

num

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information

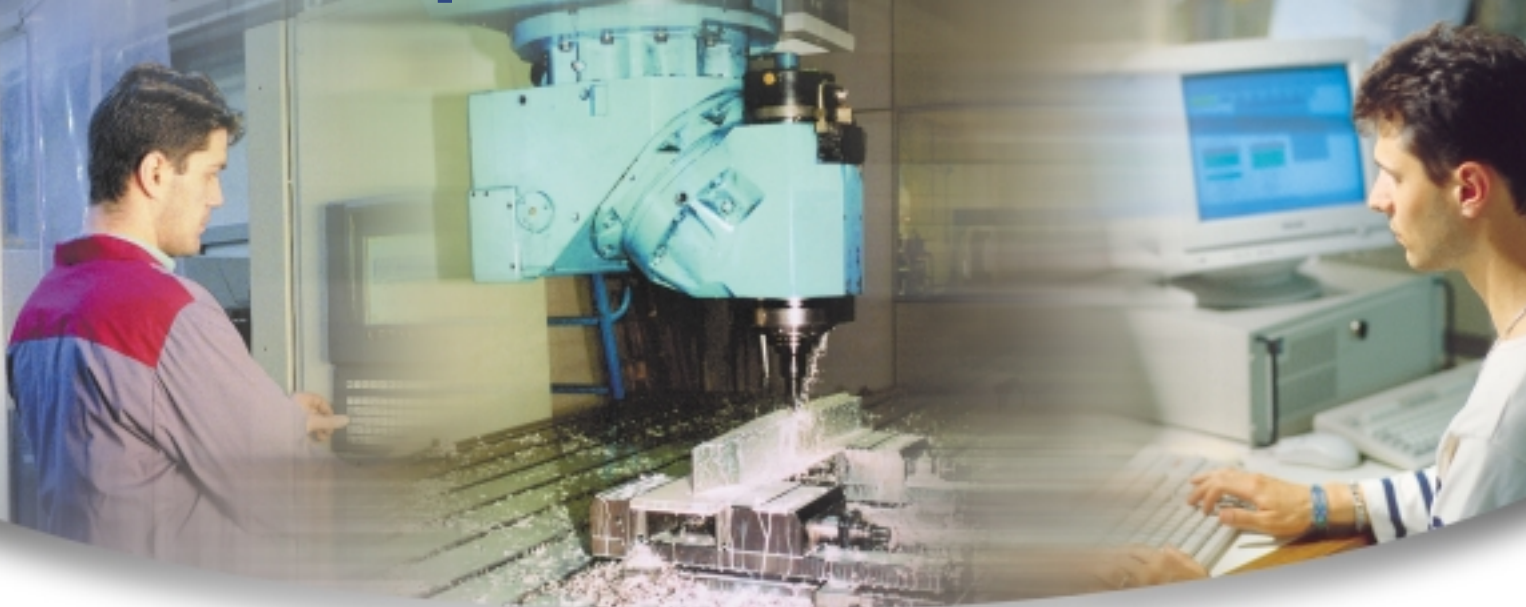
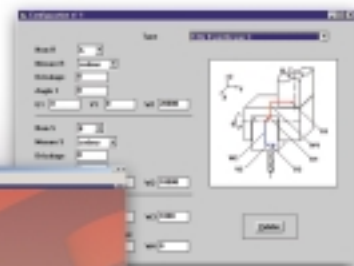
CORPORATE NEWS

A pro-active Strategy to anticipate Market Needs

SOLUTIONS

Turning, Polishing, Grinding, Milling...

**Num,
CNC Complete Solutions**



More Hardware, More Software, More Brainware

A Pro-active Strategy to Anticipate Market Needs

With the rising pressure to be more competitive, more productive and keep ahead technologically, the relationship between customer and supplier is radically changing. Anticipating this, Num has already adopted a strongly customer-oriented strategy.



Alain Digeon
Num's General Director
(left)
and **Hans Bachmann**
Vice-President of Num
(right)

In the current world economic climate, the future success of a company hinges on being able to satisfy two contradictory needs: the need to be profitable, in the light of increasing pressure on prices, making investment conditions more and more severe, and at the same time, the need to innovate and enhance in order to develop, driven on by technological changes. Under these conditions, success may mean finding the right partner, attentive to the customers' require-

ments, aims and problems. This was exactly what Num decided to achieve: to be the CNC specialist capable of providing complete systems totally tailored to each customer's needs. "Isn't the best way of satisfying customers to be a significant factor in their success?" queries Alain Digeon, Num's General Director.

Multi-disciplinary Know-How

With the CNC/Drive packages they have been recommending for several

years, Num was already catering to the OEM's need to find systems rather than just products. The packages were a homogeneous assembly of units optimized to work together. Today Num does far more than just supply equipment. "We provide our customers with wide-ranging know-how," states Alain Digeon. "We give them the benefit of our three areas of expertise: hardware, software and brainware. That is to say, technical expertise with not only hardware and software, but also skills in production techniques and leading edge applications as well."

"It is essential to be familiar with the language used by customers in their area of activity," continues Alain Digeon. "This makes it easier to analyze their requirements and specific features so as to have a better understanding of what they want and to comply with their needs. This approach must not be restricted by sales area," he adds, "which is why we are organized by markets. Segmenting our customers according to their main activity, simple or complex metalworking machines, special machines, the automotive industry or woodworking machines puts us in a better position to understand the changes taking place in each area on an international scale. In this, we

are completely in phase with our parent company, Schneider Electric."

A Systems Approach for End Users As Well

"Our familiarity with the applications," adds Hans Bachmann, Vice President of Num, "allows us to approach problems from different angles to find global solutions. This is moreover one of the reasons why we propose, in some cases, to take complete or partial responsibility for a project. In the same philosophy, we develop applications dedicated to certain niche markets that we continually improve and renovate. NUMROTOplus®, our tool machining and sharpening software, is a perfect example of this." It is interesting to point out that this customer-oriented strategy is not limited to new equipment and OEMs. Quite the contrary, Num provides support throughout the life cycle of a machine, from inception through installation, commissioning and operation to eventual re-engineering. Demonstrating the importance of end users, Hans Bachmann confides, "We consider that our customer's customers are our customers, which is why we propose a range of services (see opposite) and retrofit equipment (see p. 4). This can be the best way for a user to keep a machine in production



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our stand:
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Hall 5.

and get optimal returns on his investment," he adds.

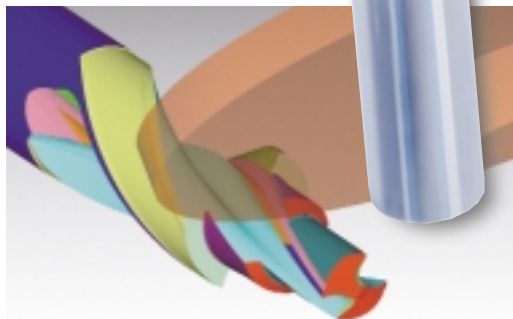
The Power of a Major Group

Num's strategic role in the Schneider Electric Group should also be noted. For instance, the purchase of the manufacturer Berger Lahr definitely confirmed Schneider Electric's ambitions in the area of machine automation. The creation of the Motion Control strategic activity, including Num for path control, Berger Lahr for

position control, Schneider's Lexium activity, etc. will allow the creation of synergies in order to be in an even better position to meet OEM needs (see Num Info N° 35). But that is not the only reason. "We feel it is essential to integrate our systems in Schneider Electric's global automation architectures," concludes Alain Digeon.

"It is now becoming necessary to take into account the New Information and Communication Techniques (NICT)." It is true

that by the nature of its products, Num is a key element between the world of machines and installations.



For Alain Digeon, the best way to satisfy customers is to be a significant factor in their success. That's why Num develops and continuously upgrades integration and operating tools as well as complete applications, as demonstrated by the most recent version of NUMROTOplus with 3D simulation.



Jean Caubit, Manager of Num's Customer Service Department:

"Our expertise in machine automation is widely recognized, so it was logical for Num to allow its customers to benefit from its know-how."

Num : Winning Services!

Today, production units need to respond fast, establish and meet a delivery schedule, be able to switch from manufacture of one item to another, manage just-in-time procurements and ensure a consistently high level of quality.

"In addition, it is becoming increasingly difficult to have a high level of expertise in all the new technologies. That is why many companies are refocusing on their core business and outsourcing peripheral jobs to specialists," explains Jean Caubit, Manager of Num's Customer Service Department. "Our expertise in machine automation is widely recognized. So it was logical for Num to allow its customers to benefit from its know-how."

A Structured Range of Services

Providing service is nothing new for Num. What has definitely changed is that Num now markets a structured range of services built around

identified needs. For instance, for spare parts, there are several types of subscriptions and contracts. Similarly, the hot line has now been organized as a call center providing different levels of service, aimed at answering customers more rapidly. There have also been changes in training. A complete CNC training cycle is now available under the auspices of the Schneider Training Institute, with different approaches depending on the trainees' background: from initiation, they progress to operation and from there to maintenance and even design. The training mainly consists of hands-on exercises, allowing the trainees to improve their knowledge and obtain a real operational benefit. In parallel, as

an approved training center, Num also provides special training courses tailored to customer needs.

Equipment Audit for Future-Proofing

The audit, a basic component of Num's services, has several purposes: to extend the life of machines in the field, plan investments, optimize spare parts management, assess training needs, prevent obsolescence, etc. "The byword is anticipation," explains Eric Le Joliff, Services Development Manager. "To be more

responsive, we have to avoid surprises by a serious, rigorous audit of the customer's equipment. That is the starting point for drawing up a list of preventive actions which will decrease the risks of failures and help make the right decisions should replacement prove necessary. This avoids panic and disruption, because a problem that has been planned for is much less traumatizing when it occurs. People are more efficient because they know what to do!" These services were first tested in France and will be gradually extended to other countries.



Eric Le Joliff, Services Development Manager: "For audits, the byword is anticipation."

Num Power: Compact, Flexible and Highly Efficient

Designed to replace the existing 1000 family, Num Power CNCs benefit from a new platform providing decisive extra power. The performance is 30 percent,

(in some cases 40 percent,) better than the current platforms! With their new generation processors, Num Power CNCs have much shorter PLC program execution and block preparation times than their predecessors. In addition, the look-ahead function also improves the system response and the availability of a co-processor optimizes floating point calculation times for dynamic operators in C.

More memory space is available for the CNC, PLC and HMI programs and as the operating system is in Flash memory, it is very quick to upgrade. Num Power CNCs also come with a multi-standard serial line and an additional interrupt input.

From 2 to 32 axes

All the connections are made on the front to facilitate wiring. The system is very compact,

saving considerable space, especially in high-end configurations. The Num Power 1000 line has added two additional models to the Num's range of analog CNC's. The new series now covers five references, Num Power 1020, 1040, 1050, 1060 and 1080 CNCs. They offer highly efficient solutions for the automation of all types of machines from 2 to 32 axes and up to 1024 PLC inputs/outputs.

Last, but by no means least, Num Power 1000 CNCs are downwardly compatible with the existing 1000 family. Considering the number of Num 1000 CNCs installed and their success, the Num Power 1000 CNCs offer an excellent upgrade path which fully protects those investments already made in part programs and APIs.

The Num Power 1000 line includes five models: Num Power 1020, 1040, 1050, 1060 and 1080 CNCs. They offer highly efficient solutions for automation of all types of machines from 2 to 32 axes and up to 1024 PLC inputs/outputs.



Get a New 10-Year Lease on Life with the Num Power 1760!

What is worse than to lose confidence in a production tool? That's what happens when you notice certain machines are getting old. They may not seem to be wearing out and may have been kept in shining condition, but the risks of downtime jeopardizing production lead-times are a real sword of Damocles. In such a situation, a retrofit is the solution that comes naturally to mind. But it isn't always easy, often requiring re-wiring, mechanical adjustments and at times even some

re-writing of part programs. That's why Num have developed the Num Power 1760 CNC, in both lathe and milling machine versions. Designed to upgrade machines equipped with Num 760 and 750 CNCs, this new CNC replaces the old one without any changes in wiring or installation. Moreover, it is fully compatible as regards part programs and axis connections, so that no changes are required in the drives. As for getting used to it, that is no trouble because the key arrangement is the same as on the Num 760

and 750 keyboards. Even better, the monochrome screen is replaced by a 10.4 inch colour LCD

giving a much better picture. The Num Power 1760 also has a higher calculation speed, which

can mean gains in productivity. The Num Power 1760 CNC doesn't just have functional advantages, it also brings security, allowing the use of the production tool for at least 10 more years. Don't hesitate to contact us...



The Num Power 1760 CNC is an attractive way of solving retrofit problems.

Genuine International Support

Num has globalised its applications support network to keep in closer touch with the needs of its customers.

One area where key knowledge is acquired is in the field of application support. Experience gained on a wide variety of cases can enhance efficiency and responsiveness. Fully aware of this, Num has grouped all its applications support services into a single department to create a genuinely international centre of expertise. By building on its vast experience, Num improves the quality of its support (consulting and technical assistance) and services (analysis, creation of special programs for customers, commissioning, etc.).

Strengthening the Subsidiary Interchanges

This new department, called Application/Technique, groups all the support services present in each subsidiary. "Our aim is to establish real partnerships with our customers," explains Peter Hutter, in charge of the activity, "because

the success of a personalized solution always has an impact on Num's reputation. We definitely need to adopt a global approach without borders. This can only be done by creating conditions which encourage information exchange between us and our customers and also among our subsidiaries." With this new organization, Num demonstrates its determination to keep developing its applications services as regards the implementation of technical solutions (see p.7 and 8), dedicated Human/Machine Interfaces (see below and p.6), and more generally, all possible collaborations that can contribute to customer satisfaction.



Peter Hutter:
"Our aim is to establish real partnerships with our customers."

Turning

When the Conventional Becomes Cutting Edge!

This manufacturer belongs to the leading French machine tool group and has specialized in turning for nearly a century. Today, it has one of the widest product lines on the market, ranging from conventional lathes to the most sophisticated machines. The Optica machines are based on a conventional lathe structure and benefit from a CNC-assisted control designed around a Num 1040 CNC with a dedicated Human/Machine Interface. This CNC was chosen for its enormous possibilities for customization. In addition, both manufacturers were keenly aware of training issues.

Complex Shapes and Roughing and finishing Cycles

Initial functions implemented: display of certain machine data on an LCD and replacement of mechanical limit switches by software ones. This process led to a major decrease in setting times. For ease of setup, the thread re-working function (metric, Whitworth, taper, etc.) was obviously the center of attention. In conjunction with a special key, this function directly positions the tool in the thread to facilitate re-machining.

Similarly, automatic tool offsets greatly simplify the operator's job, and sequencing of radii and slopes allows the machining of complex shapes, doing away with the need for copying machines. This function has been recently enhanced.

Even more recently, the possibility of machining very complex parts, both roughing and finishing, now allows the operator to save a great deal of time. With their new equipment, the Optica lathes can readily produce single parts, prototypes and small runs and are very easy to learn to use, because they were developed BY lathe operators FOR lathe operators.



With its new line of Optica lathes, Cazeneuve has achieved a successful blend between the user-friendliness of conventional lathes and the power of CNC lathes.

Surface Treatment

*“The best way of being **universal** is to use the language of the trade”*

That is the conviction of the president of Bula, a company specializing in surface treatment, polishing, deburring, grinding, etc.

Certain industrial processes are a real art. That is the case with polishing. Several of the polisher's senses are called into service to make a part: vision, to see the effect produced; touch, to perform the action, and hearing, to judge whether more abrasive paste is required and listen for brush wear. Although automation is necessary to meet industrial requirements, the operator must have some leeway for self-expression. “For several decades,” states Bernard Bula, President of Bula, “I have been convinced that the experience and know-how of the operators are a crucial factor. The machine is a marvelous tool, but it must be there to serve the operator, not the contrary. This being our philosophy, it was natural for us to attach special importance to the point of communication between operator and machine, i.e. the Human/Machine Interface.”

Using the Language of the Trade, Not That of the Automatic Control Specialist

Polishing generates highly complex paths that require controlling from 5 to more than 30 axes to reproduce the complex motions of the human hand. Polishing machines therefore generally use robots.

“We began to think about the ergonomics of our machines back in 1988, when we filed our first patent applications,” continues Bernard Bula. “Then, little by little, the search for gains in



Bula is a Swiss family-owned company that exports 95% of its production and covers the needs of various markets, each with stringent requirements: jewellery, clockmaking, surgery, and the automotive and aviation industries. Bula machines are practically mass-produced.

performance oriented us to a CNC-based solution. Polishing operations require increasing rigidity and there was no robot on the market that met our requirements for user-friendliness. In addition, the CNC allows us to use the same HMI for all our machines, which is a definite advantage for

customers who use several of them. That is when and why we chose Num.”

This was the start of a real team effort. The major difficulty was to translate the CNC operating modes into the language of the trade and vice versa. For seven months, the shop operators explained how they worked to information systems and electronic engineers. “We are especially proud of making a real contribution to the polishing trade,” explains Bernard Bula. Our teach-in function allows the polisher to work on the machine without having to program a single line of code. The Num CNC is so user-friendly that only a few hours are necessary to assimilate the basic operating principles. It would have been much easier to train the operators of our Chinese customers a few years ago if I had had a function like that. The language barrier is much less of an obstacle when speaking the language of the trade!”

Increasingly Independent Operation

With its integrated PLC, the CNC is also more flexible. The same system controls brush speed and polishing paste distribution, and monitors brush wear. “With an ongoing concern for user-friendliness, we are continuing to upgrade our machines, to make them increasingly automatic and independent,” continues Bernard Bula. “The newest generation includes accurate brush wear monitoring, guaranteeing a constant quality of machining during the entire production run.”



The use of a portable operator panel allows the operator to move around the machine. Moreover the Bula interface is multilingual

“Imitation Gets You Nowhere. You must innovate!”

Zaro, a tool sharpening and grinding machine manufacturer, has based its strategy on technologies and techniques for offering optimized solutions. Now Zaro has chosen NUMROTOplus®.

Zaro was created in Italy in the 1960s and today is a recognized player in the tool sharpening and grinding market. The company is very successful and is growing both in Italy and abroad (Germany, France, Switzerland, etc.). It's true that Zaro's success owes a lot to the personality of its president, Tarcisio Zaro, who based his entire strategy on being attentive to market needs and to innovation. “To get where we are today, we often needed to innovate,” he explains. “We were the first ones in Italy in our sector to use horizontal axis CNC dividers. Also, to keep ahead of our largest competitors, we didn't hesitate to make the transition from stepper motors to DC motors with encoders back in 1985. Already at that time, our first 5-axis machine with gauging and dedicated software was machining tools using circular and helical interpolation, not just linear. We developed the system ourselves.

Today, one of the keys to success is to get a complete system to market rapidly. And in-house development can be a time-consuming process, which is why we chose NUMROTOplus® for our most recent machine.”

**Most recent
Zaro machine:
Sharp Complet**



The Importance of a Global Approach

Tool gashing and edge sharpening are complex operations for which the quality of the algorithms, the sampling time and precision of execution are essential. Because of the special nature of these machining operations, the synergy or harmony between the mechanics, the software and the drive system must be perfect. The choice of an external solution must in no way detract from the concept of the machine. “In addition to innovations such as electric spindle with dual outlet or automatic control of coolant, it was with this overall concept in mind that we designed our most recent Sharp Complet machine,” continues Tarcisio Zaro. “We were supported in this by the strong commitment of the Num team, who not only adapted the NUMROTOplus® software to the mechanical system of our machine, but also helped us optimize the servo drives. This collaboration moreover continued during design of the PLC program and setting of the system parameters. Tests rapidly demonstrated the efficiency of our mechanical systems as well as the flexibility of the Num Power 1050 CNC and drives.”

“A performance analysis based on criteria such as contour precision, surface finish, motion reversal speeds, programmed path look-ahead and the speed of response of the Num MDLU and MBLD drives has demonstrated the structural stability of our Sharp Complet machine,” he added.

Fast and Successful Implementation!

All these features allow the users to create and sharpen their tools accurately while preserving the symmetry and geometry of the cutting edges. Operations such as gashing and grinding the cutting and clearance angles are made easy by NUMROTOplus®'s user-friendly interface.

Introduced at the recent Hanover EMO, the implementation of NUMROTOplus® and the new drive system only took a few months. Four months later, another a new machine was shipped to Germany. That made it the 16th...

Finally, innovating is not only finding a technical solution to satisfy market needs, but also in adapting it for the best possible implementation.

Milling and High-Speed Cutting (HSC)

A Completely Digital System For Faster Working

Weingärtner's Vario HS 700 high-speed cutting machine is a special thread cutting machine which mainly machines rotors and worm screws. Compared with the previous model, the machining time was cut in half by the new mechanical system, the Num Power 1050 CNC and its digital drives.



The Vario HS 700 is about twice as fast as the earlier version introduced just 18 months before.

field equipment suppliers use Weingärtner machines, because the milling of drive rotors for oil drilling (mud motors) is a specialty of the Austrian firm. It also has many enthusiastic customers among plastic processing machine manufacturers.

These activities require reduced machining times and a high level of quality. A high-speed version of the Vario machine was therefore developed, partly at the instigation of the customers, even though the previous model had been introduced only 18 months earlier. Stated aim: reduce the milling speed to nine seconds per revolution, down from 12, on a reference part, i.e. a six starts threaded drive rotor with a diameter of 60 mm for drilling equipment, under actual production conditions.

Two of Num's Strong Points: Competence and Co-operation

It was not enough to make a few minor changes. The entire mechanical system of the Vario 700 had to be re-engineered and decisive factors such as the X, C and A axes had to be re-designed. They needed to be made lighter and more dynamic. The CNC had an essential role to play in this respect. The management of Weingärtner lost no time in choosing a supplier. They had already been using Num CNCs for many years on their machines, to their complete satisfaction. Josef Grimm, Manager of the Special Machine Production Unit, clearly states why Num CNCs were chosen over and over: "Num has decisive advantages over its competitors especially in the field of special machines, in terms of CNC openness, speed, precision and surface quality." He adds: "I don't know any other

Weingärtner Maschinenbau is located in the small Austrian city of Kirchham, but its special milling machines and thread cutting machines are known all over the world. They are the benchmark for the manufacture of eccentric gears, rotors/stators, injection molding and extrusion screws and precision threaded spindles. Most oil

manufacturer as competent as Num and as co-operative for developing new projects and new machines. This saves us time and gives us confidence."

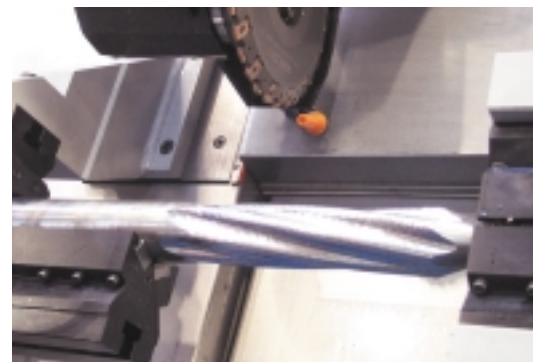
Since Num has vast experience in the area of high-speed cutting, it was closely involved from the outset in the development of the high-speed machine. The developers relied on the Num Power 1050 together with its digital drives: "The only way of achieving the required speed and precision was by complete digital coupling of the drives and CNC, provided, of course, that the mechanical system was up to par."

Six Seconds Instead of Nine!

This was recently demonstrated when the customer took delivery of the first Vario HS 700 high-speed machine. It did much better than the required nine seconds per revolution. The customer is currently achieving a speed of six seconds per revolution on this machine. The CNC and drives would be capable of doing even better, down to just over four seconds, but that would cause excessive wear and therefore a loss of yield. Josef Grimm is rightly proud of the success of his machine and appreciates Num's collaboration on the project: "Num is our partner in the area of high-speed machining. No other manufacturer can provide assistance like Num's."



Control is by a Num Power 1050 CNC with an optical link for the I/O and digital bus for the axes.



The reference part, a six-start screw with a diameter of 60 mm, is now machined at a speed of six seconds per revolution.

Flexible Shop

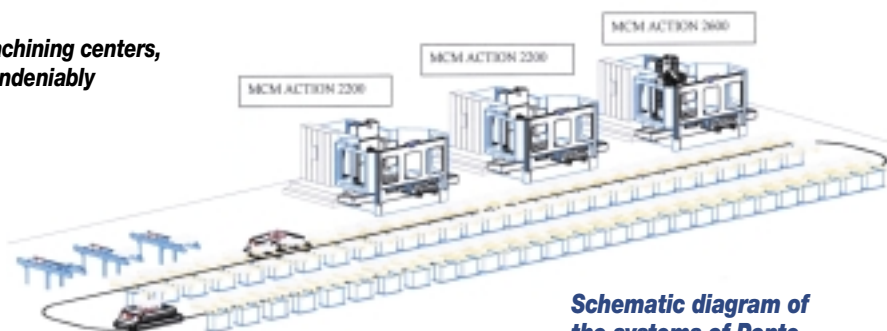
Num Contributes to Meccanica Ponte Chiese's Productivity

With its fully automatic shop including several MCM machining centers, all controlled by Num CNCs, Meccanica Ponte Chiese undeniably has a competitive edge.

Meccanica Ponte Chiese is an Italian family-operated company located in the province of Brescia. It has specialized in mechanical subcontracting since 1973. In 1988, the company purchased its first CNC machine: an MCM machining center equipped with a Num 760 and a palletizing system controlled by a Robonum 800.

"With the arrival of this machine," explains Giovanni Ferraboli, company owner, "we significantly improved our performance, especially in terms of precision. We make medium and large parts for construction machinery, the automotive and textile industries and ships."

Because of the success of this first purchase, Meccanica Ponte Chiese initiated a major flexible machine shop project. This project, very expensive but with huge potential, led to the successive purchase of three new MCM Action systems, each with a 400-tool carousel and controlled by a Num CNC (two by Num 1060s and the last by a 12-axis Num Power 1050 CNC with Num Drive digital axes and spindle drives). "We were attracted by the uniform look and feel, the user-friendliness and the performance of the Num products," states Giovanni Ferraboli. At the same time, a multiplexed network was set up to monitor several machining stations from the same terminal and control them from that same panel. Finally, MCM software handled supervision and communication between all units and with the production management system. "Not only did this new shop increase our productivity and profitability," explains Giovanni Ferraboli, "it also improved our working conditions. The platform conveyor system is a



Schematic diagram of the systems of Ponte Chiese Shop - The parts are conveyed from one machine to another by an automatic shuttle.

good example: robot-controlled and battery-operated, it has indisputable advantages of convenience and silence, considering the number and size of our parts."

Simultaneous Machining of Different Parts!

Since the operation is continuous, loading and unloading take place in masked time. But the most remarkable feature is the capability of mixing different parts on the line. "As subcontractors, we have to produce batches of different types and quantities," says Giovanni Ferraboli. "It was therefore very important for machine operation and loading to be very flexible, which is why we designed a highly versatile system platform."

The speed at which the employees were operational, the general view of the work area, the speed of movement and the level of precision achieved, as well as laser control of the tools all convince Giovanni Ferraboli that he made the right choice. "We have an undeniable edge over the competition as regards production capacity and lead times, flexibility and cost price," he asserts. "Today more than ever, we need to reduce our production costs and make our investments pay back. For a subcontractor, definition of the production tool is a very sensitive issue, because it is the dominant factor for keeping our customers and winning new ones. That is why it is so important to have a flexible tool."

In addition, Meccanica Ponte Chiese is able to provide additional services such as a dimensional check of parts in the measurement room or qualification of materials.

"The best way to remain competitive," concludes Giovanni Ferraboli, "is through experience. That is why I chose Num."



Automatic platform routing phase



Loading of a blank

Milling, Molding, Shaping, etc.

RTCP Function: *Never Lose Contact*

Often misunderstood, the RTCP function has considerable advantages for 5-axis machining.

For shaping jobs in the molding, bodywork and woodworking industries, it is often necessary to accurately keep a constant angle between the tool and the surface to be machined. This is what we naturally do with our wrist when we paint: to draw a thin line, we hold the tip of the brush perpendicular to the canvas, whereas to draw a thicker line, we naturally hold the brush at an angle and pull it in the direction of the bristles. We instinctively keep the brush in contact with the canvas and at the desired angle to the surface to be painted.

For machining, it is the rotary axes of the machine that play the part of the wrist (e.g. a dual rotary tool-head, or a table and cradle holding the part). These axes allow the tool or part to rotate around the axes exactly like a wrist. This type of setup is found on 4- and 5-axis milling machines.

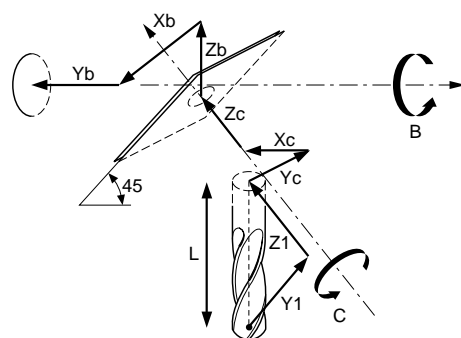
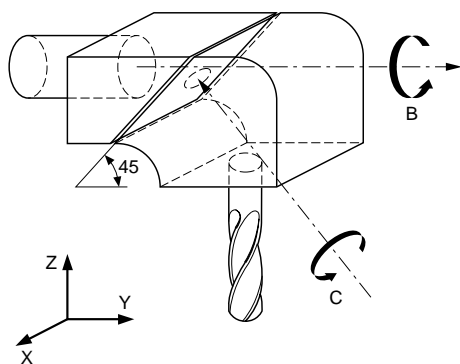
Things are much more complicated when the surface to be followed isn't flat like a canvas but has an irregular shape.

Keeping the tool in contact with the part then requires taking into account all the offsets due to the tool-head mechanics, tool length, etc. (see sketch opposite). The enormous advantage of the RTCP function is that it not only manages all these offsets automatically but in addition guarantees that the tool is effectively

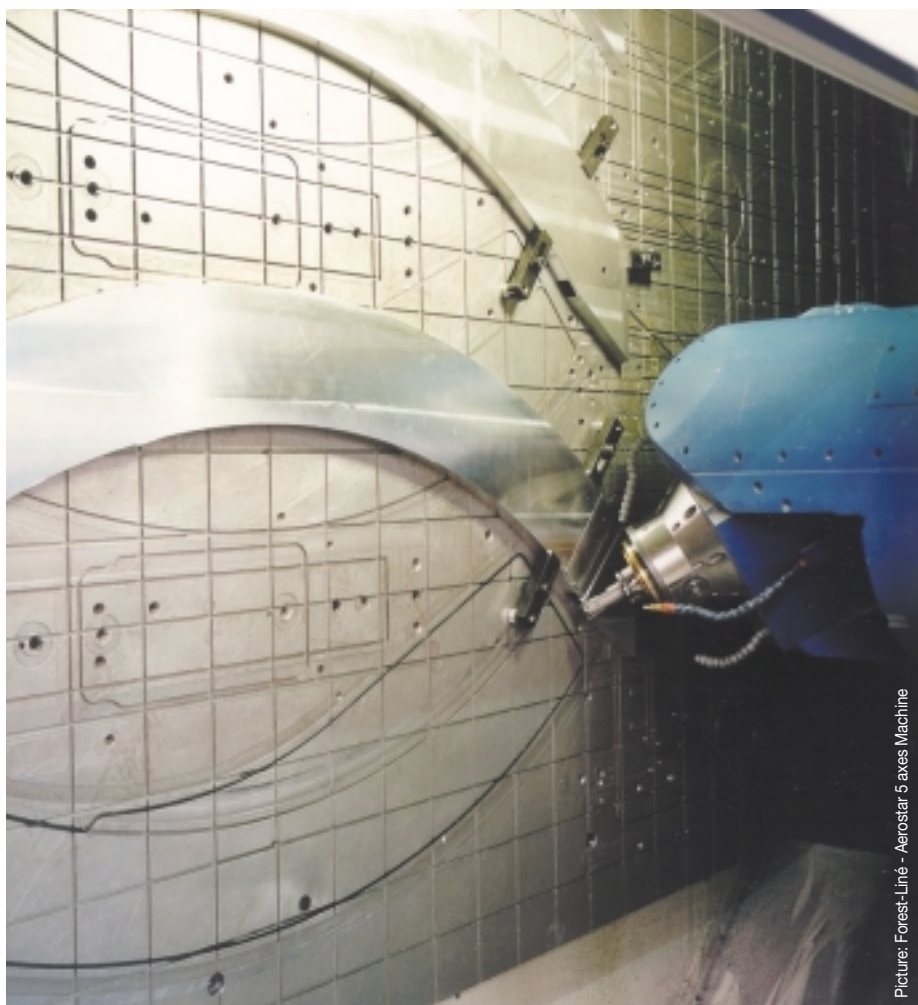
in contact with the programmed point.

A Guarantee of Enhanced Precision

One of the advantages of the RTCP function is that it uses the contact point as the reference point in all the calculations. The user therefore directly programs the machine using the part contour and indicating the desired tool angle. The CNC then determines the position of the tool-head and all the axes so as to reach this point. In addition to a significant saving of time and simplification of the CAD/CAM system, the user is also certain of correctly remaining in contact with the surface to be machined. Conversely, without the RTCP function, the reference point is the tool-head position and the contact point is determined mechanically from this reference point by application of all the mechanical shifts. This difference between "contact point used as reference point" and "contact point obtained



The RTCP function (Rotation around Tool Center Point) determines the tool position with respect to the part using the tool center as reference.



Picture: Forest-Liné - Aerostar 5 axes Machine

mechanically" is key. For instance, with a pivot length of 600 mm (the length between the tool tip and the center of the rotary head), a positioning error of only one-hundredth of a degree (1/36,000 revolution!) causes an error of 0.1 mm.

With the RTCP function, this error exists on the tool-head, but the contact point remains correct. Without the RTCP function, this error exists on the tool tip with the result that the part may be either damaged or the tool doesn't touch!

Programming Independent of the Machine and Tool!

This RTCP function also has many other important advantages! The program is independent of the machine and especially of

the tools used, since the programmed coordinates are those of the contour, not the machine. Similarly, it is possible to apply a tool offset without changing the part program. In addition, RTCP is part of the CNC post-processor, which makes part programs more portable.

The quality of surface condition is controlled much better, since, here again, the programmed speed is applied to the contact point, not to the rotary tool-head, which preserves optimal surface conditions.

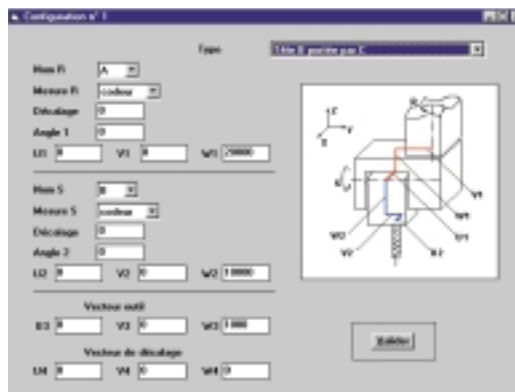
Last but not least, with RTCP, the part program is smaller and takes up much less memory space. Still not convinced?

HIGHLIGHT

RTCP at Num

As a pioneer of the RTCP function, Num has a definite advantage in this area. As is its habit, Num has also developed a particularly user-friendly application, designed to allow OEMs to set up the function rapidly and easily based on the mechanical properties of his machine.

To do so, the OEM defines the tool-head geometry on graphic views and enters the dimensions of his specific mechanical system (see screen below).



RTCP parameter setting screen. In addition to the four kinematic variables (angle 1, U1, V1, W1), 24 different geometries are proposed (dual rotary tool-heads and tables).

Num's Exhibitions

Throughout this year, right across Europe, we will be pleased to welcome you at various exhibitions.

You can discuss your projects with us and together we will determine the best solution for your requirements.

During the first half of 2002 you can find us at :

March

Simodec

5th - 9th March



La Roche sur Foron, Fr.

March

BIEHM

11th - 16th March



Bilbao, Spain

Machine-Outil

19th - 23th March



Villepinte, France

GrindTec

20th - 23th March



Augsburg, Germany

April

Hannover Fair

15th - 20th April



Hannover, Germany

May

Piedra

8th - 11th May



Madrid, Spain

Xylexpo

21th - 25th May



Milano, Italy

May

SIAMS

23th - 27th May



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