-controlled machines? What opportunities does CNC offer me in this respect?

A decision with far-reaching consequences

Time was an issue for the decision because most of the 22 cam-controlled machines dated back to the Fifties and did not feature loading magazines. Machining was limited to day shifts at the time. Roland Müller had to choose between replacing his machines with CNC machines or modernizing his existing equipment. Faced with this situation, he was offered five DECO 10/5 axes with low operating hours. Different disc holders had been tested on the previously-used DECO 10/5 axes over a period of several weeks in order to establish how many cam-controlled machines could be replaced by five DECOs. The disc holders were produced in different sizes. There were differences in head shape, rod diameter, and length and thread diameter.

The following image took shape after the test phase:

Machine	Part time in seconds	Parts/hour	Cycle time/day theoretical	Effective cycle time/day	Parts/day
M105	35	102	10 hrs	7 hrs	714
DECO 10	28	128	24 hrs	18 hrs	2304

The CEO of Josef Ganter, Roland Müller, is personally committed to modern management methods and to cutting edge technology.

The effective capacity was 323 % higher with the DECO 10/5 than with the Strohm M105 cam-controlled machine. In other words, over three times more capacity. In theory, it was therefore possible to replace almost all cam-controlled turning machines with the five DECOs. In the meantime, the cycle time for this workpiece was only 23 seconds. The machines were bought in August 2003 and were set up in less than a week in early October. In the transition period, about ten cam-controlled machines were also taken away. A few months later, the programs were also optimized, so that by spring 2004 the last cam-controlled machines were shut down. The transition was completed within four months and five CNC turning machines took over the production volumes of 22 cam-controlled machines.

Improvements in quality and performance

The key benefit to working with Tornos is that, as well as supplying technologically advanced machines, they also configure the machines to customer requirements. In the case of machines supplied to Roland Müller, this means:

- The installation of fire extinguisher device for a 24-hour operation, i.e. one manned shift and two unmanned.
- The use of drill failure detection devices.
- The integration of 3-fold drill holders on position T21/T22. This way, three fully-fledged drill positions are available.
- The use of integrated compressed air nozzles for blowing out deep bore holes.
- Optimisation of programs.

When Roland Müller looks back on his decision to purchase Tornos CNC machines, he views everything in a positive light. His staff are have all adapted to the machines (5-9 axes), and programs can be generated, optimised and modified rapidly. The elimination of cam costs means that customers can now also be offered prototype and short production runs.

The machines, equipped with loading magazine, drill failure detection and extinguishers operate nearly 24 hours a day, 7 days per week and at weekends 24 hours with partial supervision. Each machine is operational for over 5000 hours per year.

CNC technology has considerably reduced the cycle time per job, rework is rarely required, precision levels are higher and the scrap rate considerably lower, something which really makes its presence felt in the budget when fitting disc holders.

Impressive rate of growth: in 1996, the company purchased its first Tornos CNC-machine, and now 19 of them are toiling away tirelessly round the clock.

Two additional elements, which have a direct impact on efficiency, are improved use of manpower. Around 250 to 300 bars were loaded manually before the conversion. This is now done via the loading magazine so that the machine operator has more time for quality inspection and presetting the machines. For Roland Müller, the option of presetting each Tornos machine with individual jobs is a considerable selling point in favour of the Swiss manufacturer.

Two partners, one objective

Tornos and Roland Müller, is a genuine partnership based on common goals and mutual respect. Supplying 90 percent of their production to medical technology involves special standards. ISO 9001/ ISO 13485/ certification in compliance with the EC 93/42 guideline certification and the FDA demand respect. The same applies to committing resources to more environmentally friendly production. An example of this is the innovative vacuum extraction using a heat sink[1], saving energy and protecting the environment.

Roland Müller is taking on a certain level of risk with this equipment which had never been tested before. However, in his opinion, this goes with the territory: "Only by going off the beaten track, can you discover something new." He is therefore already thinking about how he can develop his production range still further to offer new products to his customers. For this reason, he is also highly appreciative of the speed at which Tornos is currently developing new ideas. Continuity and innovation are still very much the attributes which characterise their many years of working together.

[1] Or indeed a geothermal heat sink. This ecological system enables air to be drawn up from deep below ground level through a subterranean pipework system. The inertia of planet Earth is used to heat fresh air in winter, and to cool it down in summer.

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SUCCESSFUL SYNERGY PARTNERSHIP: GÖLTENBODT AND BERGER GROUP FOCUS ON GROWTH AND PRODUCTION LOCATION GERMANY!

While choosing Germany as a production location was portrayed as a thing of the past many years ago, visionary and courageous entrepreneurs were determined to focus on the positive factors in Germany. The quality of the skilled labour force, the excellent infrastructure and the optimization potential with technology partners with their finger on the market's pulse are the decisive factors for these entrepreneurs.

Göltenbodt, Leonberg.

Göltenbodt Precision Tools, based in Leonberg, has been focusing on the use of preset tool holder systems for the consistent and sustainable reduction of manufacturing costs and at the same time helping to safeguard Germany as a production location for their customers. An example of the compatibility of global success and the simultaneous promotion of the domestic production capacity is the Berger Group based in Memmingen.

Founded in 1955 by Alois Berger, the Berger Group is now the world's largest family-owned manufacturer of precision turned parts. The holding company owns thirteen individual enterprises with production locations in Germany, Switzerland, Canada, USA and Poland. With production premises covering a total area in excess of 60,000m2, a payroll staff of 1600 and annual sales of over €200million, Berger is the leading supplier of ready-to-install precision turned parts, precision machined components, assemblies and tapered gear threads in Europe and America.

Precision specialists, the Berger Group has conquered the automotive market and every major automotive firm is now a direct or indirect customer of Berger. Berger precision-turned parts prove their value day in day out with millions of diesel injection pumps, ABS and ARS systems, carburettors or valves installed.

GWS rapid drilling spindles with internal coolant feed up to 100 bar.

GWS special solutions.

At the same as expanding abroad into strategic production locations, the Berger Group has also consistently invested in the construction of five new German companies. For Ms Marianne Berger-Molitor, Marketing Director of the Berger Group, this is the key to global success: "The constant development of manufacturing technologies, an in-house heat-treatment shop with unique heat treatment processes and close partnerships with local synergy partners create added value, which can then also be transferred to our other, international locations."

Gerald Ray, CEO of Göltenbodt, is proud that Göltenbodt has been a supplier and technology partner of the Berger Group for sixteen years already. During this time, numerous GWS standard tool holder systems and special solutions customized to meet the exact Berger requirements were installed in several Berger sites both in Germany and abroad. Norbert Gumina, head of the CNC multispindle department at Berger, confirms: «For us, Göltenbodt is a technology partner, pleased to work new technological requests. Some projects have already been successfully completed through close cooperation and development of customer-specific solutions,» says Gerald Ray.

In this respect, Göltenbodt brings further strengths with their dozens of years of experience and wide product portfolio. Norbert Gumina describes the Berger Group strategy in a few chosen words: «In the production of new solutions including, for example, the hydro collet we are pleased to be able to benefit from the GWS product range and the technical expertise of Göltenbodt. Also for tasks including calibrating multispindle turning machines, I appreciate the close and direct connection to the Göltenbodt design engineers, who always have a rapid and economical solution at the ready.»

Berger's exceptionally broad range of activities combined with small, prototype and large series production requires an extremely high level of flexibility and service quality from Göltenbodt. Göltenbodt plays a key role in Berger production particularly with multispindle turning machines that cut tool changeover times. Time saved during tool changeovers plays a major role on large series, whereas with small and pilot series, preset GWS tool holders come into full effect.

According to Marketing Director Ms Berger-Molitor, efficient pilot series and prototype production through close cooperation with all major automotive

GWS tool holder for single and multispindle turning machines (for longitudinal carriages or "ways").

axes for rear drills with up to 3 drilling tools, including rapid drill spindles and many other special products.

As far as Göltenbodt is concerned, the cooperation with the Berger Group is the best example of how partners can be successful by fulfilling every area of potential cost savings in their business activity. For Göltenbodt CEO Gerald Ray, the first step is always personal discussions with the customers, where their technology level, objectives and potential for rationalization can be defined.

manufacturers is playing an ever more important role: "I particularly value the outstanding dimensional accuracy and precision of the GWS systems in our facilities. This was a decisive factor in choosing our fundamental business direction, to continue working closely with Göltenbodt in the future."

With their preset GWS tool holder systems, Göltenbodt are pioneers in the reduction of unproductive, tool-oriented downtimes in single and multispindle turning machines. A considerable benefit is that the GWS tool holder can be preset outside the machine for follow-up orders and tool changes during production in X, Z and Y axes and in parallel. All GWS tool holders are fitted with internal coolant feed for pressures of up to 35bar as standard. Higher pressures up to 100bar are available on request. The high degree of flexibility, a change precision of 0.02 mm and user-friendly application are additional outstanding performance characteristics of the GWS tool changeover systems.

A key factor from Göltenbodt customer feasibility studies is that the payback time for all the benefits of GWS is only approx. 1 year. Customer-specific special solutions are becoming an important cornerstone of the company based in Leonberg. Additional solutions include plune-cutting tools, longitudinal turning tools, U axes for CNC-multispindles, bevel cutting tools, plunge-cutting units with additional X

GWS tool holder with internal coolant feed.

For more information, please contact:

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BENSON TURNS THE TIDE WITH TORNOS

Stopping the swelling tide of manufacturing work going to low cost economies such as Eastern Europe and Asia can be a challenge in itself, but Benson Engineering Ltd hasn't only stopped but reversed this trend by exporting to "low cost" countries. "This reversal has been credit to our investment in our staff and our high specification machine tools like the Tornos DECO sliding head turning centres," comments Benson Engineering Managing Director, Mr Aaron Benson.

Killarney based Benson Engineering has operated Tornos machine tools since the company's inception in 1980 starting with CAM Auto turning machines to produce parts for the white goods industry[1]. The County Kerry turning specialist reached a staggering 30 Tornos CAM Auto machines prior to the electronics boom in the late 1990's. This growth noted Benson manufacturing components in batch sizes from 10 to 100,000 and up to a million with parts moving from CAM machines to manual milling, drilling and bench operations for final processing. The company also has a unique capability of turning with natural diamond tooling to produce very high surface finishes of less than 4 Micro Inches Ra.

With the electronics sector growing in sophistication, parts continually grew in complexity and demanded an increasing amount of manual machining. As Mr Benson recalls: "In the late 90's our orders for electronic connectors were demanding ever tightening tolerances with growing complexity that could not be fully met by our CAM machines. We realised

1 "White goods" and "brown goods" are two of the classic categories invented by marketing.
White goods are household electrical appliances intended primarily for use in the kitchen or bathroom (hob, oven, fridge, washing machine, dishwasher...). "White" is chosen simply because the external cladding on these items is very frequently this colour.
'Brown goods' are household electrical entertainment products (TV, video recorder, hi-fi, radio ...). "Brown" is chosen because their external cladding – originally involving the use of wood in most cases – was this colour.

that we needed intricate parts to come off the machines complete, so we entered the market for our first CNC machine and in particular a sliding head turning centre that could produce parts in "one-hit". As a longstanding Tornos customer we looked at their new DECO range but also took the opportunity to fully review the market."

"With almost 30 years experience with Tornos machines we were confident of the build quality, reliability and service. Regardless of these factors we needed a machine that would meet our wide range of machining requirements. Not to our surprise we found the Tornos DECO range had the ability to meet our tight tolerance and surface finish levels whilst the power and flexibility of the driven tooling was beyond the scope of competitor machines," states Mr Benson.

It is these factors that led the Irish manufacturer to purchase its first CNC machine – a Tornos DECO 10 sliding head turning centre. The DECO 10 acquired in 2000 enabled Benson to meet the changing demands of its customer base and permitted the company to meet the tight tolerance complex needs of its customers immediately.

The DECO 10 had an immediate impact with secondary operations being reduced, credit to the driven tooling unit on the Tornos. This had a knock-on effect with scrap rates being slashed, product quality improving and capacity and staff being freed up for alternate tasks. The DECO 10 created such an impact that it was followed in 2002 by a DECO 20a with 26 mm diameter capacity for larger parts. The second DECO met the diameter requirements of the ISO: 9001 registered company as well as providing lights out capability. This immediately increased productivity and enabled Benson to reduce lead times considerably.

The second DECO coincided with the demise of the electronics subcontract industry in Ireland. Forced to diversify into alternate market sectors, Benson was well positioned with its two DECO turning centres to meet the needs of the general subcontract market. Moving into the hydraulics, automotive, medical and gas cutting application industries, Benson was more than confident in its ability to meet the needs of its expanding customer base.

In the last seven years this confidence and capability provided by Tornos, now sees the 10 employee company export to China, Poland, the Czech Republic and Brazil to name a few. The lights-out machining has enabled Benson to remain competitive on cost and whilst providing impeccable quality. The underlying efficiency factor sees low cost economies order its hydraulic plungers, medical screws and connectors and pins for surface mountings on PCB's from Benson. The high quality, unerring accuracy levels, repeatability and cost effectiveness of its production facility are all factors that many European OEM's

relocating to Eastern Europe and Asia cannot specify locally.

"Our CAM Autos still play a major role in our business and they are still used for long series runs of relatively simplistic parts. However, the skills for these machines; like the technology itself is fading fast and we have to gradually phase out the machines for higher specification machines that will maintain and increase our competitive edge. It is this drive for competitiveness that led us to acquire a further five Tornos DECO's in 2006," continues Mr Benson.

Two DECO 20a machines were specified to further enhance the ability to manufacture parts up to 26 mm diameter with the DECO 26a employed for hydraulic parts up to 32 mm diameter. The remaining two DECO 13a machines serve the purpose of taking complex parts from the CAM Autos and enhancing lights-out capability. "This has worked extremely well for us and we have now reduced our CAM Autos from 30 to 12 with the seven Tornos DECO machines replacing 18 CAM Autos. This has freed up shop floor space, reduced labour costs and improved our skill levels – and this is not to mention the remarkable changes to our production," says Mr Benson.

The Tornos DECO machines have given milling capability that has enabled Benson to reduce the workload on its machining centres whilst improving the finish quality and tolerances of its parts. Moving forward, Benson plans to eventually replace all of its CAM machines with Tornos sliding head turning centres. As Mr Benson concludes: "The Tornos machines have revolutionised our facility and given us capacity, quality and the ability to comfortably compete with low cost economies. What's more the skill level for CAM operators in Ireland is increasingly difficult to find with CNC machining coming to the fore as the new technology. The move to full CNC machining in the future can only be of benefit to us and our customers."

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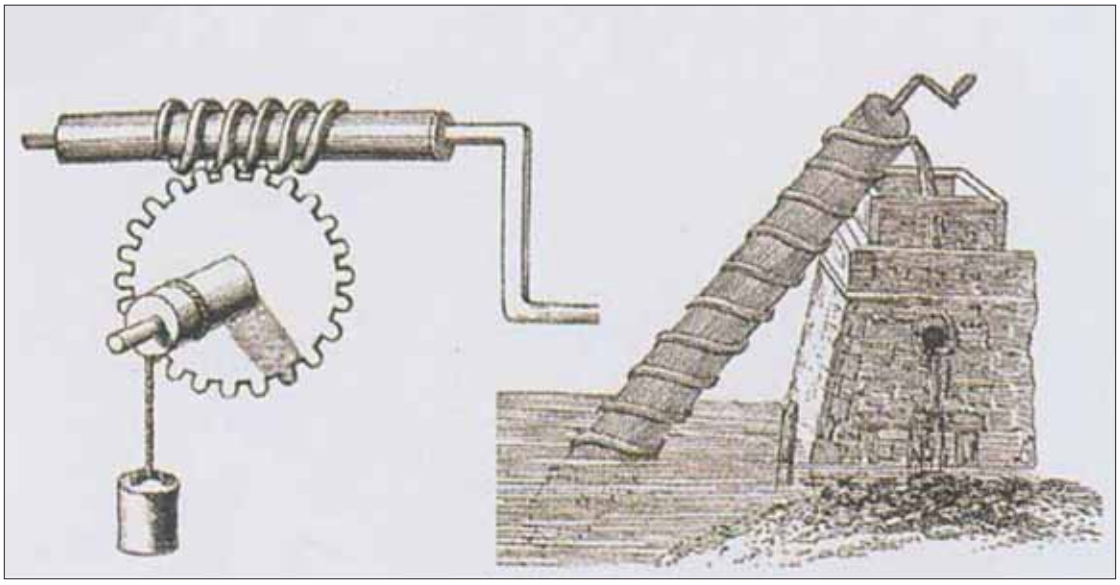
THE PINNACLE OF BURR-FREE THREAD-CUTTING OPERATIONS!

External micro thread-cutting explained by Denis Juillerat, Director of Utilis France



The lower end of this enormous screw, forming an integral unit with a cylinder, was immersed in water. By turning the crank handle, the screw started to rotate and water was then carried upwards by the thread. Source: Terra Nova.

The history of thread-cutting can trace its roots back almost 400 years

Our story begins in Egypt, 2500 years before our time, where the thread first saw the light of day. It was used primarily in presses, one example being its use in wine presses.

Archimedes (287 – 212 BC) made it famous with his "Archimedes Screw", originally a concept for raising low-lying water to irrigate elevated regions.

It was not until the end of the Middle Ages that the use of the screw and its use with nuts extended to the assembly of materials. Nowadays, thread-cutting has become an essential fact of life and, even though the principle of thread-cutting has not changed much, the types of profile now available has evolved a great deal and the range of available geometries is now vast.

Several processes are involved in the production of a thread. At present, the simplest of these involves the use of a thread-cutter. Thread cutting is defined as follows: «Thread cutting is an operation consisting of cutting a helical groove down the length of a cylindrical surface», to paraphrase the French dictionary Petit Larousse.

The triangular thread-cutting plate

Every mechanic or user is familiar with the traditional triangular plate used for thread cutting. This fascinating little plate was developed specifically for mechanical equipment and for use on machines now considered to be very conventional. Of course, prior to the dawn of the numerically controlled era, it took an operator with excellent reflexes to ensure that the tool disengaged before completing the thread-cutting diameter. To do this, and to prevent a collision from occurring between tool and workpiece, a disengagement groove became a standardised feature of these tools. This groove also makes it possible to avoid [accidentally] machining a large chamfer on the component which has just been fitted to the

Small plate 1606-0.5-10-60 VP L, not clad.

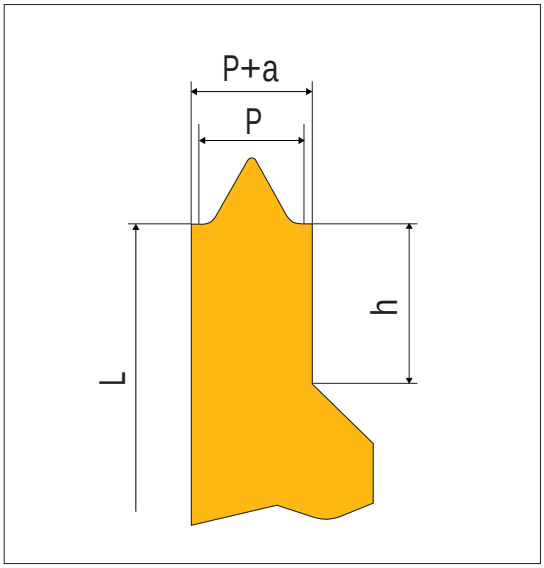
thread. Nowadays, machine shops are all run on numerical control and the task of disengaging the tool is entrusted to the machine.

Thanks to numerical control, it is possible to cut threads close to the upper diameter without running the risk of a collision and this makes it much easier to cut small diameters of thread. Now that the disengagement groove is not a pressing necessity, one fewer tool is needed on the machine, eliminating the risk of tool breakage in that operation and significantly reducing costs. Elimination of this groove also means that a thread can be cut along more of the screw length.

Under these conditions, use of the small triangular plate is no longer optimum, given the need for small pitches on small diameters, so we have effectively reached the physical limits of this kind of plate. Without grooves, we recognise that plates of this kind are more of a hindrance than a help, with operators being required to modify the cutting plate to get closer to the following outcome.

A specific plate for each bar-turning component

Already aware a few years ago of these associated problems, Utilis put forward a small plate offering minimum dimensions and the scope for machining a thread known as a "back thread". Initially, Utilis offered a plate with a pitch of 0.5 [mm] with complete profile, the width of which did not exceed the value of the pitch, plus 0.2 [mm]. In other words, for



P = value of pitch for the thread-cutting operation
a = 0.2 [mm], 0.1 on either side
h = 2 x (p+a)

a pitch of 0.5 [mm], a total width of 0.7 [mm]. This value of 0.2 [mm] was defined for pitches greater than 0.5 [mm] and is then divided in half to cover the tip of the thread.

This type of small plate offers several interesting intrinsic features. One of these is to deliver precise stock removal down the full length (L) extending to 8 [mm] for plates in the 3006 VP series and up to 4 [mm] for plates in the 1606 VP series. This length of stock removal, required during the final stages of thread chasing, helps to achieve threads with small diameters on large diameter components. Another advantage is the scope it gives for moving to a small diameter after a large one. The stock ground away around the circumference of the plate enables it to machine clockwise and counter-clockwise threads with equal ease.

This new thread-cutting plate was immediately perceived as a high-performance solution for cutting threads on small-dimension parts. From this, requests for thread pitches of less than 0.5 [mm] started arriving at Utilis.

With the narrowness of these pitches, a new concept of plate became necessary.

To ensure an optimum production process in the manufacture of small diameter and very small pitch threads, it is advisable to optimize the shape of the plate. Figure 3 illustrates a different plate which does not offer scope for plunge-cutting behind a diameter, no longer necessary for small dimensions. This greatly increases the strength of the plate.

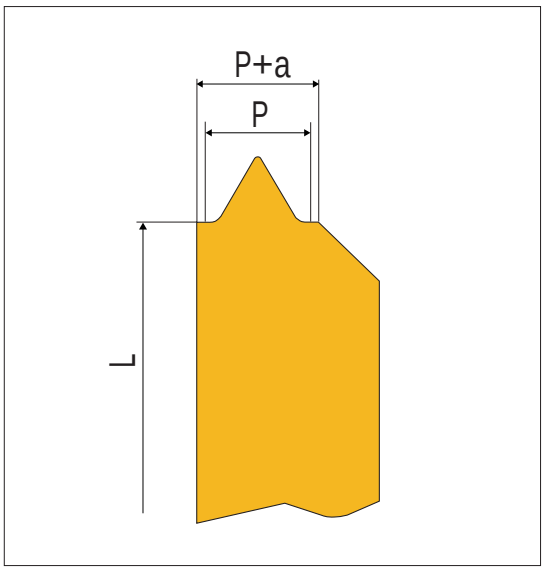


Figure 3:
Plate reinforced for pitches of less than 0.50 [mm]

Grinding such small dimensions also calls for different carbide properties to the ones usually found. For the manufacture of plates with complete profiles and pitches of 0.06 [mm] for example, the surface quality after milling needs to be of an optimum standard. To obtain the required standard of milling finish, Utilis works with a carbide with a "submicro" grain size, i.e. where the grain size is extremely small indeed. This grain size is essential for obtaining a perfectly sharp and regular cutting edge, of particular importance to assure the precision of the thread-cutting profile.

The grade of carbide chosen is one with very resilient properties. This is because the cutting speeds involved in thread cutting are often very low, so it would be appropriate to change in favour of a harder grade of carbide. *«We specify uncoated plates for thread pitches of less than 0.35 [mm] in order to maintain the sharpness of the cutting edge»*, Denis Juillerat tells us.

From the standard M 1.5 thread to the superfine S 0.06

«Our programme covers the entire range of threads currently manufactured in metric dimensions. Ground geometries correspond to a metric profile in accordance with ISO and NIHS standards (Swiss Watchmaking Standards). These plates offer our customers perfect threads with no burrs on the tip of the profile and at the end of the threaded diameter», adds the Director of Utilis France.

The service life of these plates is excellent, due primarily to the grade of carbide we use. They are used for the manufacture of watchmaking components, medical implants and micro-mechanical components. They were designed for machining materials such as stainless steel, medical grades of stainless steel, grades of steel with medium to high levels of alloy content and for titanium alloys.

Would you like more information?

If so, please do not hesitate to contact Utilis at the following address:

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WE HAVE NO WISH TO DO EVERYTHING, BUT WHAT WE DO TAKE ON, WE ALWAYS WANT TO DO WELL!

I decided to meet up with Mr. Daniel Uhlmann, Director of Azuréa Technologie, to speak to him about potential areas of synergy between Tornos and Almac, as seen from a customer viewpoint. A date was duly agreed and, in early July, I took myself to Azuréa Technologie in Moutier. The company building dates back to 1917 and has been admirably incorporated in a modern, sobre design. Small showcase windows exhibit the expertise of this company and my visit gets off to an enthralling start. Our meeting is convivial and very interesting and we listen with rapt attention to the story of the strategic global process upon which this manufacturer is embarked: one which it has been working on for several years.

A short history lesson...

Founded in 1914, Azuréa now works primarily in the watchmaking sector. Over the years, the company diversified gradually, and by 1995, watchmaking accounted for 50 % of company activity. Today, Azuréa transacts 80 % of its business in this sector. Historically a great specialist in the manufacture of components for watch movements, the company has developed various professional skills sets and is now able to produce entire movements in-house. This "verticalisation" includes machining, heat treatment, plating, polishing and assembly, to name just a few of the processes involved. Azuréa has now acquired tremendous flexibility and a complete mastery of quality and production lead times in all their complexity. In these days where the requirement for "Swiss-made" has been ring-fenced and where rules of attribution further enhance value, it is vital for all players in the watchmaking world to be fully aware and to achieve the very high quality levels associated with that.

Markets in a state of continuous evolution

Azuréa has seen a great many markets emerge, then simply disappear again. Once example was where the company watched the emergence of fibre optics, followed by the decline of bar-turning in this sector, where metal was replaced by ceramics. To meet these challenges, the company can always rely on its expertise and on its material and human assets, with an even more important role played by its engineering. Technology specialists are always on the lookout for innovative solutions for their customers and it is not uncommon for client company R&D departments to work hand in glove with their sub-contractors.

At the present time, there is a very high level of demand for top-of-the-range watchmaking components and a number of studies indicate that this trend is set to continue for a good many years. Mind you, even if the upper echelons of the watchmaking world raise production levels by 10 %, the size of the

market is such that this only occupies a minute corner. For example, if Swiss watchmakers produce an annual total of 3 million top-of-the-range watches, and if 0.3 % of the population of China were to purchase one each, total annual production output would be exhausted [1]!

A strategic diversification

Taking that point one step further, why is Azuréa in the process of seeking ISO 13485 certification for its work in the medical sector? This is the secret of success for this manufacturer which, despite the virtual certainty of having a market for the next several years does not wish to find itself being "held prisoner" on that market. «I am a believer in multi-source logistics and, by extension, I also believe that diversification is important», states Mr. Uhlmann to us. For a long time now, we have been applying our own methods to the medical sector, one example being to assure full traceability. A company is obliged to innovate continuously and to deliver more to its customers, and quite clearly this standard of service is one of the value-added benefits we provide to our customers.

It is people who make the difference

Nowadays, pretty much anyone can purchase an automatic DECO lathe and can machine components without the need for rework, and can achieve extraordinary levels of success in the process. It is possible to buy cam-type turning machines and Almac rework machines, and to launch yourself straight into production for the watchmaking sector … but that is by no means all it takes! In the same way as watchmaking manufactories can capitalise on their history and their expertise, Azuréa can draw on its depth of in-house savoir-faire, going back almost a century. Even though some components are now made on NC machines instead of on cam-type lathes, the expertise gained in the «School of 360°» is still very important. An operator who has learned to produce a component on a cam-type headstock machine with a knowledge of 360° machining will find it easy to switch to an NC machine and will be able to draw on all its benefits. A training background in bar-turning provides a solid basis .... something so effective that this manufacturer still trains its operators on cam-type machines.

Mastery of the processes involved

To ensure that quality is delivered consistently and on schedule, the entire chain of operations and processes needs to be mastered. What value the production of components to precision levels which add a few tenths of a second to accuracy if the component then has to lie waiting for a week for surface treatment? The answer to that is a very resounding one - no use at all! It follows from this that a company which adopts vertical integration of in-house functions must learn to manage several different skills sets and must take care not to lose any of them. «We have no wish to do everything, but what we do take on, we always want to do well» – Daniel Uhlmann.

That means that nothing less than perfect integration can enable the company to deliver the required standards of quality. Even when production is on an industrial scale, parts are then used in small watchmaking machine shops ("manufactories") where they are treating like goldsmith's components and handled with the loving care of watchmakers whose dextrous skills date back centuries.

However, here again, no time for any rest ... but although the manual skills are traditional, the components no longer are. Instead, they are becoming ever more complex, offering increasingly more functionality and performance features [2], so a component supplier always needs to keep a close eye on the radar.

Shared values

«Swiss watchmaking is a strong image of quality, precision, a love of the profession ... and one which will continue to capitalise on these indispensable points. Manufacturers do not need to succumb to simplicity just because demand is strong», Daniel Uhlmann confides in us. The situation is exactly the same at Azuréa: commitment to performance, quality or precision must be to the fore at all times. It is important to be consistent, and to uphold this image and renown, we should always do our maximum to assure high standards of quality.

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[1] At first glance, the customer base with high levels of purchasing power appears limited in China, since it does not even account for 1% of the population. Nevertheless, this does still constitute a regiment of more than 10 million people who, between them, own 40% of the wealth of the country. According to the researcher Ruppert Hoogewerf, China has more than 150 000 "super-rich" whose personal fortunes are estimated to be in excess of US$ 5 million.

[2] For example, a power reserve of several weeks compared to just 2-3 days a few years ago.

AZURÉA TECHNOLOGIES

Founding date:	1914
Number of employees:	125
Certification :	ISO 9001, ISO 13485, ISO 14001
Pending:	ISO 13485 medical
Professional skills:	Bar-turning, engineering, machining, rolling, assembly, heat treatment, surface treatment, watchmaking decor, quality control.

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TORNOS-ALMAC: GREAT POTENTIAL

Interview with Mr. Daniel Uhlmann

decomagazine: Mr. Uhlmann, what forms of synergy do you see existing between Tornos and Almac?

Daniel Uhlmann: First of all, I think that this is an excellent operation for Almac because stands to benefit from access to a much larger market. Next, I believe that this global product range offers extended possibilities for Tornos.

dm: And for Azuréa?

D.U: At the present time, we are using machines from two manufacturers in different sectors. We are finishing simple components on Almac units and we are machining entire and complex components on DECO machines. We are therefore performing two different types of activity with these machines. Today, for us as a Swiss manufacturer with many years of experience with Almac solutions, there is not much actual synergy…

dm: Today? Do you think that there could be some synergy at a future date?

D.U: Absolutely, yes, I believe that in terms of development, there is a great deal of potential, and complementary experiences could be encouraged to converge…

dm: By way of example, Almac offers complete solutions for machining watch cases: is that something of interest to you?

D.U: As indicated in our discussion, we have diversified into various different vocations, but as far as watchmaking is concerned, we are clearly focused on watch movements, not on their casings… Watch cases therefore fall outside the scope of our strategic vision.