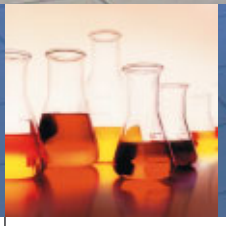
decomagazine

THINK PARTS **THINK TORNOS**

43 04/07 ENGLISH

Machine tools in Switzerland:
history and outlook.



MOTOREX –
close to the customer for 90 years.

100th! DECO
Just imagine…

Looking
into the future.

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We caught up with Karl Würzberger at EMO, where he agreed to open up his box of treasures for the readers of decomagazine.

The organisation at the service of passion.

Expertise that gives you the competitive edge.

Hallberg-Sekrom Fabriks AB invests in the latest technology from Tornos – SIGMA 20.

IMPRESSUM

Circulation: 14'000 copies

Available in: English / French / German / Italian / Swedish / Spanish

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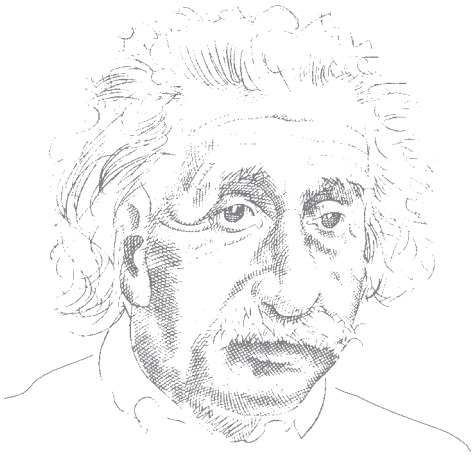
SUMMARY

THE THEORY OF RELATIVITY…



Albert Einstein made a considerable contribution to science and what comes to mind as I write this editorial is his theory of relativity!

The perception of time passing is connected to where the observer is and to his/her situation. In a famous example, Einstein once said "spend two hours in delightful company or in a very unpleasant situation", and you will see what relativity is. Depending on the situation, the two hours don't go by at the same speed at all.

As I start to write and think of the 10 years spent sharing information, researching important topics to bring you, putting you, the reader in the know… I feel like it was yesterday that everything began. These 87,600 hours seem to have lasted only a few days… but how the world has changed!

For the last 10 years, decomagazine has been bringing you information on what's new, the latest trends and developments in our sector. Over these last few years, more than 5500 DECO machines have been manufactured, the average speed of a PC has gone from 66 Mhz to 3.2 Ghz, or an increase of 50x[1], we have given you over 60 customer articles and 80 specific options and equipment have been unveiled for the first time here. In the same time, the magazine has grown. From a total of 32 pages in 3 languages in 1997, the magazine you are holding is 84 pages long… times 6 languages! There is always more content, more added value for our readers and we always work to make it more interesting. This edition is no exception to the rule of "providing our readers with added value".

We have decided to bring you this "10th anniversary" edition based on 3 sections.

The past!

In this section, we have gone back to the first customers we interviewed for the magazine, to look back on these 10 years together and to see if the forecasts of the time held true.

The present!

As with every edition, we show you what's new and what's going on in the sector at the moment: New options, test results, 100 DECO machines delivered to one customer… There's a lot to discover.

The future!

We have decided to tackle this section from different angles: tooling, oils and machine tool operators. What are the trends? What are the new developments that we can expect over the next few years? What will happen in terms of recycling in the future? We have been to see different manufacturers in these various areas and the result goes beyond what we were hoping for. Tough competitors gave us their ideas and visions for the future.

Throughout these three chapters, we have tried to gather ideas and options for the future so as to share experiences and bring you quality "input".

But that's not all! We have also met with the real insiders in our field and asked them to share with us their vision of the future of bar turning.

According to the theory of the big bang, based on Einstein's relativity theory, the Universe is expanding, just like the magazine.

Dear reader, I wish you a pleasant expansion and hope you enjoy reading this edition no 43. May it bring you that bit more!

Pierre-Yves Kohler
Editor-in-chief

[1] *These may not seem like much, but if this increase was applied to a high-speed train, it would travel at 15,000 kph today!*

10 YEARS OF DECOMAGAZINE, WE'RE FULL OF IDEAS…

Does the magazine have a future?

The press industry, whether intended for a trade or a general readership, is constantly changing and evolving. We are living in a world of paradoxes where the reader supposedly no longer has the time to really get into an article and has no time to get properly informed.

decomagazine believes in the opposite: there are still 24 hours in a day and the tools of the modern world only serve to make these hours even more available to us. The availability of the time needed for reading a magazine is therefore not connected to this notion of "less free time", but to a conscious decision about whether to allocate our time to reading this article or not.

We are convinced that articles with "added value" will always have a readership willing to put the time into gaining knowledge. Feedback and comments from our readers reinforce our vision of **deco**magazine. We admit that our preoccupation with providing detailed information can lead to us creating highly detailed articles…

A business leader recently confided in us that, in his opinion, five pages on a "simple" programming development was going a bit far. That's true!

Another company director told me that she had read the magazine during the weekend and that her daughters politely expressed their opposition… but that's the advantage of a magazine, being able to take it with you, reading it between doing other things, putting it down and picking it up again… and each time the reader gains little snippets of information.

Personally, I love picking up a magazine to "devour" a great in-depth article on an interesting subject… and I always have this in mind when we are preparing new issues, to interest and inform.

Additional services

decomagazine is first and foremost a magazine by enthusiasts for enthusiasts and if we are still here today, it's all thanks to you the reader. Over time, we have carried out different surveys to make sure our editorial line matched your requirements. Up to now, we have always managed to hit this nail on the head.

However we mustn't rest on our laurels, sit back and relax. Instead, we have to go on providing our readers with added value. So please don't hesitate to get in touch if you have an idea for an article, specific requirements… as far as is possible, we will include them in future issues. redaction@decomag.ch

During EMO, I had the chance to talk with several chief editors from Europe and further afield. Many have convinced me of the benefits of an "online" version of the magazines or at least a greater presence on the internet. This is in line with **deco**magazine's development because you already have the option of downloading al published articles for free, article by article so that you don't have to download entire magazines (depending on your connection, over 3MB takes a while to come through). All articles are listed by type and accessible via a simple interface at www.decomag.ch.

On the decomagazine blog, Mr and Mrs. Martin, the winners of the Tornos EMO competition, alongside Nathan Swarthbaugh, the Tornos Porsche pilot at Laguna Seca (California). Find out more in decomagazine n° 44.

The content is of course identical to the paper versions. For news that is hot off the press and shorter items, you can visit our Blog, online since May this year at this address: http://decomag.spaces.live.com/ and stay more regularly informed of news about **deco**magazine and our industry sector (the blog is in English only).

Full and diverse contents

When I met a workshop manager and his boss recently, I received two opposing pieces of feedback. For the first, we should include more technical articles and less general information on sectors, companies or market developments. For the second the complete opposite, naturally. With **deco**magazine, we are always striving to cover a whole spectrum, from strategic to operational information.

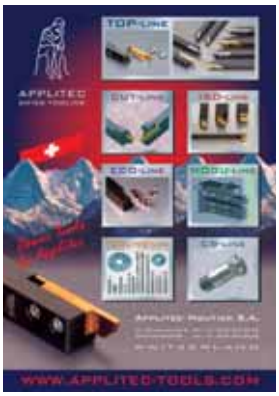
What about advertising? For the last 10 years, we have also had our faithful partners who make use of the magazine to inform you directly of what's new, bring you information on a particular special feature or product. Without them, the magazine simply wouldn't exist. We have noticed that in our pages the ratio "advertising/article space" is very low, we have on average 1 page of adverts for 7 to 8 pages of articles. In the specialised press, you often find this ratio going from 1 page of advertising to 3, 2 even 1 page of articles!. Our editorial policy on this subject is equally unambiguous. We will only accept advertising if it brings added value to the magazine. Thank you to all our advertisers!

The future

It's been 10 years since we have come together four times a year, 10 years of sharing the same adventure. For this anniversary, we are unveiling our article downloading service and our blog… and they won't be the last of our innovations we will be bringing to you.

Thank you dear reader and see you soon!

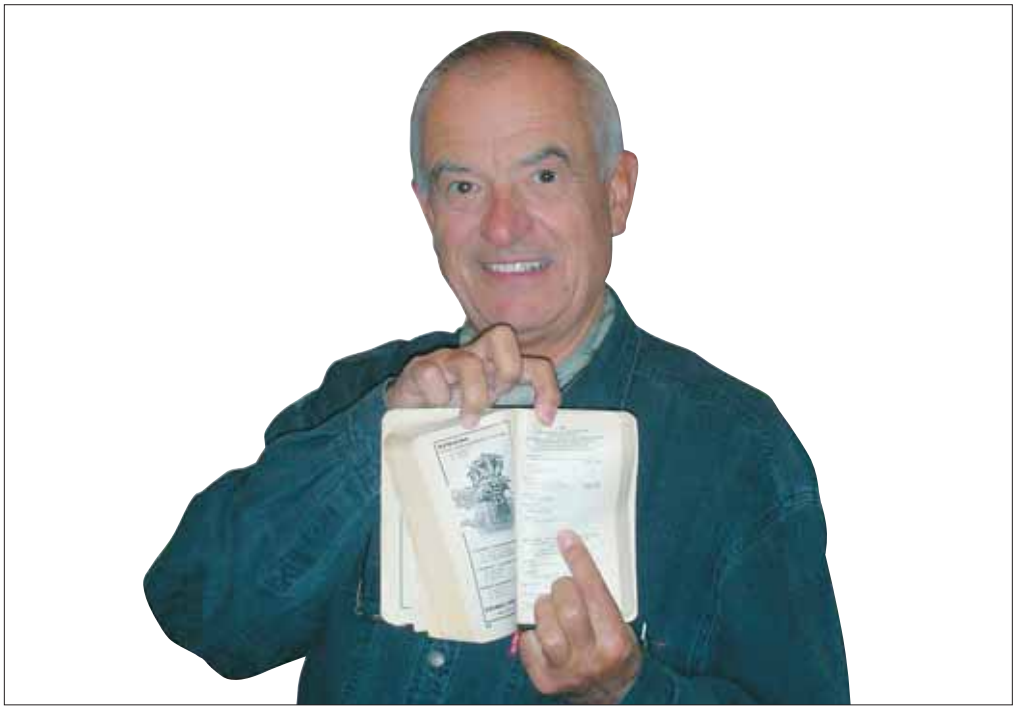
Pierre-Yves Kohler



A WONDERFUL WORLD

After meeting with Karl Würzberger (chief editor of Eurotec for over 40 years) for this anniversary issue, I am tempted to continue my headline with…

…BAR TURNERS ARE WONDERFUL!



The 1934 machine catalogue in which Karl shows us an advertisement for a "Tornos automatic turning machine".

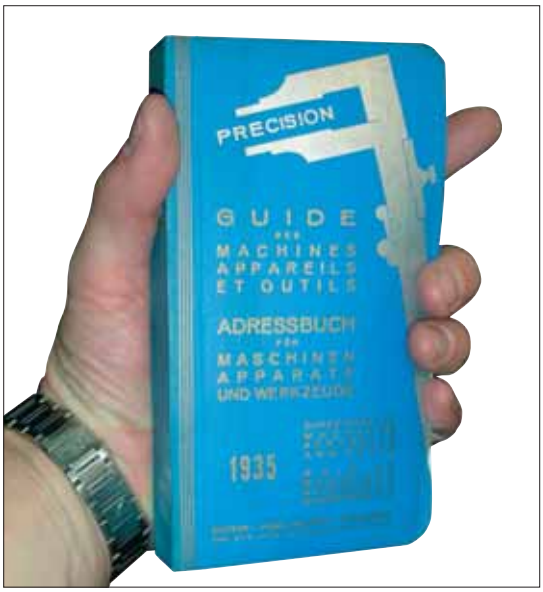
We caught up with Karl at EMO, where he agreed to open up his box of treasures for the readers of **deco**magazine (you can see it in all the illustrations in this article) and share with us his insider's vision of this industry.

decomagazine: You have been doing this job for many years, taken part in many, many exhibitions every year and are no stranger to the world of bar turning and you have written and published thousands of pages on the subject. How do you see the profession of the bar turner?

Karl Würzberger: First of all, it's a profession where a large part of the companies are individual or family-run small and medium sized organisations. It's also a profession that involves a considerable level of know-how. I think that one of the main particularities is the incredible difference between the bar turners and their machines.

dm: Are you saying that compared to their machines, bar turners are not precision-driven people? (laughs)

KW: Nice try, but naturally I wasn't referring to that! What I have noticed is that bar turners are using machines which, although highly flexible remain relatively traditional and have evolved little. Bar turning technology hasn't really evolved for 100 years and even if numerous machines arrive on the market every year, it's still the same principle of the sliding headstock apart from Esco machining by removing material. Many bar turners are still working with cam-type machines that date back 20 or 30 years…



In a practical format, the guide would not look out of place in any workshop. A genuine treasure trove of information, he has been informing professionals for over 30 years.

March 1962, cover of Eurotec showing a Bechler machine for the Swiss sample fair.

Paris, 18 June 1975. During the inauguration of the first EMO, Mr Georges Megel (centre), managing director of Tornos and President of the Cecimo presents Tornos solutions to Mr Jacques Chirac, French Prime Minister at the time, and Karl Würzberger, Editor of Eurotec.

However, bar turners have to change and evolve all the time, to find ways to cope with different sectors that vary incredibly from year to year.

dm: So does that not mean that the machines have to evolve too?

KW: Yes indeed, but this evolution can only happen if the will exists.

dm: You mean that this profession requires a particular will? That bar turners are part of a kind of "separate group"?

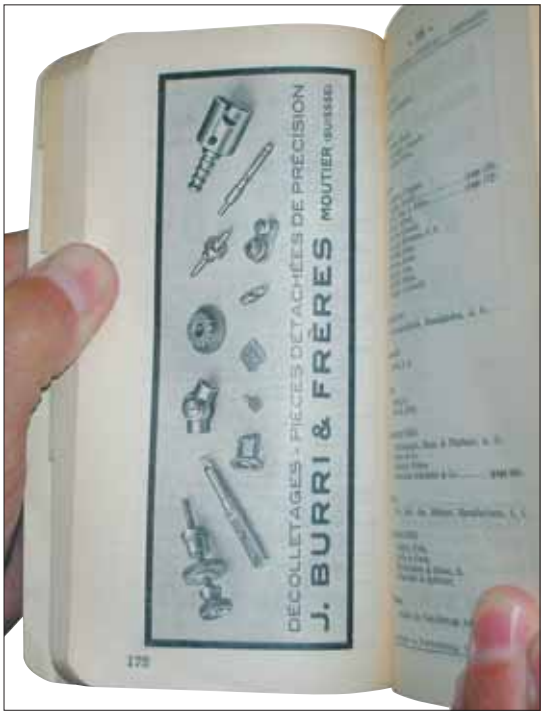
KW: Just a minute, I'm not saying that bar turners are members of some entirely separate "tribe", but they are people who all share common characteristics, the entrepreneurial spirit being a good example of one of their personality traits. When you work in an area that changes as quickly as theirs, you are obliged to be ready for every opportunity, whether you like it or not. The industry is cyclical and we have been witness to different movements, the watchmaking, electronics, automotive, medical industries… production varies with the cycles and without this extraordinary flexibility of these industrialists, nothing would be possible.

dm: Can you give us an anecdote as an illustration?

KW: It's not really a story, but take the price of material, for example. A good few years ago, it was public knowledge that bar turners didn't make their money from the workpieces they made but from the swarf, then conditions changed considerably and it became extremely difficult or more or less impossible to «make money» with swarf. I believe you even had to pay to get it taken away. So many bar turners had to revise their business model because they used to pay their staff with "the revenue from the swarf". But now the price of material has come down again.

dm: It's a question of external and extreme conditions over which no one has any real control…

KW: Exactly! And to cope with this, you need to be an entrepreneur, to be flexible and of course to have the means of production to do the job at your disposal.



As early as 1934, the Swiss Jura region was the birthplace of reputed bar turning companies.

As early as the 60s, the bar turner was looking for the optimum solution. Eurotec's response, for example, was a comparison of the profitability of different types of turning machines.

TORNOS, BECHLER, PETERMANN AND EUROTEC, THEY GO BACK A LONG WAY

A few examples of advertisements published by "the competitors of Moutier" in Eurotec. More recently, we have also seen entire editions of decomagazine in Eurotec.

dm: You are implying that the bar turner is destined to be blown from one market to another, at the mercy of the "storms"?

KW: Not really because this is where the ingenious part comes in. For example, why do you think the famous rule of EMO (which did not allow a company to exhibit at another machine-tool exhibition in Europe in an EMO year if they wished to take part in that EMO[1]) made a notorious exception for turning machines for the watchmaking industry? Simply because the profession was so well represented when the rule was created that bar turning made sure it kept a "back door".

dm: Can we say it is a profession for opportunistic optimists?

KW: Yes, in a way. You have to remain positive and look into the future to challenge yourself and keep making headway, whatever is going on in the market. But it isn't a question of blind optimism. Instead, everything has been planned, the machines are flexible, and the personnel are as well trained and responsive as they are flexible.

dm: Listening to what you say, the bar turner is a kind of superman… isn't that taking it a bit far?

KW: Sure, it's a a bit of a cliché but that's not all! First and foremost, the bar turner is a real profession-

[1] *Rule abolished (all or in part) for this EMO 2007. We still don't know what will happen at EMO 2009 (Milan from 5 to 10 October 2009).*

al with a high level of expertise. It's a profession with «the micron at its fingertips» which is something to be proud of.

dm: As in all sectors, competition is tough amongst bar turners isn't it?

KW: Of course the competition is tough, but firms have a lot in common and each has developed its own advantages, special features depending on the size of the workpieces, the type of operations, the precision, etc… As far as I'm concerned, all this makes for healthy competition and we do see bar turners coming together or even recommending a colleague to their customers.

dm: Thank you for this discussion. During this interview, we have been able to see that it's a «special little world», and that you have been at the heart of it for many years. Would you agree with the conclusion that says it's the bar turner's optimism, enthusiasm and passion which will be his greatest assets in the future?

KW: Absolutely! Just like for the rest of us!

HUGO BUCHSER[2] AND EUROTEC, INDUSTRIAL HISTORY

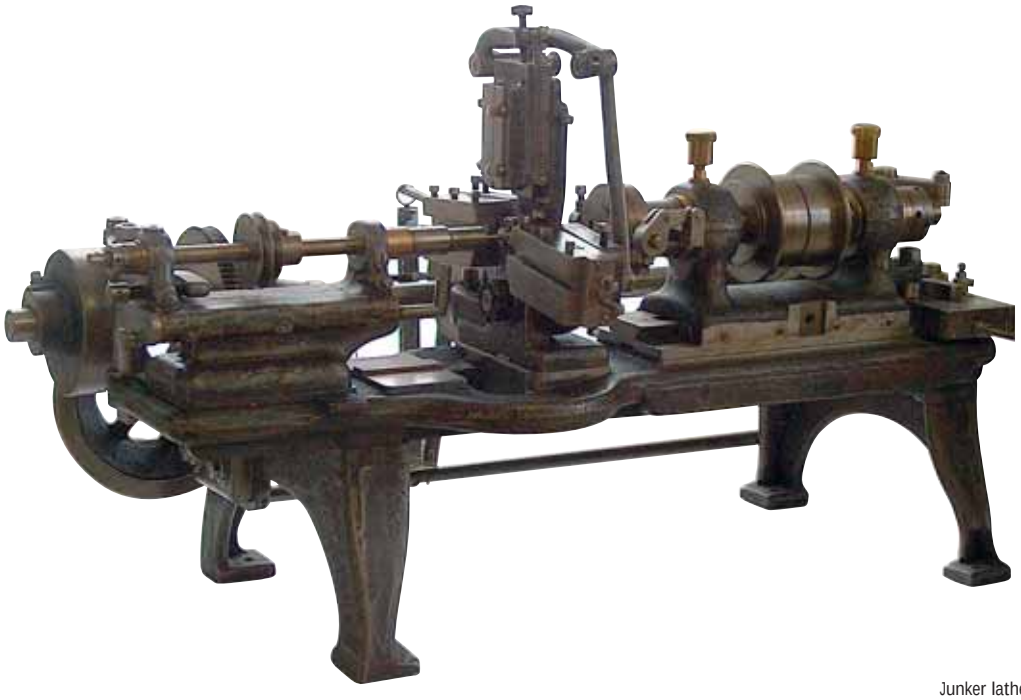
1927:	Creation of Hugo Buchser as sole trader
1933:	Creation of the rapid guide (which will later become the guide for buyers in the watch-making and jewellery sectors), magazines of finished watchmaking products and the information newsletter (the yellow newsletter still published today)
1934:	Creation of machine guide (date to be confirmed)
1942:	Publication technical information (the blue newsletter)
1958:	registration of the Eurotec name
1959:	First edition (the red newsletter)
1960:	Karl joins Hugo Buchser
1963:	Takes charge of Eurotec
2006:	46 years of service with Eurotec, official retirement
From 2006:	Freelance chief editor of Eurotec

[2] Today part of the Nielsen group under the name of VNU Business Media S.A.

MACHINE TOOLS IN SWITZERLAND: HISTORY AND OUTLOOK

The majority of Swiss machine-tool producers were formed at the beginning of the 20th century to meet an urgent requirement for high-precision equipment for the production of components for the watchmaking industry. Indeed, the early part of the century saw the appearance of Swiss machine-tool producers, operating first in the Swiss market, then increasingly on an international scale, for the production of high-precision mechanical parts.

Edouard Huguelet, editor of MSM – Le Mensuel de l'Industrie (The industry's monthly review)



Junker lathe - 1900

The preferred locations of the machine manufacturing companies in the Suisse romande were generally dictated to by the presence or not of a flourishing watchmaking industry in the area. Logically, where there was a strong concentration of watchmakers: in the Jura, in the upper regions of the Neuchâtel canton (Le Locle in particular), in Bienne and in Geneva.

The machine-tool industry originated in Great Britain, Germany, France and the USA. It's only relatively recently (end of the 19th and beginning of the 20th century) that it came to French-speaking Switzerland (Suisse romande) and mainly driven by a watchmaking industry in expansion at the time moving from a craft to an industrial scale.

Surprisingly, the vast majority of these companies were able to "hold on" during the difficult years of unemployment, between 1929 and 1940. It should be noted that from the end of the thirties and even during the Second World War, the arms industry (components for shell fuses – mechanisms similar to those found in watchmaking) literally exploded. Numerous small-scale industrialists in the Moutier region made their fortune in quick time during this short period (and in certain cases squandered just as

Petermann factory - 1918

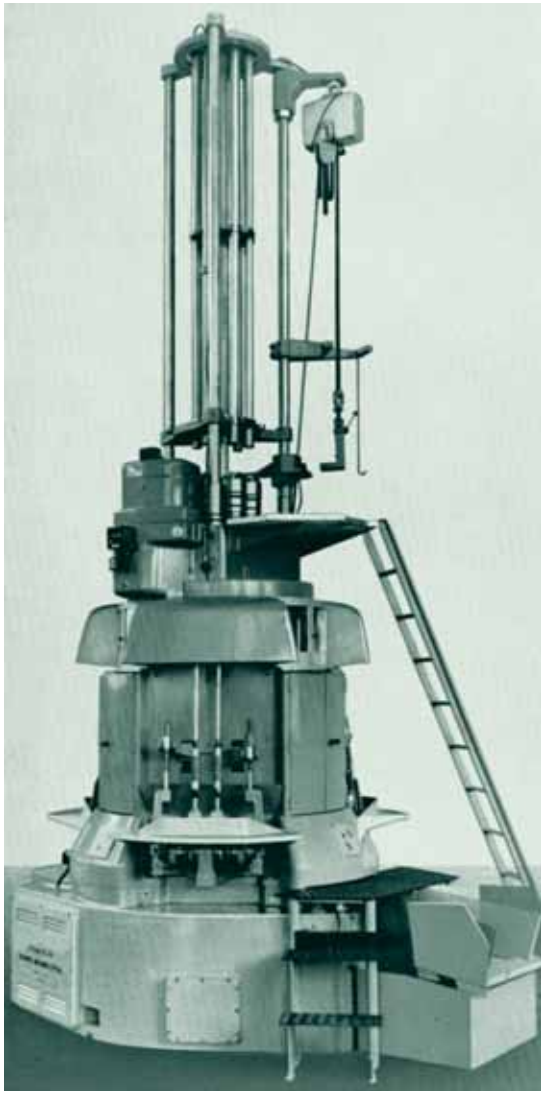
rapidly), selling their production to the future wagers of war, more concerned by quantities and delivery times than price. Some will tell you that the meticulous Allied bombing of the Moutier and Renens railway stations at the end of the war was a "premeditated mistake", wagons full of turned parts waiting to be taken to Germany (and safe to say not destined for the production of toys), was the real target.

The "first wave" of machine manufacturing companies

In this way, the automatic turning machine with sliding headstock industry saw the light of day in Moutier (see separate section entitled "The Swiss Automatic Lathe" [automatic turning machines]), with machines manufactured by three competing companies. Still in Moutier, another machine manufacturing company, previously involved in the manufacture of die stamps, munitions, bench-mounted drills, stand-mounted drills, vertical drilling-boring machines, slide turning machines and console milling machines. Two other companies, one making drilling and milling machines, the other boring-punching machines, also started producing at Le Locle, the latter facing competition from a company in Geneva. In Tavannes there was a company producing vertical automatic multi-spindle turning machines (for the manufacture of watch cases and components for the arms industry) and sliding headstock machines for long parts. A milling machine factory was founded in Bienne. In Bévilard, a company manufactured automatic machines for cutting pinion teeth for the watchmaking industry. In Chaux-de-Fonds, there was a constructor of cylindrical grinding machines and in Geneva, a company making electro-erosion machines. The dense industrial landscape of the Jurassic arc region was now in place: not merely the watchmaking industry with its dependent sectors (bar turning, manufacture of gears and pinions, cutting, rough and final finishing) and machine-tools, but also manufacturers of tooling, dimensional measuring equipment and metrology. Alongside these developments, diverse industrial companies involved with the manufacture of tools and machine accessories were also created.

Rather strangely, the industrial specialisations are distributed geographically bar turning is mainly located in Court and Moutier, pinions and watch gears in Malleray and Bévilard, watchmakers in the Vallée de la Suze in Moutier, Tavannes, Reconvilier, the Vallée

Petermann automatic lathe - P16



Vertical multispindle lathe

de Joux and Tramelan, in Geneva and Bienne; pendulum mechanisms in Moutier, in the Béroche area around Neuchâtel and in Le Locle. Musical mechanisms are manufactured in Sainte-Croix and the surrounding area, machine-tool producers in the Vallée de la Birse (Moutier, Bévilard, Tavannes), in Bienne, in Geneva and in the Neuchâtel mountains, manufacturers of watch casings in the Vallée de la Sorne and in Bienne, polishing workshops and precious stone craftsmen in Ajoie.

The "second wave" and CNC control

The first CNC controlled machines appeared in the early seventies. In the turning sector, Schaublin (Bévilard) designed the world's first CNC controlled turning machine, equipped with a "home" command with an integrated micro-computer: the Data General Nova-II. (the author of this article having actually been involved in this project). In the past, SIP was considered a pioneer, having developed a boring-puncher machine with a "home" numerical command in Geneva – a project that would prove so costly it almost brought bankruptcy upon the company.

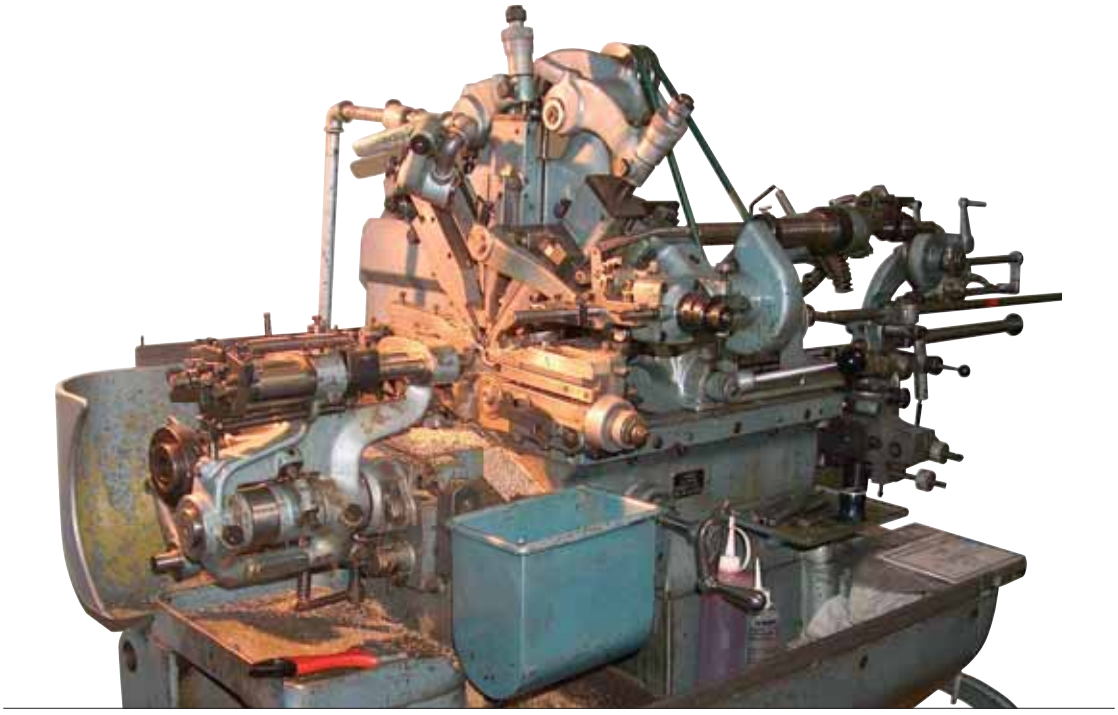
Some constructors, however, did not grasp the determining factors revolutionising the design of machine-tools quickly enough. They disappeared one after the other, some having tried in vain to convert at the last minute. Those able to adapt did however survive and evolve. In the automatic turning machine sector, it at first seemed outrageous to replace cam-driven systems with numerical control. André Bechler, in particular, saw no advantage to be gained from producing automatic turning machines at a cost two or three times higher that would require training operators in techniques that still remained a mystery.

At Tornos-Bechler, new families of automatic turning machines came out, ENC, then TOP-100 and TOP-200 ranges. It was indeed a great success, but these machines were actually more CNC machines than turning machines in the real sense of the word. Customers hesitated to buy for their production in long production runs. This period also saw the launch of automatic multi-spindle turning machines with barrels of 6 or 8 spindles, mainly designed for the manufacture of parts in long production runs for equipment and the automotive industry. Tornos and especially several specialist companies in the Moutier and Grand-Val valleys bought old Tornos, Bechler et Petermann turning machines up to date, fitting electronic variators for the programmed rotational speed control of the spindle and cam shaft. The aim of this was to enhance the productivity of traditional machines by reducing the amount of non-productive time.

At this time, whereas the majority of the machine manufacturing companies in Suisse romande had to close shop, some new machine manufacturing companies were starting up, mainly in areas close to the manufacture of components for the watchmaking industry, in the Vallée de la Sorne, Val de Ruz, Le Locle and Chaux-de-Fonds in particular. Esco in Genevez-sur-Coffrane, for example, manufactured fixed-spindle automatic turning machines with rotary tools, initially for relatively straightforward parts machined from profiled bars, which means material bars do not have to be rotated, at the same time reducing the machine floor space.

CNC-controlled machines are notable for their simplified kinematics: gear systems, transmission shafts, transmission systems, gear boxes and pulleys disappeared. If the machines are fundamentally more straightforward from a mechanical point of view, their CNC controls and programs have become faster and more powerful, especially as a result of progress made in cutting tools. Spindle speeds, cutting forces and speeds therefore increased, requiring machine manufacturing companies to manufacture more rigid components. In certain cases, the motor/spindle partnership using pulleys and drive belts disappeared in favour of the powered spindle, a compact and direct solution. Notions such as elasticity, vibrations, resonance, harmonics, distortion levels, strength… took on a new meaning. The LMO (machine-tools institute of the EPFL), under the guidance of Professor François Pruvot, established the rules of the scientific design of machine-tools towards the end of the eighties. The MSM review – Le Mensuel de l'Industrie [The industry's monthly review] published a full series of papers at the time on the transfer of techniques on the subject entitled "The future of machines-Machines of the future".

In the area of bar turning, towards the end of the nineties, Tornos designed the DECO 2000 concept. The idea was to transfer the bar-turner's expertise to CNC control, rather than force the bar-turner towards technologies he does not want or know how to use. In partnership with GE-Fanuc, a solution named TB-DECO was created. It was suited to single spindle as well as multi-spindle machines. Moving away from the tried and tested, a line of new machines called DECO, were now ready to replace the cam-type machines. The sliding headstock system, decidedly irreplaceable, was preserved. The bar-turner is on familiar ground with numerical control, which incorporates "spreadsheets" and genuine "virtual cams". The cost of the machine remains reasonable. In addition, it has a modular fitting system depending on the complexity of the machining operations to be carried out. It was a success. More ranges followed and new CNC machines gradually replaced cam-type machines in the impressive Bechler-Tornos-Petermann machine park (and competitors, for that matter) in place all over the world.



Bechler lathe - 1950

Tornos in 2007 before the construction of its new building.

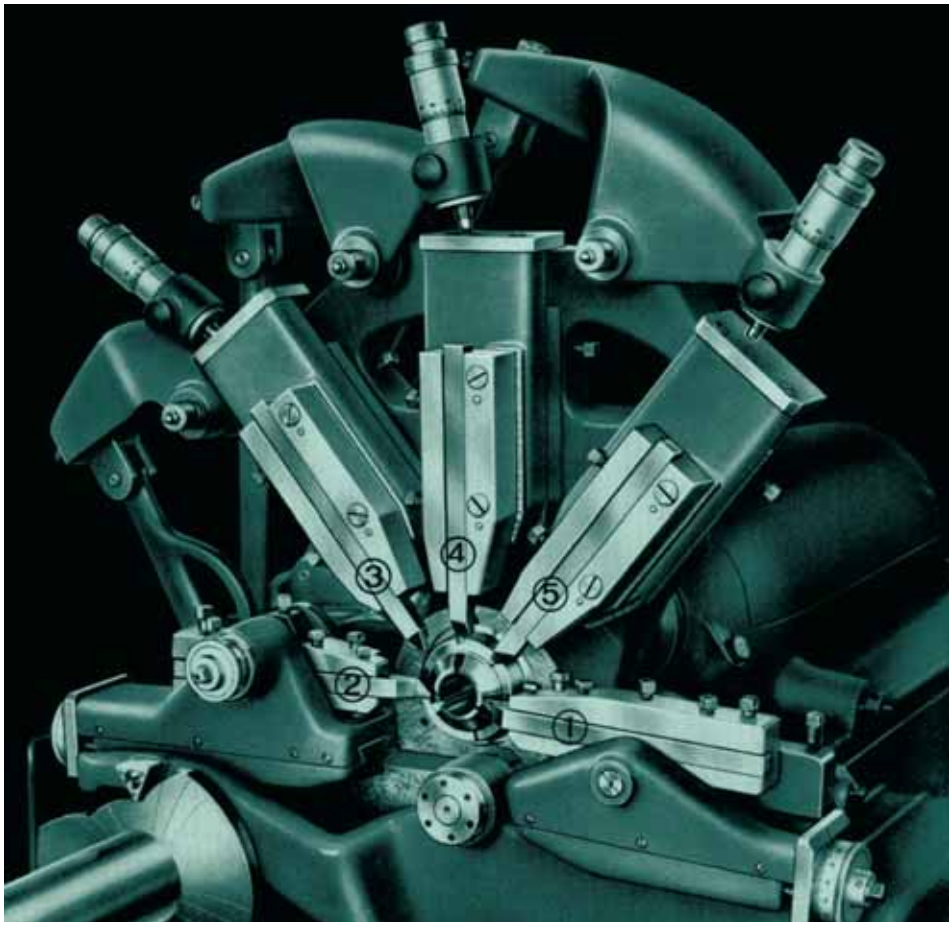
In the field of 3D machining, this period saw the appearance of "machining centers" and "machine-transfers". The latter carry out complete machining of high-precision mechanical parts or watchmaking components. They incorporate an ever-increasing number of numerical axes and are fitted with various features such as magazines, tool changers, measuring systems and palletization for flexible machining. The "home" CNC controls are being replaced by equipment developed mainly by GE-Fanuc, Siemens, Heidenhain and NUM. With the increasing levels of complexity and continual evolution of CNC controlled systems, the development of this equipment is no longer within the machine manufacturing companies' fields of expertise. Machine-tools are becoming ever-more rigid, to be able to withstand machining demands such as high speed machining technologies. Besides, the Swiss are not alone on the market. Besides the traditional competitors (Germany, Italy) new competitors from the USA, Japan, Taiwan, South Korea and in the future continental China are appearing. They are producing quality products which export well to Europe and Switzerland.

Outlooks and prospective

The outlook for the machine-tool in Switzerland is a favourable one, provided this industry does not rest on its laurels. We have witnessed the appearance of numerical technologies which has led to the disappearance of nearly half of Switzerland's machine-tool constructors, over a short period of 10 years. Technology is rapidly changing.

The current trend is to produce machines totally adapted to production, which means a modular design. The era of universal machine-tools made in large volumes is gone because the user does not want to pay for functions that he is not going to use. An important factor is the services that come with the product. All this actually requires the need for a PLM approach. This acronym stands for "Product Lifecycle Management". It is a strategy that helps companies share their product data to apply common procedures and to compile company information for product development, from the design phase to the disposal process.

A well-trained machine-tool operating and maintenance staff is also key. Decentralised courses, if possible on DVD with interactive exercises need to be available. Programming systems (CAM) need to be intuitive, object based: machine programming is to be done by mechanical staff and operators, and not by mathematicians or IT people. Special attention should be paid to element libraries, especially for tooling and clamping units and flanging. Reference documents (service instructions) need to be user-



Tool system "in a star shape"

friendly and realistic. We must not forget that services are an integral part of the product and are often even the decisive sales argument.

There is also a need for the notion of "product manager" to become more widespread, i.e. giving managers the level of responsibility they need to perform the role of "integrated entrepreneurs". The machine constructor in his overalls in his ivory tower in the research and development department is also to be put away in the antediluvian fossils drawer. The constructor of the future will spend a third of his time with the customer (with sale engineers or exterior sales technician for example), another third in production and assembly workshops and only a third of his time at his CAD work station, it will be an improvement for his eyes as well as his productivity!

Current trends in machine-tools can be projected into the future with confidence: ever faster and precise machines, more rigid, more user-friendly CNC interfaces, reduced cost of machines, purely through new manufacturing technologies and component assembly. A decade ago, we were predicting a general breakthrough in linear motor drives. Nothing came of this attractive solution in principle (involving circular movement giving way to linear movement – the key to simplifying the kinematic chain and eliminating inertia from rotating elements) except in a few special cases, to which the new principle was eventually applied.

This reminds us of the mitigated success of Wankel engines (which, at the time, seemed to be heralding the end of the traditional engine). It just proves that great ideas do not necessary succeed in the face of market restrictions. The hydrogen-fuelled cars of the future seem to be a way into the future. This idea may well lead to new generations of engine components, in particular in the injection area, which would mean new and possibly challenging applications for machine-tools. In research departments, the solid CAD approach is the preferred one. As early as the machine component technical drawing stage, parts need to be designed taking into account the best production method from a cost point of view.

Besides, a well-organised production and assembly workshop will allow other, quite substantial savings to be made. This is something that has been taken

on board by a new American constructor producing machine-tools (milling machines, CNC turning machines and machining centres) at nearly a third of the cost, for the same quality of equivalent products from Europe and Asia, thanks to highly-efficient and well-organised production.

A wish for the future…

Machine-tools do, however, need to be designed in a scientific and rigourous manner, while at the same time maintaining the practical knowledge-based aspect. For this reason, it would be advisable to reopen the EPFL (Swiss Federal Institute of Technology in Lausanne), along with the LCSM (Laboratory of Mechanical Systems Conception) a Machine-tools laboratory (LMO) entirely dedicated to machine-tools operating on swarf removal, cutting tools and machining technology (including CAM), so as to train the elite constructors of the future, while at the same time carrying out fundamental and applied research, possibly in partnership with Swiss industry.

We know that the challenges of the future – at least as far as the machine-tool sector is concerned – do not allow us to throw all our energy into fundamental research in the engineering laboratories of the various industrial companies. However, if such a Laboratory was reopened at the EPFL, you can be sure that the large Swiss machine-tools constructors would assign the best young engineers, scientific collaborators or postgraduate students, with research subjects which would not only be fascinating, but also hope for future generations of machine-tools.

… and even a hope

Why, as in days gone by, should the Swiss machine-tool industry not once again take on the role of pioneer and innovator, as was the case at the start of the 20th century with automatic turning machines? And why not – turn an idea from the author of this article into reality, who used to be (in the Cretaceous or Jurassic period?) a constructor in the Tavannes Machines Co engineering department (a company which no longer exists), who used to produce vertical automatic multi-spindle turning machines called Gyromatic, able to operate with bars of 40 mm, or 60 mm? Personally, I feel this size of machine could be revised under the CNC format. Indeed, the material bars being vertical, they are lowered using gravity alone, and the friction in the bar loader is reduced due to the vertical positioning, swarf is removed simply by gravity and the required floor space is halved. Who is prepared to take up this challenge?

THE SWISS AUTOMATIC LATHE AUTOMATIC TURNING MACHINES

Around 1940, the Swiss city of Moutier (Jurassic arc) still had four machine manufacturing companies, three factories producing automatic turning machines (Tornos, Bechler and Petermann), as well as Perrin Frères S.A., a constructor of more conventional machine-tools (column drills, turning machines, milling machines, then vertical boring machines and coordinate grinding machines). Currently, after purchasing Petermann and Bechler, Tornos is the only one remaining, Perrin having left the scene at the end of the 20th century.

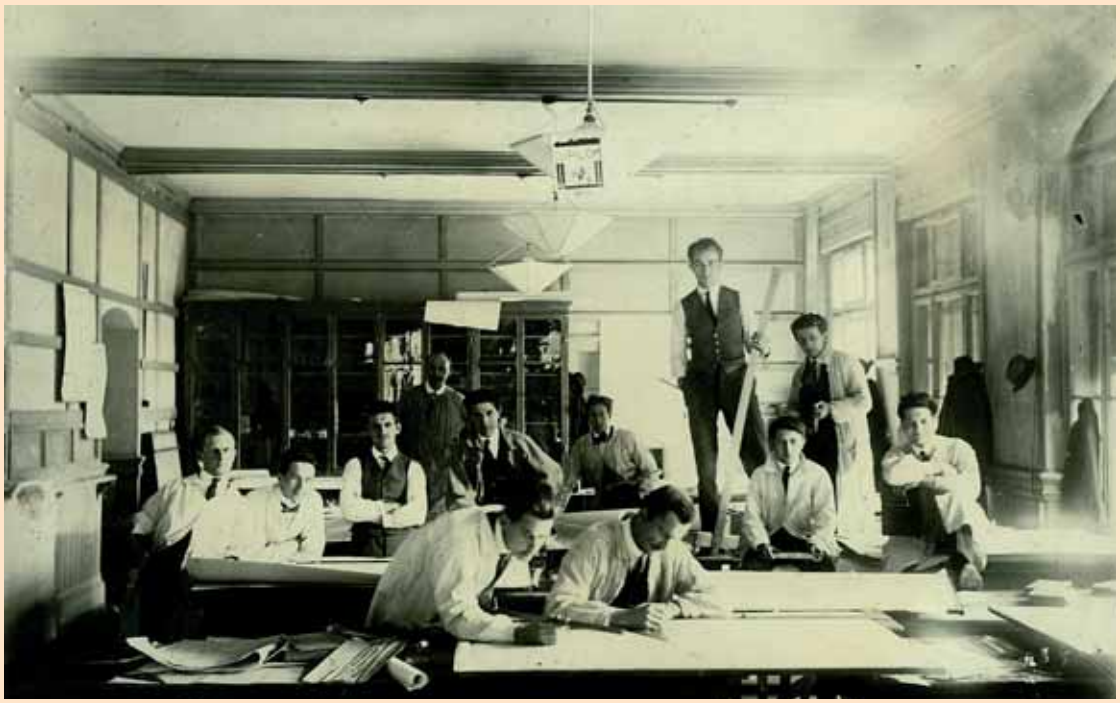
At the beginning of the 20th century, these three companies were pioneers in the field of automatic lathes (also called "turning machines"). The original idea was to construct a machine which would completely produce watchmaking screws from drawn brass bars, turning the shaft (removing the "collet" [gripper]) which would bring about the current French word for bar turning, "décolletage," threading and slitting the head of the screw. Up until that time, watchmaking screws were made laboriously one by one and the tightening of the "mid-size" was down to the operator's judgement, on small manually-operated turning machines. The invention of the process is attributed to Jakob Schweizer, a watchmaker based in the region to make watches. In fact, in Bienne in 1872-1873, this pioneer perfected the first machine prototype equipped with what was already becoming an ingenious invention: the sliding headstock, a feature that assured simultaneous rotation of the material and longitudinal movement, radial tool holders carrying out simple backwards and forwards movement. The Swiss styled automatic turning machine (known as "Swiss Automatic Lathe" in English-speaking countries) was born. It is an interesting fact to note that the latest CNC controlled machines still use this sliding headstock solution today, obviously unreplaceable.

Industrialisation really got underway in 1880 when a Swiss-German, Nicolas Junker, set up in Moutier (a prosperous watchmaking centre at the time) with the idea of manufacturing screws and pinions for the watchmaking industry. Junker then fitted the machine with new improvements, in particular a "combination" of back operations, radial cutters and a rudimentary barfeed system... The traditional star shape on the work surface of the automatic turning

Joseph Petermann

André Bechler

Willy Mégel



R&D at Petermann

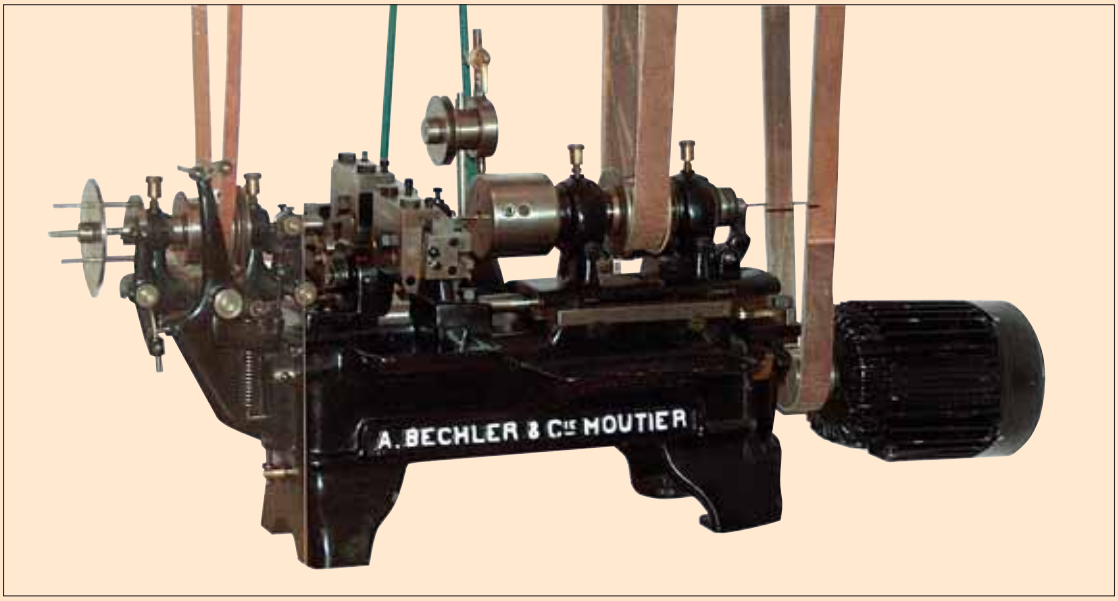
machine would hardly change at all over the following decades, apart from progress made in autonomous motorised systems (versions on a cast iron base with individual drive motor), the arrival of accessories such as a splitting unit, knurling unit, pinion cutting unit etc.

Multi-spindle machines appeared from 1969 and were followed by automatic bar feeders.

At the time machines were controlled by systems with camshafts, these generating, via sets of levers, the movements of the different mobile elements of the machine (sliding headstock, balance, slides, combined unit, accessory units). The arrival of the automatic turning machine with sliding headstock was responsible for two new professions: the bar turner and the cam calculator/setter, of no less importance, requiring this specialist to have expert knowledge of geometry, trigonometry and mathematics. Evening classes in cam calculations, trigonometry and slide rule were arranged at the Ecole Professionnelle de Moutier, for bar turners and mechanics interested in making a name for themselves in this profession. For every part manufactured on an automatic turning machine, the cam set needed to be made and fitted on the machine, the limit stops very finely adjusted (using micrometric screws), some sample parts made, then occasionally the cam set had to be disassembled for rework after production of prototype parts which were not up to standard. The only disadvantage with the cam operated automatic turning machines was therefore the preparation time, including in particular calculations, drawing, tracing and manufacture of a complete cam set in cast iron for each type of part to be produced, which only made the machines suitable for production of parts in long production runs, which was of course the case for the watchmaking industry.

In 1904, Joseph Petermann, constructor of die stamps for watchmaking, located in the Rue des Oeuches in Moutier, set up with André Bechler, a young 21 year-old technician graduated from Technicum de Bienne and financially secure. Operating under the name of A. Bechler & Cie, then Bechler & Petermann, the two business associates began developing the Schweizer-Junker system of automatic turning machines. Business was a success and a factory was commissioned in 1911 in Moutier, rue de Soleure. André Bechler perfected the system further, adding the "balance", a unique support for two cutter holders. The balance was able to perform an oscillating movement, which from a single cam, engaged two cutter holders alternately, positioned along the spindle axis.

But on 7th February 1914, André Bechler separated from Joseph Petermann, along with substantial indemnities (176'750 gold francs) as compensation



Bechler & Cie lathe - 1905

for his initial investment including appreciation, using this amount to buy the abandoned premises of a bankrupt watchmaker in Moutier. While Joseph Petermann continued constructing automatic turning machines, André Bechler, bound by a non-competitive agreement, has differing degrees of success with his variations, in particular with special machines, motorised tricycles…

In 1905, Willy Mégel (ex employee with Bechler & Cie/Bechler & Petermann) takes over the Junker factory, going into partnership in 1914 with a young local technician, Henri Mancia, who had just lost his job following the dismantling of Bechler & Cie. After a few name changes, for example "Usines Tornos, Boy de la Tour, Mégel and Mancia", the Tornos Fabrique de Machines Moutier S.A. factory was officially created in 1917 in Moutier, on the site of the Junker factory, exactly where Tornos is located today, Rue Industrielle.

From 1924, at the end of the non-competitive agreement, André Bechler was able to launch his own production of automatic turning machines of which he himself was a forerunner. As business started to take off, he built a new factory near the original location, along the cantonal road and, as of 1947, the company was known as Fabrique de machines André Bechler S.A.

This is how at the end of the Second World War there were three highly competitive companies in Moutier, all producing and commercialising automatic turning machines with sliding headstock world wide with 3000 employees (in a village totalling 6000 people at the time). Whereas the industry in Europe needed complete rebuilding, there was enough demand in the market to absorb production of machines and enable three constructors in Moutier to expand without really impeding each other. It was actually continuous competition between the three companies to hire (in a hostile manner if necessary) managers, mechanics, technicians and draughtsmen. A few Swiss and French constructors tried their hand at producing automatic turning machines with sliding headstock with varying degrees of success. Genuine competition actually came from where it was least expected, i.e. Asia and in particular the Japanese, they too saw the potential of automatic turning machines with sliding headstock.

In 1974, during André Bechler's lifetime (he died in 1978), Bechler joined forces with Tornos to create Tornos-Bechler S.A as of 1981. Previously, in 1968, Petermann was taken over – in a hostile buyout – by Tornos. Swiss competition now gone, the three former competitors were now united under a single name, Tornos S.A. Currently, Tornos S.A. is located on the original site in modern and efficient premises, near the villa of Nicolas Junker, converted into the Swiss-type Automatic Lathe Museum.

MOTOREX – CLOSE TO THE CUSTOMER FOR 90 YEARS

This year MOTOREX, the technological leader among Switzerland's oil refining companies, celebrates its 90th birthday. Innovativeness coupled with farsighted entrepreneurial vision have been a constant source of change, renewal and adaptation throughout the company's history. Only such constant reinvention has kept us up-to-the-minute at age 90, making the MOTOREX brand one of the strongest in the lubricant market today.

Synergies lead straight to the goal

Innovation and tradition at MOTOREX are anchored in values that have remained unchanged for 90 years and three generations:

1. Close to the customer. MOTOREX lives out its belief that being close to the customer at every level is the only way to meet real-life needs and wishes. The many successful MOTOREX Synergy projects in the manufacturing sector are just one example.
2. Total-quality products and services. Top-quality products and solutions are our creed. Intensive product development enables us not only to offer more than just a standard range; instead we develop products tailored specifically to customers' needs.
3. A reliable partner. Our company is committed to being a dependable, courteous and honest partner to its customers, employees and suppliers.

Langenthal: Think tank and production site

Innovation is always in the air at our headquarters in Langenthal. This is where complex formulas are researched and developed, new products brought to life, produced and marketed with a wealth of ideas.

The core competency of MOTOREX AG LANGENTHAL is undoubtedly in the tribological development and improvement of high-quality machining fluids for the metalworking industry. Motivated employees, highly specialized technicians, chemists, engineers and marketing specialists apply their knowledge and skills every day in pursuit of this goal.

A distinguished international clientele

MOTOREX AG has long specialized exclusively in the unique challenges of industrial application of cutting oils, cooling lubricants, cleaning solvents, etc. The result is the pioneering MOTOREX SWISSLINE – a complete product line that reflects MOTOREX's broad metalworking expertise. For example, leading companies around the world in every industry achieve significant productivity gains by using MOTOREX ORTHO universal cutting oil.

Innovative machining fluids measurably increase productivity. Have your systems checked regularly to stay abreast of the latest fluid technology.

MOTOREX researches and develops new products in its own laboratories and works with specialists around the world in exchange groups.

Big enough, but not a multinational

MOTOREX today is just big enough to focus precisely on each individual customer's needs. Where appropriate, we develop specialized products in conjunction with watchmakers, turned parts producers and other experts also in the US. Often these products mark the start of a new range and a lasting working relationship.

These values have been cherished at MOTOREX for generations – for it is not size, but talent that customers look for in a partner when they seek lasting success.

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The finished product in a green and silver MOTOREX barrel, representing the highest standards in modern metalworking.

MACHINES, TOOLING AND MACHINING FLUIDS COME TOGETHER

In Langenthal, in the countryside surrounding Bern, the Motorex group has its head office, an independent Swiss company that transforms basic oils. The company produces, amongst other things, lubricants for motor vehicles but also chemical-technical products for industry. It's in this sector that we find cutting oils, emulsions and other products.

Robert Meier, independent specialist journalist, Rupperswil

Daniel Schmid, head of industrial processes at Motorex AG Langenthal, in the laboratory: For a specific product, we define exactly which basic oil we are going to use. (Photo: Robert Meier)

The development and production of emulsions are particularly demanding. This mixture of water and oil has to be extremely resilient in the machine tools and also be able to meet all requirements at any time.

Avoiding alterations

Daniel Schmid, head of industrial processes at Motorex AG Langenthal, knows something about this: "First of all, it should be made clear that impurities in the emulsions are introduced externally by the tools, the machine or even from the air". Foreign body contamination can cause unwanted modification of the emulsion. This is why any oil bought in by the machine must be avoided. "The user must monitor the product. We need to make him realize that it's a high-added value product that must be handled appropriately. Unfortunately in this respect, we have noticed that there are still many users who don't take the appropriate care and freely pour liquid and other waste into it."

As a general rule, Daniel Schmid can count on a "normal" lifetime of one to one and a half years for an emulsion. However: "Some of our customers take great care when handling their emulsion tanks and have a virtually unlimited lifetime as a result". So, a little more care can pay off.

Specialist disposal

In their role as transformer of basic oil, Motorex does not dispose of used products. Within the context of its "Fluid management" concept however, the company does cover all aspects of management. As a result, a disposal concept will be discussed with the users although the disposal part will be handled by a specialist. They will take care of the removal and disposal of liquid waste in accordance with the regulations.

Emulsions of the future

For Daniel Schmid, there is no doubt: "We have to adapt to machining technologies and move with future developments." Users are handling their products more and more in the correct way. This requires time, but its well worth taking more care with this high performance component and having a look in the emulsion reservoir now and again. Motorex now supplies a wide range of extremely high performance emulsions – the new generation of Motorex Magnum lubricant/coolants has been particularly well-received.

Only selected oils

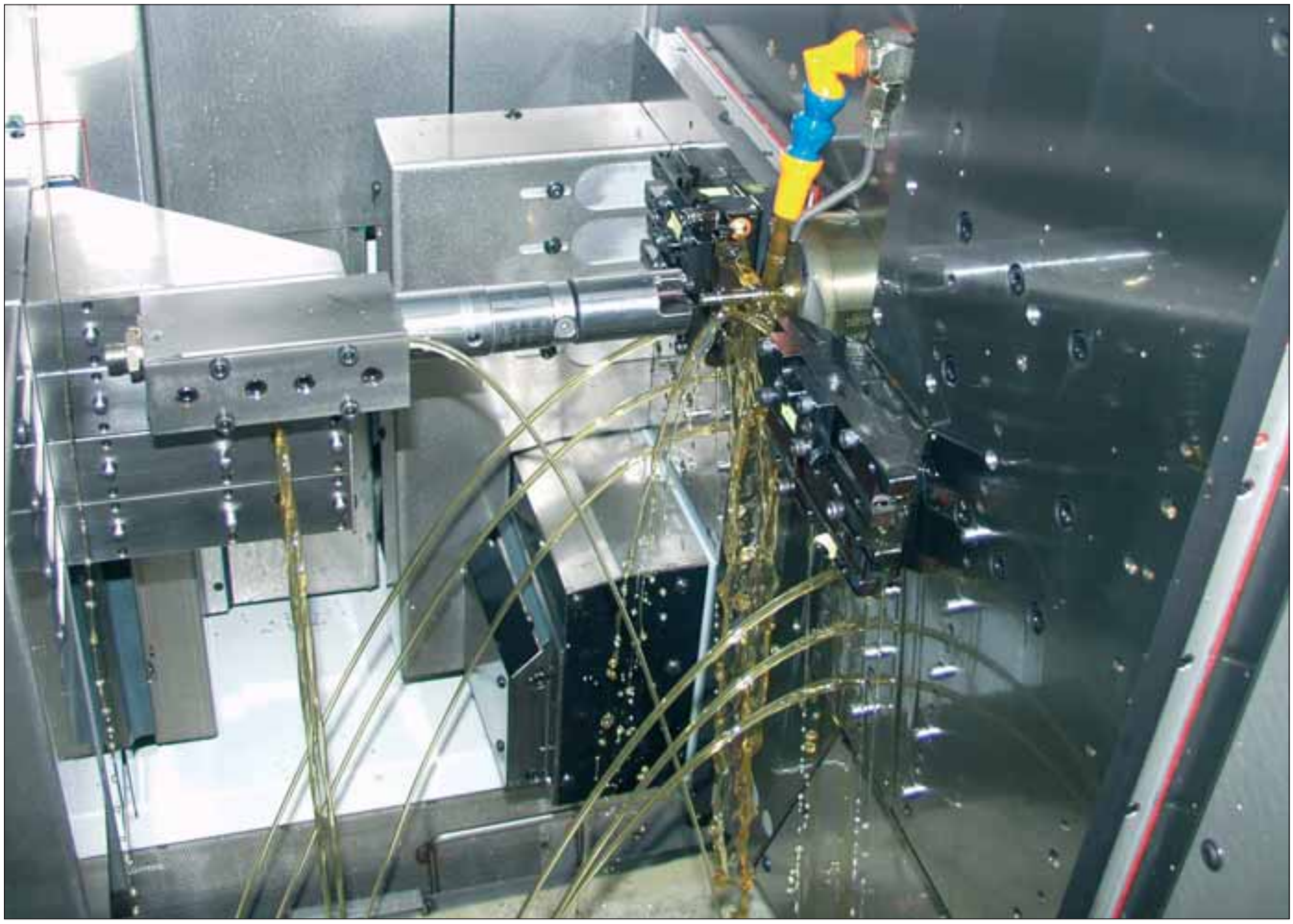
For the production of cutting oils, this Swiss company uses basic oils without additives. Daniel Schmid: "For a specific product, we define very precisely which basic oil we want to use. We add specific additives to this in accordance with a highly complex list of ingredients, in order to create the desired capacities". The goal is to achieve maximum performance. "The requirements are increasing, the scope is clearly machines and cutting tools; the cutting oil has to follow suit. In this area, the products are the result of high technology and it is fundamentally important to take into account the user as well as the environment."

As far as current machining methods are concerned, Daniel Schmid points out that, for example, for high-speed swarf removal, the cutting oil is no longer subject to high temperatures: A large amount of the heat coming from this operation is eliminated by the swarf. The aim here is to create, tribologically, a cushion of oil on the cutting blade so that the swarf slides more easily on it and therefore eliminates friction and the resulting heat increase. Motorex developed the new vmax technology a long time ago. During machining at maximum speed, a range of specifically chosen additives enables a synergy of chemical effects which in turn allow for an exponential increase of the machining process.

Biological products are not without their own problems

Recently, various biological and synthetic oils have appeared on the market. Daniel Schmid remarks: Biological products are organic. As long as they remain in their original state, their performances can

The cutting oil, the life blood of machining with swarf removal. (Photo: Motorex)



The aim is to create, tribologically, a stable cushion of oil on the cutting blade. (Photo: Motorex)

be considered as good. It's after that, problems can occur.

He confirms that synthetic oils can bring excellent results. But they are relatively costly and for this reason are used for tool sharpening operations because: Today's grinders are made of new materials and new materials in carbide are used. In these cases, the specialist achieves far superior results with synthetic oils due to the fact that the machine, the oil and the materials are better matched. He evokes improved abrasion and a slower ageing process. The higher price can therefore be justified when the added value is taken into account.

Close collaboration

For Motorex, contact with specialists in machine tools, tooling and components is very important. A close collaboration within these circles is highly valued. "We meet regularly with engineers from these companies, discuss new developments and together we look for the cutting oil which is best suited to specific applications."

The "Fluid management" concept comes to the fore here, because questions about these machining liquids need to be viewed together. Daniel Schmid gives his point of view: "Our recommendation isn't limited to just the supply of products; we see the user, his machines and his third party system suppliers as one, which needs to be harmonised and optimised."

What does the future hold for cutting oils?

Daniel Schmid hesitates: "This question is not easy to answer. We have noticed that bar turners see the synergies between the machine, tooling and cutting oil more and more." He also confirms that the collaboration between the different players within the sector is increasing. "The largest suppliers are more frequently looking to communicate with our specialists and this is often during the development phase

View of the tanks at Motorex: For each type of application, the quality of the basic oil is selected with care. (Photo: Motorex)

of a new solution. I feel that this collaboration will grow and grow in the future."

The last word to Daniel Schmid: "User – machine – environment, these are the three most important elements in our thought process. Increasing performances and cost saving is our aim. Bar turning workshops want to produce more parts at less cost with higher and higher levels of quality. These are the objectives we are working towards at Motorex together with machine tools and tooling manufacturers."

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THE ORGANISATION AT THE SERVICE OF PASSION

At our meeting in 1997 when they purchased their very first DECO for the French market, the directors of MGB told us the reasons for their choice. The DECO machines were bought with a particular goal in mind, to do more than cam-type machines and to provide the option of finishing parts completely while remaining very flexible.

How did these forecasts materialize? Did the machines do what they were supposed to do? How did MGB deal with market changes?

To find out more, decomagazine met up with Ms Véronique Roda, CEO, Ms Valérie Burnier, Financial Director and M. Yves Roda, Technical Director.

In the company entrance, from left to right: Mr Yves Roda, Technical Director General, Ms Valérie Burnier, Financial Director and Ms Veronique Roda, CEO.

decomagazine: After 10 years of DECO, how do you rate your decision to "go DECO" in 1997?

Véronique Roda: The figures speak for themselves. We currently have over 60 DECOs in service, if our decision was the wrong one, we wouldn't be here today… and we definitely would not still be with DECO!

dm: 2 years ago, (decomagazine 32) **we spoke about markets, you told us you were working 90 % for the connectivity business and 10 % for the medical sector… these percentages are still the same today, how is that possible?**

Véronique Roda: Our core business is without doubt the connectivity business and the electronics sector. The fact that we are doing 90 % of our business in this sector does not mean we are not evolving. Today's parts are smaller and more complex than what we used to do and for new applications such as the automotive, aeronautics and aerospace sectors… This all-roundness is also one of the reasons that has pushed us to buy DECO.

dm: You say that you produce 10 % of parts in medical and that the level is stable. Are the parts so different to produce ?

Véronique Roda: Actually, we are highly skilled in the production of such parts and have also invested in specific equipment for this market but we have preferred to focus on diversification within the Mil-aero sector…

dm: You still have cam-type machines running alongside DECO machines, how do you decide which part to produce on which type of technology ?

Yves Roda: The technological decision naturally depends on the type of part that we have to produce, as well as the size of the series run. But we are in need of a machine for straightforward parts in small volumes at a competitive price and it's no surprise if I tell you the Micro 7 seems an ideal machine for these markets.

Véronique Roda: We have developed a real partnership with Tornos, which goes right up to assisting with the definition of new products, which is why we are already quite familiar with this machine. We are looking forward to testing it !

dm: Coming back to your machines, at the time you wanted to eliminate all fixture-changing or "secondary" operations, is this mission accomplished?

Yves Roda: Definitely, nowadays, our workpieces are completely finished on our turning machines. Of course, we still carry out additional operations if requested to by the customer, including marking, treatments, assembly or packaging.

dm: So you don't simply supply parts ?

Véronique Roda: We mentioned partnership earlier… a valued partnership with our suppliers, but also with our customers who we provide with a genuine centre of competence. Of course, we could "simply produce parts in a specified time", but we can also bring real added value to our customers by providing them with engineering, additional services and international logistics..

To expand the range of solutions the company can offer, MGB recently installed a new Sigma 20.

25 DECO in this part of the workshop, the MGB workshop is an example of cleanliness and tidiness.

dm: How do you recruit and train your personnel?

Yves Roda: First of all, our company does not include low-skilled operators, all our personnel working in bar turning are professional, skilled regulators. Our company provides them with the support of a centralised programming department. All our staff is continually trained and MGB is very involved with schools and universities. We are lucky to be located in a catchment area where the culture of precision is in the genes. This helps us strengthen our personnel.

Véronique Roda: There are always people in training at MGB! We know that company performance depends on the relationship between man and machine expertly backed up by faultless organisation and logistics.

dm: We know that finding skilled personnel is not easy, how do you do it?

Valérie Burnier: First of all, we are extremely demanding as far as selecting the right profiles is concerned; we need people who are experts in their area and who have what it takes to face up to a lot of different challenges. We also prioritize internal promotion. What's more, we have a policy of continuous investment, not only in equipment, but also in the working environment. This policy, backed up by ISO 14001 certification, ensures that all our personnel benefit from the best possible working conditions.

dm: Do you still find personnel to work on cam-type machines?

Yves Roda: We were recently looking for such personnel and I admit to being surprised at the number of applications from young people who are highly skilled in mechanics and for whom setting cam-type machines is a genuine passion.

Véronique Roda: Passion is, I believe, a word which is fairly representative of us. Our DECO are machines which allow us to produce parts of ever-increasing levels of complexity, and our setters take on veritable challenges to "innovate and win that little extra which makes all the difference".

This idea of optimisation is actually what motivates us at all levels, whether it's making an offer, setting up a process, machining, we know that only the sum of all these little "victories" will make MGB stand out from the rest.

dm: This passion at the service of your customers. How do you plan your work?

Véronique Roda: It's one of the elements that represents a real challenge. Today, visibility is a few weeks and we can go from a customer request from 1000 to 100,000 parts. To meet the requirements of very small series runs, we have actually created a prototype and production centre for parts in TPS[1]. In this unit, the operators are also responsible for programming. It's a genuine well-equipped mini workshop that enables us to shoulder our customers in the development stage of their new products and be very reactive for small series.

dm: So it's actually an extra service for your customers?

Yves Roda: Absolutely. We can do pre-series, trials and even research into likely developments in machining technologies. For example we know that due to the unavoidable trend towards miniaturisation, we have to anticipate our customers' requests and find solutions for turning and drilling in ever-decreasing diameters.

dm: You are painting a picture of an organisation at the service of passion, what about pricing?

Véronique Roda: One more challenge! As we have already mentioned, all our processes are optimised to be able to offer the best possible prices. It is true that in our sector, customers often only talk about the price, they believe that quality and traceability are given. Lead times are also something often difficult to reduce. So we have to operate our system in the best possible way to produce parts in optimum conditions. For parts with a high added value, whether in terms of machining or additional operations, the competition is less tough. Rather than "low cost", we head toward "best cost", i.e. the full optimum purchase price for our customers which guarantees total control of all parameters … it's a trend that goes well with MGB – quality at the best price and lead times.

dm: Do you consider the market as being more difficult today than 10 years ago?

Yves Roda: 10 years ago, it was difficult to make a

[1] *Very small series.*

Optimum working conditions also mean wonderful scenery for MGB.

living and to make good parts to satisfy the customer… Today, you have to innovate all the time and be highly reactive, or even proactive. Almost anyone can buy a machine set up by Tornos and produce parts. So you have to stand out from the crowd.

dm: And what about the future?

Véronique Roda: We see partnerships taking on new importance in the future and supplying global solutions will be essential. This will be done with our customers of course, but also with our suppliers.

dm: Is it a sort of "global value chain"?

Véronique Roda: Absolutely, it's no longer about supplying a part or a machine but working together to reach a common goal at the end of the day!

MGB SA

Number of turning machines: approx. 100

Number of DECO: more than 60

Production sites: Marnaz(F), Boston (USA), Shanghai (China)

Target markets: 60% Telecom, 30% Mil-aero, 10% medical

Parts produced per year: 55 million

In the next edition of your decomagazine, you will be able to read more about MGB in a report on the 100th machine sold by Alain Tappaz – director of Tornos France to MGB in an interview with Mr. Jean-Paul Burnier, former CEO and newly retired.

EXPERTISE THAT GIVES YOU THE COMPETITIVE EDGE

Lauener, based in Boudry, was the very first company Tornos interviewed in the decomagazine 10 years ago. So what of the forecasts for the future made at that time? What has happened to the company that was then so quick to see the potential of the DECO? How does today's on-site team view the future?

To answer these questions and many more besides, decomagazine went to see Mr. Forster – managing director and Mr. Lamy – head of the "medical" sector workshop.

At Lauener, numerous workshops, DECO 10a, 13a, 20a... everything is in place to ensure the maximum amount of quality parts are produced each day.

decomagazine: When we last met, 70 % of your activity was in the connectivity business with 30 % in watchmaking and you had just ordered your 10th DECO. Is this market split still the same?

Mr. Forster: 30 % of our business is still in the watchmaking sector, but several years ago we diversified into the medical sector and this also represents roughly a third of our business today. We currently have nearly 50 DECO on our two production sites in Boudry (Switzerland) and Shanghai (China).

dm: In 1997, Lauener saw various advantages of working with the numerically controlled DECO over the cam-type machine, principally the ability to produce complex parts without a fixture change. Did these machines meet this need and what were/are the major trends?

Mr. Lamy: Yes, the DECO machines did enable us to complete a large volume of workpieces. And, over the years, we have needed to be able to produce ever more complex parts and these machines meant we could "stay in the race".

Mr. Forster: To put it simply, we were able to diversify into the medical sector thanks to the capacity of these machines.

dm: So, we can safely say this forecast was proved correct. At the time, you also told us that this type of product was an important aspect in putting the value back into the profession of bar turner. Did these machines make it easier for you to find skilled staff?

Mr. Forster: Our staff and the "man–machine" partnership are what made the difference. It is imperative that we are able to maximise the

The DECO 13a workshop: machines ideally suited to the "medical-dental" sector.

machine's performance by using it to the best of its capacity. The positive effect that NC machines were to have was such that they rendered our range of cam-type machines more difficult to use.

Mr. Lamy: I must say that younger operators working on cam-type machines see the introduction of NC as a step forward in their career.

dm: So you still work with cam-type machines? Are they still suitable for today's requirements?

Mr. Lamy: Our cam-type machines are used for fairly large production volumes where flexibility provided by NC is unnecessary. For those parts that haven't really changed in the last 10 years, there is considerable benefit to be had from a cam-type machine park which has already been amortised.

dm: Are there any trends in the size of series runs and complexity of parts?

Mr. Forster: Series are getting smaller and parts are getting more complex, that's for sure. Today, we produce parts we couldn't even have imagined 10 years ago.

dm: How do you cope with declining production runs on cam-type machines? Do you take the risk of producing parts for stock?

Mr. Forster: One of the major trends over the last few years has been the increasing participation of our suppliers. To give you an example, some of our customers no longer place orders with us! We are an integral part of their control system and decide ourselves when we need to produce parts based on our customer's consumption levels.

dm: Isn't that too much to manage?

Mr. Forster: It's a skill we had to master, we need to be involved with and close to our customers… It's a very intense form of customer focus.

dm: How do you explain Lauener's current success?

Mr. Forster: There are various aspects to it. One thing is a given – quality no longer makes you stand out from the competition. It is absolutely essential to stay in the race. Then the parameters change depending on the business activity. In the connectivity business, reactivity is definitely decisive, being able to produce relatively large volumes very quickly. In the medical sector, the rhythm is slower, validation periods are needed and production runs are short.. but just like the other sectors, being able to produce parts to "zero defect" standards and as efficiently as possible.

dm: You mention efficiency. Is that the same as productivity in your mind?

Mr. Lamy and Mr. Forster: Cycle time is part of it, but it isn't the whole story. If a given machine runs a little less quickly but enables a higher quality level to be reached, or if it makes production smoother, we will produce more parts at the end of the day. We need to get the balance right between all these parameters.

dm: To reach this level of efficiency and expertise, you must need highly-skilled bar turners. Do you have programming specialists supporting the bar turners?

Mr. Lamy: At Lauener, we made the decision to leave all the expertise with the bar turners, so they are responsible for programming, set up, optimisation and production. This is important to keep the profession attractive.

Mr. Forster: To reach this level of work quality, we have a permanent internal training policy. We train our bar turners in-house and they also have training with Tornos, mainly on programming.

dm: You have said that expertise is key but is there not a current trend towards "less operator expertise and more machine expertise"?

Mr. Forster: There are tools that can provide support, like CAD/CAM software, but they can't replace the human element, sound professional know-how will always be needed, even more so because we are faced with ever-greater challenges.

dm: What are they?

Mr. Forster: As we already mentioned. Impeccable quality is an essential prerequisite… achieved with shorter and shorter lead times. These are two fundamental parameters to which we can often increasingly complex operations and more demanding materials to work in. Our bar turners have to master as many of these parameters in order to come up with the "best solution".

dm: To go back to what you were saying about part complexity, the medical sector is very demanding. You ventured into this field before it became fashionable to do so. Several companies are riding the "medical wave", and even if this market does not seem to be cyclical, are you not worried about saturation?

Mr. Forster: The market is definitely highly populated. As we were one of the first, we have perfect control over the parameters in this field… but I agree we must also think of the future, other sectors seem to be opening up to us…

dm: I suppose you won't be telling us about these aspects of your strategy today?

Mr. Forster: I'm afraid not…

dm: We will come back to this in 10 years time, if that's OK with you. Talking of the future, what will the machines be like, in your opinion?

At Lauener, the "man/machine" relationship is a genuine tool working to improve performance.

The flexibility of the DECO 10a machines enable Lauener SA to finely manage their production.

Mr. Forster: OK. See you again in 10 years time. As far as the machines are concerned, I think the key feature will be user-friendliness and reliability. We will really need machines that we can leave to produce "on their own" resting assured the finished parts will be perfect, again and again.

Mr. Lamy: Machines will have to enable us to produce complex parts, ever-more complex in certain cases and in a straightforward way, when it comes to both programming and set-up.

dm: Can you imagine a similar trend in upstream operations to the one you are currently witnessing in downstream operations? Can you imagine a machine manufacturer connecting up to your control system to see what kind of parts you should be producing in order to propose the machine best suited to your needs?

Mr. Forster: Not really! However, the basic idea is the same, it's all about getting closer to one another, a partnership that encourages the machine manufacturer to allow its customers to look into new machine production. It's actually about customer focus.

dm: You talk about the importance of the bar turner, the importance of the relationship between partners as being the real roots of success, isn't this minimising the importance of technology?

Mr. Forster: You know, you can purchase machines everywhere, Tornos included, they are the same… but what makes Lauener stand out from the rest and in Switzerland in general is this ability to go beyond the technical aspect and offer more. These days, on certain markets, the fact that you are Swiss and you have this "quality and ingenuity" in everything you do is a definite advantage.

dm: To conclude, how do you feel when you look back on the last 10 years?

Mr Forster and Mr Lamy: Basically, the job has remained the same, demands are higher, challenges greater, parts more complex and pressure on prices is high… but what really makes the difference at the end of the day is the relationship between man and machine at our customers service.

And this will continue…

LAUENER SA

Number of turning machines: approx. 150

Number of DECO units: approx. 50

Production sites: Boudry (Switzerland) and Shanghai (China)

Target markets: 1/3 connectivity business, 1/3 medical, 1/3 watch making

Number of parts produced per year: over 250 million

DISPOSING OF USED PRODUCTS CLEANLY

In order to obtain perfect part quality, cutting fluids are used during the machining process to remove swarf. These auxiliary products are subject to wear and ageing, like the cutting tools. The fluid lifetime is therefore limited and sooner or later will need to be replaced and disposed of – professionally of course. What happens to these liquids? decomagazine looked into it.

Robert Meier, independent specialist journalist, Rupperswil

Mike Eichelberger, director of Spaltag (on the right) with his partner Meinrad Meier in front of the control cabinet of one of the treatment installations. (Photos: Robert Meier)

Auxiliary products used in mechanical and bar turning workshops have to be replaced eventually. There are laws and regulations covering their disposal with very serious consequences for those who break them. To avoid such problems, specialist companies are skilled in the transport and disposal of used cutting fluids and oils.

Collection and removal

Numerous regulations demand that used products be returned to the manufacturer. Others, however, often prohibit handling new and used products within the same company. This is why the producers of cutting fluids don't want to and can't take back oils to be disposed of. The solution lies in a close collaboration between suppliers and disposal specialists. Both sectors advise companies in the collection and disposal of used products.

Taking back this mechanical and bar turning waste is generally done either by the usual chemical products supplier or directly by a company specialising in handling such products. They all have one thing in common: All materials returned must be inspected before any treatment takes place. To find out more, decomagazine spoke to these Swiss companies, both specialists in the field, Spaltag in Urdorf and Altola in Olten. The problem knows no national boundaries, despite the different legislation sensitivities, this ecological conscience is on the up everywhere and several companies are providing solutions in many countries.

Roland Meier, director of Altola SA, wants delivered waste to be sorted by type otherwise disposal costs increase.

Collecting and examining emulsions

One of the companies specialised in waste disposal is Spaltag in Urdorf which deals with, among other things, the treatment of emulsions. Each delivery must have the regulatory paperwork. The transporters cannot accept products with missing documents or with insufficient or absent labelling on the containers. Mike Eichelberger, director of Spaltag, explains: "Workshops often don't have the necessary personnel or expertise for the relative administrative tasks. That's why we offer a service which includes reception of goods in our own workshops by one of our specialists who takes care of all formalities and even the proper labelling of the containers."

When the containers arrive at the treatment site, a sample of the contents of each delivery is taken and analysed in the laboratory. Mike Eichelberger: "The less the product is mixed with other products, the lower the disposal costs are". In the event the delivered product does not correspond with the delivery documents, it is either turned away or, if needs be, disposed of on another site with the additional costs incurred. Third-party waste is particularly problematic because to "make life easier", they are put into emulsion. Over and above the additional analyses the disposal costs increase.

By mixing the used emulsions with a separating agent intensively, the emulsifier is less effective; water and oil separate more easily.

Breaking up emulsion

Spaltag uses the CP procedure (chemical/physical). By adding suitable products to the emulsion, the mixing effects of the emulsifiers are neutralised and this way the separation of water and oil can start. Mike Eichelberger: "The need to increase the lifetime of emulsions and the resulting stability makes separating the two products more and more difficult". The oil is released is pumped into a collector and as a general rule is taken to Altola in Olten for later treatment. Any dissolved metals in the water are extracted by a supplementary process before the water is taken to the communal waste water treatment plant. By virtue of its quality standards continuous sample taking, Spaltag guarantees that discharging conditions are respected throughout the entire procedure.

All deliveries are inspected in the laboratory.

A sieve separates solids from used liquids.

Laboratory analyses reveal if deliveries correspond with what is written in the documents.

Used oils from different origins are examined and, depending on their condition, are either used as fuel or are regenerated.

Knowing what has to be treated

Another company specialised in the disposal of used products is Altola in Olten. The difference between Altola and Spaltag is that the former takes care of the disposal of used oils, as well as the treatment of emulsions. The company also offers a complete service. Roland Meier, company director, explains: "First of all, we go to each new customer to analyse the characteristics of the products to be disposed of and file the realties in our data base. This helps us inspect the deliveries and enables us to recognise variations in deliveries swiftly, because we take a sample of each delivery which is analysed in our laboratories". If the company producing the waste is unable to provide the necessary documents, the experts at Altola will take care of this.

Well separated saves money

The law stating waste should be separated by type also applies to this area. Used cutting fluids are poured into a tank where separation of any water in the oil takes place by simple sedimentation. The recovered water will be treated with the emulsions, while the "cleansed" oil is pumped into another tank and will be used as fuel in cement works, for example. In this case, large sites with suitable installations are used where emissions are under constant monitoring. This guarantees definitive disposal in accordance with the law. But a word of warning from Roland Meier: "If someone pours solvents, like petrol in the oil, the entire delivery has to be treated as solvents and invoiced accordingly. This incurs additional costs payable by the supplier" with the correct management, even for products to be disposed of, considerable savings can be made.

Nothing but distilled water

The same inspections are carried out on the emulsions to be disposed of and identical conditions are applied: Products containing solvents have to be treated as solvents with a considerable increase in the cost of disposal.

This is not a view inside a chemical plant but the three-level vacuum evaporator which turns contaminated water into very clean water.

Emulsion deliveries are poured through a filter in a separation tank where depository contents are removed by sedimentation. As is the case with Spaltag, the emulsions will be treated at Altola in dissociation reactors before being purified in a three-level vacuum evaporator. To that end, the emulsions are first heated in reactors to a temperature of 60 to 80°C and the water/oil separation induced by an acid agent. The oil is released in this way and is transferred to tanks where it will serve with cutting fluids as fuel. The residual water then goes through the evaporator where it comes out as distilled water. Passed through an activated carbon filter, it is released into the public sewage system.

Summary

The process of disposal of emulsions and used cutting fluids starts with the user. He must ensure that his products are not mixed with other liquid or solid waste. Products that are difficult to identify will incur additional costs which are easy to avoid. With disposal carried out within the law, the bar turner's mind is at rest: His emulsion and cutting liquid waste become fuel and water. It's worth the effort.

The companies cited in this article are:

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TEST THE TB-DECO ADV SOFTWARE FOR FREE!

At Tornos, software is a lot more than just a "necessary evil" To find out a little more about their new products, decomagazine met up with Marc Wyss, the Tornos Software Product Manager.

Over to him!

Marc Wyss

If you are currently a user of the old version of TB-DECO (V4, V5 or V6) or a basic new version (2006, 2007), you are not one of the 1000 users who are working with the TB-DECO ADV software.

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decomagazine: Thank you Mr Wyss, that all sounds very clear but what should we do if we require any further information?

Marc Wyss: On the website www.tornos.com, you will find more information under the menu "Technology – Programming software – TB-DECO ADV". A presentation in PDF format will give you an excellent overview of the TB-DECO ADV 2007 functions.

dm: How do I get hold of a trial version?

Marc Wyss: You have the choice between:

- Sending us an E-mail to the following address «software@tornos.com» with your contact details.
- Fill out the enquiry form available from the software hotline on the Internet: "Technology – Software hotline".
- Get in touch with a Tornos site or agent.

Following your request, we will be happy to send you our trial version as rapidly as possible.

NO HALF-MEASURES

In the heart of the Emmental region (Switzerland) lies Hasle-Rüegsau where Blaser Swisslube SA have taken root and where they produce cutting oils and emulsions. The family-run company is represented by 500 collaborators in 46 countries and has production sites in the USA, India and more recently in China.

Robert Meier, independent specialist journalist, Rupperswil

A different type of cutting emulsion

If a specialist takes a look behind the scenes at Blaser Swisslube, he will quickly notice that their COO, Marc Blaser is not one for half-measures. This is why the company has been producing cutting emulsions with an emulsifying agent to ensure the optimum mix of water and oil for many years now. This is the case with any other product, but instead of using chemical agents to stabilise the product or to combat the microbiological decomposition process, the company looks to nature for assistance. The company actually uses bacteria found in everyday drinking water. As Marc Blaser points out, this biological procedure takes place all over the world. Of course, the ideal environment has to be created for these bacteria. The in-house microbiological laboratory is responsible for this area and as far as lubricants are concerned is a world leader.

Combating contamination

The emulsion bath is often used as a place to put waste liquids of all kinds. While the chemically stablilized emulsions are rapidly overrun and are no longer able to fulfil their original role, the micro-organisms are able to decompose very rapidly and therefore render the manufacturing process secure. The laboratory at Hasle-Rüegsau not only has a role in research and development but also runs daily analyses of samples that have been sent in order to determine – even through DNA analyses – the origin of the disturbances. Because the micro-organisms are of natural origin, they are without risk for the

According to Marc Blaser (left) and Max Zuber, there is still huge potential to be had from their products. (Photo: Robert Meier)

users. The company has a further three laboratories which support both research and development but also the product user with analyses and recommendations because, through regular inspections, trends can be swiftly detected and any necessary corrections can considerably extend the lifetime of an emulsion.

The drop on the blade

Increasing demands on machine productivity together with high performance tools require "high performance" from the other partners. One of these partners is of course the operator at the machine but another, often a little unknown partner is the cutting oil. Max Zuber, head of machining technologies at Blaser Swisslube SA, regrets that the role played by the cutting oil is often underestimated: "The choice of cutting oil depends on the type of machining".

For their products, the company uses mineral-based, synthetic or ester oils, depending on the application. "Each basic product has its own characteristics and this means it is more suited to a certain application than others". These basic oils are strictly controlled in the laboratories as is also the case for the additives. "We have to be totally sure that each product corresponds exactly with previous deliveries, even if the labelling is the same. When he reckons with a lifetime of several months or even years, the bar turner has the right to expect faultless quality from his cutting oil", says Marc Blaser.

The difficulty in making the right choice

Selecting cutting oil usually depends on the type of machining to be carried out. But what is the deciding operation when the most varied of machining operations are carried out on an same automatic bar turning machine as is the case with the MULTIDECO from Tornos, for example? Marc Blaser has the answer: "The bar turner will prefer a special multifunction oil, which will give him good results every time". But in reality, it's not so simple. Parallel machining tests have indeed shown that by optimising the cutting geometry and the cutting oil, an improvement in performance upwards of 40% for a defined operation have been proven. Marc Blaser makes the observation: New tools are available on the market and they should be used optimally. This is equally valid for cutting oil.

He does however accept that technological progress does not make the professional's choice any easier. With automatic multi-spindle turning machines also equipped with powered spindles, requirements could be totally different from one operation to another. It's in this sector that Blaser Swisslube SA intends to make a big impact in the future.

Training and collaboration

The automatic turning machine is the basis for a proper use of cutting oil. Max Zuber does however make a point: Unfortunately we often find machines with a cutting oil reservoir that is too small. The machines high performance can then cause the oil to overheat and cease to function as intended, also

Biology for all to see in the laboratory. The microbiologist Dr. Alexandra Fluri is head of the microbiology laboratory at Blaser Swisslube SA.
(Photo: Blaser)

Cutting emulsions lubrify, cool and remove swarf – a substantial workload.
(Photo: Blaser)

resulting in a loss of precision of the machine. Fortunately, machine tool manufacturers, like Tornos have identified this problem and equip their new machines with a large oil tank that has an impact on both productivity and the quality of the machine. This is one of the reasons why specialists are always looking to communicate both with machine manufacturers and tool manufacturers – and of course with users. Blaser provides the latter with continuous training. Marc Blaser: Our training courses cover a short session in the customer's own workshop to a basic training in our factory in Hasle-Rüegsau.

During multiple and complex operations, the bar turner needs to choose the area he intends to focus on: Is it a large amount of swarf that need removing or on an operation to ensure a particularly high level of surface quality? With the right choice, he can, on the one hand provide the right solution to all operations and on the other, his selected critical operation. "In this area, there is still a large amount of optimisation still to be done", says Marc Blaser. And he certainly intends to transmit this expertise to the bar turners.

What does the future hold?

In the emulsions sector, Marc Blaser is convinced that new regulations are going to force users more towards biological products. "Thanks to our expertise built up over many years, we find ourselves in the role of pioneer and we still have a lot to offer". He adds, "We will definitely be bringing new products to the market". Blaser came up with the term "liquid tool" so that supplier's specialists can drive home the role of cutting oil to its partners. Marc Blaser is also of the belief that in this sector, the collaboration between the various partners will raise the awareness of cutting oil in general and that, by virtue of these synergies further improvements in performance will be possible. He assures us that, as far as the development of new products is concerned, new additives are being researched every day in their laboratories and he concludes: "In this sector too, we will definitely be bringing new products to the market". Which ones? He'll let us know when they are launched.

Cutting oils are an integral part of high-performance machining systems. (Photo: Blaser)

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PRODUCTIVITY FIRST

AppliTec, based in Moutier, Switzerland is a tooling specialist for turning machines. Founded in 1987 the company researches and manufactures high performance tools for bar turning tools that are distributed in nearly thirty countries by regional distributors. Let's take a closer look inside this company.

Robert Meier, independent specialist journalist, Rupperswil

A clamping system that keeps its promises: The Top-Line series from AppliTec. (Photos: AppliTec)

Bar turners are on to something. They are constantly under considerable pressure to lower production costs and at the same time the demand for ever more complex parts is increasing. They need the best tools they can get. This is where AppliTec comes in.

Sourcing the best to provide the best

Applitec's hard metal cutting tools are above all designed for the manufacture of small bar turned parts. François Champion, the AppliTec sales and marketing manager makes this clear form the outset: "In order to supply tools to meet our promises and the expectations of the bar turner, a perfect quality of raw material is key". This is why the company selects its suppliers very carefully. "We view them as partners with whom we discuss problems and to a certain extent our technical projects".

Meeting requirements

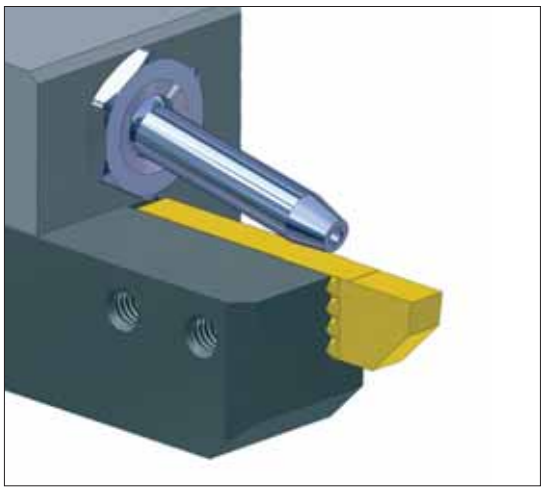
Sometimes, a bar turner still sharpens his tools himself. Here, François Champion is talking about a tooling culture that is on its way out. For this reason, AppliTec remains, with the help of its representatives, close to its customers and open to all technical issues. Indeed, the development staff is recruited from the workshop personnel. "Our company mission is to be the bar turner's partner and it is for this reason that we have built a team of people involved in the practical side."

Development is not only about individual tools but also modular tool systems as is the case with the Modu-Line range, which is a response to machine tools that are ever more high-performance but also more complex.

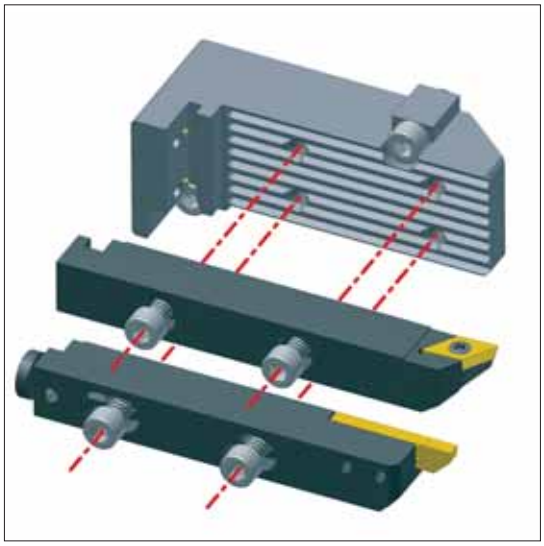
In general, new tooling tests are carried out on site at the bar turner's facility. François Champion explains: "The best way to establish the capacities of a cutting tool is to subject it to real industrial production conditions, which we cannot replicate in a laboratory".

Performance, performance, performance

Performance is what the bar turner is looking for from his production tool. He is under pressure concerning lead times and especially price and would like to reduce a part's machining time, while maintaining quality levels. Decisive criteria include machining time for a precise operation but also the lifetime of a cutting tool. François Champion emphasises the fact that the user has to take into account the overall cost of his tooling when making his selection: "The productivity of an automatic bar turning machine is a key aspect of its output. If the lifetime of a tool is double that of a standard tool, the user will have gained production time as well".



Precision is also to be found in lubrication that is directed at the actual cutting point of the tool.



Modular cutting systems like the Modu-Line range are designed for machine tools that are ever more increasing in performance and complexity.

Another key to success is the stability of the machine and the tooling. In order to guarantee a part's quality levels, the machine, and of course the tool, must not be exposed to the slightest vibration. A typical example of a cutting tool that matches this criterion is the AppliTec Top-Line series with reversible inserts. This range is equipped with an extremely stiff clamping system and perfect guiding and positioning of the insert in the tool holder, which makes the tool particularly immune to vibration.

New problems – new challenges

Machining in new materials and in particular in alloys, like stainless steel or titanium is becoming more and more difficult. The tool manufacturer therefore has to constantly find new solutions: "Research is moving toward new types of coatings, cutting angles are being re-evaluated and other points retained. The manufacturer is required to go looking for solutions in different directions at once," explains François Champion.

Another trend is going towards system type solutions, more than a "simple" tooling system. Whereas, up to now, the operator used a flexible hose to direct the cutting fluid in the general direction of the cutting blade, today's lubrication now needs to be directed at the actual tip of the cutting tool. So the development of new tool extends well beyond inserts and tool holders. The cutting tool manufacturer also has to cover the area directly surrounding his products, a trend that is on the increase. A solution going in this direction is clear to see on the Modu-Line system. Indeed, the tool manufacturer is sometimes invited by the machine constructor to participate in the development of certain solutions or at least to give his opinion on particular tooling issues for a new model. Of course, at AppliTec development doesn't stop here, but François Champion will say no more.

APPLITEC
SWISS TOOLING

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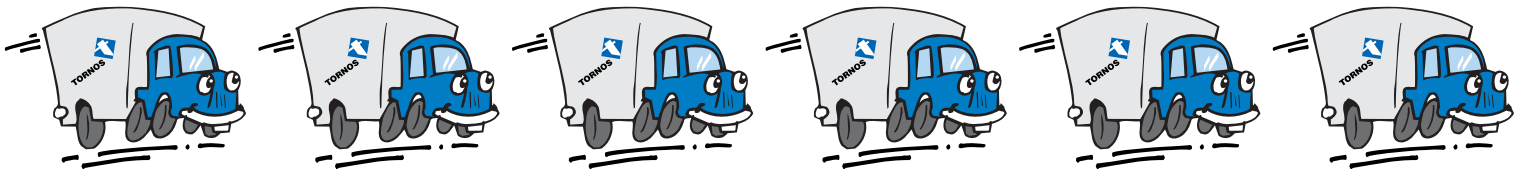


- **50 trucks each transporting two machines: that's some convoy!**
- **An athletics stadium where the entire running track is filled with DECO machines one behind the other!**
- **DECO machines lined up end to end, the top one higher than the Eiffel tower.**

For the first time in its history, Tornos has delivered the 100th DECO to one of its customers.

- Is this biggest DECO customer an international group with production sites on different continents and active in various industry sectors?
- Or is it, on the contrary, a specialist renowned for their expertise working for major brand names?

Let's find out!

decomagazine, together with the local press and the Tornos sales force from the region concerned set off to visit the company. After a final 10 Kilometers through a developing rural region, we reach the company. Recently finished and occupied since July this year, the new building leaves you with an impression of class and quality. The front door opens up onto a large hall with arm chairs and low tables upon which fine watchmaking magazines are laid out for visitors. The tone is set. We are in a company where the word "quality" is not to be taken lightly, a company for which everything must meet a very high standard. We could be forgiven for thinking we are on the premises of a fine watchmaking company, a feeling reinforced by the security gates that surrounds the site… or the CCTV cameras – where exactly are we?

We are on rue de l'Avenir, in a 100 % family-owned company that does half of its business in the watchmaking sector: We are at Bandi in Courtételle located in the Swiss Jura region. After a pleasant ceremony, we are able to ask Mr Jean-Jacques Bandi, company founder and Mr Yves Bandi, managing director, a few questions.

During the delivery of number 100, speech from Mr. Francis Koller, sales director.

decomagazine: When we knocked on your door in 2004, you were working with 34 DECO machines. Today your 100th is being delivered. It's a considerable increase, 66 machines in three years!

Yves Bandi: We have been experiencing double-digit growth for the last 10 years, something that obviously calls for additional machines.

dm: So this growth is going to continue for a long time to come?

Jean-Jacques Bandi: Yes and no! In fact, we are not obsessed with growth at all costs! We remain conscious of the need to stay in control so as not to let quality and performance levels slip. For us, quality is paramount. Of course, reactivity and customer service are very important but they are no good without quality.

Yves Bandi: We could have enjoyed even stronger growth but, after taking everything into consideration, we decided not to produce certain parts. The

From left to right: Jean-Jacques Bandi, Kurt Schnider – Sales Manager (Switzerland) at Tornos, Yves Bandi, Francis Koller – Sales Director South Europe Tornos and Carlos Almeida – Sales (French-speaking Switzerland) at Tornos.

The reception in the new building - pure class!

next step is to replace our old ENC and cam-type machines.

dm: Why replace cam-type machines?

Yves Bandi: We currently have eleven cam-type machines still in service. Our specialist is retiring in a few years time and our idea is to make the most of this event to move on to a new technology. We have looked into this and this is a genuine opportunity.

dm: When we announced a customer's 100th machine, some people thought this number was only possible in a large international group… Can you tell us about your current structure?

Yves Bandi: Our company is family-run and I am the 100 % shareholder. I took over naturally from my father Jean-Jacques 4 years ago. We have a single production site in the heart of the Arc Jurassien.

dm: When we met in 2004[1], we spoke about the large amount of small series runs that you do on the DECO. What's the situation today?

Yves Bandi: The situation is still the same, we are working at the high end of the market, and our selling point is flexibility that enables us to react swiftly. Just for your information, we conduct over 350 machine set ups every month! In our Sigma 8 Park (26 machines to date) in which the first machines are a year and a half old, we are already equipped with a data base of 900 programs! If one of our customers has a problem and orders a part that is in our production set up, I can usually deliver it tomorrow!

dm: Are you not concerned about becoming caught up in one industry sector?

Jean-Jacques Bandi: It's true that virtually 100 % of our activity is for the watchmaking sector, but within this field, we carry out work for a variety of applications in the case, the wristlet and the movement.

[1] *See decomagazine 31. http://www.tornos.com/dnld/deco-mag/tornos-deco-mag-31-fr.pdf*

Yves Bandi: We work for the very high end of the market, where cyclical trends have a far smaller impact.

dm: You talk about high end of the market… is this also the case for the small percentage of work you do outside the watchmaking sector?

Jean-Jacques Bandi: Absolutely. We work for the luxury mobile phone sector, for example.

dm: You work very closely with Tornos. I know that you have shared a lot of information with their engineers. Isn't that a little risky?

Yves Bandi: We have a partnership going. We bring our expertise to the manufacturer and they in turn allow us to gain swiftly from improvements and new developments. This also enables us to stay firmly in the race. It's a win-win arrangement.

dm: To finish with a different kind of question, you are active in a very "secretive" sector where numerous players refuse to communicate and even to say that they own a particular machine. Isn't it a problem being so open and "communicative"?

Yves Bandi: We are open but it's true that competition is everywhere; we are not going to reveal any confidential information. But there's no shame in doing good work…

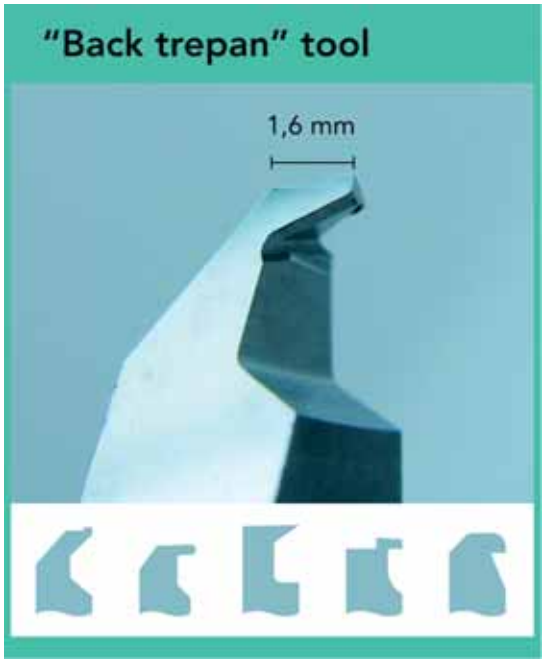
100 machines and yet a 'feeling' of a family business. The machines are located in relatively small areas, with a maximum of 20 machines per hall. This way, there is all the necessary space and the operators can work in optimum conditions.

LISTENING TO THE MACHINE AND ITS USER

In mechanical workshops and more particularly amongst bar turners, there is one primordial obligation: To manufacture to high quality standards, with ever higher levels of productivity and at ever lower costs. For these reasons, every manager will try and find the turning machine that best fulfils all requirements. But the machine isn't everything. Amongst the list of "complementary" elements, tooling is often key to success.

Robert Meier, independent specialist journalist, Rupperswil

By virtue of a special centring solution, repositioning the insert is done with a precision of +/- 0.01 mm.



"Back Trepanning" tool: The special dimension is used for machining parts for the medical sector.

Although there are large suppliers covering the market, it isn't surprising to come across "small" tooling manufacturers working specifically with the bar turner and are doing a good job of it. One of these specialists is Bimu in Tavannes (Switzerland), manufacturer and supplier of cutting tools.

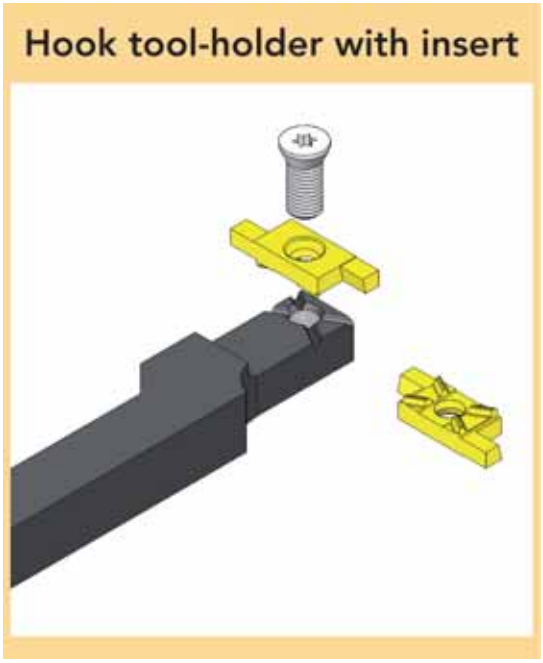
Close to the user

Bimu SA is a company involved in the production and sale of cutting tools and accessories to the bar turning sector. The company that exports to over 25 countries, is also very active in the development of innovative products, such as the X-Centering inserts or the Tecko TTS rapid changeover system. With a dynamic structure, Bimu SA is now looking to increase their productivity as well as their product range to offer the customer base solutions tailored to the market needs.

For François Beurret, director of Bimu SA, his company is highly innovative: "The only way to stay at the cutting edge is to listen to customer needs". The company therefore presents new products from its workshop on a regular basis, innovations that stem from frequent customer contact. At Bimu, the development of new tools runs in parallel to its own production.

Reducing machine down time

In order to maintain high machine tool productivity levels, the bar turner looks to reduce the down time of his machines. The assistance that toolmakers can bring to this area is the capacity to change a worn tool in the shortest time possible and without losing any precision. If necessary, Bimu specialists go to Tornos, for example, to discuss the issues and problems faced with the engineers of this machine manufacturer in order to find the right answers.



Tool holder with pawl and insert. The X-Centering holding system ensures a cutting edge repetitively of +/- 0.01mm.

Tailor-made solutions are the key to the future

François Beurret emphasises this point: "Being close to the bar turning process provides us with a certain expertise as far as material to be machined are concerned and the cutting dimensions which need to be taken into consideration" Because of this, it is hardly surprising that roughly a third of Bimu's production is for solutions which are tailor-made to a specific requirement. And he assures us: "We are a dependable partner for our customers".

What makes the difference between this tool manufacturer and a large supplier where he also sees the promise of a bright future is the size of the company: In total we have 17 employees and that makes us a small company. This actually gives us a certain degree of flexibility both in researching new solutions and adapting tools to a specific problem. "Bimu engineers often come up with cutting dimensions that make all the difference to machining time for a particular part, which is a direct advantage for the bar turner."

In spite of all this, the company is dependent on a constantly evolving market. For this reason, Bimu is always expanding its product range. It has therefore just released its new range of tools called "Watchline", a complete range of grooved tools to produce interior and frontal grooves, a tool programme perfectly suited to the demands of watch case manufacturers. François Beurret states: "The development of this range has been carried out, as it always is, in collaboration with these manufacturers".

Openness for the benefit of all

Currently, Mr Beurret senses certain openness on the part of both machine tool manufacturers and competitive tooling suppliers. "It is often the case that, instead of being in competition, we work together with other tooling manufacturers. If, for example, we don't have the right solution to a particular problem, we don't hesitate to put the question to our competitors". And it's worth noting that competition is also a driver when it comes to new developments. Which ones? That would be telling!

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CLOCKING ON TO TORNOS BENEFITS

An English clockmaker has acquired a new Sigma 20 CNC sliding headstock mill-turn centre from Tornos to manufacture a host of tiny components required for its intricate timepiece mechanisms. Claimed by the company to be considerably faster than its existing sliding head machines, the Sigma 20 has cut cycle times by more than 50 % in some instances.

Internal workings of Gluck carriage clock.

Gluck Precision Engineering Co Ltd was established in 1954 by Felix Gluck (who had emigrated from Switzerland in 1930), originally as a supplier of precision components allied to the instrument trade before progressing rapidly into the complete manufacture of industrial clocks. In the mid-1970s the company diversified into the production of exquisite carriage clocks – a venture for which the company holds a Queens Award for Export.

Having successively outgrown three sites in South London, the company relocated to a new facility at Maidstone, Kent in 2006. While clockmaking today still represents around 35% of business at Gluck Precision, the majority of the company's revenue is generated by providing industries such as leisure, pumps, scientific instruments and hand tools with precision turned parts on subcontract basis.

Since the 1990s the company has standardised on a particular make of sliding head auto. However, with an understandable soft spot for Swiss machines, Gluck Precision Engineering granted Tornos permission to provide a few cycle times for existing parts in late 2006, when in the hunt for an additional machine.

"At first, I didn't believe the times I was seeing", states managing director Roger Gluck. "In fact, I asked Tornos to double-check the times as some were 30 % quicker than our existing cycles."

Having confirmed the cycle times as correct, a deal was duly struck and a new Sigma 20 sliding head auto took its place at Gluck Precision in February 2006 alongside five existing CNC machines.

"Seeing the Tornos work alongside our existing machines is a real eye-opener," continues Mr Gluck. "Its speed is jaw-dropping; I would estimate it is 10-15 % faster on average than our existing machines, while on certain jobs it is even quicker than that. For instance, a stainless steel shaft with milled features for the construction sector is now produced in 66 seconds on the Sigma 20, as opposed to 2 minutes 38 seconds previously using one of our existing machines. The Tornos is very hungry and for the first time we have had to actively seek work to keep it busy. I estimate we will achieve payback on our capital outlay within three years."

Supplied with a Fanuc 31i CNC, swarf management system, parts conveyor and Robobar barfeed, the Tornos Sigma 20 fits perfectly with the Gluck Precision philosophy of process automation.

Tornos Sigma 20 at Gluck.

Parts coming off conveyor. "The pace was so high that I asked Tornos to double check the times as some were 30 quicker..."

"In terms of employees, the company used to be far larger," says Mr Gluck, "but technology and automation has reduced the need for so many hands. However, despite the reduction in headcount, we actually manufacture more parts per week now than ever before. Technology allows us to run 24/7 and complete parts in a single set-up".

BTMA member Gluck Precision Engineering manufactures every component used in its carriage clocks except the facia glass. The company has a host of prestigious clients and has been supplying the Crown Jewellers for the past 20 years: it has just fulfilled an order for 100 clocks for Buckingham Palace.

On the subcontract side, the firm specialises in complex turned parts. Batches vary tremendously (100 – 1 million) but are generally in the region of 5000 to 10,000 off.

"Over the years we have applied our horology skills to complex turned components," concludes Mr Gluck, "and our purchase of the Tornos Sigma 20 supports this process further."

Roger Gluck at front of premises.

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TORNOS MEASURES UP FOR TRANSDUCER MANUFACTURER

Tornos Sigma 20 at Solartron. The machine has not only taken the place of three machines but also increased productivity by over 50 %.

When Solartron Metrology Ltd needed to update its long running turning centres, the company immediately turned to Tornos and its new Sigma 20 CNC turning centre. The company has turning centres from a number of suppliers but when it came to updating its technology, the Bognor Regis manufacturer opted for Tornos.

Known as a world leading provider of precision dimensional measurement and position measurement transducers & instrumentation, 130 employee Solartron is continually increasing its production rates and the Tornos Sigma 20 is assisting the company in achieving its goals. Replacing three Tornos Elector turning centres supplied in the 1980's, the Sigma 20 has not only taken the place of three machines but also increased productivity by over 50%.

As Solartron Machine Shop Supervisor Mr Peter Shepherd states: "When looking at a new machine, we evaluated the market and found the Tornos was the best fit solution for our business. We already have turning centres from many suppliers including Tornos and from experience, the service, support, expertise and relationship Tornos provides far exceeds that of its competitors."

Exporting 90% of its production and holding an 80% market share of the global transducer market, the company manufactures significant amounts of components. With over 60,000 parts passing through the machine shop each month on a Kanban system, the ability to switch the Sigma 20 from one part to the next was a major factor. As Mr Shepherd continues: "We produce batches from 10 to a 1,000

off and we are continually changing jobs. The Sigma 20 has easy access and is well lit for changeovers whilst the user friendly Fanuc control has reduced programming times, giving us considerable time benefits when changing over jobs."

"We manufacture hundreds of families of part variations, so versatility is crucial to us and the Sigma 20 has already proved its worth with the changeover aspect of our production."

Predominantly machining 400 series stainless steel on the Sigma 20, ISO9001 registered Solartron conducts a considerable amount of drilling and it is here the Tornos machine comes into its own. As Mr Shepherd continues: "A lot of our components involve drilling; the powerful driven tooling unit on the Sigma has a torque monitor that enables us to gauge the performance of our drills. This lets us know when tools are close to wearing out or breaking. This has improved our quality process and enables our operators to work in confidence; they now know exactly when to change tooling without any breakages."

Enhancing the drilling performance further is the through coolant feature on the Sigma 20 that Solartron is now using. The through coolant has improved productivity as well as the life of the cutting tools.

"The new Sigma 20 compliments our two Tornos DECO 10 machines and has improved our production rates whilst freeing up space on the shop floor by replacing three machines. We operate a two shift system and the new Sigma 20 is running almost non-stop," concludes Mr Shepherd.

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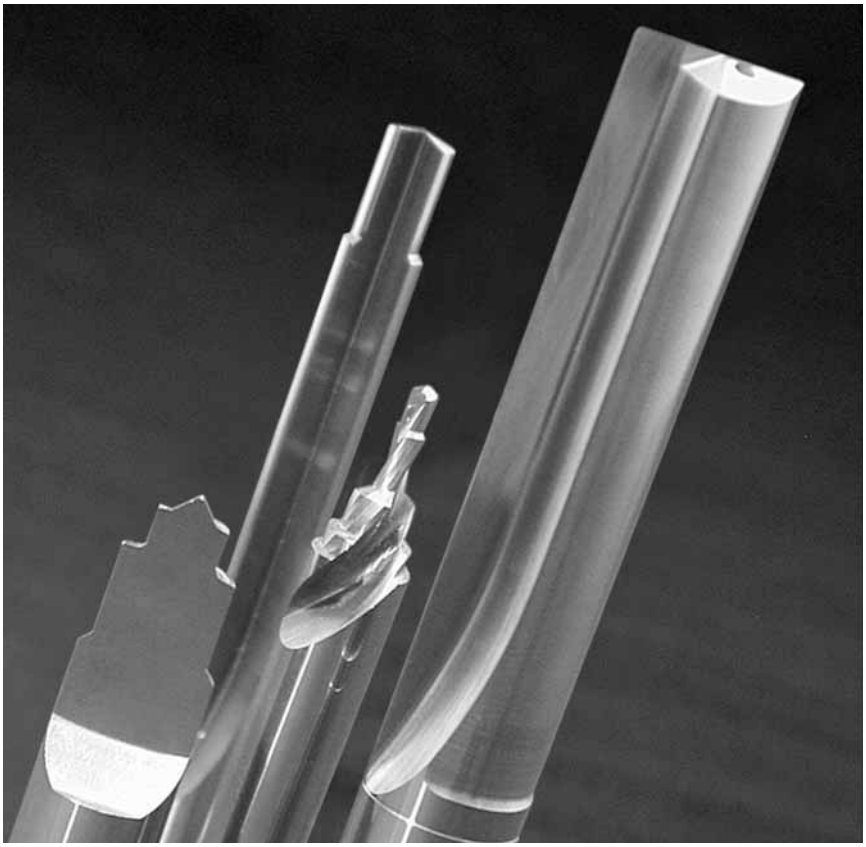
HIGH PRECISION

The watchmaking industry is not alone in demanding fine parts with occasional drilling or other operations in very small dimensions. First you have to have the right tools. PX Tools in La Chaux-de-Fonds (Switzerland) has become a specialist in small-sized driven tools.

Robert Meier, independent specialist journalist, Rupperswil



Special drills, stepped, helicoidal with or without oil apertures for special applications outlined in the PX Tools tool program. (Photo: PX Tools)

Taking a close look at the PX Tools program, the casual observer will notice straight away that the dimensions listed are often a little out of the ordinary and on the small side. Indeed, milling tools with a diameter of 0.20 millimetres or 0.10 millimetre drill bits are all part of the standard range from this cutting tool manufacturer.

Staying out of the ordinary

The company is noteworthy for its high level of specialization. Didier Auderset, director of PX Tools, gives us a better idea of its activities: "Our production consists of two thirds particular products tailor-made to match a specific customer requirement every time". The high demand for these products comes from a perfect level of quality. Customers in the watchmaking or medical sector have zero tolerance when it comes to burrs in their products. It's down to the tool supplier to come up with the goods.

No sooner ordered, it's delivered

Would it be any different at PX Tools than for bar turners? Of course not and Didier Auderset confirms: "Bar turners are regularly under pressure from very short lead times. But before starting production,

they often require adapted tooling. It is therefore up to us to supply tools in an extremely short time period". This is where the company proves its flexibility and expertise. While certain customers also have qualified personnel when it comes to tooling, others need more assistance.

"Often, our specialists work together with a customer's personnel in the area of tooling". The company can even supply very small runs, or even one-off parts. Didier Auderset: "Sometimes, when setting up a machine for a workpiece we have to find the best way of machining a certain part. With series tools, it would be difficult or even impossible to adapt them to particular conditions. Thanks to our flexibility, we can supply one-off tools, each one adapted to certain criteria". No, he doesn't consider himself a "simple" supplier but a fully fledged partner for his customers.

Adapting – and what a result!

Its common knowledge that the experienced bar turner is always on the look out for ways of improving his production. Didier Auderset can tell us more: "It often happens that we need to find an even higher performance tool to meet a precise customer requirement".

Sometimes his specialists don't find any improvement, the machining process having already been optimised to the limit by the bar turner. However, in other cases, the customer can be surprised by the results. "We have obtained results where, with a tool which is twice as expensive, we can reach a volume of swarf which is five to ten times higher than usual. In this case, with a tool which is ten times more expensive, the output was even a hundred times higher".

A success demonstrated once again that it's definitely worth looking into the whole question of tooling. But Didier Auderset is no fool: "We all know that a high-performance machine tool with standard tooling or high-tech tooling with a low-performance machine will never give the optimum result". It is for this reason that PX Tools is also looking for a close relationship with machine tool manufacturing companies and Didier Auderset sees the collaboration with Tornos engineers as an example of how it should be done.

When there is a machining problem, the bar turner is sometimes reluctant to let someone from outside the production site come into his sector – customer confidentiality prevents this. In these cases, written approval can solve this problem. This confidentiality is also a key aspect for this tool manufacturer whenever private operations are to be carried out.

In the laboratory and in the workshop

New tools are sometimes tested in the laboratories of the local engineering schools. The best answers are, however, obtained during test in the bar turner's workshops. Didier Auderset confirms this point: "It is difficult to simulate real production conditions in a laboratory. What's more, the practising bar turner can often work out pretty quickly what's working and what isn't. He's just got it in his blood".

Everything is moving faster

We can see what's in store for us in the future. Didier Auderset: "Everything is moving faster and one of our subsequent objectives is to create the production capacity to supply the first tools in even shorter lead times". The goal he has set himself is two weeks. To make this happen, the company intends to invest in different sectors, production in shifts already in place.

No, new materials are not going to make machining workpieces any easier. But in this field, PX Tools can rely on a considerable ally. The PX Group, which owns the company, is no other than a producer of metals. This way, we are the first informed, a considerable advantage. He reveals to us that tooling trends are going in the direction of materials like cermet or polycrystalline materials and that new surface coating will also see the light of day.

Cutting geometry is also subject to continuous development, as well as new tools to offer even better solutions to today's two productivity criteria: the lifetime of the tool and the volume of swarf to be removed. In what sector, exactly, will these new developments make their appearance? Didier Auderset is categoric about it: "This information is reserved for our management board".

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THE CLEANING OF PLASTIC PARTS AFTER LAPPING PROCESSES

Vallotech, a company located in Vallorbe (Switzerland), is a subcontractor to the automotive industry that produces cast polymer parts in phenoplast used for automobile fuel pumps.

Amsonic cleaning system EgaClean 4200

After the lapping process, these parts are soiled with mineral oil, petroleum, particles and additives. The parts geometry and the high drag in of soiling require a cleaning process that is efficient and constant in quality. The company's previous water-based cleaning machine produced a high volume of effluent because the detergent was always rapidly saturated with oil. This multi tank cleaning unit was replaced by an EgaClean 4200, an A3 solvent cleaning system (isoparaffin, non-halogenated solvent) by Amsonic.

Machine capacity

The EgaClean 4200 features the following technical specifications (CE and ATEX conformity):

External dimensions W x D x H	2560 x 1435 x 2050 mm
Volume of solvent	700 litres
Distillation capacity	120 l/h
Installed power	54 kW
Basket dimensions	670 x 480 x 320 mm
Maximum basket weight	100 kg
Cleaning functions	Ultrasonics, flooding, filtration 1 µm
Emissions: solvent vapour	approx. 3 kg/year
Disposal of the distillation sump	Is burnt in cement factories

Machine specifications

The standard cleaning programme consists of the following process steps:

- Working tank (precleaning) — Ultrasonics, Micro filtration
- Clean tank (distillate) — Ultrasonics, Flooding
- Vapour phase
- Drying
- Cycle time — approx. 14 min.

The solvent is heated to approx. 65°C under vacuum (100 mbar).

The movement of the cleaning baskets is programmable (oscillating, rotating or static).

Economic efficiency and environmental protection

In principle, the solvent is not replaced periodically. Distillation losses amount to approx. 5 - 10% of the oil drag in.

Operational costs per year	**€**
Solvent 300 litres at approx. 3.00 €/l	1'020
Energy 20 kWh x 1800 h x 0.10 €/kWh	3'600
Maintenance (single shift operation)	500
Spare parts	1'500
Total	**6'620**

In comparison with cleaning machines based on chlorinated solvents, the Amsonic EgaClean features an outstanding ecological balance. The A3 technology has therefore managed to achieve a broad market share and is an alternative to cleaning with per- or trichloroethylene.

The complete recycling of the solvent guarantees a constant cleaning quality and a high economic efficiency of the process. This technology is also applied to clean parts prior to galvanic processes such as PVD and CVD coating.

All types of class A3 solvents can be utilised in the EgaClean. Isoparaffin is applied in case of soiling by mineral oil. In the electronics industry, however, modified alcohols are applied because of their optimal suitability for the cleaning of printed circuit boards after soldering processes.

With regards to cleaning quality, the following values can be achieved:

Quality criterion	Water-based cleaning system CleanLine	A3 solvent based cleaning system EgaClean
Surface tension in Nm/m	>65	<45
Particle soiling in µm	<50	<150
Carbon content in mg/m²	2	13
Residual film (C) in Nm	Not measurable	10

To conclude, it should be said that, cleaning technologies have to be applied systematically. Water-based cleaning processes are particularly suitable for the removal of polar soilings and in cases of low oil drag in. They assure a very high degree of cleanliness. If the material to be cleaned is subject to corrosion, certain precautions have to be taken in connection with this cleaning method, e.g. corrosion inhibitors have to be used in detergents and rinsing tanks.

Nonpolar soilings, e.g. cutting oils, are preferably to be removed with A3 solvent based processes. This technology is nontoxic and offers a good protection against corrosion. Consequently, there is no universally valid cleaning solution and the coaction of soiling and material has to be reviewed carefully before choosing the one or the other technology.

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NEW CNC FUNCTIONS

New options for Sigma and Micro.

Simplified transfer of part programs

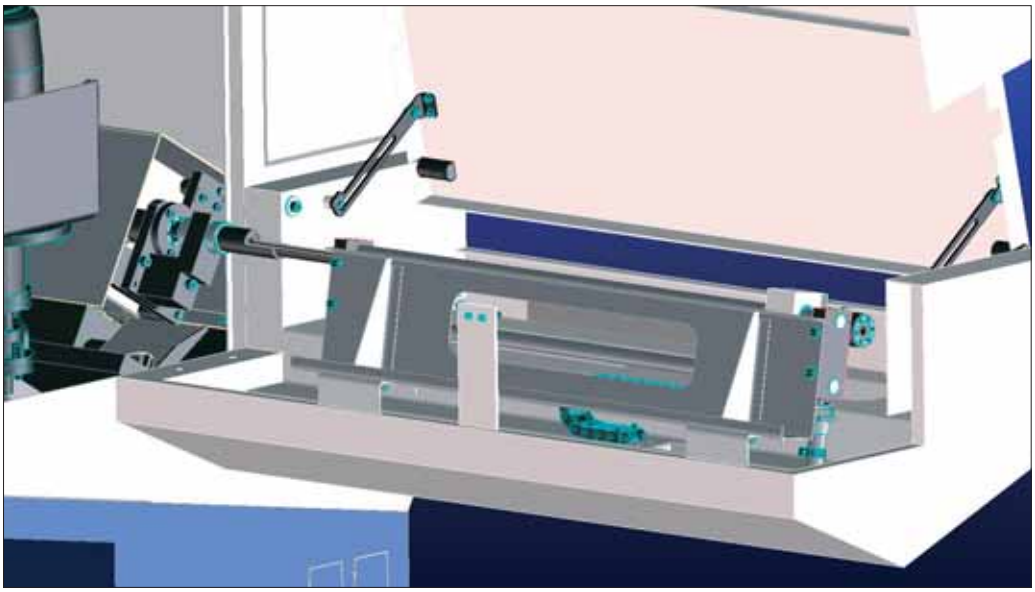
Until October 2007, part programs were transferred on Micro and DECO Sigma machines via standard Fanuc functions (CNC 31i and 32i). These standard functions are relatively restrictive for downloading a program. What's more, they don't give you the option of recovering the CNC part program in a single ".dnc" file.

Tornos has been offering a simplified program transfer on all DECO [a-line] and MULTIDECO machines for several years. This part program transfer enables all necessary operations to be launched from the single push of a button before running the start of the cycle.

This simplified part program transfer is now available on all Micro and DECO Sigma machines. It is also possible to adapt it to Micro and Sigma machines that are already installed.

Availability of types of simplified transfers

Memory card:	Available with immediate effect
Ethernet:	Available from April 2008
RS-232:	Not available



New bar feed

Another very useful function has been added to the DECO Sigma 20 and 32. This enables blanks to be cut with the G913 cycle during bar feeding. Its main application is the reduction of the initial bar in order to reduce the number of falls when the long part option is being used (4410).

Another example of an application of this function is the facing of new bars. This option is available with immediate effect on new machines and can also be retro-fitted on all currently used Sigma machines.

10,000 WORKPIECES IN A THIMBLE

Even if machining very small workpieces is an operation that has long since been mastered by many a bar turner, recovering workpieces can be a problem depending on the workpiece, the equipment on the machine or existing company practice.
As an effective solution to this problem, Tornos provides a system to recover workpieces using a vacuum.

2 bucket system

8 bucket system

Operational principle

Once machining has been completed, a 'suction' recovery device is brought towards the workpiece via a pneumatic system. When cutting begins, the vacuum system comes on and draws the workpiece down a flexible hose to a recovery bucket.

Benefits

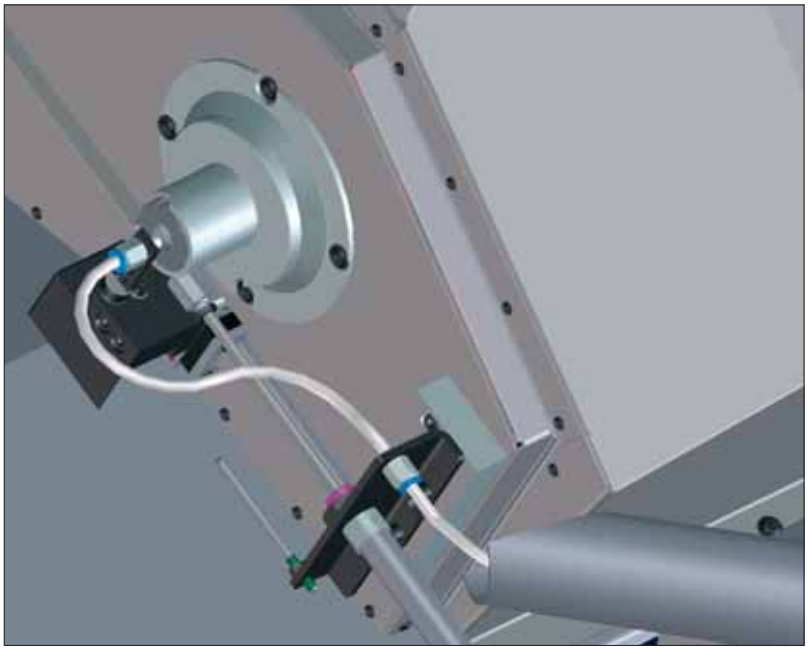
This system ensures that all workpieces are recovered. The system is available in two versions – a straightforward two bucket system and a turntable system with 8 buckets. In both cases, the buckets are filled with fluid to ensure a soft landing for the workpieces to prevent collision between the components.

The parameters of the 8 bucket system can be set, allowing workpieces to be sampled or production to be monitored more easily. The workpieces produced can therefore be transferred to different destinations

during the production shift. Real security for production runs at night, for example.

Technical specifications

- Max. size of workpiece: Ø 3 x 6 mm.
- Bucket capacity (2 or 8): Ø 50 x 90 mm (0.18 litre).
- Turntable programming: simple and independent of the machine.



Recovery device

Compatibility

DECO Sigma 8/Micro 8 and DECO 10a/10e

Compatibility	2 bucket system	8 bucket system
Micro 8	Option as standard	Available on request
DECO 10a/10e	Available on request	Available on request

Availability

Ex-factory available immediately and also available as an option on pre-installed machines.

Comment

The recovery device is positioned on the counter spindle and the recovery area is installed to customer specifications.

HALLBERG-SEKROM FABRIKS AB INVESTS IN THE LATEST TECHNOLOGY FROM TORNOS – SIGMA 20

Early 2007 Hallberg-Sekrom invested in a sliding headstock single spindle automatic lathe Sigma 20. The machine is intended as a complement to the 6 existing DECO (DECO 7, 10 and 20). The first DECO was delivered 10 years ago and after that has Hallberg-Sekrom been fantastic successful with their DECO-line which now consequently has led to the fact that they now has invested in a Sigma 20. It can also be mentioned that the success is a result of the close cooperation between Hallberg-Sekrom and Ehn & Land AB (Tornos preferred partner in the Nordic countries) as a complete supplier of machine tools, tools and service.

Mr. Mikael Bergh, product manager at Ehn & Land AB, visited Hallberg-Sekrom AB to find out what they have to say about their new Sigma 20 machine.

Mr. Bergh, E&L: The possibility to make changes directly in the machine, do you see this as an advantage? In the past you had to walk to the computer, make the changes and then input the program again. How is this done today?

Mr. Torbjörn Bramstång; machine engineer, H-S:

We know that it is possible to make changes directly in the Sigma 20 machine, but I work in the "old way", I find it both convenient and confident for me. We have tested to make changes directly in the machine but I find it easier to do this at the computer, it is a straightforward and neat way to get the answers directly in the computer. If it is just an ordinary adjustment this is performed quickly direct in the machine when it is running.

Mr. Bergh, E&L: What is your opinion of tolerances and precision? Does this come up to your expectations in the Sigma 20?

When speaking about travelling length the machine is very impressive, for example when the sub-spindle is moving to the main-spindle for cut off. The counter spindle moves almost half a meter before it shall pick up the component and it easy to think that this should involve some problems on a cold machine, but it is not so! If you want to you can always warm up the machine but we have not seen this as necessary as it gets warm very quickly and presents impressive qualifications.

Mr. Bergh, E&L: The new development of Tornos bar feeder SBF-532, what is your opinion

about that? How do you find this compared to the previous one SSF-226 of which you have a great deal of experience?

The Robobar magazine is impressively fast to reset now when you just have to lift up the guides, turn around and put back to correct capacity. We would also like to mention, that it now has been much easier to run the bar feeder, when it is controlled from one and the same panel direct on the machine. If you wish to increase the pressure, run backward and forward you can do all this from one place, which is an enormous improvement!

Mr. Bergh, E&L: Have you noticed any difference when running the Sigma 20 as there are equivalent spindles in both head and sub-spindle, or other advantages?

We have not managed to recognize any major differences, but this is certainly depending on the fact that we have not made so many operations in the sub-spindle. But it is definitely an advantage that you can run the same operations in the sub- as in the main spindle which makes it possible to mirror the process if you want to. An opinion we already have is that it is easier to change-over the Sigma than the DECO [a-line] – some things are better, more flexible and more operator friendly. The space inside the machine is big enough, which makes it easier to exchange tools or just modify an existing tool inside the machine. Another positive thing is the new quick change holders for rotating tools. There are no belts to lift up, you just have to set up the tool and fasten it with screws, which definitely is an improvement that saves a lot of resetting time. The belts are already there under the tool plate, so the pulley itself is directly guided in place, simply and smooth!

Mr. Bergh, E&L: We would like to know some more about the Sigma 20 machine, what is your opinion about it, is it as you expected or?

Yes, sure it is as expected, what you miss from the DECO 20a is probably that you can not use the same tool holders in the machines, a detail which makes that you are not just that flexible. But the machine itself is just as we expected it to be.

The flushing on the sub-spindle is improved, it gives much more oil and can be open as long as you want to, the structure of the ejector is better on the Sigma when it is producing than on the old type.

Mr. Bergh, E&L: You use TB-DECO today, do you notice any difference on TB-DECO and TB-DECO ADV?

Some improvements have been noticed in TB-DECO ADV. There are also many really good facilities, you

From left: Managing Director Gunnar Bergström, PC/purchase Peter Jansson, Machine Engineer Torbjörn Bramstång

can easily go in and collect different types of input. Then you also have the new options in ADV which not were available in the earlier version of TB-DECO.

Last but not least, the programming is much faster with ADV – less key-pressings as earlier.

Mr. Bergh, E&L: What about the security in Sigma 20 compared to earlier DECO-machines? The work around the machine, space inside the machine, to avoid people being injured?

Some things can be inconvenient when you will change something in the machine and make something fast, protection devices etc, but we also understand that they are present of one reason, CE-standards. There are sometimes operators, who are not familiar with this type of machines and then it is super that the machine stops when you open hatches and doors.

Sometimes we would like to stop the machine in an easy way, stop the spindle and open the hatch, look into the machine, then shut the hatch and run. Today we have to stop the spindles, shut of the oil, and turn the key to manual position before we can open the hatch, which is a very roundabout way.

All machines have the working hatch locked of security reasons, so today the machines are complete, you cannot do anything that breaks the security – then the machine stops immediately. But we understand that this is for the operators' safety.

Mr. Bergh, E&L: Is it easier to work with Sigma 20 than the DECO [a-line] machines?

It is a bit tougher to set up for example a boring head in the Sigma than in the DECO, but you should also remember that there is a price tag on the machines.

One example; if you take 20 components and machine them in the Sigma and 20 similar components in the DECO machine, the Sigma is not as fast as the DECO, which depends on the long moves in the Sigma machine. If the tool at the very top is used and then has to move the whole way down to the cutting-off tool it takes some time, it is almost one meter between these two tools. But the Sigma 20 moves very quickly, that's not the point.

Mr. Bergh, E&L: Can you produce more than you expected in batch sizes?

It depends on the type of component that is produced, if you run one thing at the time in the Sigma (one operation at a time) then it are not much slower compared to the DECO.

Mr. Bergh, E&L: Do you produce more just in time or do you put more parts in stock now when you have a new machine?

We produce parts that our customers orders continuously and mainly in small series. This means that we have more or less small stock for our customers. It is most often frequent work so we try to set up the machines twice a year.

It happens however that the customers run out of their annual need after 8 months which means that we have to set up the machine one extra time.

Mr. Bergh, E&L: What is the purpose with the Sigma 20 machine, is it bigger series, less set ups?

Today we make set up once a week but the aim are one to two weeks before we make a new set up. This is to get some continuity.

Sometimes we also run one day and after that we make a set up, so it will be a combination. We do not know at all what type of parts there will be in the future but the aim is one to two weeks' run before a set up.

Mr. Bergh, E&L: Who are satisfied with result of the machine, the customers, the management and also you? Is it as expected?

Yes, we are very satisfied here in Stockholm. The customers are satisfied as long as they get the quality they are used to and nothing else.

The management is satisfied with the investment. But on the other hand everything is so new yet so it can be difficult to say anything else.

Mr. Bergh, E&L: Considering that you have several DECOs and now one Sigma 20, is it possible that you buy more Tornos machines?

Yes, definitely. We get on very well with Tornos and we have used products from Tornos a long time – and successful. For us Tornos is a matter of course! The machines are easy to program and run and we shall not forget the service get from Ehn & Land, this is unique, the service staff is really very competent!

We at Ehn & Land and Tornos would like to thank you very much for your confidence and wish you all the best for the future. We hope that our cooperation will continue to be successful a long time to come.

ABOUT THE COMPANY

A system supplier with their own sub-contracting production. As a system supplier we offer assembly as well as production of mechanical details. Within our group approx. 700 people in total are working today. Having production both in Sweden, Estonia and China we are able to offer competitive prices, meeting high demands for delivery and quality. We are certified according to ISO 9000:2000 and we have modern equipment and systems for control measurement.

HSF STOCKHOLM
Our company has a wide range of machinery and long experience as a subcontractor of automatic turning details with high precision. Today we are one of the leading suppliers in Sweden and we also have a substantial export business. Our automatic turning and headquarters is located in Täby outside Stockholm.

HSF VISBY
In Visby we are working with mechanical & PCB design, electronic assembly (SMD) and design of manufacturing equipment.

ELIMAG
Elimag in Mölndal, just outside Gothenburg, are specialised in High Speed Machining (HSM) and Salt Bath Dip Brazing. With very modern machines we are able to produce complicated high precision parts in a short time for both high and low volume production.

HSF TARKON
Nearly 100 years of experience from former production of telephones, radio sets and black boxes for civilian and military airline businesses our company has developed into a reliable supplier of milled and turned details and above all assembly of cabling and apparatus for i.a. the telecom industry. Hallberg-Sekrom Fabriks AB is the major shareholder with 85% of the stock capital. Tarkon is situated in Tartu, Estonia.

HSF TARKON LEHTMETAL A/S
This company is a sheet metal working company with ultramodern machinery for production in thin sheet.

MEDETO
HSF Medeto is our contract manufacturer in medical technology with manufacturing in Estonia.

HSF WUXI ELECTRO MECHANICAL, LTD
HSF Wuxi; China will be in operation in the middle of 2006.

LOOKING INTO THE FUTURE

As outlined in our editorial, for the 10th anniversary of decomagazine, we have decided to run articles on tooling and lubrication from a "less immediate" standpoint, with the hope of revealing certain trends or key aspects for the future.

We have assigned this task to Mr. Robert Meier – independent specialist journalist – to carry out this investigation and here you can find the result of his research in this edition.

We thought it would be interesting to interview Mr. Meier, because even if the result we publish will bring us new food for thought, we were almost certain that we could, with his help reveal a little more about what the future might hold.

decomagazine: Mr Meier, we have seen, through different articles that the people you have spoken to are open to your questions but quite naturally they don't reveal everything. In your opinion, what may happen in the future?

Robert Meier: These articles involved my contacting different companies from various sectors. As soon as the questions touched upon new developments, they did indeed venture nothing. This is of course understandable. Nobody wants to reveal the current state of the development of new products or which avenues they have been told to go down by management. Amongst all the answers, however, certain key points come to the surface and are worth mentioning.

dm: For example...

RM: New coatings. The huge advances in medical technologies have meant more titanium is being found in alloys on automatic turning machines. Machining this metal and stainless steel materials with these alloys is causing a few headaches for bar turning specialists. It will come as no surprise to learn that future development of new materials for tooling is heading in this direction.

Talk of new types of coating is to be expected because there is already a great deal of expertise in this area, materials such as cermet polycrystalline materials are also well-established. On the subject of cermet, it should be noted that specialist opinion attributes less stability to this material due to the difference in the characteristics of the basic materials which is too great. We can now obtain finer powder and higher performance additives which make for improved adhesion between the two basic materials. This way, hardness and lifetime of the cermet are improved or even increase. The bar turner can therefore expect tool manufacturers to be very active in this area and bring new products to the market.

dm: Everyone is talking about "nanotechnology". Did this also come up in your interviews?

RM: Nobody wanted to talk about the future use of nanotechnology in any of the sectors we discussed. There is however a lot of research going into this area with hope of great things to come, particularly in the field of new coatings of all types. In several universities and engineering schools, researchers are studying the use of nanotechnology products and one of the areas of study is actually this field of tool coatings. Thanks to the degrees of hardness that can be reached and the sliding qualities of these coatings, they are expecting improved performances when machining with swarf removal and at the same time an increase in the cutting tools lifetime. This research is being done in collaboration with industry and it would be very surprising if we didn't discover new products in this area on the market very soon.

dm: Besides the new developments to come out of research, are there other trends?

RM: What I did remark on, during the interviews with cutting tool manufacturers, is that they are increasingly attentive to the demands of the bar turner. They are right to do so because experience has shown more than once that tool which is specially adapted to a particular machining operation increased the performance of the machine tools sometimes exponentially as can be seen in the PX Tools example.

This trend towards more tailor-made solutions is very obvious. Something to come out of the discussions was that specialists are not so much counting on new methods or tool shapes as shapes of cutting blades and cutting angles which are specially suited to a particular sort of operation specifically prepared for this. The partnership between suppliers and users seems to be growing in importance.

dm: We have talked at length about tools. What do you think the future holds for cutting oils?

RM: You won't be the only one surprised to hear that two large suppliers of emulsions and cutting oils that we interviewed mentioned the lack of know-how amongst users as far as the optimum use of their products is concerned. What is also striking in this sector is that suppliers have been able to demonstrate via parallel tests that by selecting a cutting oil which is specially suited to a precise machining operation, specialists were able to considerably improve the performance of the machine tools.

The future of cutting oil seems most likely to be towards an even more optimised use of products that already exist. This should certainly lead to new approaches from the manufacturer, especially as far as the question of the choice of the cutting oil is concerned. The topic we discussed earlier also came into the discussion here: The question of nanotechnology did not receive an answer from these suppliers either. The nanotechnological products have however, been on the market for over 40 years (!) and specialist articles mention the fact that these particles are able to adapt to the characteristics of the oils.

dm: Are you heralding the arrival of "intelligent" oils?

RM: If coatings which contain nanotechnological particles can have a favourable influence on the sliding ability of swarf on tools, why then shouldn't nanotechnological additives do the same thing in oils? It's virtually certain that users will find surprising new products that will enable machines tools to reach even higher levels of performance.

WHAT IS NANOTECHNOLOGY?

Nanotechnologies can be defined as being all procedures of construction and handling of structures, material units and systems done on the scale of a nanometer (nm). They are the design, characterization, production and application of structures, units and systems, the shape and size of which is on a nanometric scale (0.0000001mm).

Nanotechnologies can be characterized by the study of new material properties which appear on a nanometric scale, in particular with surface effects and quantic effects. In actual fact, on a nanoscopic scale, the relationship between the different interactive forces is different from the macroscopic scale. For sizes measured to the nanometer, electric, mechanical or optical characteristics of materials change.