MITSUBISHI ELECTRIC

The smart magazine for users

Profile

Issue 01 · October 2013

Contents

HANS-JÜRGEN PELZERS

Editorial

Only walking on air is better …

Any customer who manages to cut machining time for a tool from 50 hours to 30 will be walking on air (page 36). And this is pretty much the principle that the unique Tubular Shaft Motors work on – available only at the top of the range from Mitsubishi Electric. By consistently eliminating friction, wear is excluded from the outset. So it is hardly surprising that customers are increasingly tending to ask for just a single quote – a quote from Mitsubishi Electric (page 06).

There are many reasons why Mitsubishi Electric has become the world market leader in the EDM sector. The exclusive Tubular Shaft Motor builds on this lead and helps many users to achieve better results in shorter job times. And when one considers that the whole system saves energy on a big scale, it becomes obvious that the current machine pays for itself through higher productivity and energy savings alone. You can then enjoy the extra precision and comfort as a bonus. And, talking of bonuses, ask me about the special energy bonus – you're sure to like it!

Down-to-earth regards from Ratingen

Hans-Jürgen Pelzers
Distribution Manager Europe

Legal notice

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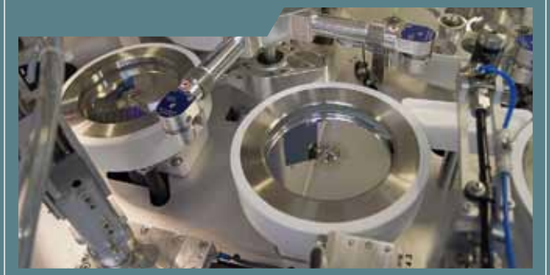
Newsflash

Rapid relief for flood victims

With the quick and unconventional donation of 25 dehumidifiers, Mitsubishi Electric has responded to the flood disaster in southern and eastern Germany. The move was initiated by Christina Marx, Mitsubishi Electric employee, who comes from the affected district of Wurzen. Christina has also ensured locally that the dehumidifiers run reliably and safely in tough continuous operation.

LED screens so large **they can be measured in wingspans**

To highlight the diversified product spectrum and outstanding pinnacle technologies of Mitsubishi Electric, the online advertising campaign "You wouldn't believe the things we do" has been launched. It shows a selection of products and applications ranging from satellite communication and e&ecoF@ctory to power semiconductor modules.



20,000 Blu-ray discs per day on a footprint of only 17 m²

Manufacturers of optical discs (DVDs and Blu-ray) have to temporarily produce large quantities of discs in rapid cycles. Satisfying such tough requirements in production, Mitsubishi Electric has been the automation supplier to Singulus Technologies (Singulus), a leading maker of replication systems for CDs, DVDs and Blu-ray discs, since 1999.

The new generation of **Ecodan heat pump systems**

The new generation offers even higher efficiency and further simplification of planning and installation. While the solution for indoor units is available with and without drinking/hot water storage, outdoor units can be employed with power inverter or new Zubadan compressor technology. The hot water tank volume has been increased to 200 litres net.

HANS MÖDERER WERKZEUG- & FORMENBAU

We are all members of the Möderer family

Everyone at Hans Möderer Werkzeug- & Formenbau GmbH, Leinburg, had good reason to celebrate. In October 2012, there was not only the company's 75th anniversary to commemorate, but also the change of generations at top management level. And, on top of this, the company that sees itself as a big family had just invested in a second wire EDM machine from Mitsubishi Electric.

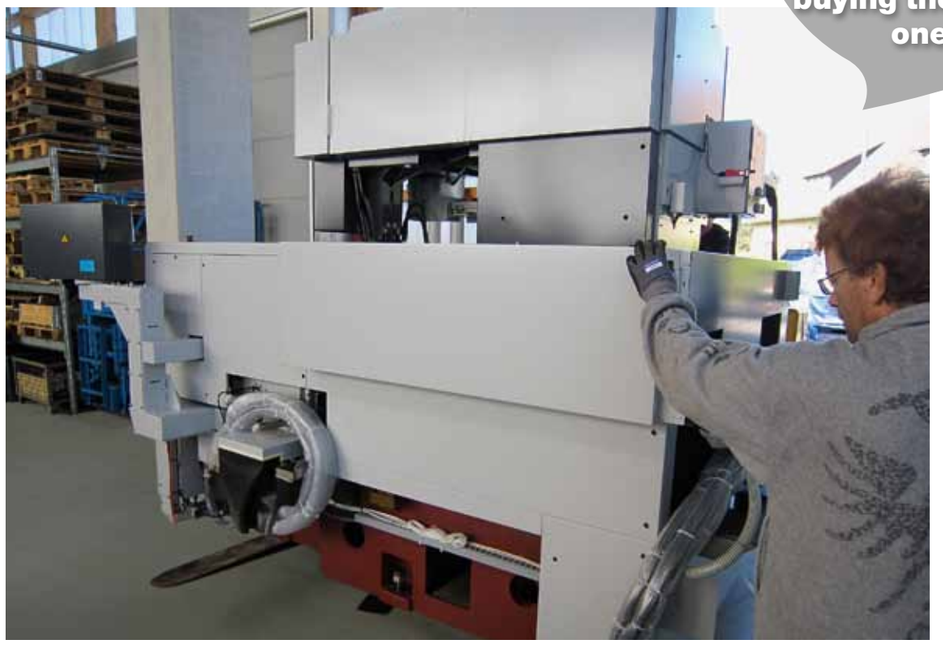
The guests of the anniversary celebration looked forward to an opulent buffet of hot and cold dishes.

A welcoming reception with sparkling wine and soft drinks. Followed by an opulent buffet of hot and cold dishes, arrayed around a suckling pig turning on a spit. A mouth-watering sight for the guests, be they friends of hearty Franconian cuisine or more partial to fish and other seafood, cheese, fruit or desserts. But not only the buffet was substantial, but also the speeches in which company history was "served up" before the informal part of the evening.

From 1937 to the age of the Internet

After the welcome address by Managing Partner Norbert Neubauer, politicians turned in their speeches to the company's development and accomplishments. The representative of Central Franconia's Chamber of Trade also stressed that the world in 1937, when Hans Möderer established his business, was entirely different to today's. There were neither smartphones nor the Internet or email. A good deal has happened in the 75 years since its foundation, reported Norbert Neubauer in his illustrated talk. At the beginning, Möderer's lines of business could not have been more diverse. He produced turned parts to customer drawings, sold bicycles, mopeds, electrical appliances and sewing machines, drove workers from the surrounding villages to their work with his own fleet of VW minibuses, ran a petrol station and kept bees. Over the years, the company specialised before finally maturing with in some cases massive investment in buildings, the machine park and CAD/CAM workstations into a high-tech supplier to specialised machine manufacturers and into a maker of top-class injection moulds. A major factor in this was the decision to build larger moulds and components under subcontract. As a result, Möderer built another shop in 2007 and purchased for all production processes machines equipped with larger machining ranges. An example of this is the FA30-V wire erosion machine from Mitsubishi Electric with a machining range of 700 × 500 × 350 millimetres (X/Y/Z). The end of this phase of investment was marked by a FA30-S Advance as the second wire erosion machine, which went into operation just two weeks before the anniversary celebration.

» The first machine from Mitsubishi completely satisfied our expectations, so we didn't investigate other options when it came to buying the second one. «



The FA30-S Advance was supplied on a truck and transported by a forklift into the production shop.

Big extension to production capacity

Möderer has been working with wire EDM since 1989. Sometimes in unmanned operation at night and at weekends. This is why the company demands very high machine availability. A demand that culminated in the purchase of the FA30-S Advance from Mitsubishi Electric in November 2007 and hence in a change in supplier. Neubauer: "We were happy neither with the competition's service nor with the wire-threading system. Without a reliable threading system and our extra 20-kilo wire station, continuous unmanned operation would be out of the question."

In choosing the FA30-S Advance, the operator went for a wire-cut EDM machine whose machining range of 750 x 500 x 410 millimetres (X/Y/Z) matches his maximum workpiece dimensions perfectly. The new, high-precision erosion system equipped with an Advance CNC control also has a greater cutting height than the FA30-V. Möderer had the machine fitted with the optionally available digital FS generator in order to achieve e ven better surface quality.
Now that the company has significantly extended its production capacity by adding the second system, it has been able to reduce its production

We are all members of the Möderer family and Möderer's success is our collective success.

bottlenecks appreciably and to free resources for new customers. Neubauer celebrated the anniversary in an upbeat mood: "The firs EDM machine from Mitsubishi Electric completely satisfied our expectations, so we didn't bother to investigate other options when it came to buying the second one."

With the aid of the wire erosion systems, the Möderer team fabricates extremely precise injection moulds from drawings and CAD data – from design and mouldmaking through to piloting. EDM business also comes from the machine manufacture sector if these are elaborate parts that cannot be cost-effectively turned or milled. An example of this is gripper components for injection moulding machines. Moreover, wire EDM for Möderer is also an alternative to milling if unusual geometries are called for or the delicacy of the workpiece necessitates an unconventional clamping arrangement. For EDM, in which no pressure is applied to the part, the workpiece can be simply laid on the magnetic clamping plate. Möderer mainly processes hardened mouldmaking steels as well as special materials that are difficult to machine conventionally, such as those required for medical technology machinery. Whatever the material, the company uses standard 0.25 millimetre wire. The workpiece sizes range from 30 x 30 to 700 x 800 millimetres.

Rake tooth of VA 1.4301, of which the customer ordered several parts. Möderer initially produced a plate, then cut the slot through all the parts and finally wire-cut the exterior contour of all the parts at night during unmanned operation.

Since everything is developing promisingly, Neubauer views the future with optimism.

Georg and Ingrid Weinmann hand over the management batons to Norbert Neubauer and his wife Andrea.

"You have reached your destination"

Before the buffet was opened, senior manager Georg Weinmann, who has been managing the company since 1976 with his wife Ingrid and, since the mid-Nineties, additionally with their son-in-law Norbert Neubauer, delivered his speech. Together they have developed Möderer into one of the bigger mouldmakers in the Nürnberg region.

Georg Weinmann stressed the team spirit and pointed out that his company is like a big family: "We are all members of the Möderer family and Möderer's success is our collective success." And then the big moment arrived: Georg and Ingrid Weinmann handed over the management batons to Norbert Neubauer and his wife Andrea.

Today, the company certified to DIN EN ISO 9001:2000 sees itself as a specialist in the production of parts of any complexity. In the mouldmaking sector, the customers include the automotive and toy industries, manufacturers of cosmetic products and suppliers of automation solutions. With everything developing promisingly, Neubauer views the future with optimism. "We've positioned ourselves well in the last few years, overtaken some of our competitors and increased our circle of customers in the region. In view of this and since 95 per cent of our customers are located in and around Nürnberg so that both sides benefit from the short distances involved, I have no worries about the coming years. Our comprehensive service and ability to deliver at short notice are much appreciated, as this makes our customers aware of our determination to support them at all times."

Neubauer asked his wife and parents-in-law over for a group snapshot. "The voice of a satellite navigation system would now say: 'You have reached your destination.' But don't worry, a new destination has been entered and the route is already being computed."

www.moederer.de

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Professionals in Profile:
Norbert Neubauer

Name and place of company:
Hans Möderer Werkzeug- & Formenbau GmbH, Leinburg, Germany

Founding year:
1937

Managing Partner:
Norbert Neubauer

Number of employees:
34 permanent employees, 4 apprentices and temporary staff

Core business:
Tool- and mouldmaking

How did you earn your first money?
As an electronics apprentice.

What motivates you?
I'm to some extent naturally ambitious. It's from this that I derive my motivation to be successful at work and in my private life.

What's different about how you do things now, compared to five years ago?
Five years ago, the company was in the middle of a phase of growth. The investment in the FA30-S Advance marked the end of this phase. Now it's a question of consolidation economically and in terms of internal structure.

Where do you see your company in five years' time?
We aim to stabilise the position that we've reached and build on it in a controlled fashion.

What's your favourite way to relax?
Jogging and singing.

What attributes do you value most in other people?
Dependability and honesty.

How would you briefly describe your work to someone with no technical knowledge?
I cut contours in metal with wire in the same way as I cut wood with a fretsaw.

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Sauber F1
Factory Tour

Win one of 10 places on the F1 Factory Tour!

What floats on air and yet achieves high precision?

- ☐ Shuttlecock
- ☐ Tubular Shaft Motor
- ☐ Hot-air balloon

Simply tick the right answer, fill in your address and send off by fax.
The closing date is 30th September 2013.

Fax +49.2102.486 7090

Company

Surname First name

No., road

Tel.

Post code Town

Date, signature

Note: Only one prize can be awarded per person. There will be a draw for the winners. Employees of Mitsubishi Electric and sales partners are not eligible to compete. The judge's decision is final. Payment of the prize in cash is not possible. Your data will not be passed on to third parties, except to companies involved in the handling of the processes mentioned. You can object at any time to the storage of your data. To do so, simply send a fax to: +49 . 2102 . 486 7090.

EDM and more

ALDROVANDI

Intelligent clamping
makes all the difference

Outstanding results are only possible with a tailor-made clamping fixture. Since Peter Aldrovandi is convinced of this, he builds the fixtures himself – including one for his new wire EDM machine, an MV1200R Grand Tubular from Mitsubishi Electric.

Peter Aldrovandi, Managing Director of Aldrovandi AG in Baar, Switzerland, sits at his PC and pages through the latest contributions to his discussion forum that he has set up at www.aldrovandi.ch/forum. As an EDM specialist through and through, he has been running the forum for several years so that he can share his expertise with his fellows. “I have no reservations about doing this. I regularly swap notes with colleagues from all over the metalworking sector. At social evenings that I organise several times a year, we share our worries and ideas.” In the forum, he encounters a user faced with the difficult task of choosing between three wire erosion machines from different manufacturers. Some advice sounds pretty flippant. For instance, “With Mitsubishi you get the most for your money” or “The biggest cheek was once after wire breakage when the machine rethreaded the kerf on the spot.”

In close and direct contact with customers

In view of his openness, manifested by the constant flow of information on technological developments and savings opportunities, it is no surprise that Peter Aldrovandi has regular customers who have remained faithful to his firm for 30 to 40 years. Through the window he greets a man who has just arrived to collect his parts. “That’s someone from V-Zug AG that produces high-grade devices for kitchens and washrooms – one of our customers since the Seventies.”
V-Zug is thus one of the very first customers of the mechanical and technical firm that purchased its first wire EDM machine back in 1974 and focuses on wire and die-sinking EDM.
The company now uses six wire erosion machines and one die-sinking machine, all of them state-of-the-art, and can thus

Daniel Melliger benefits from the easy-to-operate new ADVANCE PLUS CNC control

better alternative to wire EDM, we say so. The customer's confidence is the most important thing."

Cultivating contacts with the customer also includes personally supplying key accounts with finished parts and collecting parts for machining from them. Within the sparsely populated firm, relations are no less personal. As fellow employees, the Managing Director has his wife Elisabeth and his sister Esther. And then, finally, there's Daniel Melliger as the only non-family member whom Aldrovandi has known since childhood and who, like his sister, trained as a toolmaker at Aldrovandi AG.

Clamping fixtures can be seen on a cart. Aldrovandi picks one up. "In the interests of our customers, we aim to clamp workpieces intelligently, so we build these fixtures ourselves. For series parts, for example, so that several can be clamped together and wire-cut cost-effectively. Or for complex parts for which high positional accuracy is all-important so that we don't have to additionally align them manually.

» With Mitsubishi you get the most for your money. «

"I couldn't say no."

Aldrovandi replaced an old machine with his MV1200R Grand Tubular from Mitsubishi Electric in December 2012. He was curious about the latest technologies, he says, including the drive strategy of the MV Series with its Tubular Shaft motors that permits a high quality of surface finish even with standard settings. These drives in the X, Y, U and V axes prevent cogging and ensure smooth and highly controllable movements. In the workshop, Aldrovandi tells us that he became aware of the Tubular Shaft motor during a presentation of the high-end NA Essence wire erosion system at the Sauber racing car production shop. "I told Hans-Peter Barth, the Swiss Mitsubishi regional rep, that if he were to offer me an FA-S Advance with Tubular Shaft motors, I'd buy it. And when I finally saw the MV1200R Grand Tubular at the 2012 Prodex trade fair, I couldn't say no." The machine completely satisfies Aldrovandi's requirement profile. He expects a wire EDM system to be compact, precise, maintenance-friendly, dependable and cost-effective and offer a high machining speed. An integrated B axis is an absolute must for him. The MV1200R picks up further points with its price/performance ratio, low servicing and operating costs and its easy-to-operate new ADVANCE PLUS CNC control. Completely digital, the latter communicates much faster and more efficiently with the aid of the Optical Drive System and thus enhances component precision.

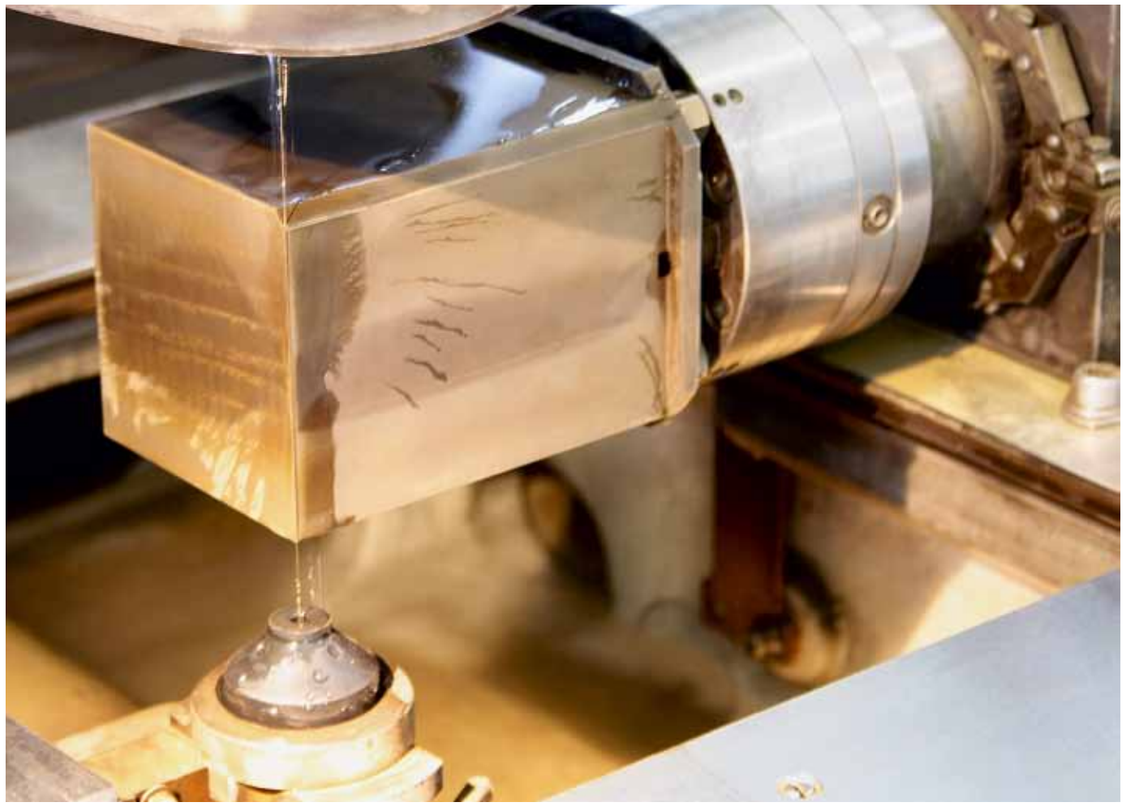
However, Aldrovandi doesn't program at the machine, which he has equipped with a 20-kilo wire station for longer interruption-free assignments, but at a

→ very swiftly and flexibly respond and ensure punctual delivery even where more elaborate jobs are concerned. Also available is a machining centre that enables him to offer the full range of machining inclusive of grinding.

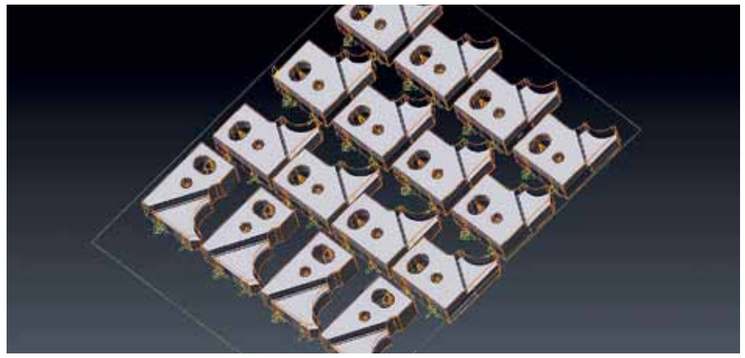
The smell of freshly brewed coffee wafts through Aldrovandi's office as he places cups and a plate of croissants on the table. "In face-to-face meetings with customers – and over a cup of coffee – we've often found surprising and simpler solutions. We're in close and direct contact. Our customers expect quick, inexpensive and competently performed work within the tolerances." But Aldrovandi knows where his limits are. "If there's a

EDM and more

"In the interests of our customers, we aim to clamp workpieces intelligently, so we build these fixtures ourselves."



The MV1200R Grand Tubular threads the wire in the kerf.



Aldrovandi's product range also includes medical technology components.

"I had no idea that it worked."

Because data have to be kept confidential, Aldrovandi applies high security standards to his IT infrastructure. "I've built my own server so that my data and those of my customers cannot wander off into the Web. My customers appreciate this data security."

3D CAD drawing of the plate of a die (eroded cuts are marked with orange lines)

He opens the door to a store room. "I keep at least six months' stock of all the consumables that I need for EDM. Wire and filters, for example. As long as power comes out of the socket, I can do the jobs for my customers."

The "Intelligent AT" automatic wire-threading system developed by Mitsubishi Electric has also stimulated his interest. He demonstrates how it works. "I was recently standing at the machine and glanced into the dielectric bath, when the wire suddenly broke and the machine threaded the kerf on the spot. And on an 80 millimetre high workpiece. Until this morning, I had no idea that it worked so perfectly. " He also stresses the energy efficiency of the MV1200R Grand Tubular. "I benefit firstly from the lower piece costs. And secondly, as the father of a nine-year-old daughter, I have an obvious interest in protecting the environment and conserving resources."

→ specially created programming station. He is able to adopt the most commonly used CAD data straight from the customer and process them. With reference to products, he can show what he does with the data. "We produce components for sensors, medical technology parts, punching tools and general machine components. The main materials we use are hardened tool steel and stainless steel as well as cemented carbide and titanium in dimensions ranging from 10 x 20 to 200 x 250 millimetres."

www.aldrovandi.ch

www.aldrovandi.ch

Name and place of company:
Aldrovandi AG, Baar, Switzerland

Founding year:
1965, converted into a Swiss Aktiengesellschaft in 1976

Geschäftsführer:
Peter Aldrovandi

Number of employees:
4

Core business:
Wire-cut and die-sink EDM, precision machining

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Professionals in Profile: Peter Aldrovandi

How would you describe in a sentence what your company does?
We've been wire-cutting everything conceivable for customers at home and abroad for 40 years now.

How did you earn your first money?
While still at school and in the holidays, I wrote programs for my father for his very first wire EDM machines.

What motivates you?
Curiosity, because I'm very interested in new technologies. I want to keep up with the state of technology in all areas of my life.

What's different about how you do things now, compared to five years ago?
I drink less coffee and more wine.

Where do you see your company in five years' time?
We want to continue to make use of the latest technologies so that we can offer our customers the best-possible results.

What was your biggest business success?
Keeping our family business on course in good times and bad.

What's your favourite way to relax?
I've been practising Shinson-Hapkido for five years, which is very relaxing. I also enjoy playing with new technological challenges. I'm currently exploring 3D printing.

What attributes do you value most in other people?
Honesty and keeping a sense of humour.

How would you briefly describe your work to someone with no technical knowledge?
Using a fine wire and electricity, I cut the most incredible shapes out of a piece of metal.

Rust protection with water

Chia-mo Srl has been designing and building accessories for machine tools for subtractive machining since 1972. The company whose headquarters is on the urban periphery of Bologna today produces an extensive range of accessories for machine tools and particularly for lathes: chucks, closure systems, lathe collets, tool holders, boring bar sleeves, manual tap holders, tailstocks, awls, spindles and other spare parts.

CHIA-MO

Thanks to its many years of market presence, Chia-mo Srl has acquired a wealth of experience in this field, enabling it to provide planning and design services for bespoke components that have to meet the customer's specific requirements.

The company has been quality-certified for ten years and meticulously monitors the entire production process – from the materials and certified and tested heat treatments through to the application of SIT-certified measuring instruments for final control. All phases in planning, machining and testing are carried out internally, thus facilitating continuous control of all production processes. Chia-mo is also committed to the environment, having installed at its site a photovoltaic system that covers 50 per cent of the company's energy needs.

The other strengths of the company in Bologna include rapid order processing, as Fabio Chiari, in charge of production, confirms: "We are constantly increasingly our product range. 95 per cent of our standard products are now stocked and we can send out the items on the same day as we receive the order. We design and machine many products. This applies, for example, to drilling tools that feature a special system making it easier to work with the tool and thus eliminate the strength- and centring-related problems that can occur on the machines. This product was the result of the requirements of customers who for the most part act as subcontractors and approach us with all kinds of inquiries calling for a high level of flexibility. This is a real test for us, as we are faced with every problem that can arise during machining. This experience is reflected in everything we produce."

Chia-mo Srl's extensive range of components for lathes and loaders includes collets, chucks, groove nuts, tool holders, sleeves, tailstocks and many other products.

A reliable and high-performance machine

Most of Chia-mo's customers are Italian, although the company has representatives and distributors for the most important European markets: Germany, France and Spain. Chia-mo has always attached huge importance to quality, which is reflected in its sales. Tested and certified raw materials, reputable

The Mitsubishi Electric machine was chosen to ensure a high degree of precision, quality, reliability and above all productivity.

→ and dependable suppliers, meticulous processes, and the application of the latest technology – all this contributes to the achievement of uncompromising quality. One of the most recent investments has been in an EDM machine, the new Mitsubishi Electric MV 2400 R.

Even if the lion's share of work is performed on lathes and milling machines at the Bologna plant, a not inconsiderable proportion calls for EDM. Particularly if subtractive machining is not possible – not least because they have to be carried out on already hardened material in order to ensure a high degree of precision.

It is a question of special shapes (square, hexagonal), geometrical sections with an extremely small radius, and interior areas that are inaccessible: "The Mitsubishi Electric machine was chosen to ensure a high degree of precision, quality, reliability and above all productivity. All this was guaranteed by our supplier Tecnomach. We trusted him – not least because of the many years of profitable cooperation that unites us – and took the plunge by purchasing it without having seen it in operation. We had clearly defined our requirements."

All work performed underwater

The Bologna-based company has to machine numerous small-size workpieces and had long been considering benefiting from unmanned operation at night. This would mean that the machine is loaded in the evening and the workpieces are finished by the following morning.
However, for this to be possible, it was necessary above all that the wire-cutting machine was able to thread the wire automatically: "This feature has been available on the market for some time, but none of the machines we had previously tested proved to be absolutely reliable. The results were acceptable, as long as high standards of cleanliness were maintained.
However, it just took the tiniest contamination on the wire or a little dust, and there were problems. After a certain number of workpieces, rethreading failed to work properly, so the process had to be stopped."

» The new MV 2400 R has demonstrated exceptional dependability – threading has been flawless without exception. «

The wire threader of the new Mitsubishi Electric MV 2400 R operates not only fully automatically, but also ensures a high degree of reliability and uniform results.

Semi-finished collet with a wire-cut pilot bore and overmeasure for skim cutting.

In addition, after the finished workpiece was removed from the water, rust developed on it after exposure to the air for just a few hours – only superficially and locally, but it was unacceptable for aesthetic reasons. It had to find an EDM machine that would solve all these problems: "At Mitsubishi Electric, we've found it. The new MV 2400 R has demonstrated exceptional dependability in the last few months – threading has been flawless without exception. Whenever I come into the workshop in the morning, all the work has been correctly performed – and with the previously set precision. Tecnomach also assured us that threading underwater would be performed with the same dependability. And so it was. This way we are able to solve the problem of rust, as we keep the workpieces immersed until the very last moment and thus prevent their coming into contact with the air. Then they are all dried collectively."

Mitsubishi has designed an extremely efficient, innovative and revolutionary wire threading system. The wire is heated and stretched, which yields a barely perceptible but sufficient reduction in the diameter. Then a water jet is directed at the lower machine head (30 cm further down), which is only a few millimetres larger than the diameter of the wire and threads the wire. Digital motors feed the wire, with continuous monitoring of the process.

Optimised parameters

As for the programming of the machine, the Chiamo technicians stress that the system for the simple and intuitive organisation of work processes,

however complex, is mature and extremely user-friendly. “An external camera is practically unnecessary. The video graphics are self-explanatory. Communication with the machine takes place via masks and symbols that make programming much more straightforward. Many parameters are automatically calculated by the machine. Other manufacturers adopt the same procedures, but in terms of precision we have found that this new model from Mitsubishi Electric sets the standard.”

The solution for the adapted movement of the axes is based on reluctance motors (tubular motors), which is why no further mechanical components are needed. Further advantages include energy savings and the optimisation of all operating parameters, starting with the speed of wire running

Since the installation of the new machine from Mitsubishi Electric, the productivity of Chia-mo Srl has improved considerably without compromising on quality.

through to the values for electrical discharge. The outcome is a considerable reduction in cycle time. Unlike other machines on which the number of successively settable operating coordinates is limited, the user is granted more freedom: “We can place a large number of workpieces on the table, each of which is accessible via its coordinates. The work program is capable of precisely positioning the machine head in the various positions and thus working automatically without the need for manual intervention.”

Conclusions

Since the installation of the new machine from Mitsubishi Electric, the productivity of Chia-mo Srl has improved considerably without compromising on quality: “We used to have to machine the workpieces one after another, empty the tank immediately to dry the components (before rust can form) and finally start the cycle from the beginning with a new workpiece. This resulted in waiting time that we wanted to eliminate at all costs. Now we can do all the work unmanned – the machine operates entirely by itself.”

www.chiamo.it

Wire-cut series parts: hexagonal tool holders for reamers.

www.chiamo.it

Name and place of company:
Chia-mo Srl, Bologna, Italy

Founding year:
1972

Managing Director:
Adalberto Chiari

Number of employees:
30

Core business:
Production of components for machine tools

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Did you know …?
Bologna

Welcome to the home of tortellini, mortadella and other culinary delights. Bologna is the capital of the province of the same name and has a population of over 380,000. The area between the rivers Reno and Savena and the Appenine Mountains is also much loved by the students of the university city.

Bologna is the home of tortellini – ring-shaped pasta filled with minced meat that is usually served in a meat broth (“brodo”) or with “sugo bolognese” (made from minced meat and tomatoes), which is usually simply called “ragù”. In Bologna, the “sugo” is made not only with minced meat, but sometimes also with the addition of “salsiccia” (coarse raw Italian frying sausage). According to legend, tortellini are modelled on the navel of Venus, the Roman goddess of love.

Another speciality of Bologna is mortadella, a cooked pork sausage that is eaten cold, usually diced or finely sliced.

Bologna is also famed for its lasagne and yellow tagliatelle of egg pasta. According to another legend, the latter is said to have been invented by a cook who was ordered to create a dish for the wedding of Lucrezia Borgia to Alfonso I. d’Este, Duke of Ferrara, and found inspiration in the bride’s golden hair.

Cutting diamonds with precision

Karl J. Lütticke stepped down in 2005 and his daughter Britta Weinberger and his son-in-law Stephan Weinberger took over the company together.

When it comes to high-performance machining in industry, tools with cutting edges of PCD (polycrystalline diamond) and CBN (cubic crystalline boron nitride) have become firmly established – among other things in the automotive sector and in the machining of graphite and of carbon-fibre- and glass-fibre-reinforced plastics. PROFILE magazine spoke to Stephan Weinberger, Management Director of innovative tool specialist Lütticke GmbH, about the production and machining of such tools.

Mr Weinberger, some women's eyes light up when they hear the word "diamonds". How do the polycrystalline diamonds that you process differ from the decorative variety?

Weinberger: Diamonds for jewellery are usually natural polycrystalline gemstones. They are bright, and they gleam and refract the light in its many facets. PCDs, on the other hand, consist of polycrystalline, synthetically produced diamond grains that are bonded together in a matrix usually consisting of cobalt and other substances.

"True" diamonds can be immediately distinguished from PCDs by their outward appearance. A PCD is usually black and not very attractive. However, what they both have in common is their very high strength, although the two types of diamond differ greatly in their amenability to machining. Whereas a natural gem can often only be ground in a single direction, a PCD can be ground, eroded and lasered.

What steps have to be taken to make a high-performance tool out of PCD?

Weinberger: We use PCD for the cutting edge. For this, we first produce a tool carrier. We usually buy the PCD in 70 mm round blanks. We cut them by wire erosion, and braze the matching blade into the carrier and then finish it. This can be by grinding it or wire-cutting it with the aid of the fine finishing generator.

For your EDM work, you have been using Mitsubishi machines like the MV1200, FA20 VS and BA 8 for almost 30 years. What do you like about the machines?

Weinberger: There are a number of points. We're very happy with the after-sales service. Operation is intuitive and

→ the programming system neatly structured, and our staff are immediately able to handle it reliably. We have of course tried out a number of rival products over the years, but we weren't impressed by the trials.

In which production areas do you used EDM machines?

Weinberger: We use them for the preliminary machining of tools, which means cutting the blanks. We grind the insert seats with the required precision. If the customer wants particularly high precision, we wire-cut the recesses for the PCD blades. With this form of machining, we work with a tolerance range of 5 µm when preparing the tool carrier. We basically produce small series, although we also have products in our portfolio machined in numbers of up to 200. The average batch size with PCD is 3 to 5.

Last year you invested in two new Mitsubishi MV1200S wire EDM machines. Are these additions to your machine park or replacements for older models.

Weinberger: The new MV machines are extensions to our range of machining options. For the Scandinavian market, we have reorganised our field service, and this has yielded a good number of wire-cutting jobs. One of the machines is working to a high level of capacity. We've equipped the second machine with a clocked axis. It is a redundant system that steps in to handle the existing workload in the event of a machine failure or maintenance. This sounds costly, and it is. But we work for the automotive industry and if we can't meet our deadlines, we lose the customer. Also, we've just reached the limits of our capacity again. All our machines are in operation. We have very little downtime. Our production department operates with flexitime shifts from 5 am to 7 pm. After this, we let most of the machines work into the night. Our automation cell runs 24/7.

What are the advantages of the MV system in your view?

Weinberger: Allow me to concentrate on the points that matter to us. First of all, there's the fine finishing generator. Unlike the slightly older machines, it delivers significantly better surfaces when cutting PCD. It also achieves a more precise cut. Secondly, there's the automatic wire threader. We cut all tools with a clearance angle of under 7, 11 or 15 degrees. In the event of wire breakage, the older machines first run the system back into its zero position. But not the MV. It automatically re-threads the wire in the position where the wire has broken. In doing so, it feeds the wire diagonally, at the given angle, through the kerf, which in our case is a maximum of 0.25 mm wide – and at high speed. And thirdly, there's the generator output that makes much faster cutting possible.

Almost every tool is unique and produced in small batch sizes. Each one has to be designed, computed and programmed from scratch. We've adapted our structure to this.

Lütticke produces rotating tools with more than two cutting edges on the new system with its automatic tool changer.

Mr Weinberger, let's talk about your fully automatic tool changer. What is it for and how does it work?

Weinberger: I have to admit that getting started was difficult. For Lütticke and our partner Mitsubishi, it was the first system of this kind. In its current, initial state, a robot aided by a tool changer loads a FA 20 VS with new tools for wire-cutting around the clock. The system is specifically intended for the fabrication of rotary tools that have more than two cutting edges. For the extensions planned for 2014 and 2016, we intend to integrate another wire-cutting machine in the system. At present, the tool changer can be loaded with a maximum of 15 tools. With interim extension, we plan to increase this figure to 30 and, in its final state, to 50.

What are the difficulties involved?

Weinberger: When we order a new wire-cutting machine – say from Mitsubishi – we get a complete system with tested software. In this case, the tried-and-tested software wasn't available. The software for the control of the cell comes from GTR and the machine from Mitsubishi. Problems at the interfaces are practically inevitable. But we've got to give credit to Mitsubishi. Their staff always came round straightaway to track down the error source and remedy it. We've now overcome all the teething troubles. The system has been running totally smoothly for the last three and a half months and we haven't had any system-related failure. Self-critically, I have to admit that we underestimated the problems beforehand and didn't do all our homework. Not all the tool dimensions were precisely logged and the zero points were not all clearly defined.

Companies **in Profile**

Since its founding in 1979, Lütticke GmbH has been concerned with machining solutions for industry. While the company initially served exclusively the regional market, it now has its sights on Europe. With its innovative products for machining, it has developed into a dependable supplier to the automotive industry and automotive parts suppliers. Other focuses can be found in the machining of CRP, GRP and graphite and abrasion protection. In the last 10 years alone, the product range has grown to about 10,000 tools, machined typically in batch sizes of 3 to 5 pieces as well as 100 to 500 pieces. One of its specialities is high-grade special tools with cutting edges of PCD (polycrystalline diamond) and CBN (cubic boron nitride).

In the last few years, Lütticke has invested about EUR 4 million in its modern machine park and in efficient automation solutions. Together with reputed partners, the company researches and develops, among other things, blade geometries for the machining of CRP materials and the high-precision profiling of diamond grinding discs with wire EDM.

The company's backbone is its 16 highly skilled employees who, together with the committed managers Britta and Stephan Weinberger, stand for punctual delivery, precision and innovation. So that it can continue to meet its high standards of quality in the future, Lütticke successfully trains machinists.

In the coming years, the company aims to increase its market shares, expand its foreign business and grow at its current site with further automation and innovative further development in the special tool sector.

A big advantage of the system is its intuitive operation.

» We have of course tried out a number of rival products over the years, but we weren't impressed by the trials. «

→ Mr Weinberger, how did you solve these problems before the installation of the robot cell?

Weinberger: Basically we didn't. We had the ideas and got the machine system going before we got the first job. Only afterwards did we take on work. This way we didn't get under too much pressure. As I mentioned earlier, our customers expect delivery to deadline. With the new automation strategy, we've been able to significantly boost our sales, and they've risen by about 30 %.

For the first time we've been able to adopt totally new tooling strategies and machine rotary tools with even greater precision, as it is our aim to improve speed and precision. We believe that we can only hold our own as a German-based company if we can produced high-precision and high-grade tools with an attractive price/performance ratio.

Mr Weinberger, you've been conducting research together with the Fraunhofer Institute in Berlin into the optimisation of the subtractive machining of CRP materials. What's the idea behind this?

Weinberger: Together with SGL Carbon and the Fraunhofer Institute, we want to develop an entirely new cutting material. With Mitsubishi's support, we want to determine the optimum production parameters and cutting geometries for the machining of CRP materials and wood with the aid of all-ceramic tools. Our goal is to develop a tool that at top speed during high-speed cutting is able to absorb the process heat well while also permitting higher feed rates.
We thus wish to reduce the burns that often arise during the machining of wood to a minimum.

Are there any other projects?

Weinberger: In another project, we are working together with Mitsubishi on the EDM profiling of diamond grinding wheels. This project has already reached the industrial testing stage. We see applications in the glass industry and in the precision grinding of mills with knurled toothing.
We are currently working here with metal grinding wheels. But the first attempts to produce grinding wheels bonded in a synthetic resin matrix with conductive filler have gone well.

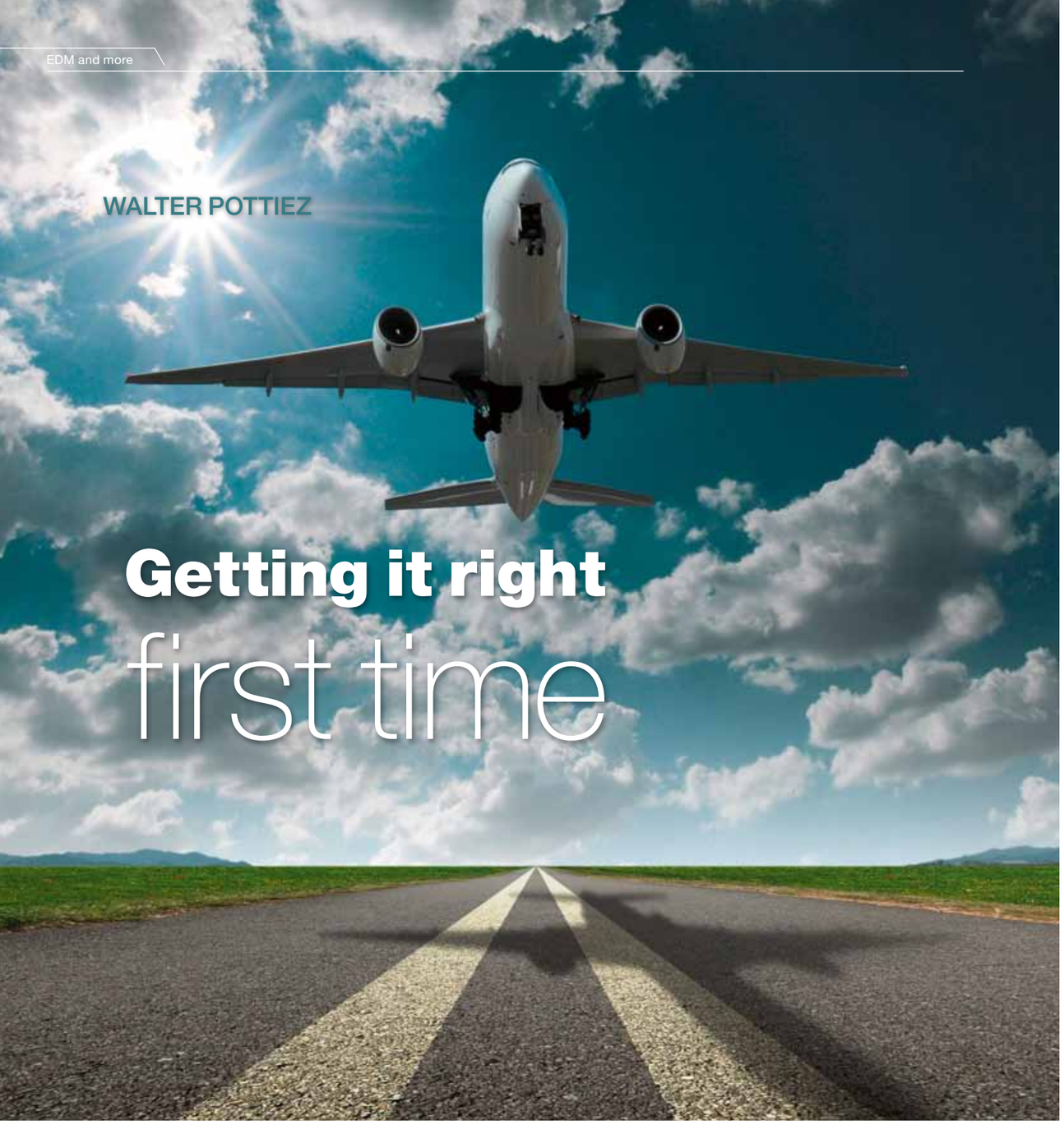
When will you be publishing the findings?

Weinberger: The initial findings on the profiling of grinding wheels are already available. The final report on the research project devoted to the development of technology for all-ceramic shank tools for CRP and GRP machining will be published in May 2014.

Mr Weinberger, thank you for the interview.

www.luetticke.biz

This system makes it possible to produce many different tools in small numbers.



WALTER POTTIEZ

Getting it right first time

Walter Pottiez GmbH is one of the first users of the MV2400R Grand Tubular from Mitsubishi Electric. With its precision, the wire EDM system seamlessly continues the tradition of the broad range of machines that tool- and mouldmakers need for the efficient production of one-off parts.

A batch size of one – a concept that instils fear in many metalworkers – is the norm at Walter Pottiez GmbH in Sulzfeld. In its work, the family company benefits from its shallow hierarchy and the resultant flexibility.

Qualified engineer Lars Kölle, who runs the business together with his wife Katja Pottiez-Kölle, places a gearing die on the table whose teeth have been cut on the MV2400R Grand Tubular. “Since we only produce one-offs, we have to be sure of getting it right first time when wire-cutting, as with all our other processes. At the same time, it’s a question of mastering this challenge at acceptable cost. This is why precision, for example, is more important than a high machining speed. Speed is of course also appreciated, but before we produce scrap, we prefer the machine to run a little longer instead.” Precision doesn’t of course exclude speed, as the Grand Tubular is renowned as much for its speed as for the precision of its corners and curves.

Unique position in Germany

Lars Kölle points to the operator who has just clamped a workpiece. “To create the conditions for precise cuts, we have additionally opted for 3D machine set-up, enabling us to measure the position of the clamped component.” Apart from precision, Pottiez, who sees himself as a high-performance supplier of precision punching tools and precision punched parts and subcontracting work, demands high standards of the surface quality, reproducibility, parallelism and the contour accuracy of his products.

Do we detect a whiff of aerospace, cars and food in the air of the production shop, or it just our imagination? After all, the customers of the company that calls toolmaking its core competence come from these branches of industry along with the electrical, electronics and consumer durables industry. Pottiez mainly erodes ram and die sets as well as guide plates for tools. These are required for shaping stainless steel, aluminium and steel. Kölle takes another component out of a glass cabinet. “Along with heat exchangers and corrugated and tubular fins, this baffle, for instance, is one of the finished parts that customers make with our products. Thanks to the special punches that we develop for this purpose, we have achieved a unique position for ourselves on the German market.” The materials that Pottiez mainly processes are steel, metal-ceramic steels and cemented carbide. The dimensions range from tiny to the size of the entire clamping space. The machining times, he says, run from a few minutes to several days.

» Since the MV2400R Grand Tubular runs unmanned at night, we have to be able to depend on the wire-threading system. «

Non-stop EDM

AJustifying his purchase of the MV2400R Grand Tubular and hence a change of supplier, Kölle stresses its attractive price/performance ratio and superior technical features. Also noteworthy were the competence of the Mitsubishi Electric staff and the good impression made by the way the company outwardly presents itself.

The most important technical features in Kölle’s view include the now fully digital ADVANCE PLUS CNC control and the new Intelligent AT automatic

Baffle as a finished part for a customer

Justifying his purchase of the MV2400R Grand Tubular and hence a change of supplier, Kölle stresses its attractive price/performance ratio and superior technical features.

Lars Kölle, Managing Director of Walter Pottiez GmbH, with a gearing die whose teeth have been cut on the wire EDM system.

messages are sent to selected mobile phone numbers. To be able to judge the drive concept using Tubular Shaft motors, it is still too early in the managing director's view, having only commissioned the machine last autumn. Even so, Mitsubishi, he believes, has taken an exciting new approach in that the wear associated with conventional motor spindles does not arise on the linear motors employed with the Tubular Shaft direct drives. An additional advantage of the new solution is that the drive technology in the X, Y, U and V axes is responsible for totally cogging-free and extremely smooth and highly controllable movements.

Faster to a new level

In the control sector, Mitsubishi Electric is also going new ways. Within the Optical Drive System, a fibre optic network now handles data interchange. This communicates considerably faster and more efficiently via optical waveguides between the ADVANCE PLUS CNC control, servo amplifiers and Tubular Shaft direct drives and thus facilitates even greater machining precision. Apart from this, Mitsubishi Electric has improved the user-friendliness over the old Advance CNC control.

Kölle goes to an external workstation. "This is where we program the control. The data are then transmitted with the aid of a postprocessor." He points out another advantage of the MV2400R Grand Tubular as far as operation is concerned. "Anyone confronted with wire EDM for the first time achieves a higher standard of operation on this new machine faster than someone who is used to a different model and first has to re-adjust to the new machine."

On top of all this, the MV2400R Grand Tubular achieves high energy efficiency as a result of the Optical Drive System combined with the Tubular Shaft motors. How much energy he saves is impossible to calculate, says Kölle, because he only machines one-offs. It inevitably reduces his energy consumption as the control disables unneeded functions and the machine switches as required from sleep mode to stand-by.

If he wants to work out whether his operating costs are lower than with the old machine, he again runs up against the problem of batch size. Kölle shrugs his shoulders. "Although the replacement parts from Mitsubishi Electric are cheaper than from our former supplier, what effect it has on our machine hour rate is difficult to say because we don't produce any series."

Glance beyond the immediate region

What is clear, however, is that Pottiez has broadened its base for single-unit production by investing in the MV2400R Grand Tubular. Kölle stops at an assembly table. "This unique piece of equipment is a fine example of how we convert even our own ideas into one-off items. This assembly table, which is unavailable for purchase on the market, is accessible from all sides and thus makes tool assembly easier."

The company also demonstrates creativity in the marketing sector, having extended its feelers well beyond the immediate region. In 2009, Pottiez opened a sales office for North America in Atlanta, Georgia and has since set up a joint venture there with a partner for the production of heat exchanger components.

www.pottiez.de

→ wire-threading system. As the word suggests, this is an intelligent solution because it threads the wire reliably and quickly in any situation – in the dielectric, in the kerf or after interruptions in start-hole drilling. Even the height of the workpiece is no object. Kölle observes the process in the dielectric tank. "Although the machine contributes only about ten per cent of our tool output on average, it is in almost constant use. We operate seven days a week, around the clock. Since the MV2400R Grand Tubular runs unmanned at night, we have to be able to depend on the wire-threading system." In view of this, Pottiez has also invested in a 20-kilo wire station and the equally optional mcAnywhere Contact function via which brief status

Gearing punch with wire-cut teeth

www.pottiez.de

Name and place of company:
Walter Pottiez GmbH,
Sulzfeld, Germany

Founding year:
1963

Managers:
Lars Kölle and Katja Pottiez-Kölle

Number of employees:
86

Core business:
Toolmaking and jobshop punching

Professionals in Profile:
Lars Kölle

How would you describe in a sentence what your company does?
We design, build and test high-precision progressive compound tools. This is joined by the punching of parts under subcontract for a variety of sectors of industry.

How did you earn your first money?
In my parents' repair shop for farming machinery and other items of equipment.

What motivates you?
At work, my interest in technology.

Where do you see your company in five years' time?
We have a strong international presence and want to develop further in this area.

What was your biggest business success?
Our foreign activities in the USA. We had customers there before we opened our sales office and were able to build on this foundation.

What's your favourite way to relax?
Spending time with the family or playing a round of golf.

What attributes do you value most in other people?
Honesty.

What faults in other people do you find easiest to forgive?
I can forgive anyone who is willing to honestly admit a mistake.

How would you briefly describe your work to someone with no technical knowledge?
We produce tools with which shapes are produced from flat materials.

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MITSUBISHI ELECTRIC

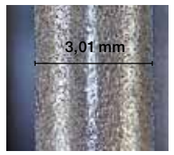
The carousel
for precision grinding wheels

CBN and diamond grinding wheels can be profitably dressed to a high standard of quality with wire EDM and supplementary axes.

Peripheral wheel

Above left Diamond grinding wheel D46 with metallic binder

Below left and right
Multiple profile
D = 150 mm inner and outer radius
r = 0.12 mm ± 30°



The dressing (= profiling and sharpening) of grinding discs by wire EDM is not a fundamentally new technology. However, with the current wire-cutting machines from Mitsubishi Electric, the scope for machining has become broader than ever before.

Unlike conventional dressing with fixed or moving dressing tools, the process with wire-cutting is contactless. Although this also applies in principle to die-sinking dressing with shape-imparting electrodes, the wire erosion process is much kinder to the grinding wheel.

Precision and durable grinding discs thanks to contactless dressing

Let us start with a brief overview of the process. The grinding wheel undergoing machining is initially set turning by a special spindle within the wire EDM machine's working range. In the course of the process, the cutting wire negotiates a cutting path corresponding precisely to the grinding wheel's future profile.

During the erosion process, the electrically conductive binder is eroded to expose the abrasive (CBN or diamond particles) on the surface of the grinding wheel. Abrasive outside the final geometry also simply falls from the wheel together with the eroded binder.

What is also worth noting is that a wire-dressed grinding wheel can be used in the grinding machine immediately and without further treatment. It is sharp and its direction of rotation is no longer relevant. Tests have proven that the removal rate of grinding wheels processed with wire erosion can be as much as twice as high as that of conventionally dressed wheels. Another positive feature is that, despite this superior performance, grinding wheel service life can be five times as long, as its structure is not damaged during wire erosion.

Child's play with the wire erosion systems from Mitsubishi Electric

The wire erosion systems from Mitsubishi Electric make this process child's play. The basis is the grinding wheel's geometry – defined either in a drawing or, better still, in a geometry file, e.g. in DXF format. The profile is programmed as a cutting path. If a DXF is available, it can be read straight into the control and processed into an NC program. The machining technology is selected from the machine's database, and then the grinding wheel is clamped and work can start. The process takes place fully automatically, and the only thing left to do is remove the ready-profiled grinding wheel from the chuck. It couldn't be simpler or more flexible

In cooperation with ITS-Technologies in Oberndorf am Neckar, various rotating spindles have already been developed with the most widely used chuck seats so that grinding wheels of many different sizes and with conventional chuck interfaces such as HSK63-F can be efficiently processed. Mitsubishi Electric and ITS-Technologies have wide-ranging expertise and plenty of experience in this sector.

Even unmanned and fully automated operation if desired

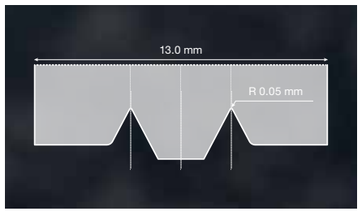
The process as such is defined and takes place dependably on the unmanned wire EDM machine. This means that a basic precondition for the further automation of this machining technology has been satisfied. Here, again, Mitsubishi Electric has the associated expertise and also the requisite products of its own, e.g. the robots of the MELFA series. Many fully automated machining cells that also dress grinding discs in self-controlled operation are already in operation.

In 2013, Hannover will again be the focus of the metalworking world's attention from 16 to 21 September, when EMO Hannover, the industry's undisputed flagship fair, is taking place.

A fully automated machining cell as described above will be on show there at Mitsubishi Electric's Stand C08 in Hall 25. We look forward to seeing you!

www.mitsubishi-edm.de

Discover the fully automated machining cell at EMO in Hannover: Hall 25, Stand C08



Left Grinding wheel with inner radii of 0.05 mm.

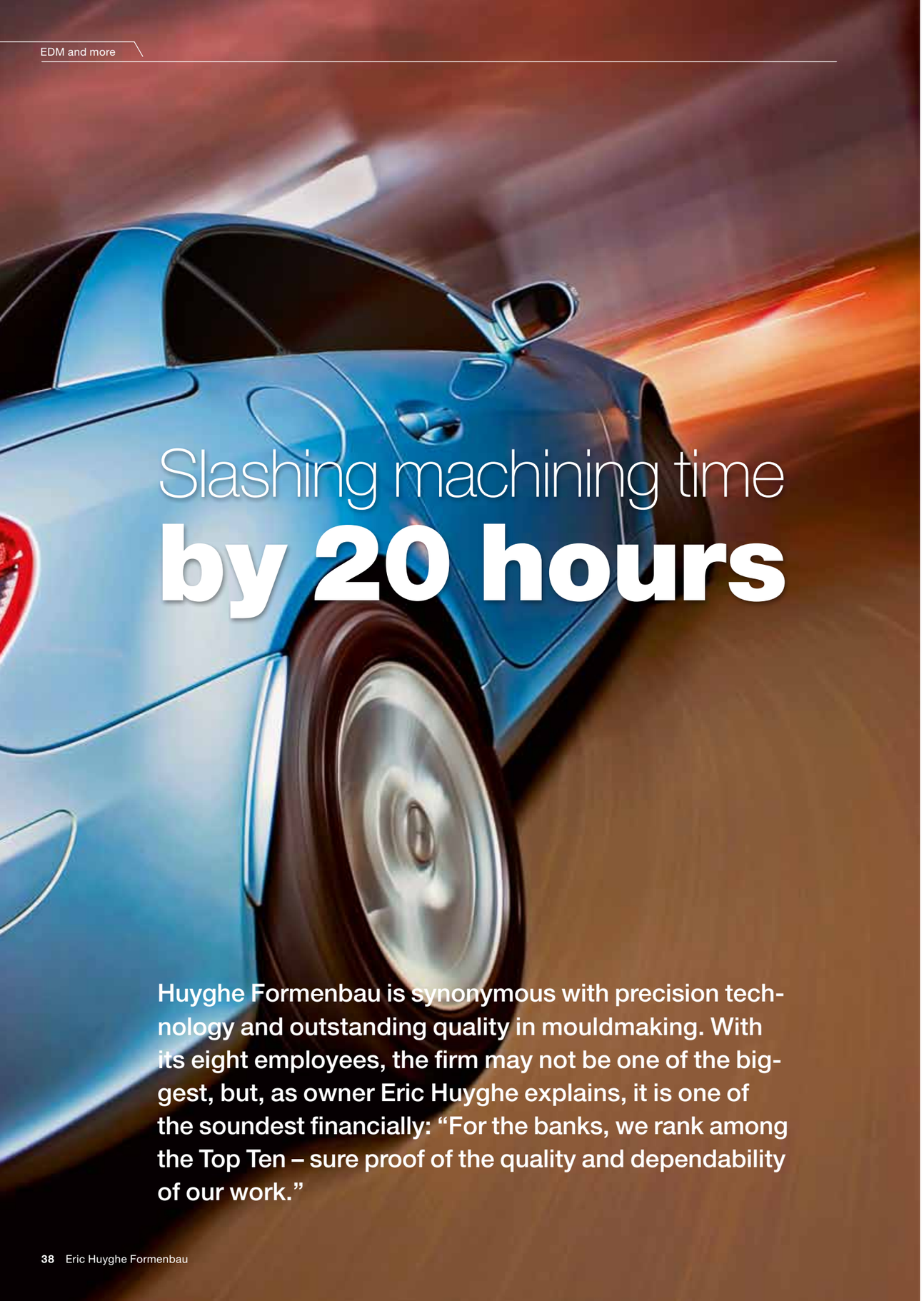
Above Example of an application of wire EDM dressing.

Wire EDM dressing of CBN and diamond grinding wheels with metallic binders:
The key facts in brief

Precondition
The grinding wheel's binding material must be electrically conductive.

Achievable today
- Smallest inner radius for kerfs ≈ 0.05 mm
- Smallest outer radius ≈ 2 x grain size + binder material
- Multiple profiles on a grinding wheel = unlimited

Benefits
- No special dressing tool necessary
- Outstanding grinding wheel geometry and topography
- Profile trueness in the micrometre range
- Intricate contours are achievable
- High concentricity
- Rapid response
- Simple programming with 2D contouring: DXF, DWG, etc.
- Process amenable to full automation
- Several times longer grinding wheel service life
- Feed rate in the grinding process up to twice as high
- Open-pored grinding wheels – sufficient defined swarf space
- KNo break-out of binder matrix components (broken-off pieces)



Slashing machining time **by 20 hours**

Huyghe Formenbau is synonymous with precision technology and outstanding quality in mouldmaking. With its eight employees, the firm may not be one of the biggest, but, as owner Eric Huyghe explains, it is one of the soundest financially: “For the banks, we rank among the Top Ten – sure proof of the quality and dependability of our work.”

HUYGHE FORMENBAU

In Lüdenscheid, Huyghe Formenbau finds itself in the very best company, as the region is home to a good 160 firms specialising in tool- and mouldmaking, a stronghold of the industry.

“As a small company, we have always concentrated in the region around Lüdenscheid and sought our customers here. We so far haven’t had any need for advertising campaigns or for active efforts to attract business,” says Eric Huyghe. His customers appreciate quality, punctual delivery and flexibility – values that the company has been committed to since its founding in 1995. With a modern machine park and its highly skilled staff, the company has a broad base and is excellently equipped to produce tools and moulds for the whole of industry. One of Huyghe’s specialities is the production of moulds and tools for the large-series production of high-grade system components for the automotive and electrical industries. In the last few years, the company has focused strongly on the construction of two-component moulds and built up its specialised expertise in this area.

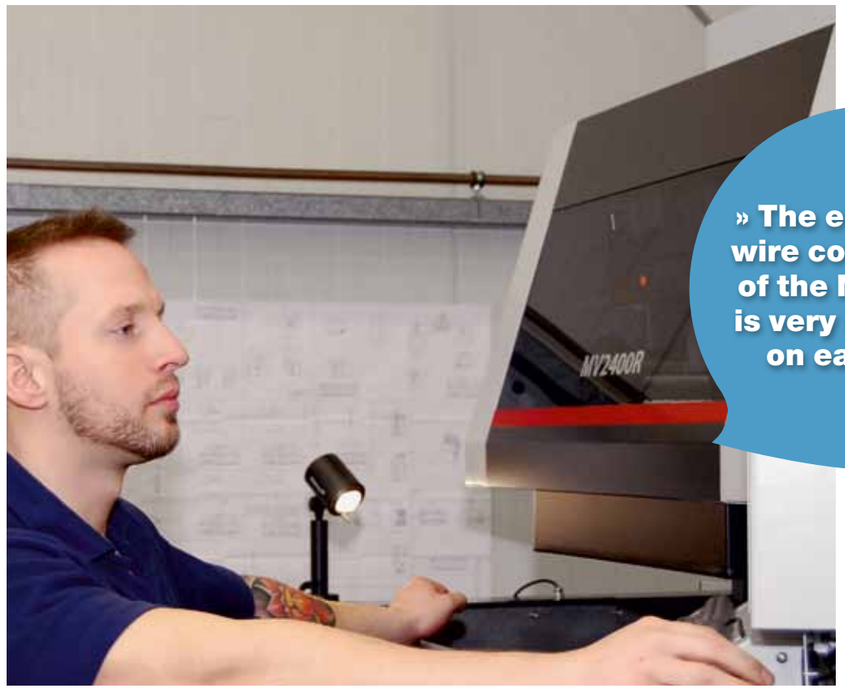
Anyone can optimise – you’ve got to know where

At this modern toolmaking company, EDM and conventional machining are complementary processes. “Each machining method has its strengths. We combine the two methods so that we can always achieve the optimum of quality and machining speed and respond flexibly to customer requests,” Huyghe stresses. This adaptable way of working is only possible with high manufacturing depth – indispensable for superlative quality.

In the last few years, Huyghe Formenbau has built up specialised expertise in the production of two-component moulds.

To ensure that all the work in toolmaking is done with the demanded care, the company has deliberately decided against farming out work. “Only then,” says Huyghe, “can we comprehensively plan, design and control all work steps. After all, our customers have to be able to rely on getting the quality they want.” Quality is assured in accordance with DIN ISO 9001 and DIN 2008. For Huyghe, however, this is only the formal basis. The company’s specialised knowledge is the crucial resource for the production of moulds and tools of the desired quality. The highly trained and skilled workforce and the advanced machine park form a sound foundation for quality and flexibility. For instance, at Huyghe Formenbau, all toolmakers are able to operate any of the machines and fully process any of the demanded workpieces with maximum precision. Each employee is solely responsible for his job. This calls for great technical competence and offers plenty of scope for working independently while also demanding a high degree of personal accountability.

“In the last few months, however, one of our employees has been concentrating more on wire-cutting with the new Mitsubishi MV 2400 R“, the boss says. One indicator of the quality of tool- and mouldmaking is the rework rate. At Huyghe it is practically zero. In the tool design sector, the Lüdenscheid company has been working for a long time with experienced specialists.



» The economical wire consumption of the MV 2400 R is very noticeable on each job. «

→ Change of generation

For years, the company wire-cut all its high-grade tools on a Mitsubishi FA 20. By taking good care of the machine and having it regularly serviced, its performance was always impeccable and there was never any cause for complaint. But even good things can be improved on. In summer 2012, Mitsubishi Electric presented the latest generation of its wire EDM machines – the new MV. Huyghe was immediately amazed by the machines and it soon became clear to him that his firm was on the verge of a change of generation in wire EDM. An investment that would significantly boost the productivity of his EDM department and soon pay for itself.

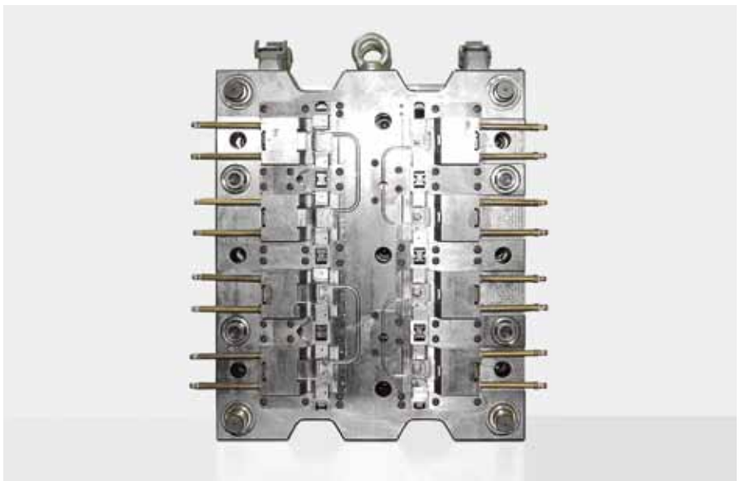
The MV Series immediately justified the investment, as it offers maximum functionalism, significantly shorter throughput times than its predecessors and hence lower piece costs as well. Thanks to the new generator technology, energy and wire consumption is significantly lower. For a modest sum, the new MV Series from Mitsubishi Electric marks the entry level into the high-end class of wire-cutting machines.

"During the presentation, the marked improvement in performance and the lower wire consumption and energy savings were the decisive factors for me," says Huyghe. Other practical considerations, like the larger machining range and the space occupied by the machine, were also important.

The test of everyday use

The MV 2400 R has been installed in the Lüdenscheid firm since autumn 2012 and has since been running in 1.5 shifts per day without any notable stoppages. Staff were instantly impressed by the clear layout of the control panel and the machine's intuitive program structure. During the machining of the very first workpieces on the MV, the new wire-threading system was conspicuously fast. While the FA 20 took an average of 20 seconds for threading, the MV is back in operation again after 5. "In relation to the overall machining time lasting several hours," Huyghe explains, "the time gained during threading is negligible, but it is indicative of the huge improvement in productivity of the new machine generation." With its modern generator system, the MV 2400 R operates with great speed and extreme accuracy.

"The most astonishing and for us the most satisfying results were yielded by the direct comparison of machining



Huyghe Formenbau produces high-tech products, among other things for the automotive industry.

Clamped on the FA 20, the workpiece took about 50 hours to reach completion. For its almost identical counterpart, the new MV 2400 R completed the process after about only 30 hours.

times," Huyghe continues. For a truly informative comparison, the employees machined almost identical tools simultaneously.

30 hours instead of 50

The comparison was performed with complex workpieces of very similar design produced again and again for a longstanding customer. Clamped on the FA 20, the workpiece took about 50 hours to reach completion. For its almost identical counterpart, the new MV 2400 R completed the process after about only 30 hours. "The first machine presentations by Mitsubishi Electric yielded very similar figures. But it was the precise confirmation of these data in our everyday work that really surprised us," says Huyghe.
In everyday operations in a production shop, it is not easy to produce comparable data. However, price calculation calls for reliable and realistic data. The company generates the data with its own methods. The economical wire consumption of the MV 2400 R is very noticeable on each job. As far as consumables are concerned, Huyghe estimates savings of about 40% over the FA 20. It is a little more difficult for Huyghe to estimate power consumption, as the machines do not have their own electricity meters.

Payback time

"If we finally look at the issue of payback so important for business owners and financiers, we're not yet able to accurately quantify a period on the strength of just six months' practical experience. On the basis of cautious estimates, however, I expect the MV 2400 R to have paid for itself in our production shop after two to three years."
The company believes that wire-cutting will continue to grow in importance in the foreseeable future, as the tools for many branches of industry such as the automotive and electrical industries will become increasingly complex. The demand for modular tools will thus grow. This is a task in which EDM machines with their technological advantages will truly come into their own. Particularly when one considers that such machines are capable of cutting tools directly out of hardened materials.

www.huyghe-formenbau.de

www.huyghe-formenbau.de

Name and place of company:
Eric Huyghe Formenbau,
Lüdenscheid, Germany

Founding year:
1995

Managing Director:
Eric Huyghe

Number of employees:
8

Core business:
Injection moulds for automotive engineering, specialising in two-component technology

Eric Huyghe - Formenbau
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58513 Lüdenscheid
Germany

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Fax +49.2351.9526 74

info@huyghe-formenbau.de

Professionals in Profile:
Eric Huyghe

How would you describe in a sentence what your company does?
Huyghe produces high-grade tools and moulds.

How did you earn your first money?
During my training as a toolmaker.

What motivates you?
The fun and pleasure of tool- and mouldmaking. Creativity, new tasks and the associated challenges.

What's different about how you do things now, compared to five years ago?
We're more efficient.

Where do you see your company in five years' time?
We want to stay about the same size but produce faster and more efficiently. Boosting not just sales, but also profits.

What was your biggest business success?
Continuous profit-oriented company growth.

What's your favourite way to relax?
Cycling in the hills.

What attributes do you value most in other people?
Honesty and standing up for what one believes in.

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NEUGART

Tooth for tooth
geared for success

The proverbial precision of Black Forest clocks also applies to the products of Neugart in Kippenheim in Baden.

For wire-cutting, the gear manufacturer trusts in the new MV 2400 R Grand Tubular from Mitsubishi Electric.

Clocks made of locally sourced wood have been made in the Black Forest for 300 years. Since they were cheaper to build than their more widespread counterparts with metal mechanisms, they became so affordable for ordinary folk that about 600,000 clocks from Black Forest clockmakers were sold in about 1850. At about the same time, the first German School of Clockmakers was founded in Furtwangen to train craftsmen and standardise clock sizes and forms. This encouraged quality awareness and exports. Clocks from the Black Forest became a hallmark. With the onset of the Great Depression in the last century, many companies in the region were forced to close. And toolmaker Karl Neugart was thus made redundant. However, with enterprise and energy he and a friend founded a small business in 1928 that produced gearwheels for the clockmaking industry and tiny components for fine tools. This was the foundation stone for a successful and innovative company that today employs 380 people, has subsidiaries in Italy, Brazil, Turkey, the USA, China and France and achieves global sales of roughly EUR 50 million.

In 1943, Neugart bought a residence with a suitable shop for production activities in Kippenheim in Baden. Initially he made vegetable graters and other everyday items that were exchanged for food until the company was able to return its focus to gearwheels.

Training and Toolshop Manager Otto Hebding discusses the details of a gear-wheel contour with wire-cutter Wilhelm Michelis.

During the period of the Economic Miracle, Neugart produced the mechanism for mantle clocks that could be found in almost every German living room at the time.

The product range also included spring-driven dry razors and mechanical oil level indicators for oil tanks. These were later joined by the first gears machined to the company's own designs. At the end of the Sixties, Neugart's children Georg and Erika took over the family business. In the meantime, the running of the company has been passed on jointly to grandchildren Thomas Herr and Bernd Neugart.

Top supplier to machine manufacturers

Contributing his experience in motor manufacture to the company, Herr has set the standardisation and quality yardsticks both for economy gears for simple handling tasks and for low-play precision gears. This has given rise to twelve standard series of planetary gears for machine manufacture, automation and medical technology. The company has developed so successfully that it currently sees itself in the global Top Five in terms of market share and innovation leadership. "Quality is our overriding principle, coupled with innovative products and outstanding service," says Marketing Manager Stefan Füllbrandt, adding, "As you can see, we're doing very well with this approach."

Neugart products are known for their 'fit & forget' durability and quality. Costs due to product defects are negligible. The company generates two thirds of its sales with standard gears in different classes of precision and performance, which are market leaders. Neugart benefits here from its high manufacturing depth. Apart from bearings, gaskets, screws and lubricants, all gear components can be produced on site, says Füllbrandt.

On the walls of the foyer of the plant are documents showing certification to ISO 9001:2008 and Blue Competence environmental management and an award as a Top 100 small/medium-size company. "We have just been commended by

» We're extremely happy with the quality, precision, flexibility and speed of the machine. «

Bosch-Rexroth as a Preferred Supplier. That's a real boost," says Füllbrandt. Several strategic partnerships with large automation specialists like B&R, Festo, Baumüller, Bosch-Rexroth and Schneider Electric complete the picture.

Precision from the Black Forest

In addition to its planetary gears, Neugart produces various special gears and gearing. "If the customer has special requests in terms of thermal conduction, precision of movement or installation space, we're able on the basis of our huge wealth of experience to develop the matching special gears," Füllbrandt explains. And it was special gears that brought Neugart and Mitsubishi Electric together. Some special gears have a tooth geometry deviating from the norm. "With wire EDM, we can produce small gearwheels inexpensively and offer the customer any type of toothing," says Otto Hebding, Training and Toolshop Manager at Neugart. "Wire-cutting has now become an essential process for us in production. We also use even it for the building of special machines and injection moulds, and particularly for such small gear modules as 0.6 and 0.3."

The module is the metric unit of gear tooth size and expresses the quotient of the reference diameter and number of teeth. The smaller the module, the smaller the tooth. "When our customers saw what we were capable of producing, they came along with even more exotic requests," says Hebding. "This stretched our old CX 20 wire-cutting machine to the limits of its capacity and precision." The time was ripe for investment in a replacement.

Delighted by the new MV 2400

"We went straight for the new MV 2400 wire-cutting machine from Mitsubishi Electric and were delighted by the first demonstration, as this machine cuts with extra-fine 0.1 mm wire," says Hebding.

Thanks to its global partners, Neugart is becoming a hallmark of quality beyond the national borders.

➔ The new machine has been installed in Kippenheim since November 2012 and cuts teeth in form rings for injection moulds.

"We're extremely happy with the quality, precision, flexibility and speed of the machine. Automatic wire threading is outstanding – even I was surprised. You only have to see how a 0.1 mm wire is threaded back in the kerf after wire breakage – an absolutely trouble-free process", says Hebding enthusiastically. "There's often tension in the material, which is why the wire breaks. But even such a wire breakage doesn't hold up the machine, because with the automatic wire threader it runs for an entire shift practically unmanned." Particularly worth mentioning are also the extended abilities of the MV 2400: owing to rapid set-up, it is able to cut prototypes with hugely different geometries in a very short time so that they can undergo application testing.

Although the leap from the old CX to the new MV machine was huge, Hebding and his staff have already made a number of adjustments so that they are again producing various fixtures for production, e.g. toothing stubs, tension devices, drill jigs, and measuring and testing jigs. To this end, the MV 2400 EDM machine has been equipped with an additional B axis. "This way we can also produce circular parts like crowns," says Hebding. "This works excellently." The Kippenheim company uses the new machine not only for the many custom-machined parts, but also for current production. For example, couplings and planetary gears for medical products are machined on the MV 2400. These thin-walled parts are hardly bigger than a 10 cent coin and have to be wire-cut as they are essentially too small to be milled.

Good staff are the company's biggest asset

"Our company is based on immaculate products. And these cannot be produced without the skills of our employees," says Hebding. "This is why we attach great importance to training. For years now, trainees account for 10 per cent of our workforce and we enjoy a fine reputation in the training sector. Our skilled staff mainly come from within our own ranks." This is hardly surprising, since training is also a subject dear to senior partner Georg Neugart's heart. The 75-year-old can still be seen in the toolshop and training workshop almost every week. "The senior partner knows nearly everyone personally," Hebding explains. "Since every employee wears the company's own T-shirt with his name across the chest, Georg always knows who he's talking to," says the head of toolmaking and training in his Neugart T-shirt with a laugh.

> Neugart products are known for their 'fit & forget' durability and quality.

The MV2400R with a B axis integrated in the control.

www.neugart.de

www.neugart.de

Name and place of company:
Neugart GmbH, Kippenheim, Germany

Founding year:
1928

Managers:
Thomas Herr and Bernd Neugart

Number of employees:
380

Core business:
Planetary gears for economy and precision applications; custom-machined gears

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Fax +49.7825.847 2999

sales@neugart.de

Professionals in Profile: Otto Hebding

How did you earn your first money?
As a surveyor's assistant involved in reparcelling and in a vineyard.

What motivates you?
As the Training Manager, I aim to stimulate the interest of many young people in technology and machine tool manufacture and of course in our company.

Where do you see your company in five years' time?
We wish to grow even more strongly internationally, strengthen our service orientation, improve our position among the Top Three worldwide and stay an independent company.

What was your company's biggest business success?
Surviving the credit crunch in 2008 almost unscathed, having a bigger workforce than ever today and being able to invest well over EUR 2 million in machines and plant.

What's your favourite way to relax?
Growing vines and mountain-biking.

What attributes do you value most in other people?
Conscientiousness, honesty and ambition.

Almond crescents

launch bespoke machine building

A number of successful entrepreneurs started off small, working from their garage. And one such entrepreneur is Alois Bott who got his one-man show by the name of “Alois Bott Mechanische Bearbeitung” off the ground in a barn in 1979.

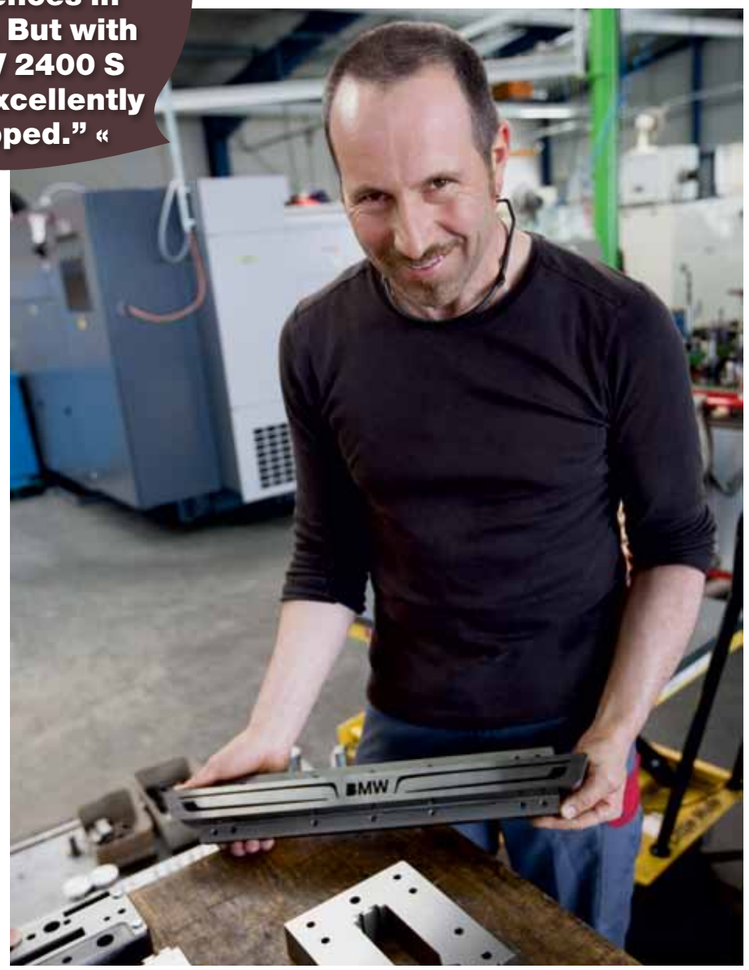
BOTT

Today, Bott GmbH Werkzeug- und Maschinenbau in Wolfegg has over 40 people on its payroll and has just ordered its second wire EDM machine from Mitsubishi Electric.

The wire-cut EDM machine MV 2400 S takes over two days to machine the small parts that remotely resemble Christmas trees. These are the flagship products of Bott GmbH in Wolfegg in Baden-Württemberg. Just 10 millimetres wide and 15 millimetres long, they have to take a lot of punishment.

» In most cases it’s the tiniest deviations that account for major differences in quality. But with the MV 2400 S we’re excellently equipped.” «

Six such intricate parts are fitted in a subassembly that is installed in a customised machine and used in production as a stamping tool. Each component has to withstand extremely high pressures and show as little wear as possible. So that the cutting edges after 150,000 stamping operations are still as sharp and dimensionally accurate as on Day One, they are cut on the MV 2400 S wire erosion machine from Mitsubishi Electric. The machine takes almost 100 hours to cut 30 such parts for the stamping tool out of a block of cemented carbide. “Our customer uses this tool to produce large numbers of parts and markets them worldwide. For him we produce the component that is practically the machine’s key element,” explains Alois Bott, Managing Director of Bott GmbH. “Basically, parts are getting more and more complex and difficult to machine, as design engineers squeeze more and more functions in a single component. This is why toolmaking is such a difficult field. Everything has to be exactly right to the nearest hundredth. “In most cases it’s the tiniest deviations that account for major differences in quality,” explains Georg Strobel pointing to the new machine. “But with the MV 2400 S we’re excellently equipped.”



Georg Strobel inspects the quality of moulds for pressing tools machined with the new MV 2400 S wire EDM machine.

A success story takes its course

“I originally set up my own business so I would have more time for my leisure pursuits,” says company founder Bott, laughing. “But nothing came of that.

➔ What happened is exactly the opposite. We've grown because we're efficient and good, we've bought new machines and taken on new staff, processed our orders and invested further."

What started life as "Alois Bott Mechanische Bearbeitung" with a part-time helper in a barn in Bad Wurzach has developed over the years into a successful company that now produces technically elaborate machine components, stamping, punching and forming tools and bespoke machines for a huge range of industries and applications. In Grimmenstein commercial estate in Wolfegg, it now employs more than 40 people. The company has four divisions and over 2,500 square metres of production and office space.

Bott GmbH started off purely as a jobshop. The development and production of highly accurate single- and multi-component scales for powder goods came later as a second line of business. "Today it's also our bread-and-butter business that has always helped us through lean times," says Bott, underlining the closeness to his customers. Many highly reputed mechanical engineering companies, now regular customers of Bott GmbH, have settled in and around the Swabian Jura, Stuttgart, Lake Constance and the Black Forest. "I feel it's essential that we're not far from our customers. If there are problems, we can then solve them together. This way we can tackle complicated components that many other firms are unable or reluctant to handle," says Bott outlining his recipe for success.

High manufacturing depth for quality and prompt delivery

Its above-average manufacturing depth of 95% enables the company to handle the lion's share of its output in-house. "We turn, mill, grind, wire-cut, measure and inspect everything on our own machines. Our employees work on the very latest CAD/CAM systems and our production equipment is geared essentially to the efficient fabrication of prototypes and small series," says Bott with reference to his machining centres from Herle, Okuma and DMG. "This way we can cope with any desired quality or deadline and can produce any part, however extravagant, ourselves," Bott explains, holding up a complex stamped part.

"But ultimately our survival depends on being able to produce such parts neatly and to a high standard of quality," says Bott and tells us the story of how he became a special machine manufacturer more or less by accident 20 years ago: "We'd been producing various spare parts as a jobshop for Tekrum in Ravensburg." The family company that joined Griesson – de Beukelaer GmbH & Co. KG in 2005 is one of the leading makers of fine confectionery and ice cream wafers. 20 years ago, company owner Krumm was looking for someone who could build, at the drop of a hat, a machine to mass-produce his famous almond crescents and Florentines. "We were out of our league, to be honest, but my present Co-Managing Director Jörg Osterkamp said, 'Let's go for it!' We sat down and designed, built and set-up the machine from scratch in

Bott GmbH's progress

1979 **Founding** of "Alois Bott Mechanische Bearbeitung", 1 employee

1981 **Move** ito the company's first own and larger premises in Weitprechts, 5 employees

1987 **Renamed** "Bott GmbH Werkzeug- und Maschinenbau", 13 employees

1994 **Move** to new company site in Wolfegg, 16 employees

1999 **New division** for component development and production, 21 employees

2000 **Extension of production space** to 2,800 m², 1,200 m² of which was rented for 7 years

2001 **Large-scale investment** in the latest production machinery

2008 **Investment** in a highly efficient computer network, 38 employees

2009 Recession-related consolidation, 34 employees

2011 **Extension** of the development department, 37 employees

2012 **Extension** of office space by 300 m², 40 employees

2012 **Appointment of fellow Managing Director** Jörg Osterkamp

2013 **Workforce:** 43 employees

→ eight weeks. Mr Krumm was nothing less than astonished, as all the other machine builders he had asked said it would take eight to ten months. Our speed enabled Tekrum to go into business with Aldi and launched our career as bespoke machine builders," Bott laughs. "Toolmaking was then added seven years ago. This was the start of our relations with Mitsubishi Electric, because it is essential for our toolmaking activities to have our own wire EDM capability."

Moulds for pressing tools machined with the new MV 2400 S wire EDM machine at Bott GmbH in Wolfegg.

Good employees are the backbone of any company

Toolmaking is the trade that calls for the most specialised knowledge and the best machinery. Bott adds that his company has been training its own apprentices for 25 years.

"We now train two to three apprentices per year. This is quite a lot for a company this size," says Bott, "but it's what we do well and makes the company strong. We have a very low average age. And young people want to be able to use the latest technologies and prove themselves.

When I founded the business in 1979, all my friends asked me why on earth I was doing it. I meanwhile know that we are only so good because the right people have come together in the right place at the right time. I'm firmly convinced that we have thus covered a large part of the business risk," says Bott. As a logical consequence, this means that the company has highly motivated staff and a highly progressive machine park. An example is the new MV 2400 S wire EDM machine from Mitsubishi Electric.

"We bought the predecessor, the FA 20, seven years ago. Karl Haller, our Toolshop Manager, chose the machine and swears by it," Bott proudly explains. Originally selected solely for toolmaking, it has subsequently also been used for customised machine construction and jobshop work. So much in fact that EDM became a bottleneck. "But before we farmed out work and gave up control over our processes, we decided to buy a second machine," says Bott. "This was a decision taken within two days, because punctuality and quality come top of our priorities. Our customers really appreciate it. They know that Bott supplies them with parts that are always dimensionally accurate and thus immediately ready to install. That's our hallmark."

Two generations of wire EDM machines from Mitsubishi Electric: in the foreground the new MV 2400 S and in the background the FA 20.

www.bott-maschinenbau.de

www.bott-maschinenbau.de

Professionals in Profile:
Alois Bott

Name and place of company:
Bott GmbH Werkzeug und Maschinenbau, Wolfegg, Germany

Founding year:
1979, and 1987 as a GmbH

Managing Directors:
Alois Bott and Jörg Osterkamp

Number of employees:
43

Core business:
Toolmaking, machine building, jobbing

Bott GmbH
Werkzeug- und Maschinenbau
Grimmstein 9/6
88364 Wolfegg
Germany

Tel +49.7527.9611 0
Fax +49.7527.9611 50

info@bott-maschinenbau.de

How did you earn your first money?
Bolting cars together as a car mechanic.

What motivates you?
Maintaining and building on what has been achieved. It is motivation enough to see that the company doing well economically.

Where do you see your company in five years' time?
We want to continue to expand the company and keep it stable in economic crises.

What was your biggest business success?
Achieving things that others don't achieve. You can then see that something develops out of it.

What's your favourite way to relax?
In the garden or motorcycling.

What attributes do you value most in other people?
Frankness, honesty and enthusiasm.

EMPA

Uncharted **territory**

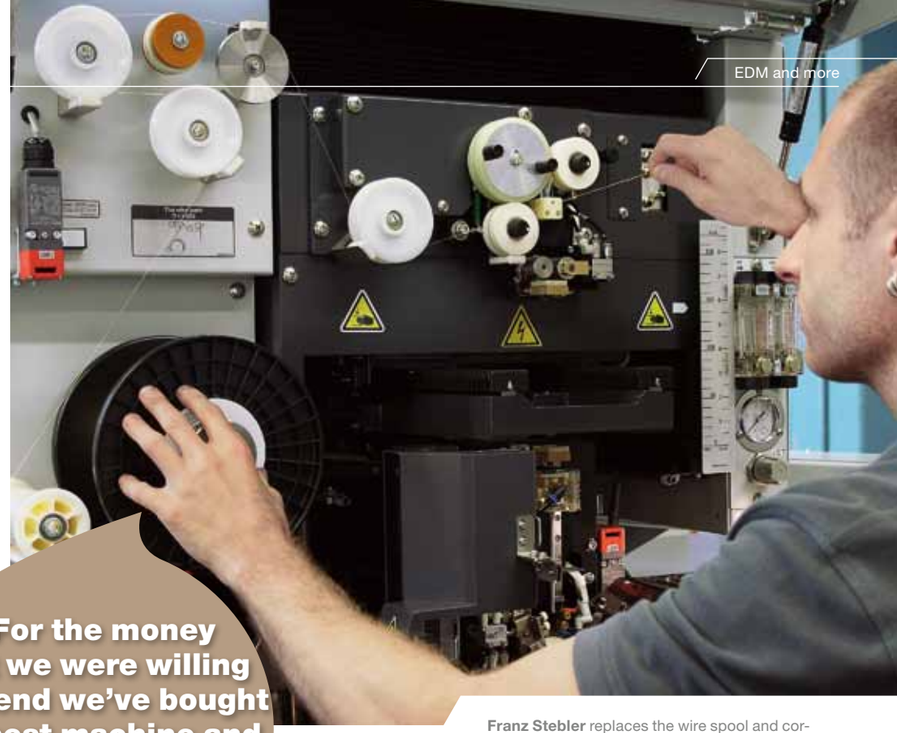
By investing in an MV1200S Tubular, Empa Materials Science & Technology, Dübendorf (Switzerland), has ventured into uncharted territory. Instead of paying jobshops for EDM work, the research institute is now itself an owner of a process-secure wire erosion machine – a machine that will probably soon pay for itself as well.

Erwin Pieper, a Swiss diploma'ed master mechanic and Workshop Manager in the Design Engineering/Workshop department at Empa, lays a three-part eroded stainless steel component on the table. It would be ideal as a paperweight. However, pulled apart, it becomes a note-holder bearing the word "DANKE". "This part, of which we've produced several, is intended as a thank-you for the Empa management and departments involved in the investment in the MV1200S Tubular. We're expecting it to pay for itself in two to three years, as the cost of jobshop EDM work until now has equalled the cost of the new machine over the same period."

Empa was founded in 1880 as the Institute for Construction Materials Testing in the basement of Zurich's Polytechnikum (school of engineering), today's Swiss Federal Institute of Technology (ETH). In 1938 the institute was re-named the Swiss Materials Testing and Experimental Institute for Industry, Building Construction and Commerce and had the reputation for destroying all the materials it tested. Pieper laughs: "Our image today is better. Since 1988, the name Empa has stood for 'Eidgenössische Materialprüfungs- und Forschungsanstalt'" – or 'Materials Science and Technology' in English. And that is what Empa now is – an interdisciplinary research and services institution for materials science and technology development. Empa lays the scientific foundations for the sustainable development of society and, together with partners in industry, converts research findings into marketable products. To this extent the institute has a large hand in strengthening the international competitiveness of Swiss industry.

Cutting materials

The tasks of the workshop include eroding material samples that are often composed of several materials and cannot be cut with conventional methods because of the material's hardness. Examples of this include nickel-based alloys with structural steel and gold-germanium brazed onto metal. Empa takes samples of these and among other things examines the behaviour of the materials in terms of fatigue at different high temperatures. Or Empa wire-cuts cracks and inspects whether and how they propagate under load. The range of wire-cut materials also mainly includes aluminium, beryllium bronze, titanium and stainless steel as well as cemented carbide and structural steel.
Pieper removes a tiny molybdenum part from a glass showcase: "Since a milling tool might break such a hard metal and process security is so important to us, we opted for wire-cutting in this case." Precision to the nearest hundredth of a millimetre is usually sufficient for Empa. The demanded surface quality comes to an average roughness of 0.8 to 0.4 micrometres.



Franz Stebler replaces the wire spool and correctly feeds the wire around several pulleys.

Pieper thumbs through a list of jobs. "The high machining speed displayed by Mitsubishi Electric's wire erosion system is also important for us. We don't have the comparison with another machine, but our jobshop supplier confirms with his job records that he takes longer than us to wire-cut similar parts." Using 0.25 millimetre wire, Empa takes anything from 3 minutes to 20 hours. The primary material is up to 210 millimetres high, 500 millimetres long and 200 millimetres thick. Because the workshop achieves rapid throughput, to which a clamping system also contributes, it now has capacity for extra jobs.

» For the money that we were willing to spend we've bought the best machine and the one with the best operating and maintenance characteristics. «

In addition to the single wire-cutting machine, which has been in operation since January 2013, the workshop has five milling machines at its disposal. EDM accounts for a correspondingly small proportion of machining volume.

All the same, some challenges can only be mastered with wire EDM technology.

Superior user-friendliness

Pieper watches the operator initiate a wire-cutting process. "The machine offers plenty of comfort. The operator got on well with it from the beginning." One contributory factor is the superior user-friendliness of the totally digital ADVANCE PLUS CNC control that communicates appreciably faster and more efficiently with the machine's servo amplifiers and tubular direct drives via the optical waveguides of the new Optical Drive System.
One of the resultant advantages of this is greater machining precision. Programming, he says, is not performed at the machine. Instead, Pieper's team sends entire programs to the MV1200S Tubular.
Pieper holds a wire guide in his hand. "This wearing part can be swiftly and easily removed and replaced. A task that arises once a week during cleaning. It is just as important that the machine re-threads the wire in the event of breakage automatically, as here at the workshop we sometimes run the machines unmanned at night." Empa thus benefits from the new Intelligent AT wire threader that re-threads the wire in the dielectric, after interruptions in start-hole drilling or in the kerf – and even on high workpieces. Whether a threading jet is used or

Core holder of Böhler V155 tempering steel and 1.6582, wire-cut on the inside, for the extrusion of ceramic filters.

Another point in Mitsubishi Electric's favour is its good service.

→ not. Pieper is also interested in the tubular shaft motors of the MV that ensure cogging-free and responsive movements in the machine's X and Y axes. He stresses the wear-freedom of the drive strategy that dispenses with spindles and ball bearings and therefore ensures smooth and maintenance-free running.

Best machine for the available money

"We opted for the MV1200S Tubular because it embodies a combination of advanced technology and a very attractive price/performance ratio. The latter refers to its high precision and its comparison with a milling machine." Pieper opens up the project folder. "We looked at three quotations beforehand. For the money that we were willing to spend we've bought the best machine and the one with the best operating and maintenance characteristics." To see reference erosion systems from Mitsubishi Electric in action, says Pieper, they went to racing car building Sauber, who wire-cuts almost the same spectrum of materials as Empa. Another point in Mitsubishi Electric's favour is its good service, he says, for which the company's Swiss dealer in the neighbouring town is responsible.

www.empa.ch

Stebler clamps a workpiece in the machine.

www.empa.ch

Name and place of research institute:
Empa Materials Science & Technology in Dübendorf, Switzerland

Founding year:
1880

Managing Director:
Prof. Dr. Gian-Luca Bona

Core business:
Research & development, materials science & technology

Empa
Überlandstrasse 129
8600 Dübendorf
Switzerland

Tel +41.58.765 1111
Fax +41.58.765 1122

contact@empa.ch

Professionals in Profile:
Erwin Pieper

How would you describe in a sentence what your company does?
Research, development, testing and teaching.

How did you earn your first money?
In my apprenticeship as a machine mechanic.

What motivates you?
Curiosity and the joy of technology.

What's different about how you do things now, compared to five years ago?
EDM, 5-axis machining in the milling sector, programming with a CAM system and investment in clamping systems for faster set-up.

Where do you see your company in five years' time?
We want to continue to research and develop. As a workshop, we have to keep up with new trends.

What's your favourite way to relax?
In my free time with my model railway and walking and doing nothing.

What attributes do you value most in other people?
Reliability and openness to different solutions.

What mistakes in others do you find easiest to forgive?
When someone tries something out and it goes wrong.

If you were asked what you do by a friend with no technical knowledge, how would you explain your work in a single sentence?
That I cut metal with a wire and electricity.

Moving up into the world league

ERMO GROUP

Multiple moulds for two-component injection moulding are what make ERMO unique.

If there were a world league for makers of multiple moulds, the ERMO Group would be up among the leaders. The mouldmaker has achieved this position among other things thanks to its high-precision injection moulds, delivery quality and service.

When Jean-Yves Pichereau, CEO of the ERMO GROUP, Marcillé-La-Ville (France), welcomes visitors, you can sense something of the company philosophy in his handshake. “I shake the hands of all my employees every day and wish them a good morning. Treating everyone like members of the family is important for me. I know each of them personally and want to show them that I appreciate their efforts.” Pichereau has high standards, has come a long way with his business and is passionate about his trade. His company philosophy is one key to his success, his concentration on multiple moulds that he produces for the plastics industry being the other. Pichereau opens his laptop and presents pictures of injection moulds past and present. “Initially, we mainly worked for manufacturers of cars and televisions sets. We then changed our tack and have made a name for ourselves as world-class makers of multiple moulds.”

» The precision was within 5 micrometres – something that not many competitors are capable of achieving. «

In its entrance area, ERMO displays products from the medical, packaging and cosmetics sectors that are produced with the aid of multiple moulds.

In a single cycle, two-component injection moulding creates mouldings that have two colours or combine two materials (the pictures show cut-outs in the halves of the bi-injection mould with an inserted finished product).

Superlative wire-cutting precision

A development due mainly to the precision of ERMO injection moulds and their surface quality. Pichereau taps one of the pictures with his finger. “Last year we largely wire-cut a mould consisting of 16 components. It took 3,000 working hours. The precision was within 5 micrometres – something that not many competitors are capable of achieving.” He selects another picture. “These moulds for two-component injection moulding make us unique. The process creates injection mouldings that have two colours or combine two materials in a single cycle. We are the first French company to design and make such moulds.”

Pichereau knows that his customers attach importance to a fast response, high delivery quality and rapid and competent service. This is why he needs wire EDM machines that display impressive performance, constant availability and high efficiency. You’ve got to set out with the goal, he says, to be the best in every department and offer your customers innovation that enables them to boost their productivity. ERMO has already produced moulds that no one previously thought were possible. So that the company stays on track for success, he adds, it operates around the clock, at night and, as far as possible, with unmanned machines or machines monitored by a smaller team.

With wire erosion, ERMO machines injection moulds that in some cases weigh over 10 tonnes, consist of a maximum of 96 components and are worth as much as EUR 1 million. As the material, the company mainly uses hardened and stainless steel. Pichereau shows us a complex wire-cut component and discloses its secret: “To produce this part, which is a moulding element and ejector in one, we were the first French company to invest in

Didier Lambert clamping a workpiece.

→ an MV Series wire-cutting system from Mitsubishi Electric. The machine went into operation in October 2012."

On the trip to TECHMO 61 in Alençon – a production location of the ERMO GROUP that uses the MV 2400 R Grand Tubular – Pichereau expresses his wish for a stronger presence of French companies on the international stage. At the Chinaplas trade fair in Guangzhou, the French industry only participated with a small stand, while the Germans booked an entire hall. France would do better, he feels, if more companies took the same approach as the ERMO Group with its global export share of over 70 per cent.

Drop in wire consumption

Claude Lambert, Workshop Manager, leans against the MV 2400 R Grand Tubular. "We used to farm out the EDM work that we now do on the new machine to jobshops. Thanks to the performance of this machine, we've now got the extra capacity to wire-cut components for other companies." At an external PC, his name-sake Didier Lambert, operator of the MV 2400 R Grand Tubular, processes a file received from the production planning system. He then sends the DXF data to the EDM machine's digital ADVANCE PLUS CNC control fully designed by Mitsubishi Electric. "Because of the smooth wire feed and Tubular Shaft Motors that very sensitively control the machine's movements, we achieve the demanded precision even on high conical cuts." Also contributory to this is the Optical Drive System that communicates considerably faster and more efficiently by optical waveguide. Loïc Drouet, Plant/Location Manager at TECHMO 61, stresses that, in terms of parallelism, they achieve precision of less than 5 micrometres, even over a height of 150 millimetres.

In addition to this, Didier Lambert has found that the wire consumption of the MV 2400 R Grand Tubular is 37 per cent lower than on other machines. A value that can be improved on, he believes, and perhaps up to as high as the 46 per cent reported by Mitsubishi Electric. Then there are savings with the ion exchange media. Claude Lambert pats his namesake approvingly on the shoulder, encouraging him to carry on optimising the process. "The machine is only ever as good as its operator."

Drouet includes automatic wire threading among the important factors when choosing an EDM machine. Thanks to the reliability of the Intelligent AT wire threader, we're capable of producing extra components in a given time and thus boosting our productivity. Furthermore, wire-threading is performed in the kerf and even there without the operator's help. This, he believes, is a decisive advantage in view of the length of processing, which can take anything from a few hours to a matter of days. We often make full use of the size of the machine table and clamp several components in parallel. The smaller ones, he continues, are eroded during the day and the larger ones at night. Moreover, the new Mitsubishi is convenient to operate, even for someone who has never previously worked at such a system. Even a trainee took little time to master it, he adds.

Didier Lambert starting the wire-cutting process on the MV 2400 R Grand Tubular.

In his plane, Pichereau is taking part in an air rally across Southern Europe.

> With wire erosion, ERMO machines injection moulds that in some cases weigh over 10 tonnes, consist of a maximum of 96 components and are worth as much as EUR 1 million.

A high flyer privately as well

Pichereau, leisure pilot with a plane and helicopter licence, will soon be taking part in an air rally across Southern Europe for a whole week. Whether he'll find time to think about developments in mouldmaking, he doesn't know. However, his position in this respect is very clear. "If the mouldmaking department is to still exist in five years' time, innovation coupled with quality and reliability will be required. This is where wire erosion is of special importance because wire-cutting systems permit continuous production – around the clock if need be. Unmanned of course. From an economic point of view, there's no alternative to such an automated system when one considers the high cost of labour in France. If a collision occurs on a milling machine, it comes to an abrupt stop with the risk of damage to its costly tools. Unlike on a wire EDM machine that automatically rethreads the broken wire and carries on working."

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Professionals in Profile:
Jean-Yves Pichereau

Name and place of company:
ERMO, Marcillé-La-Ville, France

Founding year:
1981

Managing Director:
Jean-Yves Pichereau

Number of employees:
181

Core business:
Fine mechanical engineering

How would you describe in a sentence what your company does?
We develop, design and produce injection moulds for plastics.

What motivates you?
Innovative projects and research & development for the satisfaction of customer needs.

What's different about how you do things now, compared to five years ago?
We have made the transition from traditional sectors such as the automotive industry and television set manufacturers to high-tech markets, such as medicine, packaging and cosmetics.

Where do you see your company in five years' time?
We are positioning ourselves increasingly as a manufacturer of high-precision injection moulds.

What was your biggest business success?
The way the company has developed, starting out with 4 employees and today, 34 years later, having grown into a group of international stature that is recognised by major customers.

What attributes do you value most in other people?
Honesty, thoroughness and professionalism.

How would you briefly describe your work to someone with no technical knowledge?
We design and produce metal moulds that are required for the production of plastic parts.

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Origami
the art of mechanic and material

Converting a simple sheet of paper into a scaly dragon is a severe test of the material and of the folder's dexterity.

Paper was already being folded in Japan when the Europeans were still building castles. In the last century, Akira Yoshizawa, the grandmaster of origami, popularised the craft and devised a notation to make it accessible to all.
According to legend, if you want a wish to come true, you should fold a thousand cranes. Whether the legend is right or the endurance thereby acquired makes the wish come true, we cannot say.

Why draw something when you can fold it? Some of these Japanese works of art representing animals and plants consist of as many as 300 folds. In classical origami, everything is produced from a single square sheet, without help from scissors or glue. The greater the constraints, the greater the chance of overcoming one's own limits.

Ever seen a crane with a wingspan of a sailing yacht? No? Then you didn't go to the Odate Jukai Dome where the 78 metre tall marvel once sat. On the other hand, you need good eyes to be able to see the smallest crane, as it is only 1 x 1 mm in size – which, of course, is still huge by EDM standards.

In Japan, folded butterflies are popular wedding presents – and are obviously a more personal expression of affection and skill than any quickly purchased gift.

If you want to learn origami, you can attend courses and find instructions in books and on the Internet. Origami calls for patience and fine motor skills. If you work at it, perhaps you will one day emulate Yoneyama Yuichi's feat of folding 100 cranes in 40 minutes. By extrapolation, his wish would come true in only 400 minutes. Computer programs like TreeMaker and ReferenceFinder may help you along the way. And who knows: perhaps you'll be the first to fold an origami scale model of a wire EDM machine?

User horoscope

Aquarius (21.01.–20.02.)

Your bright ideas cause the lights to go out among your rivals. Now you can really let the creative sparks fly so that you can switch off afterwards (your MV2400R does this later without your help).
How about something new? Take up origami or orchid growing or anything that begins with O!

Pisces (21.02.–20.03.)

You seem to have an inbuilt FS generator for relationships. This opens new doors in areas where all efforts used to be futile. Steer clear of legumes in the next few weeks and swap workplaces with one of your mates. The change in perspective raises your spirits, and you can now effortlessly afford the new machine!

Aries (21.03.–20.04.)

Thanks to the new constellation between Mars and Saturn, you now master the most intricate conical cuts as if by magic. The upper and lower contours simply materialise before your mind's eye. The people around you are astonished by your output. But you might like to read a book for a change – it'll calm you down and give you new inspiration, and then you'll make even faster progress – almost like with an MV2400R. On Sundays, green tea is the solution for extra get-up-and-go.

Taurus (21.04.–20.05.)

While others can't put a foot right, you shine like a fixed star in the EDM firmament. Treat yourself to a little wellness – you've earned it. You soon bump into a friend from years ago and your conversation turns your thoughts to such totally new ideas that even you are surprised.

Gemini (21.05.–21.06.)

After trying out dielectrics in different ways, you hit upon a brilliant idea for a new cocktail. Even the big-name astrological experts are unable to agree on the scale of Jupiter's influence.
You're in store for difficult decisions and this doesn't just refer to giving the cocktail a name.

Cancer (22.06.–22.07.)

In the night of the full moon, you dream of a floating drive for erosion machines. This sense of lightness pervades all areas of your life in the course of the week – even your shopping bags are only a fraction as heavy as usual.
With this extra buoyancy, you manage to complete projects that you've been putting off for quite a while. Now take the extra time and study the unique floating tubular shaft motors!

Leo (23.07.–23.08.)

On holiday you control your machine from your iPad and it works! Give yourself and your automatic threader a pat on the back!
When die sinking, you should pay special attention to the electrodes, as Mars currently holds sway over them.

Virgo (24.08.–23.09.)

Your horoscope benefits from your knowledge of planetary programs – you negotiate your curves and corners with ease. With such aplomb, you even achieve things that others consider impossible. So in the coming weeks take part in as many prize competitions as possible (starting on page 11 of this magazine). And if you win something big, remember Erodia who gave you the tip.

Scorpio (24.10.–22.11.)

Jupiter's moon Ganymede will be controlling your life in the next few weeks. Not as precisely as a CNC, but you'll be surprised that some of the food you eat suddenly tastes entirely different. On the other hand, you produce stamping dies much faster than you expect – even when you don't need them. See for yourself!

Sagittarius (23.11.–21.12.)

Neptune is responsible for surfaces that feel velvety because the vibrations penetrate to the subatomic level.
You have a Midas touch with your leisure activities – do more, go out and be adventurous! Neptune conjures a smile onto your lips and even your EDM machine greets you with extra sparks. All the same, don't forget the backups!

Capricorn (22.12.–20.01.)

Saturn's moon Telesto swerves audaciously out of its usual orbit. You appreciate these extraordinary curves not only when wire-cutting, but also during your beer after work. So that things go faster, take a deep breath! Even when it gets really hot in summer, you know as an experienced EDM machinist that you mustn't dangle your feet in the dielectric tank.

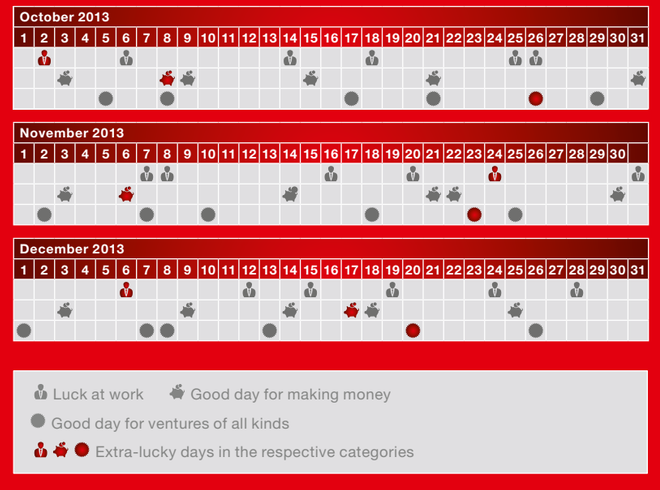
This month's horoscope

LIBRA

(24.09.–23.10.)

Don't take any short cuts when roughing and smoothing in the coming weeks. Proceed with caution, as this will pay off in the long run. Wipe the display of your wire-cutting machine – important because Mars with its gravitational pull may be exercising its influence.

You've also now got the knack of interior decorating – this is your chance to impress your partner!



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