decomagazine

THINK PARTS THINK TORNOS

48 01/09 ENGLISH

Tornos Engineers
Chain of Success at APB.

When medicine
meets micro technology…

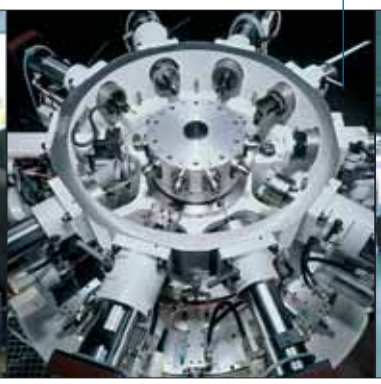
New TORX G962
milling cycle.

The solution
is in the rigidity.

14

On the road to market leader.

28



Ortho Hydro HLP hydraulic fluid.

60

Successor of cam-type turning machines.

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Plates in only 20 minutes.

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SUMMARY

OPPORTUNITIES TO SEIZE!

Crisis! In Chinese, this word [1] has a double meaning, signifying a time of change which can without doubt indicate the presence of a threat, but which also stands for a source of opportunities. Of course, the danger and its attendant threats need to be analyzed, but the opportunities are also there for us to discover and grasp firmly. The emphasis should be placed on this second aspect!

The world is always undergoing continuous change and is ceaselessly calling for solutions which respond to needs which are perpetually being reinvented. It is by listening to customers, and through open-ness and transparency, that these needs can be transformed into opportunities. These might be organisational opportunities, or opportunities associated with product development, or opportunities relating to sales networks and to partnership with suppliers/vendors and customers, opportunities to improve relations with customers or opportunities to deliver turnkey solutions, to name just a few.

The medical sector is one such area of opportunity, one to which many companies have committed their resources. Every day, advances are made for our well-being and, on a frequent basis, these advances call for expertise to be delivered at all levels. One such example would be the Da Vinci system (page 6) with which you can undergo an operation at the hands of the greatest specialist in the world, working remotely from a base in the Antipodes! A new era has already dawned and the skills of listening and the ability to respond to needs are tools at the service of this remarkable new world.

Population growth, the democratisation of advanced healthcare, the purchasing power of middle-aged people, and the growth in the complexity of hardware and materials all contribute towards one thing, and it is this: manufacturing for this sector is now based on high-tech solutions and on personalised advice. Which is exactly what you will encounter at Tornos.

The automotive sector is a most fascinating industry. Even though oil reserves have not been exhausted, every day brings newly developed concepts for consuming and polluting less; hybrid, solar, electric and hydrogen-powered cars … and many other ideas as well. In Iceland, one oil company is setting up a network of service stations capable of refueling hydrogen-powered vehicles. Automotive OEMs are unveiling one model after another, each with better environmental credentials than the previous one, and even the "simple internal combustion models" are benefitting from frequent innovations. Car racing also makes it possible to develop solutions which could in the due course of time be "democratised", i.e. made available to the general public. One example would be systems which use braking energy to boost acceleration.

Things are definitely on the move here, and this is yet another sector where the application of listening skills and the ability to respond to customer needs really can work wonders.

In most cases, the technologies involved in creating the desired components for the opportunities presented to the industry already exist, as do the human skills and expertise they call for. However, there is more to it than "simply" bringing the two sides together. Here at Tornos, we place ourselves alongside our customers to help them respond perfectly to these needs, which are in turn subject to constant change. Our engineers and technical staff around the globe are keeping their skills well honed, and are committed to being creatively inventive on your behalf.

Feel free to contact them at any time – they will take great pleasure in helping you to transform opportunities into successes.

I wish you every success on the markets.

Willi Nef
Head of Sales and Marketing

[1] Incidentally, most other languages harbour the same duality in this word.

DA VINCI® ROBOTIC SURGICAL SYSTEM RELIES ON SWISS PRECISION

Key to winning the business: follow the golden rules of customer service

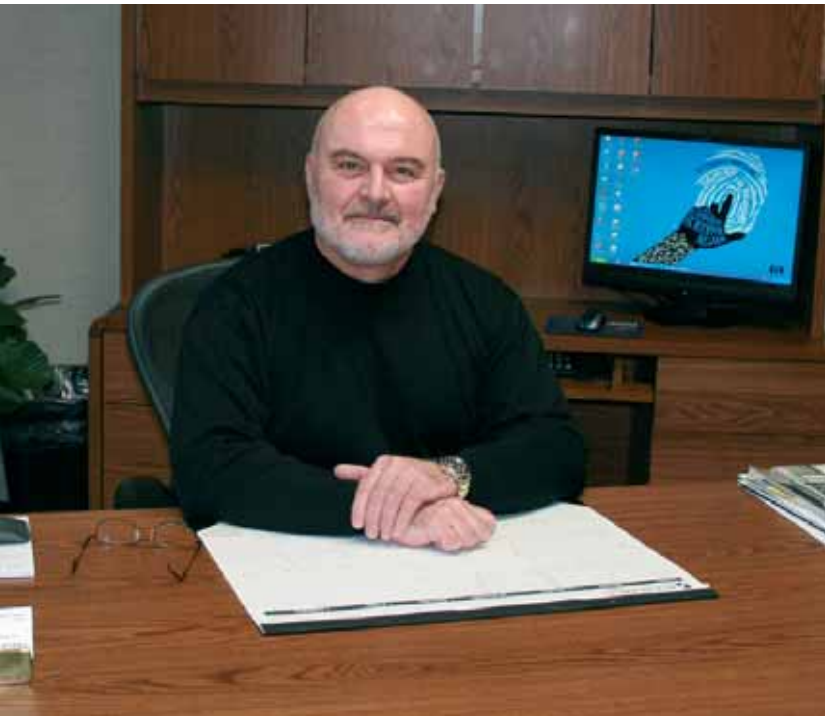
Ask questions. Listen to customer needs. Deliver quality product. Stand by your product. These are the golden rules of good customer service. And these are the reasons that Intuitive Surgical Surgical of Sunnyvale, California, manufacturer of the revolutionary da Vinci® Surgical System, chooses to partner with Swiss Precision Machining, Inc., a Swiss-style machine shop based halfway across the country in Niles, Illinois. In fact Swiss Precision recently attended a Top 20 Supplier Summit at Intuitive Surgical in California.

©Photo courtesy of Intuitive Surgical, Inc., 2009

The parts that Swiss Precision manufactures are used in the robotic hands of the da Vinci® Surgical System and are critical to its accuracy and overall operation. Swiss Precision is a member of an elite group of companies making parts for the da Vinci® Surgical System – many of whom are Tornos' customers. Tornos works with many of the major medical suppliers worldwide and is pleased to be able to share this story with **deco**magazine.

What is the da Vinci® Surgical System?

Introduced in 1999, the da Vinci® Surgical System is being heralded as the future of surgery – it's the most advanced platform for minimally invasive surgery today – and it's re-writing accepted standards for surgical care. And, as it happens, many of the parts that are key to the system's operation are Swiss type components!



"So I went out and bought an autoclave and we do the testing here. And that's what I think is the most important thing – to not only match what your customer is doing, but exceed what he's doing." Mike Haupers, Swiss Precision Machining Inc.

The da Vinci® Surgical System provides surgeons with an alternative to both traditional open surgery and conventional laparoscopy. It puts a surgeon's hands at the controls of a state-of-the-art robotic platform enabling him or her to perform even the most complex and delicate procedures through very small incisions with unmatched precision.

For the da Vinci® Surgical System patient, benefits may include:

- Significantly less pain.
- Less blood loss.
- Less scarring.
- Shorter recovery time.
- A faster return to normal daily activities.
- And in many cases, better clinical outcomes.

For example, to perform a prostatectomy to remove cancerous cells in a patient, just five dime-size holes are made in the abdomen instead of the traditional large incision that runs from navel to pubic bone. The patient is ready to go home the next day after the da Vinci® Surgical System surgery. The da Vinci® Surgical System is quickly becoming the preferred protocol for urological surgeries for prostate cancer, bladder cancer, and kidney disorders as well as surgeries for mitral valve prolapse, obesity treatment, and gynecological surgeries for uterine conditions, sacrocolpopexy, and hysterectomies.

The da Vinci® Surgical System is comprised of three networked components:

1) an ergonomic surgeons console, 2) a patient-side cart with up to four interactive robotic arms and quick-change surgical instruments, and 3) a high definition 3D vision system.

The da Vinci® Surgical System surgery process is fascinating. The robotic-arms are outfitted with miniaturized instruments – scissors, retractors, clamps, suture needles, etc. which are then inserted into the tiny prepared holes in the patient's body. Seated at the da Vinci® Surgical System console, the surgeon views a magnified, high-resolution 3D image of the surgical site. And as he or she manipulates the console's controls (mimicking the movements of a traditional surgery) the system scales, filters and seamlessly translates the surgeon's hand movements into precise micro-movements of the da Vinci® Surgical System instruments.

The da Vinci® Surgical Systems are currently being used worldwide. Tens of thousands of procedures

have been performed using the da Vinci® Surgical System. And, according the company website: as of March 31, 2008, 867 units have been shipped worldwide.

Landing the da Vinci® Surgical System business

As you can imagine, getting your foot in the door at Intuitive Surgical is not easy. But Mike Haupers, president of Swiss Precision, tells an interesting story.

"One day we got a phone call and the gentleman said, "I'm from Intuitive Surgical in California." (And at the time we had never heard of the company). They were in town and wanted to come and take a look at our shop. And I said "there are a lot of good shops out in California, what brought you to the Midwest?" He said "Well, I started in California and I'm working my way East. We're looking for quality shops that can do our products." So we gave them the tour and showed them a number of the other parts that we manufacture. What impressed them most was we were obviously heavy into medical and dental."

Related medical and dental experience is a must to be included on the short list of potential Intuitive Surgical vendors. But for Swiss Precision, it was quality that won them the work.

Says Haupers, "One of the first things I do with any new customer is to get together with their quality department and find out exactly how they are inspecting their parts and what problems they might have had with any other vendors. And that's what really helped out with Intuitive Surgical."

Haupers explains that Intuitve hosted a quality seminar this summer for 20 of their top vendor partners. The vendor partners got the privilege of doing a surgery (on a plastic dummy) with the da Vinci® Surgical System. "We actually did an operation and got to see our parts in action; which is neat. We have parts that are used on the actual surgical robot.

Walk into Mike Haupers' office and you'll likely hear beeps and bubbling and the sounds of steam pressure from the autoclave on his desk. At the quality seminar, Intuitive Surgical made it clear that they wanted their parts delivered certified. So Swiss Precision set about analyzing the parts on their end and asking questions about the quality protocol on Intuitive's Surgical side. And in the process they learned that Intuitive Surgical had been having some cleaning issues. They also learned that parts were being inspected via autoclave even though that specification did not appear on the part print. "So I went out and bought an autoclave and we do the testing here. And that's what I think is the most important thing – to not only match what your customer is doing, but exceed what he's doing."

Haupers got even more excited when he saw that he could cut one of his da Vinci® parts on the Tornos 30% faster as he was cutting them on his competitive brand machines.

da Vinci® Surgical System.

Swiss Precision is a thirty-year-old company, running seven days a week and looking to expand their facilities. Haupers estimates that they cut 30 million parts in a year out of all sorts of exotic materials including Nitronic 60, 440A stainless and many other types of stainless, titanium, Inconnel, and more. "We pretty much cut anything, explains Mike.

How Tornos fits into the story

Mike Haupers was first exposed to Tornos back when he ran the machine shop for a leading dental manufacturer in the Chicagoland area. Haupers became a big Tornos fan and when he bought that business and opened his own doors in 1979, Swiss Precision had seven Tornos M7 cam machines on the floor. That number grew to fifty-two Tornos. The shop was 100% cam until 1994 when they started converting over to the CNCs.

"I was bred on Tornos. If you had parts that were running up at 12, 15, 20 parts a minute, you couldn't beat the Tornos cam machines! Their machines are magnificent. They always have been. They made an attachment for every application you could imagine.

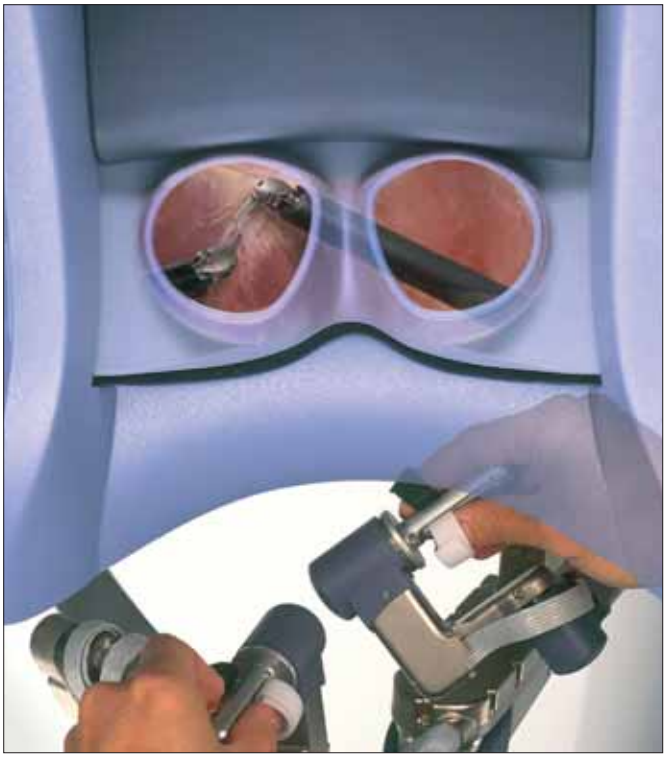
"So, in the 90's, when we started converting to CNCs, I went to Tornos." But he wasn't happy with what he encountered at that time. And, like many other US machine shops, Swiss Precision looked to other brands for a while. In fact, Haupers bought 50 CNC machines.

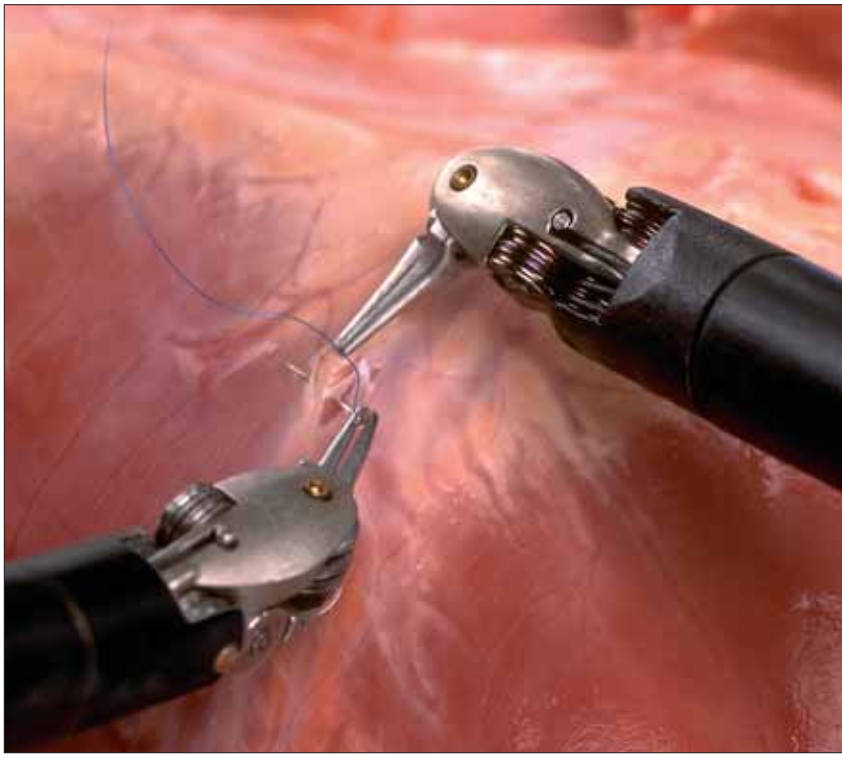
The 1990's were not a rosy period for Tornos US. And unfortunately that was also a crucial transition period for Swiss turning owners as they moved from their beloved cam systems to the new CNC type machines. Pressure to manufacture parts cheaply to compete with the new threat, China, were changing the industry.

Haupers relays his experience. "If I wanted somebody to service the machines, I had to fly them in from Connecticut. So the cost was prohibitive. Especially at that time with the emergence of China and a lot of those parts going across the pond. I had to be highly competitive and had to pinch my pennies."

Tornos Turnaround

"I have never worked with a company like Tornos. Their application engineers are career people. And





©Photo courtesy of Intuitive Surgical, Inc., 2009

InSite® Vision.

I'm in this for a career too. So I like talking to someone who knows what they're doing. And that was the one thing I missed about not having Tornos those years."

So Haupers made a point to visit the Tornos booth at the International Machining Technology Show (IMTS) in Chicago. "I was so happy to go down to the IMTS and talk to Paul (Cassella) and everybody else.

"We went out to Lombard and they did a demo for us and Scott (Kowalski, president of Tornos US) spent a good hour and half with me. He asked me what turned us away and what brought us back. I am so glad to see Tornos here in the Chicagoland area! With as many Swiss houses as we have in the Midwest, they really needed a location here. It was a phenomenal move!

"It's a very nice facility. I was impressed by the training room and they have a good staff of people – very knowledgable and personable." But then Haupers really lights up. "And the parts department! That was the first thing I asked Scott was "do you keep the wear parts here?" and he said, "let me show you"…because I said, that was my major headache before."

So, with all those service issues addressed by the building of the Midwest location for Tornos – including a large spare parts inventory – Swiss Precision was ready to join the Tornos family again.

In fact, Tornos added three new Centers of Excellence across the US and new Techno-centers all over the world – making many long-time customers happy. A new 5000 m^2 building on the site of the company headquarters in Moutier houses a state of the art training and technology center as well as space for turn-key machines for customers. New facilities in France and Germany have also welcomed many customers. These facilities together celebrate a more visible and accessible customer-based organization worldwide.

Serving customers is a top priority for the New Tornos. Each of the new facilities allow Tornos to guarantee faster delivery times, convenient showroom demonstrations and easy access to their new industry-leading training facilities. They also provide increased access to Tornos sales, service and applications experts as well as parts and distribution. From coast to coast – all across the world – the new Tornos is focused on service.

da Vinci® S Instrument Arm – angled.

Dropping da Vinci® Surgical System parts complete 30% Faster

Haupers got even more excited when he saw that he could cut one of his da Vinci® Surgical System parts on the Tornos 30% faster as he was cutting them on his competitive brand machines. Haupers was cutting this particular part on two competitive machines. But when we saw that he could cut the part 30% faster on one Tornos machine – he was sold! "We were doing the da Vinci® Surgical System part in two halves. We wanted to consolidate it and drop it in one complete." In order to keep within Intuitive's Surgical price parameters, it became a must to achieve this.

And the guys out in Haupers' shop were impressed too. "It opened a lot of people's eyes when I took them out and showed them the modular system that Tornos has. And the multiple axes. And the power-tools. I told them I can definitely produce this part faster on a Tornos than I can on these products." The whole Swiss Precision team was dazzled by the "New" Tornos – not just because of the changes Tornos had made to the machines and the control that added tremendous value – but also because of the improved support Tornos was now delivering.

As Haupers makes plans for the future, he is thrilled to be able to include Tornos again. Tornos never stopped delivering a quality product – "true Swiss quality." Haupers agrees with this point. And now that Tornos has re-learned how to live by those other golden rules of customer service, it has regained a loyal customer in the process.

"We're talking about remodeling the whole building. So it never stops. We've been here since '95 and, pretty much, this is all original. We own the land in the back and it's time to remodel the offices and we need some more space." It's apparent that this Intuitive Surgical Top 20 Vendor is a big success. And thanks to the quality Tornos product and "done-in-one" concept (and great service), that success will only grow from here!

da Vinci®
SURGICAL SYSTEM

See a news US news clip of a prostatectomy here:
http://www.davincisurgery.com/procedures/urologic/prostate/davinci_prostatectomy.aspx
and visit the site to see live webcasts of da Vinci® Surgical System surgeries.

ON THE ROAD TO MARKET LEADER

Courage, consistency, technical expertise and innovative ideas – these have been the factors of success for Tebit GmbH precision technology for the last 20 years. Ever since Meinolf Skudlarek founded the company at the age of 23 with a student friend, it has experienced continuous growth and is now one of the market leaders in high-complexity turned parts in the dental and medical sectors. A partner who has been with the company virtually from the beginning is Tornos, the Swiss turning machines manufacturer. That is why Tornos is also supporting the latest initiative from Meinolf Skudlarek. In its anniversary year, Tebit has set up a new, innovative training centre which Tornos has equipped with a new CNC machine and also contributed a financial donation.

Meinolf Skudlarek (left) in discussion with Werner Klein (Tornos).

Andreas Schulte, Tebit (right) interviews Werner Klein during the official ceremony.

The reason why Tornos was a partner right from Day One is easily explained. The origins of Tebit go back to 1988. Together with a friend from university, Christoph Rennefeld, Meinolf Skudlarek purchased some basic equipment for setting up a company: an office desk, a computer, a phone and a fax machine. Together, they founded the "TEchnical consultancy and Innovation Team", the German abbreviation of which is "Tebit". The core business was initially the sale of turned parts for the photocopier and pneumatics industry. Skudlarek was inspired by his father, who also worked in the turned parts industry and has already dreamt of his own production facilities. From this moment on, the development of Tebit started to take off. While Rennefeld left the company a year later, in order to embark on a successful academic career, Skudlarek took over the expansion of the company with courage and commitment and decided to bring his father's dream to life in 1990. In 1991, with ideas of a modern industrial facility, the company set up in the "Am Schnüffel" location in Meinerzhagen. Trading continued successfully at the same time as the building phase . During this phase, Meinolf Skudlarek made first contacts with machine tool manufacturers in order to set up optimum production conditions. He finally chose Tornos, because these machines were at the cutting edge of technology and the project leader at Tornos, Achim Günther, offered the best solution for the scheduled parts range. As a first step, three machines were purchased and installed. In the meantime, 22 Tornos CNC machines have been in use. In total, the company has over 30 CNC machines at its disposal, on which, over 50 employees produce precision turned and milled parts primarily for the medical sector.

Quality assured, dependable and precise work

Users of medical products put extremely high demands on products and their suppliers. This why quality and rigour play a central role for Tebit. This is clear to see in the founding of a quality assurance department long before this became standard practice. In the mid-Nineties, Andreas Schulte, an employee with expertise in the field of swarf removal, joined Tebit. Frank Weber, another key member of staff, joined the company as assistant to the Board in 2001. After restructuring in early 2008, Frank Weber became head of customer services and Andreas Schulte head of production. Since then, Tebit has set up three production areas: Turned parts, the machining centres and assembly departments. Andreas Schulte has consistently expanded the cooperation with Tornos and has used the expertise of the Swiss and Pforzheim technologies intelligently. Several common solutions have resulted, which Tebit have used to their valuable competitive advantage. However, the correspondingly complex manufacturing processes also call for well-trained and committed employees.

Tebit founder and company director, Meinolf Skudlarek and Claudia Voswinkel-Schöpp, managing director of Voswinkel GmbH, came to the conclusion during the period of very swift growth, that skilled employees do not grow on trees. The idea of setting up a training centre and also offering this innovation to other companies developed. This idea was implemented quickly and there is now an attractive facility in the Tebit company premises. The modern training workshop is home to 13 apprentices in the first year of learning. Here, they are supervised and trained by a full-time dedicated trainer.

Training centre also open to other companies

"Alongside manual skills training, further training on other CNC turning machines and the theoretical finishing in new training rooms is a key component of our training", explains Meinolf Skudlarek, as he alludes to the particularities of the training centre, which is also available for other companies and the training of their apprentices. Both initiators have set the standard in the region with this project. Running this kind of centre without public money calls for a certain courage and considerable financial investment from both small companies. For this reason, they looked for partners to accompany and support this project. Tornos, the Swiss turning machine manufacturer, which has been greatly involved in training for years, willingly offered its support and provided a new CNC single-spindle turning machine free of charge.

On the occasion of the opening on Friday 17th October, there were tow good reasons to celebrate. Both the company's 20th anniversary and the completion of the training centre. This is why Meinolf Skudlarek not only invited representatives from poli-

Carlos Cancer (Tornos, left) and Werner Klein (Tornos, right) handing over the cheque to Meinolf Skudlarek.

Modern and functional, the new training centre at Tebit Präzisionstechnik GmbH.

Carlos Cancer, Director Business Unit Single Spindle Tornos, and Werner Klein, Tornos area manager, with an apprentice from the cooperation partner Voswinkel.

tics and industry, but also all employees, customers and suppliers including friends of the company. Carlos Cancer, the Director of the single spindle turning machine business unit and Werner Klein, the area manager from Tornos were therefore present in different capacities: as machine suppliers, partners and as friends. In his official capacity, Carlos Cancer brought with him best wishes from Switzerland for this training centre and handed over a cheque to be used for further development of the project. This way, the course is set for the continuous expansion of Tebit and the ongoing successful cooperation with Tornos.

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INNOVATIVE RANGE OF ACCESSORIES FOR TORNOS MICRO 7 / MICRO 8 DEVELOPED BY BIMU

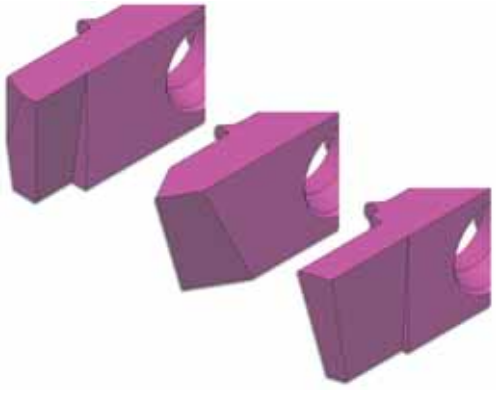
At the present time, bar-turners are faced with a number of disadvantages whenever they are machining components with tight tolerances on their Micro 7 and Micro 8 machines. Examples include the requirement in some cases to design their own cutting tools, the problems of maintaining precision levels when drilling and boring, or indeed the recourse to grippers with long jaws which necessarily entail a loss of precision during trimming to length. To mitigate these problems, Bimu has worked jointly with its customers in the watchmaking sector to develop a complete range of accessories. The next section will now introduce you to these.

1. Small tool tips made to measure

Tool tips adapted to suit your specific needs

A major disadvantage facing the bar-turner is that fact that the range of standard tool tips often does not enable him to address his specific needs. By virtue of his years of experience, he may then be able to machine his own tool on a sharpening machine but this is seldom a good way of assuring the same standards of repeatability as a modern machining centre. Nor is he able to benefit from any surface coating across the entire tool, and this has a not insignificant impact on the service life of each tool.

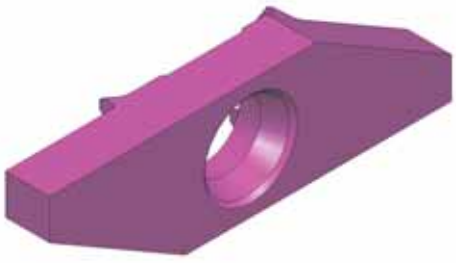
Bimu now offers him a way of obtaining these made-to-measure tool tips at an attractive price. This not only constitutes a major time saving but also provides the guarantee that each subsequent tool is entirely identical to its predecessor, and comes with a uniform surface coating. Moreover, the bar-turner retains the ability to resharpen his tool tips.



2. Hard metal for “specialist watchmaking” work

A great solution for tough materials

The watchmaking sector needs to face up to the machining of new and ever tougher materials for which standard carbide tool tips are not always satisfactory.



In response to this difficulty, Bimu has developed a sinter tool tip made of a tough material which is more resistant to mechanical wear. Combined with the latest generation of coating (BI42), this tool tip delivers the optimum conditions for the machining of materials such as 316L, 4C27A, CuBe and, in general, quenching grades of stainless steel. The design involving the last of these materials is based on a mock-up from the 400-line program with an X-Centering clamping system.

3. B8 precision gripper holder

Delivering precision to your drilling operations

For drilling operations, the bar-turner is usually only able to call on standard ER types of gripper. Although these are relatively precise, they are unable to guarantee levels of precision below one hundredth of a millimetre.

Derived from a cam-type machine concept, the B8 gripper holder from Bimu reintroduces us to the delights of the pull-type gripper. This is a simple principle which involves placed a B8 type of gripper in the gripper holder using a draw-type mechanism, referencing this with a precision taper.

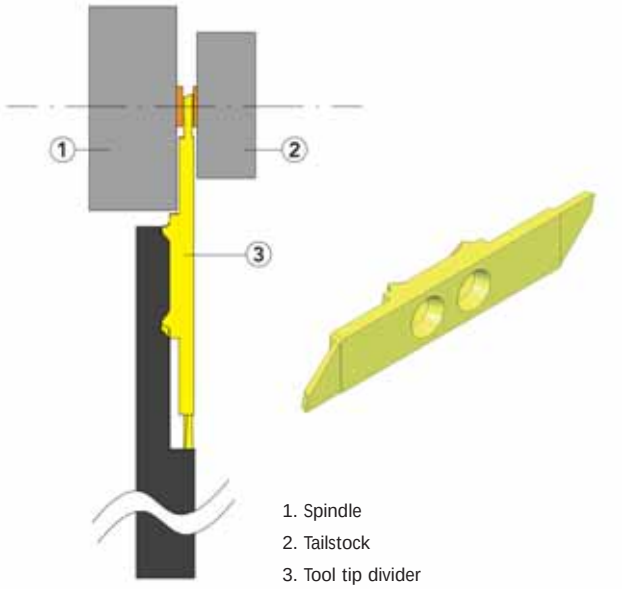
1. Draw-type mechanism
2. Reference taper
3. Guide
4. B8 type of gripper

Several tests have demonstrated that this approach makes it possible to achieve precision of ± 3 microns and this product has already enjoyed considerable and immediate success with its users.

4. Increasingly short dividers

No longer any need for extended gripper tips

The classical problem when cutting short pieces to length (the "dividing" process), is caused by the systematic need to use grippers with extended tips. This entails a loss of precision. Bimu offers a unique solution for "dividing" tool tips on a tool holder with a cross section of 8 x 8 mm. This enables machining to be performed close to the spindle / gripper and tailstock. This solution is also available for tool holders with a cross section of 12 x 12 mm.



1. Spindle
2. Tailstock
3. Tool tip divider

5. Double tool holders

Drilling and turning in a single operation on Micro 8

In the absence of a tailstock turning operation on Micro 8, Bimu has developed 2 tools. These either enable drilling operations to be performed as the primary operation, with turning as a tailstock operation, either using ISO (VC..11 / DC..07) tool tip or Bimu 400-line tool tips (ideal for machining small watchmaking components).

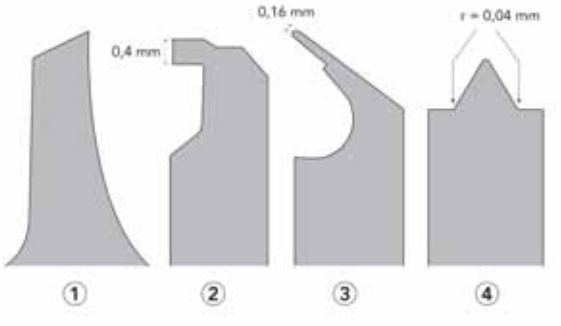
In addition to the accessories for Micro 7 and Micro 8, Bimu is continuing to diversify and is now offering an entirely new product:

Tool tips with complex profiles

Precision geometries

Many areas, especially the medical and dental sectors need to use tool tips with very specific profiles.

To respond to this demand, Bimu is proposing, from now on, to create complex profiles on its entire range of draft tool tips in the 040-line, 400-line and OXOline ranges. Having recently acquired new production facilities, Bimu is able to manufacture shaped tool tips at short notice ("trepan" machining, profile thread-cutting, thread-cutting of entire profiles, turning of inserts with radius, plunge-cutting, cutting with radius etc) at very attractive prices and delivery lead times (from batch sizes of 5 upwards).



1. Radius cutting
2+3. Trepanning tool
4. Thread-cutter for complete profiles

In conclusion, in order to resolve the problems facing its customers, Bimu has developed a range of new solutions which not only enable operators to optimize their machining options on Tornos Micro 7 and Micro 8 machines, but which also enable them to gain precious time in the process. Now that these products have proven their capabilities, Bimu will now be seeking to come to the assistance of other bar-turning specialists who are encountering the same difficulties.

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cutting tools & accessories

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For detailed information about these products, please visit www.bimu.ch

ALWAYS PERFECT OIL...

When talking with oil manufacturers, they always insist on the importance of using a good cutting liquid adapted to the material, the operations, the conditions...an so on. They are right, but not only must the liquid be suited to the conditions to be effective, but its cooling and lubrication qualities must also last over time! There are many devices now available to ensure durability and we are presenting a new swarf conveyor that includes an absolute integrated filter system.

Option

234-6055: Swarf conveyor and integrated paper filtre for Sigma 20/32.

If interested, the filter may be selected without the conveyor.

234-6060: Internal paper filtre for Sigma 20/32.

Principle

The new conveyor is associated with a gravitational paper filter for all types of swarf. This "paper filter" type system filters all cutting liquids without restriction up to 100 µm. The pivoting conveyor evacuates all swarf outside the machine.

Benefits

- Filter and conveyor integrated on the machine. All oil is directly filtered below the machining area. There is no build-up of contaminated oil. The base of the machine comprises the clean oil tank.
- Low floor space when compared to additional systems. The integration of the filter below the machining area ensures that the floor space of the machine is unaffected. In addition, the integration of the filter below the machining area involves a reduction in cost, compared to an external paper filter (transfer pump for contaminated oil, no external clean oil tank).
- Not having to pump contaminated oil creates less turbulence, so less air in oil and finally less heat transfer to hydraulic circuits.

In conclusion

- Ensures perfectly efficient lubrication every time and therefore an excellent surface finish quality of the workpiece.
- Ensures tool service life.
- Enables optimum usage of oil and extends service life.

TECHNICAL SPECIFICATIONS

Conveyor

- Connection: on "standard conveyor" Tornos interface.
- Installed power: 0.2 kVA.
- Electrical consumption: 0.5A.
- Belt speed (m/min): 1.3 (50Hz) 1.5 (60Hz).
- Chain pitch: 38.1 mm.
- Swarf flow: 140 dm3/h with regular supply.
- Discharge height: 820 mm.

Paper filter

- Connection: on the conveyor or on standard "Tornos peripheral" interface.
- Installed power: 0.2 kVA.
- Electrical consumption: 0.5A.
- Paper grammage: 17 g/m^2.
- Type of paper: polyester-polypropylene mix.
- Paper consumption: depending on swarf, for example 0.2 m/h for fine brass swarf.
- Paper autonomy: 100 m.
- Filtration capacity: 100 µm.

Compatibility

Sigma 20 and Sigma 20 II, Sigma 32.

Comments

If using a filter without conveyor, a new swarf tray is provided.

Availability

This option is already available ex-works. Installation on pre-installed machines possible.

TORNOS ENGINEERS CHAIN OF SUCCESS AT APB

When APB Engineering of Sandhurst acquired a competitors business over ten years ago, it did so for the order book and the customer list. The business with over seven Bechler CAM Auto turning centres was productive but was losing work to businesses that had invested in CNC sliding head technology.

Motorcycle oil chain components/assembly manufactured by APB.

Started in 1984 by Managing Director Mr Adam Busby, APB saw its opportunity to turn the new acquisition into a profitable entity by purchasing a sliding head lathe. With this in mind, Mr Busby reviewed the sliding head market and found that Tornos was the only manufacturer at the time to offer a turning centre with a fully independent sub spindle and tooling that would fit all axes. Compared to competitor machines this made Tornos more productive with reduced cycle times through its sub spindle. The Tornos machines also proved more cost effective as the tool holders were interchangeable between tooling stations, another feature not available on competitor machines. With productivity, tooling costs and integration immediately proving more attractive, Mr Busby bought a Tornos DECO 20 in 1998.

As Mr Busby recalls: "The Tornos DECO machines were way ahead of their competitors and this not only influenced our decision in 1998, it has influenced our decision to buy an additional two Tornos DECO machines since. We conducted trial parts and Tornos was considerably faster than competitor machines. It also had a powerful driven tooling unit and a large and more accessible swarf area that made emptying and cleaning the machine a simplistic task with minimal downtime."

The first Tornos machine gave APB versatility, capability and productivity levels that soon noted the removal of seven CAM Autos. The 26 mm diameter capacity machine was employed to produce electrical terminals and medical components in average batch quantities of 1000 off. As soon as it was introduced, the DECO 20 was machining anything from

Bank of Tornos machines at APB (DECO 20, DECO 26a and DECO 20a).

nylons and plastics to brass, stainless and mild steels. Despite operating one shift the Tornos was immediately working 24/7 whereas the CAM Autos had to be manned at all times.

In an innovative approach to extend unmanned running of the Tornos beyond 24 hours, APB developed a fixture to retrofit to its Robobar SSF barfeeder to accommodate twice as many bars regardless of diameter. The fast to fixture system is now used on the DECO 20 and DECO 26a regularly.

The second Tornos, the DECO 26a arrived at APB in 2003 as a result of additional capacity needs. As Mr Busby says: "The work on our CAM auto's was straight forward and the first Tornos gave us the potential to produce complex parts. Once we started down this route, the complex work grew taking us beyond our capacity levels. When we needed a new machine, a Tornos seemed the logical answer. Our work was increasingly diverse in complexity and dimensions, so the DECO 26a with a 32 mm diameter capacity was ideal for larger work."

"We get involved at the design and development stage of customer products and having the capability to make complex parts has been critical. Now we manufacture exhibition displays and parts for the leisure, electronics, motorcycle and hand tool industries with some really interesting applications," says Mr Busby.

One project the company has been involved in from the development stage is a motorcycle component

The APB facility in near Sandhurst, Berkshire, UK.

A batch of components produced on the Tornos DECO's.

that automatically oils the drive chain to improve bike performance, maintenance and running.

The four part assembly for Acumen Electronics works within the 3D map or "brain" of the Chain oiler to increase the flow rate relative to the chosen flow number and the speed of the vehicle. The motorcycle engine power transmitted through the chain varies with the square of the speed, so the chain gets more oil as the speed rises. This constant lubrication system is currently produced at around 10,000 systems per year. However, interest from motorcycle manufacturers could take this system from a retrofit for motorbike enthusiasts to a factory fitted system potentially incorporated into millions of motorcycles.

With such projects expanding rapidly, APB acquired its third Tornos machine in 2006, a DECO 20a. As Mr Busby says: "We have impeccable quality standards and we work with some customers that have been with us since day one. The ability to manufacture complex parts with fast turnaround times has seen our business expand."

"We now produce in the region of 750,000 parts every year with batch sizes as small as 100 off. We make some parts with a ±1 micron tolerance, something many machines aren't capable of. The machine capability combined sees us making parts from the motorcycle assembly to a bio-reactor for growing organic heart valves as well as more run of the mill parts like rivets for icing guns."

"In conclusion the three Tornos DECO's have been invaluable to our business. The service we receive is excellent and if spares are ever required they are always available, we are delighted with our Tornos turning centres," concludes Mr Busby.

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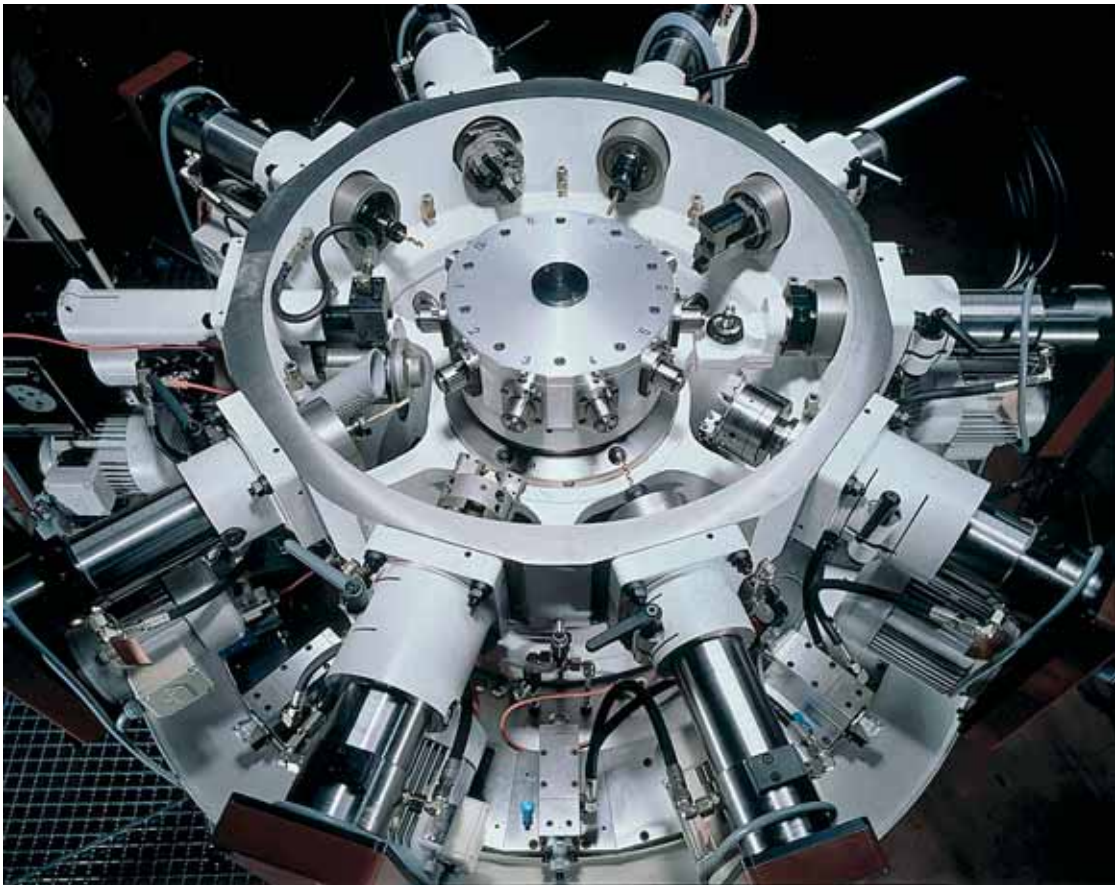
THE BEST OF BOTH WORLDS: ORTHO HYDRO HLP HYDRAULIC FLUID

Ingenious hydraulic functions in modern machine tools are now a real success factor in the metalworking sector. However, in the course of hydraulically powered operations, losses of tiny amounts of hydraulic fluid can occur. These mix with the cutting oil and impair its performance capability. This shortens tool service lives and the quality of machining output declines. K.R. Pfiffner has a global reputation as a first-class provider of electro-hydraulic rotary indexing machines and has an in-depth understanding of the challenging requirements that a hydraulic system needs to satisfy.



The name **Hydromat**® already points to the significance of hydraulics in the machine tools manufactured by K.R. Pfiffner AG. In the shortest of cycle times, complex workpieces can be manufactured in large volumes to the highest standards of precision. In this process, the Hydromat® rotates the tool, unlike conventional turning machines that rotate the workpiece. This enables Pfiffner rotary indexing machines to operate with up to 16 horizontal and 8 vertical machining stations. They turn, mill, bore, grind, hone and saw workpieces – to name but a few operations – and do so simultaneously in a single rotary indexing operation! Three operating fluids are used in this process: a hydraulic fluid, cutting oil and a lubricant for the central lubrication system.

The heart of the system: Hydraulic

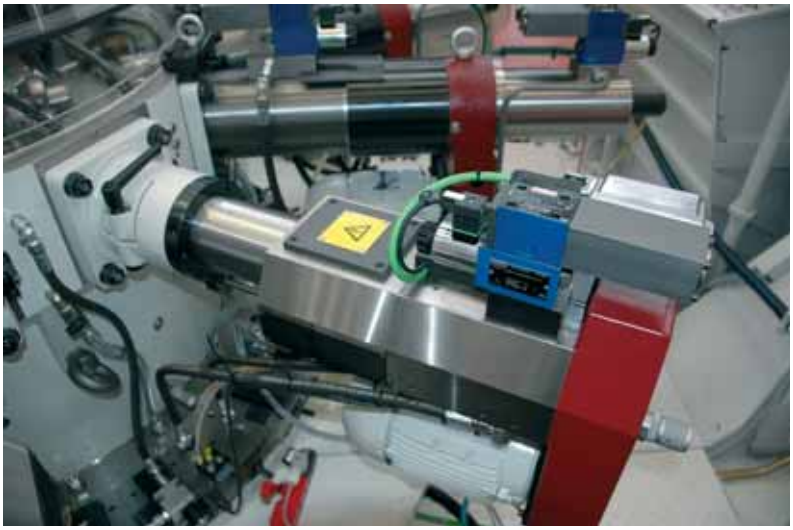
Hydraulic actuation of countless functions is performed by a high-performance hydraulic system. This system can be supplied with a compressor pump, a tank, valves and depending on operating location, heating or cooling. Delivering a pressure of approximately 65 bar, about 80 litres of hydraulic fluid per minute flow through more than one hundred metres of pipework, cylinders, pistons and valves in the machine. This hydraulic fluid needs to be powerful and versatile to accomplish this feat: This multi-talented liquid transmits immensely powerful forces and controls valves to within fractions of a second. It also lubricates and cools all moving parts, creating a basis for virtually wear-free operation of the system over many years of service.

In a Synergy Project with hydraulic specialists and users, Motorex has established that Motorex hydraulic oils outperform even these demanding requirements in practical operations, both in terms of quality and also of performance parameters. Nevertheless, those in charge of production in a plethora of different sectors have made it clear that better compatibility is required between hydraulic fluids and cutting oils. This effectively fired the starting pistol for the development team at Motorex.

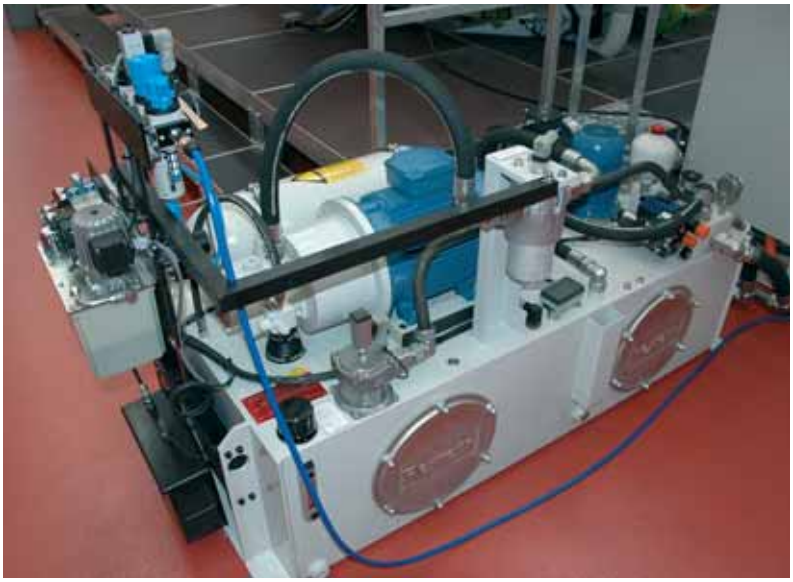
Cutting oil as the basis of success

Based on the petro-chemically compatible basic components of the high-performance cutting oil Motorex Ortho, the chemists and engineers at Motorex developed a new kind of multi-functional hydraulic fluid: Motorex Ortho Hydro HLP. Multi-functional because it exhibits the same advantageous properties as the Ortho cutting oils, while also holding DIN 51524/T2 approval as a hydraulic fluid. Thanks to an ingenious formula, these experts have successfully combined the desired properties from both areas of application, and the outcome of their work can now benefit users.

If a bar-turner uses an Ortho NF-X cutting oil (e.g. ISO 22) and the latest Ortho Hydro in a hydraulic system (e.g. ISO 32), if the two fluids do happen to get mixed together, this only affects the viscosity of the cutting oil. By carefully adding a slightly less viscous (e.g. ISO 15) grade of Ortho cutting oil, balance can be restored without having to involve any costly procedure. The addition of hydraulic oil to the cutting oil therefore no longer has any adverse impact on the



Up to 16 of these electro hydraulic machining stations are in use with the rotary indexing machines of K.R. Pfiffner AG. The rotary action is generated electrically – but longitudinal and transverse movements are hydraulic.



The heart of the hydraulic system takes the form of the hydraulic pump / tank unit. Depending on machine type, up to 120 to 400 litres of hydraulic fluid may be in use, in some cases on a 24/7 basis. By the way: Ortho Hydro is also suitable for central lubrication systems!

With regard to needs

"The ingress of hydraulic oil in cutting oil, once it rises above a certain concentration causes substantial and adverse impacts on the performance level and quality of machining operations. Motorex has investigated this problem and, through its development of Ortho Hydro HLP, it has achieved a significant technological step forward in this sector. Moreover, our customers and I greatly appreciate that Motorex also offers important services such as rapid laboratory analyses and technical support. This has enabled me, during my long career, to resolve a fair number of tricky issues, and to do so remotely…"

Urs Blessing – Hydraulic Department
K.R. Pfiffner AG, Thalwil

This CNC-controlled feedback control valve on a machining unit is manufactured to a high standard of precision and responds within fractions of a second. This is where the advantageous HP properties (HP = High Pressure) of Ortho Hydro HLP really come into their own.

performance capabilities of the machining fluid. This is an important argument when running unmanned shifts and optimized cycle times. Of course, this does presuppose that the machine is already filled with the two compatible Ortho products.

High quality required continuously

Every machine tool delivers its performance on the basis of precise parameters. It is therefore enormously important for the quality of the operating fluid being used to be identical at all times, and for it to comply with the specifications of the machine manufacturer. Unfortunately, in practice and often in far away countries, e.g. in the Far East or Asia, this is not always the case. As a consequence, time and again in foreign countries, impurities, e.g. in new hydraulic fluid, or inappropriate contents (sulphur, heavy metals etc.), repeatedly cause unnecessary incidences of damage. The specialists at K.R. Pfiffner AG therefore recommend to their international customers that they continue using the ex-factory products used in their machine. If so desired, products can also be supplied in ultra-fine filtered hyper clean quality. As a result, Motorex has developed into a fleet-footed solutions provider to the diverse and versatile range of machines employed by this company.

Good to see: On the inside of the workpiece holder at stations 10 to 13 and on the opposing side, a range of different tools which all rotate during the machining process and which move longitudinally as well as transversely.

If unsuitable or insufficiently filtered hydraulic oil is used, this can cause premature wear or damage to the seals. Ortho Hydro HLP protects them from wear and has no adverse effect on seals.

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

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mediSIAMS, MOUTIER (SWITZERLAND)

WHEN MEDICINE MEETS MICRO TECHNOLOGY…

For the second time, medical technology had the place of honour in the Bernese Jura (Switzerland). From 10th to 13 March, Moutier played host to the mediSIAMS fair. A look at the first events and the future.

Off to a first success

With a little over 200 exhibitors and nearly 5000 visitors, the first edition of this specialist fair biennial held all its promises. For example, almost 500 visitors from "research and development" departments found answers to some of their questions in terms of machining and/or finished products intended for the medical sector. For a first edition, the international dimension was a source of great satisfaction for the organizers as a just under 300 people came from France, 150 from Germany, 80 from Italy, 65 from Sweden, 53 from the United Kingdom and 30 from Spain, to list only the major foreign markets. The organizers, on the back of their experience in micro technology with SIAMS and in the medical sector with this first edition decided to set up the second edition.

A second edition with something extra

With a very slight increase in the number of exhibitors but nearly 30 % more floor space to almost 3500 m^2, mediSIAMS 2009 looked like an essential event for beginning of the year. As far as other medical fairs as concerned, mediSIAMS positions itself as a medical "micro technology" where the ambition is to meet the requirements of the sector's players in terms of precision and quality. The mediSIAMS fair works closely with the Medical Cluster of the Canton of Berne (Switzerland) to ensure the fair is perfectly in tune with the needs of the industries in this sector.

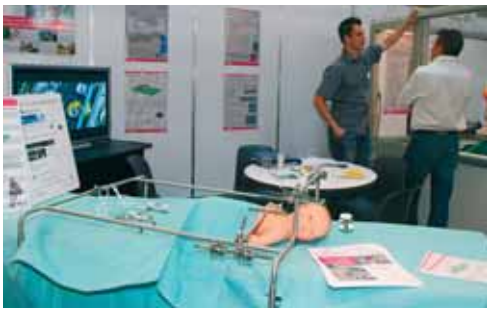
A program of conferences with added value was proposed to visitors in order to assist them achieve a better understanding of the sector which is as demanding as it is rewarding.

A desire for continuity

No, the mediSIAMS is not a mini-SIAMS for the years in between. When asked about this, Pierre-Yves Schmid, the person in charge of the fair, is convinced. Within the competitive landscape of specialist fairs, there is very clearly a place for a fair which honours the inventive genius of manufacturers in the micro technology sector. In this sense, there is a connection with SIAMS, but only in the general approach in terms of precision, quality and innovation. As far as exhibitors are concerned, over 2 out of 3 are returning and feedback has shown the fair is heading in the right direction.

«Yes, we have our competitors, but who doesn't these days? It's up to us to emphasize the quality of mediSIAMS. Exhibitors and visitors will be our best ambassadors» – Pierre-Yves Schmid

www.medisiams.ch



FORUM DE L'ARC – A NEW EXHIBITION HALL TO REPLACE "THE CAMPSITE"

Visitors to SIAMS over the last 20 years, and more recently to mediSIAMS, know that an exhibition to Moutier has nearly always been synonymous with a more or less successful pitching of tents. With the new Forum de l'Arc these images have been consigned to the past. With over 9000 m², the organizers have a trading area at their disposal which will even enable mediSIAMS to enjoy continuous growth for years.

HIGH-FREQUENCY AND MUCH MORE BESIDES!

Small, compact, energy-efficient, fast, vibration-free, precise ... the new high-frequency spindles deliver a hand full of trump cards as they take their place on the precision machining marketplace. Why use spindles of this kind? A meeting at Meyrat SA with Mireille Barras, the Head of Marketing and Christian Walther, the Director of this company explains...

Particular conditions

Use of the high-frequency spindle is frequently determined by usage conditions. First case to highlight: machining that calls for a very high rotational tool speed (up to 80,000 rpm), in cases like this that are becoming increasingly common, there is no other effective solution. Second case to highlight: shortage of space; modern machine-tools are becoming ever more compact, so it follows that spindle dimensions also need to follow suit. Since they are not connected to mechanical links (e.g. belts), they can be located anywhere with ease. These points harbor some important implications. Firstly, the fact of not using a mechanical coupling delivers operation without mechanical shocks or vibration and this of course extends the service life of tools while at the same time improving the surface condition of the machined component. Secondly, with this higher rotational speed, faster rates of workpiece machining are achievable and this helps to boost productivity.

Productivity is the key

The overall productivity of machine-tools is improving continuously, while the quality and resistance properties of the tools enable them to operate at ever higher speeds. Operations such as milling, drilling and thread-whirling performed as tailstock operations no longer need to slow down the overall machining process. For example, the time allocated to milling Torx heads on medical screws in a tailstock operation must not be allowed to exceed the machining time of the headstock operation. High-

frequency spindles therefore deliver a flexible solution to the practitioners involved in running successive series of production operations. For the operator, the extended tool service life is of great benefit.

Markets to be informed

If you take a look at the sales statistics of Meyrat SA, a company which achieves an annual turnover of SFr 10 million (an annual sales figure that has trebled over the last 4 to 5 years), it is interesting to note that the geographic spread of high-frequency spindles is a very uneven one. The golden triangle of micro technology, i.e. Switzerland, France and southern Germany, is where the majority of sales are made. To spread the word about solutions of this kind depends on the kind of workpieces to be made and the small and precise point is not to be found in the exclusive penetration of this large region, but in the fact that the potential for using solutions of this kind is largely under-exploited at present. As a general rule, spindles are ordered at the same time as a machine-tool and it means that for Meyrat SA, its first-line customers are invariably machine manufacturers. Nevertheless, the final customers are free to contact Meyrat SA with any technical questions they may have, as well as to obtain specialist training courses if they so wish.

At Tornos, the calculation offices integrate the characteristics of Meyrat SA high-frequency spindles to reflect the configuration of machines, and the workpieces which are to be machined. At the same conceptual level, Meyrat works in partnership with Tornos. The new, compact MHF-22 spindle was originally developed specifically for the Micro 7 and Micro 8.

Spindles since 1947

Meyrat has been manufacturing spindles for more than 60 years. Now, the company's product range extends across several thousand references distributed over three large product families. High-frequency spindles, powered spindles and belt-driven spindles. For the most part, these products are mainly used on turning, milling and grinding machines.

The "savoir-faire" of this company can be found in its range of high-frequency spindles; operating at speeds of up to 80,000rpm on turning machines, the precision and balancing of the spindle are key factors that determine the service life of the tools and spindles.

Manufactured in Bienne, the high-frequency spindles are recent products, the oldest of which was developed only 5 years ago. The quality of construction benefits from the micrometric skills of the company's team of specialists. All these staff have attended specialist training courses that have enabled them to achieve a high standard of in-house expertise.

Quality, price and word of mouth

The balancing precision is accurate to within a few tenths of a milligram, so the service life of tools and word of mouth are key reasons underpinning the business success enjoyed by Meyrat SA. This is something of which Mr. Walther is convinced: *«The quality of our spindles is reflected in the satisfaction levels of our customers. If the operator is satisfied with the operation and service life of his tools, and if Meyrat responds effectively whenever problems occur, we gain a good reputation for quality of service, and machine operators pass the word on among themselves!»*

«Are you interested in learning more about high-frequency spindles, or about any of the other products? If so, please send an e-mail with your contact details to info@meyrat.com and we will get back to you with more information.»

M. Barras

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COOPERATION AT THE CUTTING EDGE

With a view to constantly extending the range of services it offers to its customers, Tornos works in close collaboration with a certain number of partners around the world. In this edition of decomagazine, the main focus is on collaboration with Schaublin, and on a meeting between the two companies recently held in Germany.

Tornos, the automatic turning machine manufacturer and the clamping tool specialists at Schaublin are now working closely together. Tornos recommends Swiss precision clamping tools from Schaublin and fits them to their machines before they leave the production line. Tornos customers in Germany also benefit from the new clamping tool storage facility in Bad Emstal for repeat orders. The extensive inventory at the new Schaublin GmbH clamping tool storage facility ranges from the tiniest of grippers to the heaviest of *"heavy-duty"* tool holders. *"We can respond swiftly and flexibly to orders here"*, says Roland Gerlach, Company Director, with a certain pride. The German Schaublin team also provides a detailed maintenance fact sheet for every Tornos turning machine – with specific advice on clamping tools. *"Customers can download these fact sheets from a secure area of the Schaublin website with a customer-specific log-in. Our new storage facility also enables us to make rapid and simple deliveries on a need by need basis"*, reveals Roland Gerlach.

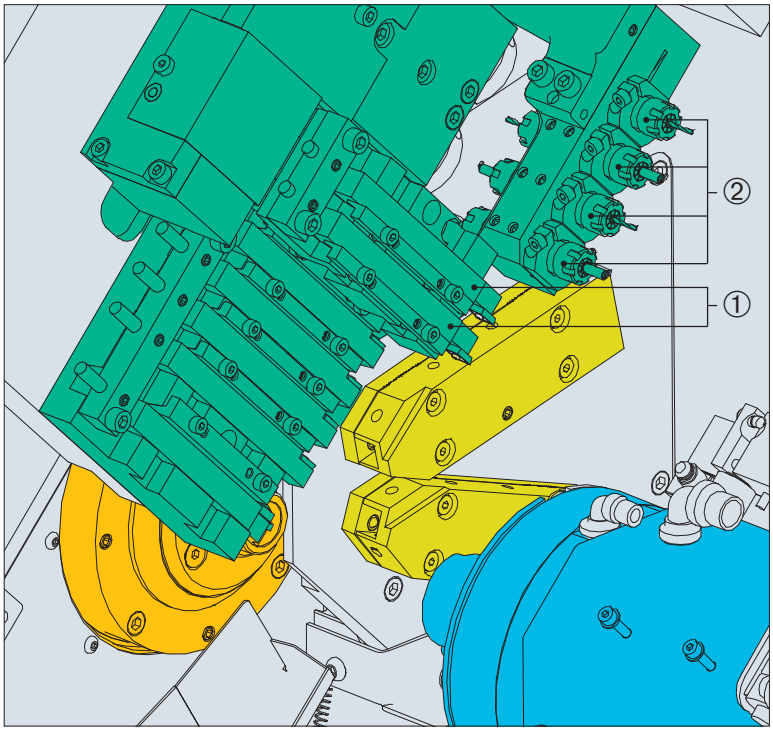
An ideal partnership

"Cooperation with Tornos is very important to us", stresses Frank Muehlaus from corporate management at Schaublin Germany. *"The recommendation of a well-known machine manufacturer is a clear message of quality that we are sending out to our customers. With cooperation as good as this, we will certainly be going much further down the road together."* Right from first base, Tornos is an ideal partner to be working with. The long-established company's range of machines complements the Schaublin machine catalogue superbly. This manufacturer of turning machines and lathes is also a leader in its sector – just like Schaublin. In particular, Tornos has built its reputation on developing optimum customer-focused solutions. *"The unrivalled quality level of Schaublin clamping tools is the decisive factor for Tornos when agreeing to this cooperation. We look forward to a fruitful and close cooperation. The customers of both companies all stand to benefit from this"*, says Frank Muehlaus.

decomagazine will return to the notion of customer-facing partnership in greater detail in a future edition.

MICRO 7 AND 8: PRODUCTIVITY INCREASED BY A MAGICAL WAVE OF THE WAND

In the Tornos range of single-spindle automatic lathes, the Micro range is characterized by its ability to achieve very high levels of precision to within a thousandth of a millimetre, combined with unrivalled levels of productivity and tremendous versatility. Applitec, the cutting tool manufacturer has developed a complementary tooling system for these turning machines that further boosts the capabilities of these lathes, which in turn further improves productivity.

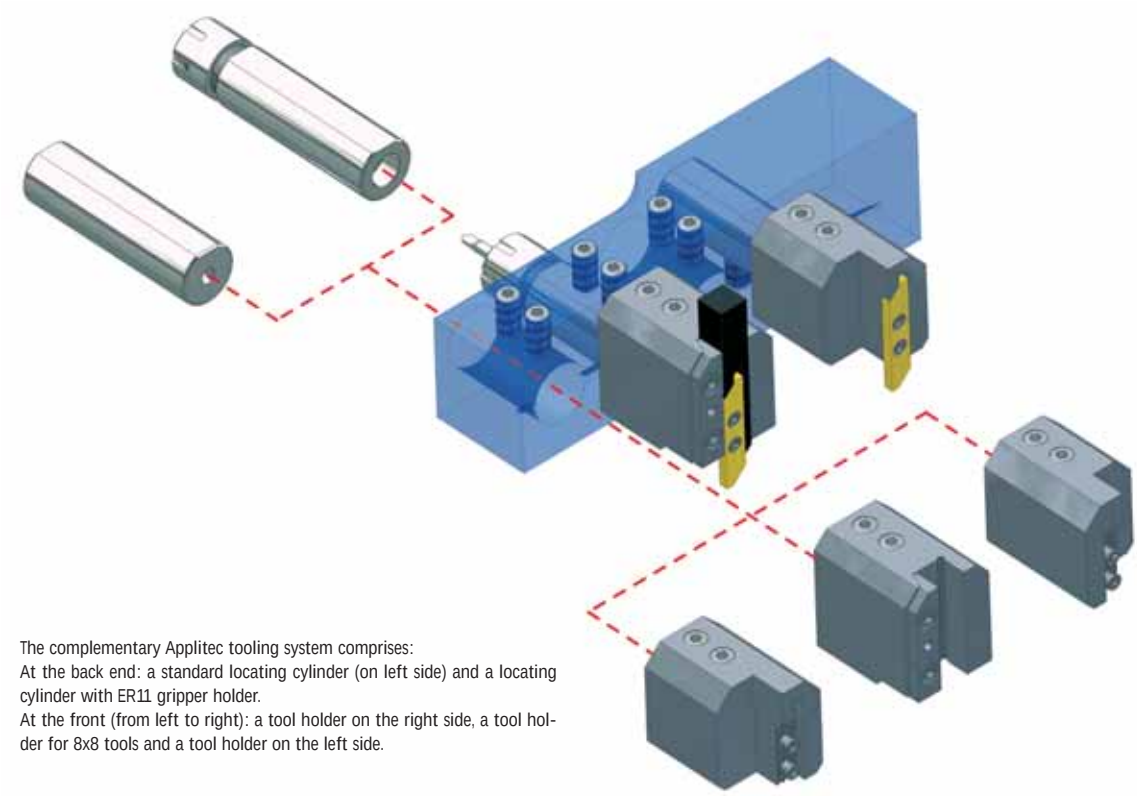


The positions for locating back-operation tools can also be used to accommodate a transverse drill. Pos. ① Cylinders with Applitec tool holders slide into their mountings to accommodate back operation drilling tools. Pos. ②

The Tornos Micro series with its back spindle has everything you need to perform a full range of machining operations on a workpiece. As well as four placements for tool holders for the back operation of drilling, these lathes have two positions for receiving cutting tools to allow back operation (i.e. tailstock) machining. In addition, the operator is able to secure a transverse drill at this location. This option delivers benefits in its own right, since it allows complementary operations, while at the same time blocking other types of machining operations at the same stations. What do you do in cases of need? Dispense with certain operations and perform machining as a back operation?

Flexible solution

Engineers at Applitec have studied this situation and have developed a solution that is both simple and flexible and also substantially increases the capabilities of these lathes. Their ingenious concept involves using the mountings provided by the manufacturer



The complementary Applitec tooling system comprises:
At the back end: a standard locating cylinder (on left side) and a locating cylinder with ER11 gripper holder.
At the front (from left to right): a tool holder on the right side, a tool holder for 8x8 tools and a tool holder on the left side.

of this lathe to accommodate locating cylinders with gripper holders for drilling work in back operation mode. These cylinders are secured with the help of two screws: changing them is therefore a fast and simple operation. Applitec has created a tooling system comprising a standard locating cylinder combined with a left-hand tool holder and a right-hand tool holder. These two tool holders have been designed to take Applitec series 730 and 740 tool tips as shown in the catalogue.

Nothing is wasted...

The Micro 7 and Micro 8 automatic lathes each have four locating points of this type. As a consequence, operators have the option of adding back-operation tools to their lathes while also using – when so required – a transverse drill. In one fell swoop, the options for machining complex components using back operations are improved substantially and the bar turner will find it much easier to complete the machining of workpieces – even complex ones – in a single fixture setting. With this improvement in productivity, the clued up bar turner has everything to gain. These specialist tool holders can be fitted without any modification to the lathe, and without requiring any special tooling. The process simply involves sliding the tool holder onto its standard locating cylinder, tightening the two screws and sliding the cylinder into position in its mounting.

...however, a further benefit is being offered

As well as the two tool holders for Applitec tool tips – i.e. a relatively proprietary solution – this tooling supplier is also offering a tool holder for 8 x 8 mm tools. This tooling item, freely available on the open market, makes it possible to gain even more benefits from the flexibility of this solution and to leverage these straightaway on Tornos automatic lathes; an additional ace in the hole for this solution – and for Micro automatic lathes from Tornos.

RM

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SWISS TOOLING

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NEW TORX G962 MILLING CYCLE

A new milling cycle for a six lobes recess for machining TORX head screws is now available as an option with TB-DECO ADV 2009.
This cycle can be used on the entire DECO [a-line] (7, 10, 13, 20 and 26) range.

Why this new cycle?

Tornos is committed to providing greater customer satisfaction. This is the reason why today the company is unveiling major improvements in TORX production:

- Simplified programming of circle arcs using a configurable cycle and an assistant.
- Improved finishes from machining with linear movement on the Z axis.
- Optimization of milling cutter life by varying machining feed between internal and external lobes.

Use

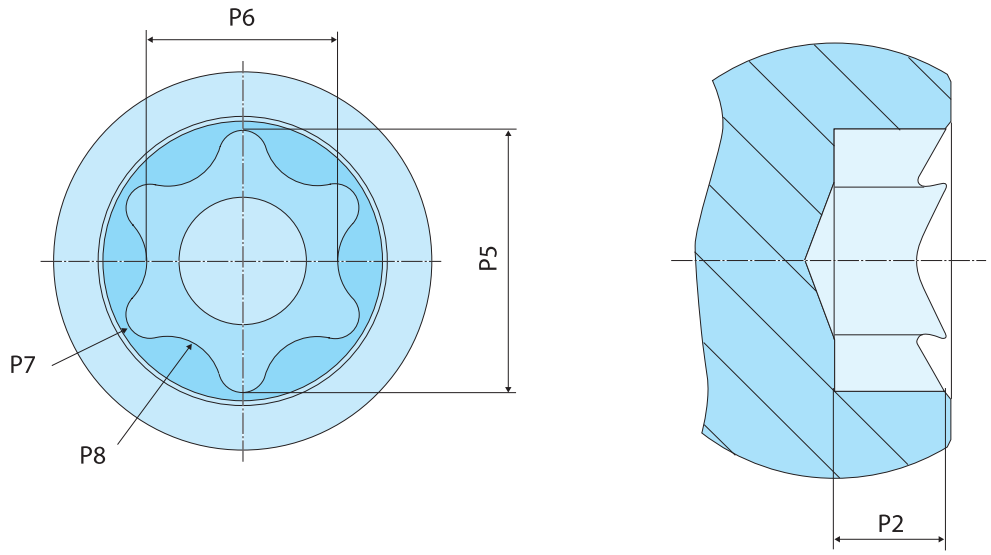
The macro G962 can be used on plattens 1 & 2, on the end attachment or in counter-operation.

The TORX recess can either be programmed in a X_pY_p plane or the X_pC_p plane in polar coordinates.

Two recess programming modes are available:

A) By specifying the recess number in compliance with the ISO 10664 (P1) standard.

B) By entering the parameters of the recess shape (P4 to P8).



Programmable Parameters

Parameter	A	B	Default value	● Mandatory parameter ○ Optional parameter -- Parameter not available
P1	●	–		N° of TORX recess in compliance with the ISO 10664 standard
P2	●	●		Depth of recess
P3	●	●		Milling feed Feed on internal section if used with P16
P4	–	○	6	Number of lobes
P5	–	●		Circumscribed diameter of the recess
P6	–	●		Inscribed diameter of the recess
P7	–	●		External radius of the recess
P8	–	●		Internal radius of the recess
P9	–	–		Not available
P10	–	–		Not available
P11	○	○	0.5	Depth of the helical infeed
P12	–	–		Not available
P13	–	–		Not available
P14	○	○	1	Number of false passes
P15	–	–		Not available
P16	○	○	P3	Feed on the external segment

Other benefits

- The programmed feedrate will be the milling cutter tangential speed and not the speed at the centre of the milling cutter. The macro G962 calculates the speed of the centre of the milling cutter based on the tangential speed.
- Three parameters are sufficient to programme TORX milling with a helical infeed of the milling cutter:
  - The number of the recess in compliance with the ISO 10664 standard
  - The depth of the recess.
  - The machining feed.

Programming

Examples of TORX programming based on version A.

Standard machining:

G1 G100 Z4=2 M503 S8000	***Positioning at start of machining***
	+ Start tool at 8000 rpm
G962 P1=20 P2=-4 P3=800	***TORX machining cycle***

Machining with position of the spindle at 30°:

M405	***Spindle S4 stop***
M419 Q30	***Position of spindle at 30°***
G4 X0.2	***Tempo for positioning (not required in all cases)***
G1 G100 Z4=2 M503 S8000	***Positioning at start of machining***
	+ Start tool at 8000 rpm
G962 P1=20 P2=-4 P3=800	***TORX machining***

Practical information

The Macro TORX (22x-7004) option is sold per machine and may require an update of the CNC software.

1 year operating the DECO «e», 10 years of DECO «a», 37 years of Bechler tailstock drilling unit. So many years spent pursuing the objective of precision (Iberian) and quality.

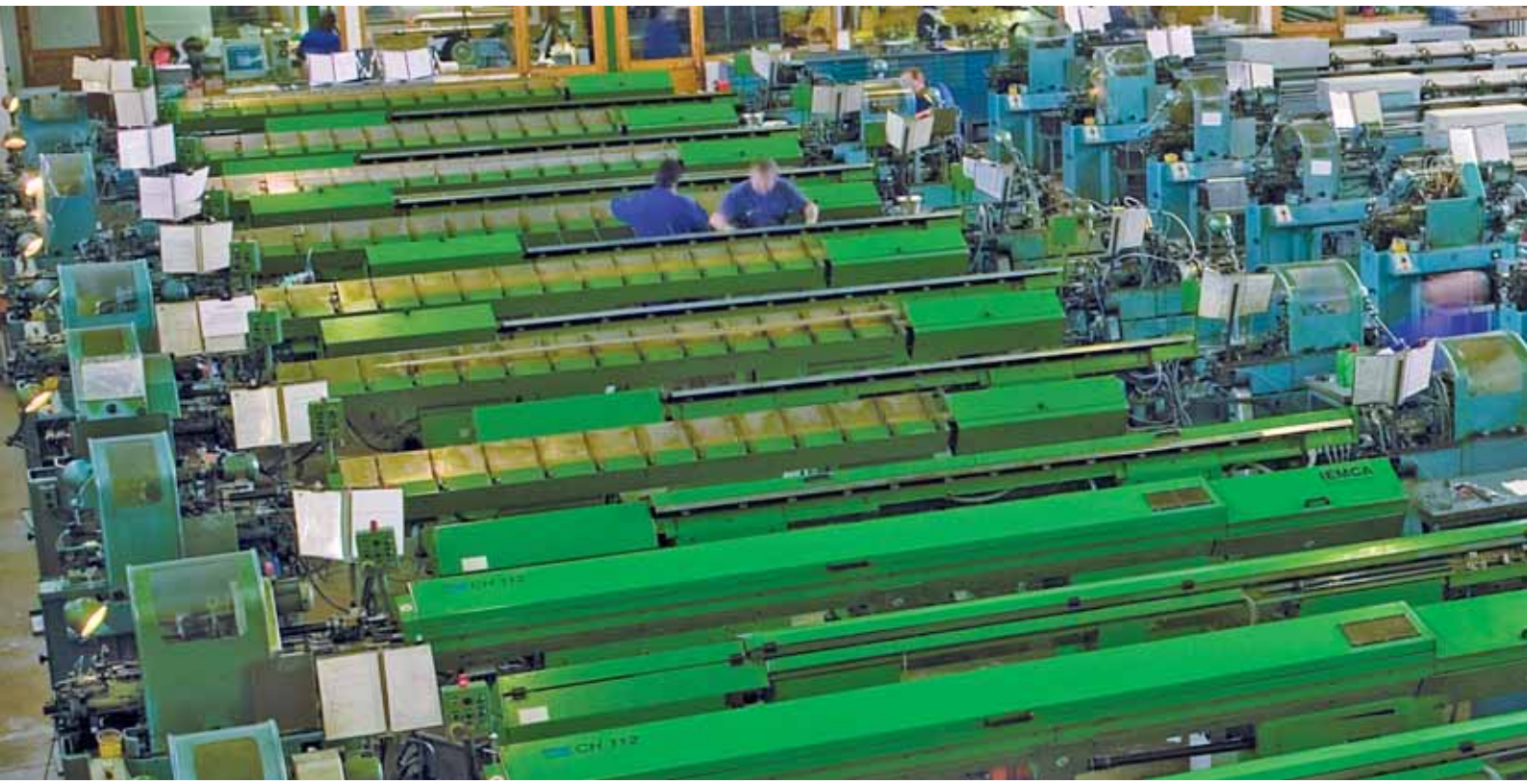
IN THOSE DAY, PRECISION IN SPAIN WAS SOMETHING OF A PIPE DREAM!

Meeting in Reus (Catalonia) with the Preciber S.A. management team.

It is common to state that bar-turning in Spain back in the Seventies is best illustrated by the square screw, an item so badly produced that its essential geometry was altered. However, during this period, there was a market for this type of workpiece, so imagine what it took to set up a company specializing in the manufacture of small, high-precision workpieces, so good that they brought a smile to your face. Mr. Correig and Mr. Casas took the decision to launch their business on 2 January 1971 with a single defining and guiding aim: that aim was to produce very high quality all the time!

These two men set themselves some clear rules – they would need the best possible machines, which they would have to learn to operate to perfection. Following a thorough analysis of what was on offer, the decided to invest in 4 machines from Bechler AR. *«These machines were the very best for back operations at that time»* Mr. Casas tells us. He goes on to add: *«The Bechler tailstock drill performed wonders and, even to this day, our cam-type machines produce high quality in normal operating mode and in back operations».*

After manufacturing for the optical sector (high-end screws for hinges) and components for gas lighters, the market opened up for Preciber, by then with a reputation for its production quality. Today, the company has 21 DECO units and almost 50 cam-type



machines. Its guiding principle has remained the same, and centres around a single word: quality!

Preciber, probably the most dynamic exporter among the bar turning companies in Spain, achieving 75% of its annual sales internationally, is perfectly entitled to look its international competitors in the eye on an equal footing.

A short history lesson...

dm: You certainly needed a fair amount of courage and vision to launch yourselves into precision bar-turning work. What prompted you to take this decision?

Mr. Correig: We were both involved in the production of small workpieces, and we knew there was a market out there. We therefore chose our machine carefully, and our gamble has paid off. We still work in the same way today. Before launching the production of a new machine, we carefully examine all the solutions, carry out a production test with the machine and, if everything goes well, we add more machines. This is what has been happening with DECO «a» over the last 10 years, and with the «e» models over the last year or so. We source all our machines from a single manufacturer which enables us to economize on training, and we benefit from the inherent synergy in numerous ways.

dm: Before we talk about your current set of machines, you mentioned that «there was a market out there» for your workpieces, but we have seen these types of component, particularly those used in the production of spectacle frames, migrate to other countries. How have you compensated for this disappearance?

Mr. Correig: Over the years, our cam-type machines, then our NC machines, have been tooled up for every conceivable kind of machining operation. We now have highly developed implementation capabilities for headstock as well as tailstock, i.e. normal and back, operations. Instead of trying to play "follow the workpiece", we decided to build even more strongly on our capabilities for manufacturing complex workpieces. Our DECO machines have equipment for polygon cutting, thread whirling, milling… the limits to which we can operate are very low. Since we are effectively able to turn our hands to almost anything, and always to do so at the very high standard of quality which is our hallmark, our markets naturally enough remain open to us.

MM. Correig and Casas, a perfect team to ensure the company's success.

dm: You have a perfect mastery of Bechler machines. What do you do to assure their maintenance and usage?

Mr. Casas: We navigated some tough times, and when Tornos bought back Bechler, we kind of lost our bearings, lost our points of contact and, for several years, we did not purchase any new machines. We acquired all the skills we need to safeguard maintenance for our old machines ourselves, and purchased second-hand Bechler machines to round off our machine shop.

More complex workpieces

dm: Given your great mastery of cam-type machines, why move to NC machines?

Mr. Casas: Our notion was to extend the range of workpieces we were able to produce, firstly into larger diameters and secondly into workpieces requiring even more complex machining operations. This is why we purchased one of the very first ever DECO 20 machines from Tornos. Our policy has always been to choose very well appointed machines which are capable of doing everything. We started by producing workpieces with a 10.5 mm diameter on our DECO 20 machines. We verified the machine, then we went on to purchase a further 20 DECO units!

dm: DECO 20? Isn't this machine a bit big for machining diameters of 10.5 mm?

Mr. Casas: At that time, Tornos did not have the DECO 13, and the DECO 10 was too small. We are very satisfied with our 20 mm machine and, of course, we now also have the 10 and 13 mm units, and we are still occasionally called upon to manufacture small 5 or 6 mm workpieces on our DECO 20. Quality and precision are perfectly in phase. That guarantees us flexibility!

Normally, we manufacture all the more complex workpieces on our NC machines, in preference to our cam-type machines. These are therefore complementary products.

dm: Are you still able to find operators for your cam-type machines?

Mr. Casas: There is no difference between operators of cam-type and of NC machines: we are simply unable to find personnel in Spain who are trained in bar-turning work. We therefore recruit mechanics and then train them up for our work entirely in-house. Our workforce is a multitasking one: all can operate cam-type and DECO machines. To equip someone with this level of mechanical expertise, we need somewhere between 3 and 4 years! There are great synergies between these two technologies. Given that cam-type technology is necessarily limiting in nature, we need to be very creative to find ways of machining our workpieces. This understanding and this creativity can then be used to maximum benefit by TB-DECO to program DECO machines.

Complementary machines

dm: You said that you were one of our first customers in the world to work with a DECO 20a, then with a 13a, then one of the first to work with DECO 10e and DECO 13e. How do you divide up your work across these different machines, and your cam-type machines?

Mr. Correig: Well the division of work between cam-type machines and DECO machines is a fairly simple one. First of all, all the "big workpieces[1]", the very complex workpieces, components made of very tough materials and short production runs are all machined on our DECO units. Only a very small number of our "cam-type" workpieces have migrated to DECO. I would have to say that the market for Preciber has developed along two distinctive lines. We have added to our range of CN machines, but at the same time, we have also added new units to our range of cam-type machines. If it is possible to manufacture a workpiece on a cam-type machine, then that's what we do with it! This is driven by commercial logic.

dm: Let's stay on the subject of commercial logic for a little longer: you now have DECO «a» and «e» units. What are the advantages of having both types of machine? Are the stated synergies really there?

Mr. Casas: Absolutely. We work with both types of machine, and the fact that they both get programmed in the same way, that is to say that they run the same programs, is a major advantage. The tool holders are interchangeable, but the philosophy is identical – it really is an ideal situation for having these two types of machine. For us, this enables us to make better use of the «a» machines with small, highly complex workpieces, and to employ the «e» machines to focus on workpieces requiring only a few back operations. The compatibility of these two types of machine is a crucial factor, and certainly delivers real benefits to us!

dm: How do you go about choosing workpieces for your «a» and «e» machines?

Mr. Casas: We have a track record and a reputation for producing good components, and this helps us decide which machine to work on. We know these types of workpiece, and their needs in terms of machines. The choice is certainly a technical one, but cost-effectiveness also has role to play in our decision making process.

Mr. Correig: Workpieces can be manufactured at a certain price, and this price influences our ability to be competitive. If we are able to manufacture parts less expensively, we will find it easier to sell them. At the same time, we have never deviated from our guiding principle, which is never to compromise in terms of quality or precision. At the present time, our range of cam-type, DECO «a» and DECO «e» machines are all being well utilized, and we are manufacturing types of component which benefit from the advantages of each solution.

Global competition

dm: You are therefore highly competitive?

Mr. Correig: Our competitors also have DECO machines. We are highly competitive because we use our machines to the full extent of their capabilities and our workforce operates them in a creative manner. The fact that we have machines well suited to

[1] More than 10 mm!

The DECO 10e is the ideal complement to the DECO 10a in Preciber's plant.

the types of workpiece we manufacture is a key competitive factor.

dm: Do you have any workpieces which you used to machine on DECO «a» and which you now produce on the «e» machine?

Mr. Casas: One example would be dental implants! We started out on the DECO «a» machines because these are what we had at the time, and they enabled us to manufacture highly complex workpieces. However, these machines were never used to full capacity, and we could have been manufacturing even more complex workpieces on them. From that point, to free up capacity, and to produce in a more cost-effective manner, we started manufacturing those workpieces on a DECO «e». The transition is a fairly simple one, both in terms of programs and of equipment and tooling. Once these machines had gone into production, we were able to extend our range of services to include other workpieces and sectors.

dm: What is your return on investment?

Mr. Correig: The return on investment is good in both cases. With the «e» machine, since it cost less to purchase, we are able to sell its production output at lower prices. There is a kind of natural selection at work today: you can't sell components that are too expensive. Instead, you need to manufacture at the best possible price in order to sell at the best possible price. This company is run in a collaborative manner with close liaison between its technical and commercial directors - we communicate a great deal and always know where we are, in both commercial and technical terms.

dm: As we have seen today during this interview, the two aspects of "commercial" and "technical" are valued equally in this business – is it still as important to you today to stay involved personally?

Mr. Correig and Mr. Casas: Absolutely – whenever "the boss" is directly involved with production or with customers, there are by definition no middlemen, and this level of direct contact ensures that we understand one another perfectly and can respond rapidly to anything that is asked of us.

dm: Let's now talk about the future. I see that you have just enlarged your premises…

Mr. Correig: Indeed we are. We were starting to feel a bit confined, and this process takes its time. Enlarging a factory is not as "politically interesting"

Preciber's new premises at the end of the 2009 extension.

as opening a holiday club, and there has been some delay in getting official permission granted.

Mr. Casas: We have substantially increased the size of our machine shop and are working now with larger diameter workpieces. That means that we need more floorspace to accommodate our new machines. In addition, we wanted to offer our workforce better working conditions, larger changing rooms, a training room and a canteen. These changes were all completed in early 2009. We are expanding our business on an entirely self-financing basis, meaning that we are keeping our capital here in the company.

dm: In conclusion, what is the key to success for Preciber today?

Mr. Correig: The answer is one of a balance between numerous factors. We are doing things that need to be done to remain true to our guiding principle of "high quality and precision". Our workforce is highly skilled, and our system of ongoing in-house training runs very smoothly. We are directly and personally involved in the ongoing running of our business, and in the investments required to sustain it. We have a very high-calibre range of machines in our workshops. Our customers are loyal because they know that we are working for them.

INDUSTRIAS PRECIBER, S.A.

Founded: 1971

Number of employees: 80

Export: 75 % of annual sales

Diameter ranges: 1 to 20 mm

Production site: Reus/Tarragona (Sp)

Certifications: ISO 9001:2000 certified by TÜV

Expansion in 2008: The production floor area increases from 2300 to 3100 m^2

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NEW «REACH» STANDARD

You could be about to go into "technical unemployment"... A provocative sentence with that the Swiss Federal Office of Public Health (OFSP) starts its flyer in "REACH", to attract the attention of all industrial companies to this EU Directive appears to be about to impose severe constraints. So what is it all about?

Reach – so what is really behind it?

The website of the Swiss Federal Office of Public Health, OFSP, provides this answer: "REACH is the abbreviation for Registration, Evaluation, Authorization of Chemicals and also includes the restrictions applicable to these substances. This is the new EU Directive that aims to make the manufacture and use of chemical substances safer within the EU."

Reach came into force on 1 June 2007 and relates to chemical products for which pre-registration by 1 December 2008 is mandatory at the European Agency for Chemical Products (ECHA), based in Helsinki. This mandatory requirement applied to known substances that were manufactured or imported in quantities greater than or equal to one ton per annum by the manufacturer or by the importer. Registration of new substances started on the 1st of June at the same agency.

Who is affected?

The "REACH" Directive affects companies based in the EU that are required to request pre-registration of new products, or the registration of existing products in question. Swiss companies are affected if they export their chemicals – i.e. the products manufactured by themselves – to a country of the European Union. In such cases, the partner in one of these countries is required to satisfy all the required formalities. The Swiss company is required, for its part, to provide all the necessary documents. If a Swiss company imports a substance from the EU then re-exports it to the EU, it must ask its supplier for all the

necessary documentation to accompany the shipment.

Any Swiss company that only supplies its products to customers within Switzerland, or to countries outside the EU, is not affected by this EU Directive. However, if a customer subsequently exports a product containing one of these substances to an EU country, that customer will request explanatory documentation from his Swiss supplier because: "The communication of dangers and safety instructions must be assured down the entire distribution chain for chemical substances." This point is an important one because it calls upon every party involved down the entire chain of production to play its role!

Does this affect bar-turners?

A bar-turners product, depending on the description of that company's activity – involves workpieces machined from (for the most part) metallic materials. To do this, bar-turners necessarily use products such as cutting oils or cooling fluids and all these products can be viewed as chemical substances. After the machining operation, as a general rule, the workpieces are washed before being supplied to a customer. In such cases, the bar turner does not supply any product of a chemical nature, and is therefore not affected by REACH. In cases where the bar-turner is going to be machining synthetic materials, he is well advised to first contact the supplier of this material to ask whether a conformity declaration can be provided and, if not, can then press for one.

If a bar-turner then gets involved in assembling several components on behalf of a customer in the EU, or for a customer who will be exporting to the EU, that bar-turner may find themselves affected by this Directive. This depends on the lubricant content, and the content of other chemical products in this sub-assembly. Depending on the case involved, it may be necessary to follow the same procedure as the machine manufacturers.

What about machine-tools?

The manufacturers of machine-tools are subject to the same Directive as any other producer. The decisive point is to know if a material or a product used in a machine - for example oils or greases - is affected by REACH and if the quantity exported in this case exceeds the official annual limit of one ton. To recapitulate: it does not matter if a product is exported directly or via an intermediary. The manufacturer involved must, if certification is not already provided by his supplier, must take steps to obtain written confirmation that the product (oils, greases) has been registered with the appropriate authority in Helsinki.

Doubt is permissible

This is relatively complex subject matter, something which even the specialists dealing with this subject are willing to admit. Doubt is therefore allowed. To learn more, the interested party can consult the OFSP website, or one of the other websites listed later in this article. Moreover, all manufacturers of related substances involved directly or less directly have been looking at this issue for some time and are now in a position to provide fairly accurate information on this question.

For example, the lubricant manufacturer Blaser SA is providing a specific e-mail address: reach@blaser.com where questions can be tabled on this subject. Motorex is another company willing to provide information through the following e-mail address: msds@motorex.com.

RM

Internet websites to consult:

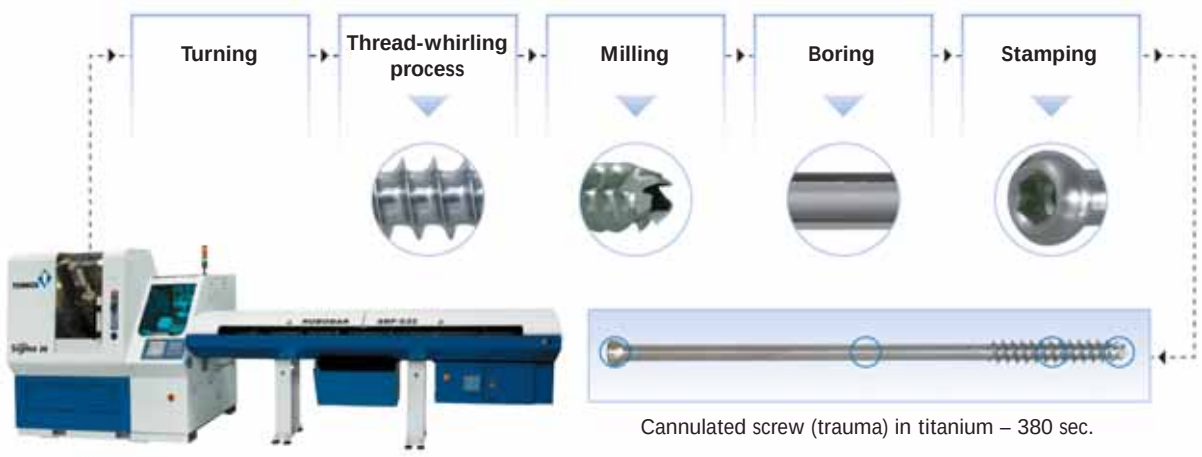
http://www.bag.admin.ch/themen/chemikalien/00531/02835/index.html?lang=fr
http://echa.europa.eu/reach_fr.asp
http://eur-lex.europa.eu/JOHtml.do?uri=OJ%3AL%3A2007%3A136%3ASOM%3AFR%3AHTML
http://ec.europa.eu/enterprise/reach/index_fr.htm

…and there are plenty of other websites out there

E-mail address of Blaser SA: reach@blaser.com
E-mail address of Motorex SA: msds@motorex.com

A MATERIAL AS FASCINATING AS IT IS DIFFICULT TO MACHINE

Titanium (Ti) is one of those metals which, by virtue of its properties are all the rage in different sectors. Its numerous benefits are highly appreciated for parts in the aeronautics, medical or leisure sectors. However, machining this metal is tricky and often requires quite substantial machining times and expensive tooling.



Cannulated screw (trauma) in titanium – 380 sec.

With a density of 4.51 grams/cm^3 titanium is heavier than aluminium (2.7 g/cm^3) but much lighter than iron (7.8 g/cm^3). It is therefore a relatively light metal, with excellent corrosion resistance and its melting point stands at 1660°C, slightly higher than iron (1535°C), but considerably higher than aluminium (658°C). A factor which makes titanium stand out from other materials is that it remains stable even at relatively high temperatures. Titanium is recognised as being biocompatible and therefore suitable as a base material for parts including screws and other medical implants – uses which are quite contested today.

A short history lesson...

Books will tell you it was the Reverend William Gregor – a British mineralogist and chemist – who discovered and described this metal for the first time in 1791. He isolated what he called Black Sand, known today as Ilmenite. Martin Heinrich Klaproth, the professor in analytical chemistry at the University of Berlin, identified the same metal several years later, independently of Gregor. Klaproth gave this metal its current name of "titanium" in reference Greek mythology, while totally unaware of its physi-co-chemical properties. It was only in 1910 that Matthew Albert Hunter, researcher at the Rensselaer

Polytechnic Institute (NY, USA) was able to produce 99 % pure titanium. Then, it was not until 1939 when Wilhelm Justin Kroll, metallurgist and chemist from Luxemburg and consultant at Union Carbide Research Laboratory in Niagara Falls (New York), developed an industrial process for producing titanium by ore reduction with magnesium (reduction is a procedure where the metal is extracted from an oxide that it encloses by eliminating the oxygen).

On earth, titanium is a common substance. It is the tenth most common element of the earth's crust, with an average content of 0.63 %. This metal is also found in coal, plants and even the human body. Titanium is also found in meteorites, the sun and M-type stars. Rocks bought back to earth by the Apollo 17 mission to the moon are made up of 12.1 % of TiO_2.

Aeronautics, the largest titanium consumer

Due to the cyclical fluctuation in the demand in the aeronautics, chemical and energy sectors, the titanium market is subject to extreme variations. Stable applications including the leisure, building or other sectors are insufficient to compensate for these fluctuations. However, the aeronautics sector remains the consistent sector representing the largest market for metal titanium. Its main uses include helicopter turbines, plane structures and engines. In the energy and chemical sectors, titanium is used in desalination plants, chlorine and chlorate production plants, paper mills or heat exchangers.

Extinguisher required

Titanium is considered a metal with a high mechanical resistance and a good ductility in standard temperature conditions. Its specific resistance (tensile strength to density ratio) outclasses aluminium and steel. However, machining with this metal proves to be quite difficult. One of the problems stems from the fact that when titanium is in its divided metal form it is highly inflammable. This means the swarf easily ignites. As a result, there is a genuine fire risk when machining parts in titanium. Tornos, with considerable experience in machining this metal, strongly recommends installing a fire extinguishing device on the turning machines in the event titanium will be machined. Naturally, Tornos equips their turning machines with such a unit as an option.

Suitable machine-tools and tooling

An additional major difficulty lies in the swarf formation. François Champion, sales director at tool manufacturer Applitec, explains: «The problem can be compared to that of stainless steels alloys. Based on our experiments, you need to look for the most suitable tool every time. One of the difficulties in machining titanium lies in the quality of this metal: The first time you may have an alloy making extremely long swarf which is difficult to break, the next time the machined alloy creates quite short swarf. «This confirms the observations made by Philippe Charles, an expert in this field at Tornos: «Depending on the type of operations, the swarf is either long or short. The operator therefore needs to work with high-pressure lubrication and adapt the speed and cutting tools.» He adds: «In the event of short swarf, filtering the cutting oil becomes crucial.» François Champion: «There is no single type of cutting tool for titanium machining. In each case, the bar turner is required to select the right tool, based on the metal alloy and the type of operation. We assist them in this selection, of course.»

As the metal is relatively soft, it is easy to leave marks on the workpieces, an unacceptable defect in most cases. For Philip Charles, alongside high-pressure lubrication to remove swarf immediately and efficiently, a rotating or self-adjusting guide bush help solve the problem. Both the machine-tools and tooling therefore need to be adapted to the task. Tornos, with over twenty years experience, meets these specific requirements with its products.

Important research in progress

As part of a project supported by the federal commission for technology and innovation (KTI), the Inspire SA institute – located on the premises of the Swiss Federal Institute of Technology Zurich (EPFZ) – is working very hard to find the solutions to the problems of titanium machining. The research is first and foremost focusing on milling with this metal, but Carl-Frederik Wyen, researcher and leader of the project, confirms: «We also need to study the problems inherent to turning."

The blade breaks

One of the special features of titanium is the very rapid oxidation of its surface. This is an advantage when it comes to involuntary scratches on a surface in titanium: the oxide reforms spontaneously in the presence of air or water and the metal closes the "wound" quickly and efficiently. This layer of oxide is complete and very adhesive. This can be advantageous when the neutrality of the metal can be a handicap during machining. In fact, the cutting tool needs to remove this layer which reforms immediately. There is worse to come, however, as Carl-Frederik Wyen explains: «If the cutting blade material is based on an oxide, like ceramic oxide, for example, the titanium capacity for oxidation is such that it will extract the oxygen contained in the blade. This gradually disintegrates and explains the short working life of some cutting tools."

The metal avoids the blade

A further problem lays in the low elastic modulus of between approximately 105 GPa and 120 GPa depending on the alloy (steel: between 195 and 210 GPa). This low elasticity modulus is naturally beneficial when using this metal. But Carl-Frederik Wyen adds: «During machining, however, titanium unfortunately tends to "flow" around the blade, instead of being removed. Another problem when it comes to precision machining this metal.» What can be done? «Often, machine-tool operators think they are doing the right thing using a tool with a very sharp blade. According to the initial results of our research, we believe that the cutting angle needs to be fully reviewed and maybe rounded.»

The research project is set to last two years. Carl-Frederik Wyen intends to be in a position to present the conclusions by the end of 2009. So: Watch this space.

RM

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WHEN BAR TURNING AND «IT» GET MARRIED

There is a growing wish to see lettering and even emblems on turned components. To make it easier to machine components, Fabio Aquilini from MMT in Cologno Monzese in Italy has created a piece of software for PCs from which it is a simple task to transfer wording and symbols in the form of ISO code to the numerical control (NC) system of an automatic bar turning machine.

Fabio Aquilini, creator of the "Millwriter" software and his father, the boss of MMT, Giovanni Aquilini. (Photos: Robert Meier).

With NC systems, it always was possible to create numerals and symbols using the machining capabilities of an automatic turning machine. However, this did tend to require fairly assiduous programming work and a substantial investment in terms of man hours. Many bar turners would like to have a much simpler solution. Here then is a proposal that will be of interest to a good few of their number.

Leaving the simple behind to work on the complex

With its three automatic turning machines and its three members of staff, MMT is a typical example of small company. Founded back in 1962 by Elio Aquilini, the company was carried forward by his son and current boss, Giovanni Aquilini who, with his long-term employee Tommaso Altomare, decided to stop producing screws and similar components in favour of the machining of very high-precision components involving a considerable degree of complexity. To this end, he set about adapting his range of machines, currently comprising three turning machines: one DECO Sigma 20, one DECO 20 and one Schaublin 110 CNC.

Giovanni Aquilini has now specialized in the machining of prototypes and short production runs of ultra-high precision components – preferably for the hydraulics industry, watchmaking or for research applications. For him precision means being accurate to within a thousandth of a millimetre. «We do not operate our machines to their maximum capacity – we run them to their maximum precision.» Their customers demand 100 % quality inspection of all components. «We are always thinking quality first and last», he states.

An IT specialist at the controls of turning machines

Giovanni Aquilini's son Fabio has an unusual educational background for a bar turning specialist: he studied IT at the University of Milan. However, he is now involved in hands-on work at the controls of an automatic turning machine, the Sigma 20 from Tornos. Fabio emphasizes two things which he views as fundamental: «The controls of a modern machine tool are based on IT software. With my in-depth knowledge of IT and of bar-turning, I am perfectly capable of programming a turning machine to make machining operations more efficient.» And to underline the importance of choosing a Sigma 20 for their workshop, he has this to say: «In point of fact, this lathe is intended for the production of complex workpieces in medium to long production runs. Of course, in our case, all our production runs are short, but the workpieces we machine are complex. It is therefore very important for us to have a machine which enables us to produce workpieces of this kind, and which makes it easier for us to do so. That's why we decided in favour of this Tornos machine.» Most of the more complex workpieces are manufactured on the Sigma 20. In the MMT workshop, although all our staff is capable of working on each of the machines, each employee has his own dedicated turning machine. For example, Fabio prefers working on the Sigma 20.

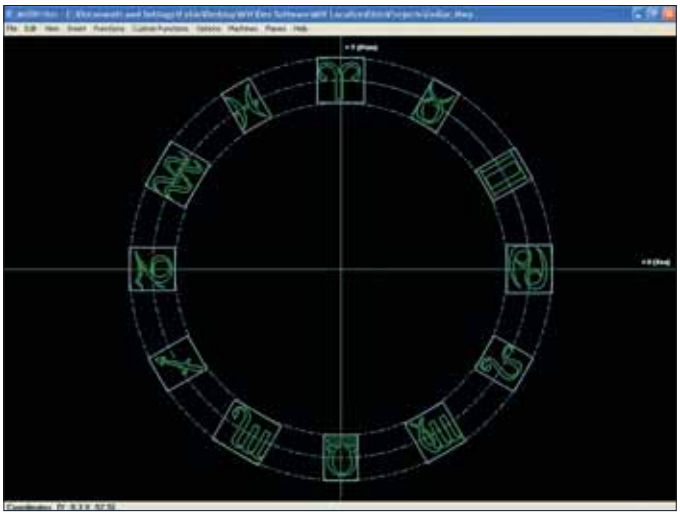
Graphics rising constantly

Giovanni Aquilini confirms this: «It is now eight years since we received our first requests for graphic elements on workpieces. Since that time, demand has been rising continuously. At the present time, about 30 % of our order contains an item of this kind.» The programming of elements like this holds no secrets for Fabio, but this work was taking him a great deal of time. «Sometimes, I start with a design on paper before starting to write the program.» In addition, since the company has specialized in short production runs, new start-ups are a frequent occurrence, which constitutes an added difficulty. As a skilled IT specialist, Fabio sought a solution to make this work easier.

The Millwriter was born

His father confirms the fact that Fabio worked night and day to create suitable software. His efforts have been crowned with success: «I have written a piece of software called "Millwriter". This software contains dozens of fonts and graphic elements written in "G" code, and these can be engraved on any flat, cylindrical or spherical surface of a workpiece. «The Millwriter can be installed on a PC or on a Notebook running under Windows XP or Windows Vista.

However, how does this software work? Fabio Aquilini: «The user writes a text in Millwriter on a PC, using an alphanumerical character set, which can be laid out as desired. For this purpose, the software has numerous functions such as a wide choice of fonts and graphic elements, as well as modules which, for example, enable a text to be rotated or stretched to configure, in almost any conceivable



Screenshot of the programming of signs of the zodiac using Millwriter...

...and the finished ring, bearing the signs of the zodiac, machined on the Sigma 20.

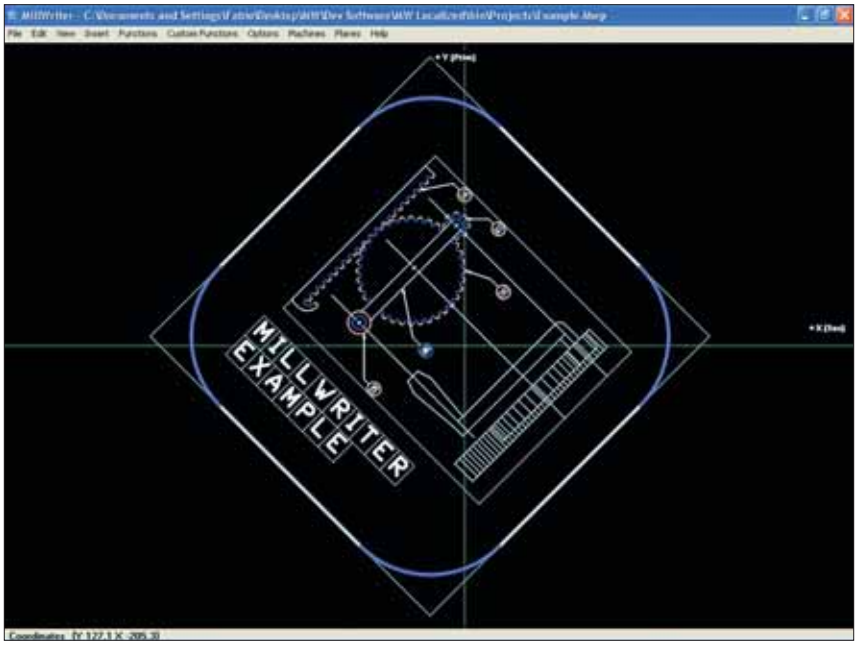
Typical MMT-machined workpiece. The number on the left side of the cylindrical section is engraved by the turning machine during machining operations.

Complex, high-precision workpieces are the daily bread and butter of MMT.

way, the letters and numbers involved, making it easy to produce something closely approximating what the customer is looking for. Millwriter then converts this text into ISO code and the user then simply inserts it in the workpiece program.

For the Sigma 20, this insertion can be made in the "Tornos CNC Editor" software (distributed free of charge by Tornos), or in the "TB-DECO ADV" software with the help of the "copy & paste" functions. Millwriter also offers scope for sending ISO code directly to the machine control unit. Millwriter also does a great deal more: it can even do logos, based on imported DXF files. Here too, once the user has formatted this graphic to personal requirements, Millwriter is then able to convert it. Only one limitation: «Millwriter is not able to convert straight lines and the radii of circles. Nor is it possible to use splines in the DXF file.» If by some misfortune, the control unit only supports G1 segments, it is a simple operation to convert the G2 and G3 codes into G1 segments. Even though Millwriter is now already functioning in the desired manner, Fabio Aquilini is not content to stop at this point: «It is certain that other advantages can still be incorporated with such a good programming tool», he confirms. Nights are going to be short.

A team of specialists, from left to right: Fabio Aquilini, creator of Millwriter, Walter Pasini, local regional Tornos representative, Giovanni Aquilini, the boss of MMT and Tommaso Altomare, the loyal employee of MMT.



Screenshot showing an example of the programming of graphic elements with Millwriter.

Available to everyone

At this time, Fabio Aquilini is no longer afraid of customer orders which contain graphic elements. By virtue of his software, within a short period of time, the CNC control unit is able to receive appropriate instructions and is able to engrave letters, numerals and graphics on the workpieces, without recourse to any challenging manual programming.

Is this a solution for other operators? Fabio Aquilini confirms that it is: «I sell Millwriter software to any operator who asks for it. This software is aimed at bar-turners with a good working knowledge of ISO code management.» The software is currently available in Italian and English, and is protected by a USB dongle. It is supplied on CD and is easy to install on any computer. «When an operator places an order, they have to tell me which type of machine they intend to use with the ISO code created in this way. This in turn enables me to adapt the software to suit requirements prior to shipping it.» Needless to say, Fabio makes a point of being contactable - in Italian or in English - to answer any questions his customers might have. However, he does advise interested parties to contact him by e-mail.

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Detail of an inscription programmed with Millwriter and engraved while on the turning machine.

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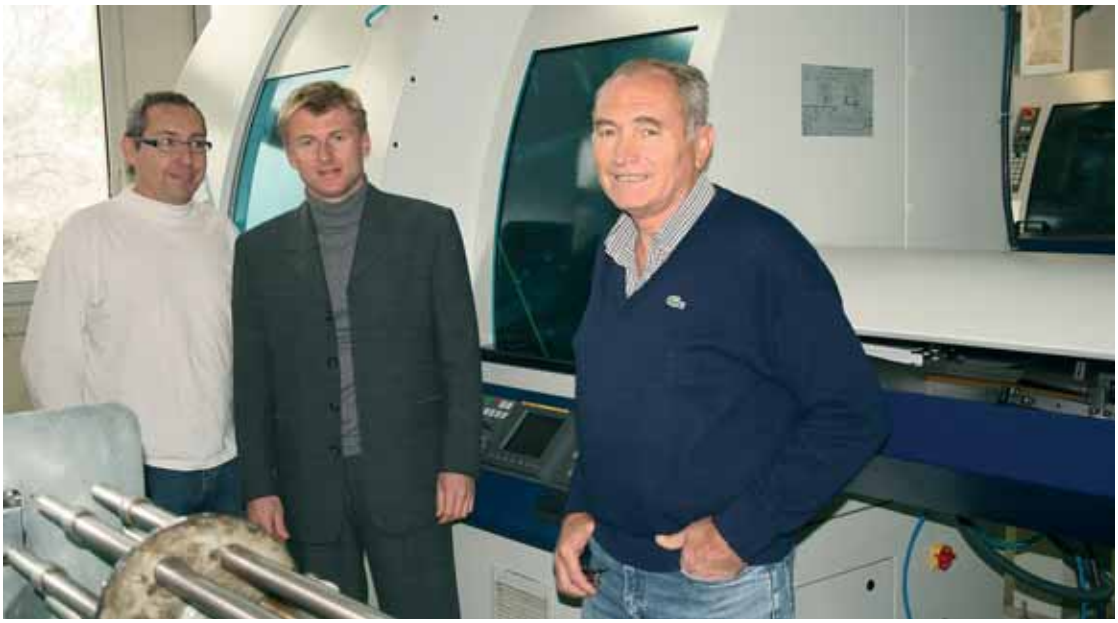
SUCCESSOR OF CAM-TYPE TURNING MACHINES

The birthplace of French bar turning is located in the valley of Arve, in Upper Savoy. This region, or to be more precise, Cluses, is home to Duchosal SA. This family-run business can meet all the requirements for turned parts. decomagazine takes an inquisitive look round this company.



In front of the DECO 26a from left to right: Jean-Christophe Duchosal, Patrice Armeni, Tornos France Sales Director and Charly Duchosal. (Photos: Robert Meier)

What strikes you when you go into Duchosal is the great variety of the machine park. A series of traditional cam-type lathes stand alongside CNC turning machines, including the latest acquisition of a Tornos Delta 20/5.

A family clan at the helm

Charly Duchosal founded his company in 1971. He tells the story: «To create my company, I bought second-hand cam-type turning machines including the oldest one still in service dating from 1950." Now, his machine park now totals 17 cam-type turning machines including 12 from Tornos. In 1997, Charly Duchosal left the company in the hands of his son Jean-Christophe and it is he who now manages this family-run business that employs seven people. Has the father gone back to the ranks definitively? Jean Christophe Duchosal makes it very clear: «Although it's now down to me to run the company, I can, and I want to count on the advice of my father.» One thing is sure; the choice of a new turning machine is a two-person job. «Naturally, two minds are better than one, but above all, two quite possibly conflicting points of view help identify the needs and the suppliers' proposals and to make the right choice.»

Digital – contemporary and necessary

In the workshops at Duchosal, the digital age arrived a while ago already. This means the visitor can discover 14 CNC turning machines, including 12 from Tornos. Has the company turned resolutely towards digital? Charly Duchosal makes it clear straight away: «cam-type turning machines require longer set-ups that lead to a preference for using these machines for longer production runs. However, on one hand batch volumes are tending to get smaller and on the other hand, it is getting harder and harder to find qualified personnel able to work with cam-type machines.» Jean-Christophe adds: «Sometimes we get requests for the turning machine to be set up in the morning and the first parts delivery is expected in the afternoon, a service that proves impossible with cam-type machines». Indeed, the number of parts par series varies from 50 parts to a million or

Cam-type turning machines are still put to good use.

even more, although such orders are becoming increasingly rare.

The company works for customers from sectors including the machine-tools industry, aeronautics, medical, automotive or the leisure sector (due to the neighbouring Alps). The machine park enables the machining of parts with diameters ranging from 1 to 51mm and lengths of 0.5 to 600 mm, where the great strength of this bar-turner lies. «Our machine park enables us to offer high reactivity and flexibility while remaining versatile. These are the requirements of today's customers», remarks Jean-Christophe Duchosal. «Technical competency and assured consistency in levels of precision make us increasingly attractive».

But why Tornos?

Experience has made Charly Duchosal a user convinced of the benefits of Tornos turning machines: «The choice of Tornos was made based on my experiences of these turning machines' reliability and continuity in precision over the years. An additional positive point is the after-sales service located nearby.» Jean-Christophe Duchosal has no intention of going back on his father's choice: «An undeniable plus-point is the feasibility assistance when we receive complex or original workpiece. The Tornos service offers valuable advice enabling us to find the optimum solution both from the point of view of part quality and its production cost.»

Feeling the market

And he proves his attachment to Tornos because the firm recently extended its line of turning machines with a DECO 26a and a Delta 20. The choice of the DECO 26a, a single-spindle sliding headstock automatic turning machine, and compliments the company philosophy well, with its maximum bar capaci-

The Delta 20/5 is called up to gradually replace the cam-type turning machines.

Jean-Christophe Duchosal is very pleased with the Delta 20.

Part made on the Delta.

Several DECO 2000 are also part of the Duchosal machine park.

Sample of machined parts from Duchosal.

ty of 32 mm. Although the turning machine is designed for machining complex and very sophisticated workpieces, Jean-Christophe Duchosal looks upon the choice in another way: «I want turning machines on which I can make complex but also simple parts. With a less sophisticated turning machine, my capacities are more limited.»

The Tornos Delta 20 is a turning machine which is highly specialized in the production of straightforward parts with medium complexity. «When looking for a turning machine to replace the cam-type machines, we opted for the Delta range from Tornos», explains Jean-Christophe Duchosal. «This turning machine meets our requirements in terms of set-up speed and quality of more straightforward parts perfectly.» His father adds to this analysis: «We can also make relatively complex parts on this machine. But the real benefit is the price of the machine which enables us to have a relatively low machine/hour cost and this gives us a head start on the market.» Although the selected model enables a bar capacity of 20 mm, the diameter of workpiece currently machined on this machine barely exceeds 9 mm. Here's why: «We want to hold on to all the options of such a turning machine and be sure that – according to customer requirement – we can machine parts with a larger diameter. Taking this into account before the acquisition means we can benefit from future opportunities», concludes Charly Duchosal.

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THE SOLUTION IS IN THE RIGIDITY

It was with a certain amount of surprise that Maurice Hugard, CEO and technical director at Hugard-Décolletages in Magland in Upper Savoy, noticed that on the same workpiece, the cutting tools were wearing down too quickly. As this same workpiece was being produced on three different turning machines, he wanted to find out why. He finally found the solution using the Modu-Line tooling system from Applitec.

Maurice Hugard, technical director at Hugard décolletages is the first to admit: even if he is very pleased with the new Micro 7 from Tornos, it's not easy to make him smile.
(Photos: Robert Meier).

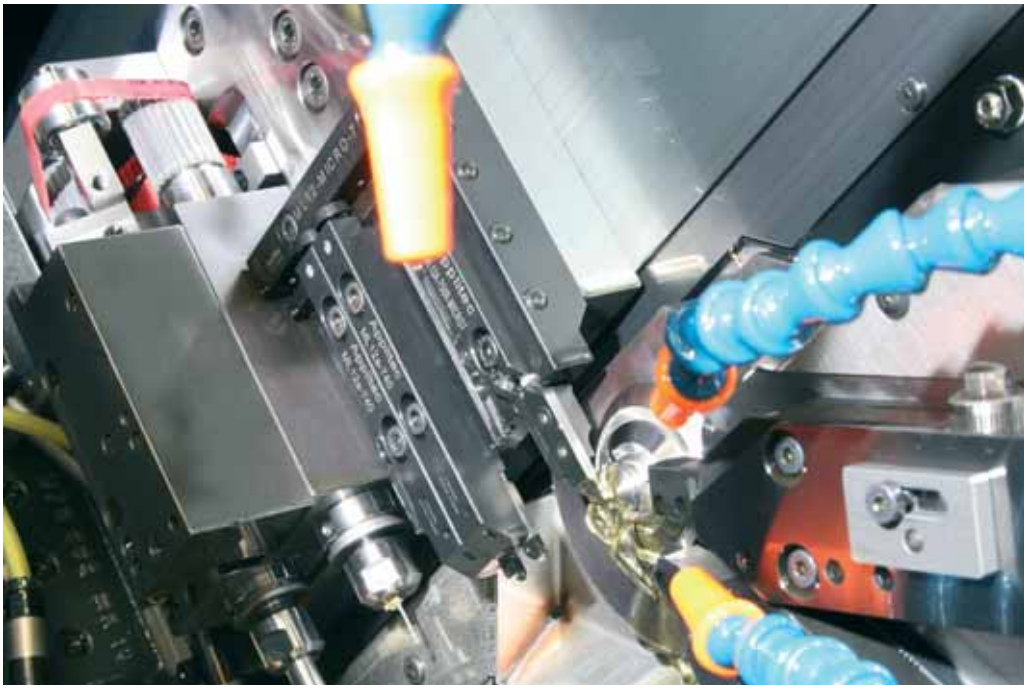
No, Maurice Hugard would not be a bar-turner if he gave up easily. The fact that for the same workpiece, and on three different turning machines, the inserts failing too early was very unsatisfactory: «We don't have time to lose time," he says.

Looking for and finding the cause

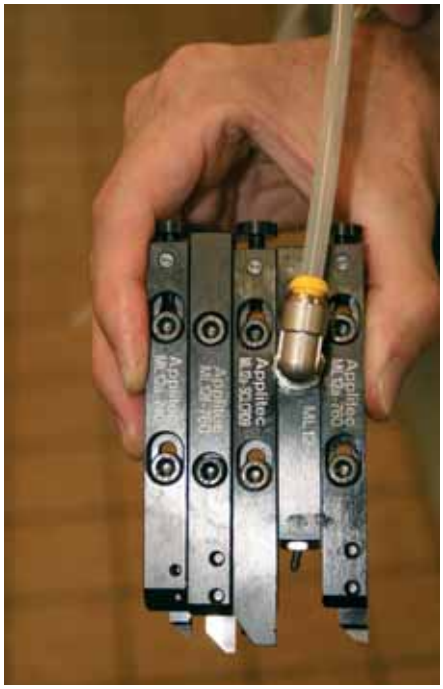
During his time off, Maurice Hugard started to look for the cause with a bar turner from his company; he wanted to find out the truth: «We verified all the tool settings and values in the CNC command, without finding anything that might lead us to the cause of this failure.» So he decided to equip a turning machine with the Modu-Line tooling system from Applitec whose tool holders' 12 x12 section are more rigid than the tooling used until now. Surprise: «The first series was machined without failure and, at the end the inserts were still in a satisfactory condition. Just luck?» Maurice Hugard launched a second then a third production run changing the turning machine. The result was still the same positive one. «I had to conclude that the micro-vibrations were too much for the inserts which led to their premature failure. Thanks to the rigidity enhanced by the Modu-Line tooling system from Applitec, we were able to find a permanent solution to this problem.»

Criteria: feasibility

The Hugard Décolletages machine park is made up exclusively of Tornos CNC machines. Maurice Hugard gives the reason for this choice: «When it came to replacing the cam-type turning machines, I drew up a list of specifications containing the drawings of machined parts in our workshops, a list I sent out to several potential suppliers of CNC machines» To my



A look at the Modu-Line tooling system installed in one of the Micro 7.



A set of tool holders always form a compact block.

great surprise, only Tornos sent a convincing response to this request and their recommendation was a ENC 74 turning machine. Maurice Hugard confirmed this choice: «All our tests showed that the parts in our list of specifications were able to be produced efficiently.» This demonstrated the feasibility of all these parts. «This was the beginning of our confidence in the company.» Later he would discover the DECO 2000 turning machines, 27 of which are now installed in his company, a machine park completed with two DECO 13 machines. Another reason for his satisfaction is the proximity and helpfulness of the Tornos France after-sales service, the head office being located near the birthplace of Upper Savoy bar turning in Saint en Faucigny, a stone's throw from Magland, and home of Hugard Décolletages.

Transfer of expertise

Increasingly demanding requirements in terms of precision compelled Maurice Hugard to purchase two Tornos Micro 7 turning centres. Apart from the very high levels of precision that can be repeatedly obtained, by virtue of the option of running counter operations, these turning machines offer a greater capacity in terms of machining ever more complex workpieces. And Maurice Hugard took a decision: «Our philosophy is to look for standardization in tooling. As a result of our experience, we have permanently equipped the Tornos DECO 13 turning machines with the Modu-Line tooling system from Applitec and we are entirely satisfied. It is for these reasons why we also decided to equip the two Micro 7 turning machines with this tooling system from the outset.»

He has no regrets: «In addition ensuring a level of precision quality, this design of this system means we can fit an extra tool or a lubrication unit for a particular tool.» This further improves the capacity and convenience of these turning machines. The fact that inserts can be changed very quickly and efficiently and with a guaranteed repetitiveness, adds to the satisfaction. But he sees another advantage which is not immediately obvious: «With this system, by attaching tool holders on the tool holder plate, we always get a plane surface, which prevents the build-up of swarf or filings.»

Animated discussion between, on the left, Patrice Armeni, Tornos France sales director and Maurice Hugard, in front of a DECO 2000.

Specialized in small

Today, Hugard focuses on the production of small parts with diameters ranging from 0.18 to 16 mm and lengths varying from 0.2 to 105 mm. Maurice Hugard: «We trying to optimize our production. That is why we have become more specialized in small dimensions.» While at the same time expanding our clientele. Today, the company serves customers from sectors including the connectivity business for telecommunications, medical, aeronautics and other diverse areas. The number of parts per series varies from only 10 to 100,000. But Maurice Hugard confirms: «The series are getting smaller and smaller. 95 % of our series are under 20,000 parts.» Both the Micro 7 turning machines and the ModuLine tooling from Applitec are the perfect solution to this demand.

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One of the Micro 7 with its bar feeders in a clean and tidy environment.

One of the machine rooms with the DECO 2000 turning machines. Here too, spotlessly clean.

CUB 112: THE REVOLUTION IN THE WATCHMAKING WORLD

PLATES IN ONLY 20 MINUTES

Astonishment at the Prodex machine tool trade fair in Basel in November 2008: Almac SA based in La Chaux-de-Fonds, Switzerland, presented the CUB 112, a brand new machining centre designed to manufacture plates and bridges in record time for the watchmaking industry directly from a bar and in a single clamping. But what exactly is CUB?

The CUB 112 will not only be a high-performance production tool but also a machine to catch the visitor's eye in the workshops. (Photos: Robert Meier)

In the watchmaking world, plates are made in several stages, starting with the production of a suitable disc, machining one side, heat and other treatments, machining the second side and then further treatments. This series of handling operations not only takes a great deal of time, but often damages these delicate workpieces. This means considerable cost and waste for those who manufacture them and who are naturally looking for a new solution. But what?

Attentive to market requirements

One of Almac's key markets in La Chaux-de-Fonds is the watchmaking industry, where the firm has an undeniable experience as far as production tools are concerned. Roland Gutknecht, the company's CEO, remembers: «It was through listening to our customers that we became aware of the problems in producing plates and bridges.» Almac has its own research and development department with a total of seven engineers and technical personnel. The decision was taken to accept the challenge and develop – still with recourse to external resources – a machining centre able to respond to the calls for help from the watchmaking sector. Now, after three years of hard work, result is impressive.

A unique concept

Until now, the production of a plate – or a bridge – started with a perfectly flat disc that first needed preparing. A range of operations and manipulations followed, in order to reach the finished part with a

He has every reason to be proud of his CUB 112: Roland Gutknecht, CEO of Almac SA in La-Chaux-de-Fonds.

level of efficiency which fell far below today's industrial requirements. Almac reinvented and above all simplified this process to reach a production time from bar to finished plate in only 15 to 20 minutes depending on the number of operations to be run.

In fact, in contrast to today's still common practice, the Almac method means machining begins directly on the bar, so there is no longer any need to prepare a disc used as a basis for later machining. There is also no need for complex clamping because for the first face the radial operations remain an integral part of the bar.

Once the first face is finished, the counter spindle is perfectly synchronized with the main spindle. A support adapted to the workpiece to be machined, equipped with positioning dowels for the plate, grips it using a vacuum. The workpiece is then separated from the bar and the machining of the second face of the plate – or bridge – can continue without the need for any intermediate handling. During this time, the machining of the first face of the next workpiece begins on the main spindle. Each workpiece leaving this machining centre is both finished and of a quality level allowing it to be used at a future point, the risk of scrap having been reduced to zero!

Continuous production

The CUB 112 is designed to be a production tool for continuous machining. Therefore, this centre is equipped with 139 tools including 64 for machining the first face on the main spindle, 48 for the second face on the counter spindle, 20 tools are available on a third spindle for peripheral machining and seven turning tools complete the equipment. A bar feeder ensures a continuous supply of bars. Phantom production has also become a reality for plates.

Set-up in record time

The range of tools covers the large majority of operations required for the manufacture of plates and bridges. As a result, after an initial set-up of the CUB 112, a new plate is set up in record time. The CNC command – a GE Fanuc Series 31i, Model 15 – is factory set to use dimensions based on a drawing and to transform them in operation order for the centre. Julien Métille is a programmer/demonstrator at Almac. He confirms the simple set-up of a new workpiece: «During a demonstration observed by an interested customer, the set-up time for a new workpiece was 11 minutes, stopwatch in hand!" No mean achievement!

Julien Métille, programmer/demonstrator at Almac proved it: Set-up of a new workpiece in only eleven minutes.

This counter spindle tool magazine can hold 48 tools.

View of the main spindle: the machine is ready to machine face one of a new plate directly on the bar.

The counter spindle waits for a plate to machine it on face two...

...which it takes directly from the main spindle.

Designed for the micron

A watchmaker does not need to be told what precision is. This sector is highly demanding which makes tolerances very tight. The new machine needed to take heed of this as a matter of course. The first consequence can be found in the housing of this machining centre which is made of cast iron and concrete. Roland Gutknecht: «In order to ensure optimum stability and rigidity, the housing must have a large absorbent density.» The CUB 112 not only features a bearing surface but also a housing in the form of a frame which covers all sections of this machining centre, from top to bottom. «Total stability is therefore ensured» confirms Roland Gutknecht before adding: «As soon as machining is required on a micron level, the temperature of the machine is also extremely important. For this reason, we have equipped the CUB with a water-based cooling system which maintains the temperature of the machine within a narrow range.»

Technologies of the future

The constructors have also excelled in the drive systems. All drives are actuated by linear motors offering the machine speeds of 90 m/min on the main axes and 60 m/min on the other axes, all with an acceleration of two g. In addition, this type of drive reduces the noise level of the centre to a minimum. The direct measuring system functions to a resolution of one-tenth of a micron. Roland Gutknecht: «To machine workpieces with tolerances within the micron, the machine needs to be a lot more precise, which we tried to do».

Amazement at Prodex

Visitor feedback was equal to the performances of the CUB 112. In his role as demonstrator, Julien Métille had a ringside seat: «The record machining time intrigued more than one visitor and our concept aroused great interest. And, the visitors liked the look of the machine.»

Roland Gutknecht confirms: «This machining centre is going to revolutionize plate manufacturers' workshops. This way, they will become much more efficient in meeting the demands of the market.» He plans the first CUB 112 to become operative in the workshops of a plate producer this spring, where the machine will undergo tests under industrial production conditions. And his confidence shows: «I am convinced that the first machines will be delivered to our customers as soon as this summer.»

And when will we see other new developments?

When asked if other similar projects are in the pipeline, Roland Gutknecht replies with a smile: «All our attention is currently focused on the CUB 112. But of course the expertise gained with this machine will serve as a basis in the future for other developments, perhaps in other sectors.» During the interview these words were backed up by a machine undergoing acceptance tests in the Almac workshop: A machine-tool which was originally intended for machining workpiece for the watchmaking sector is now destined for the production of parts for dental medicine.

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