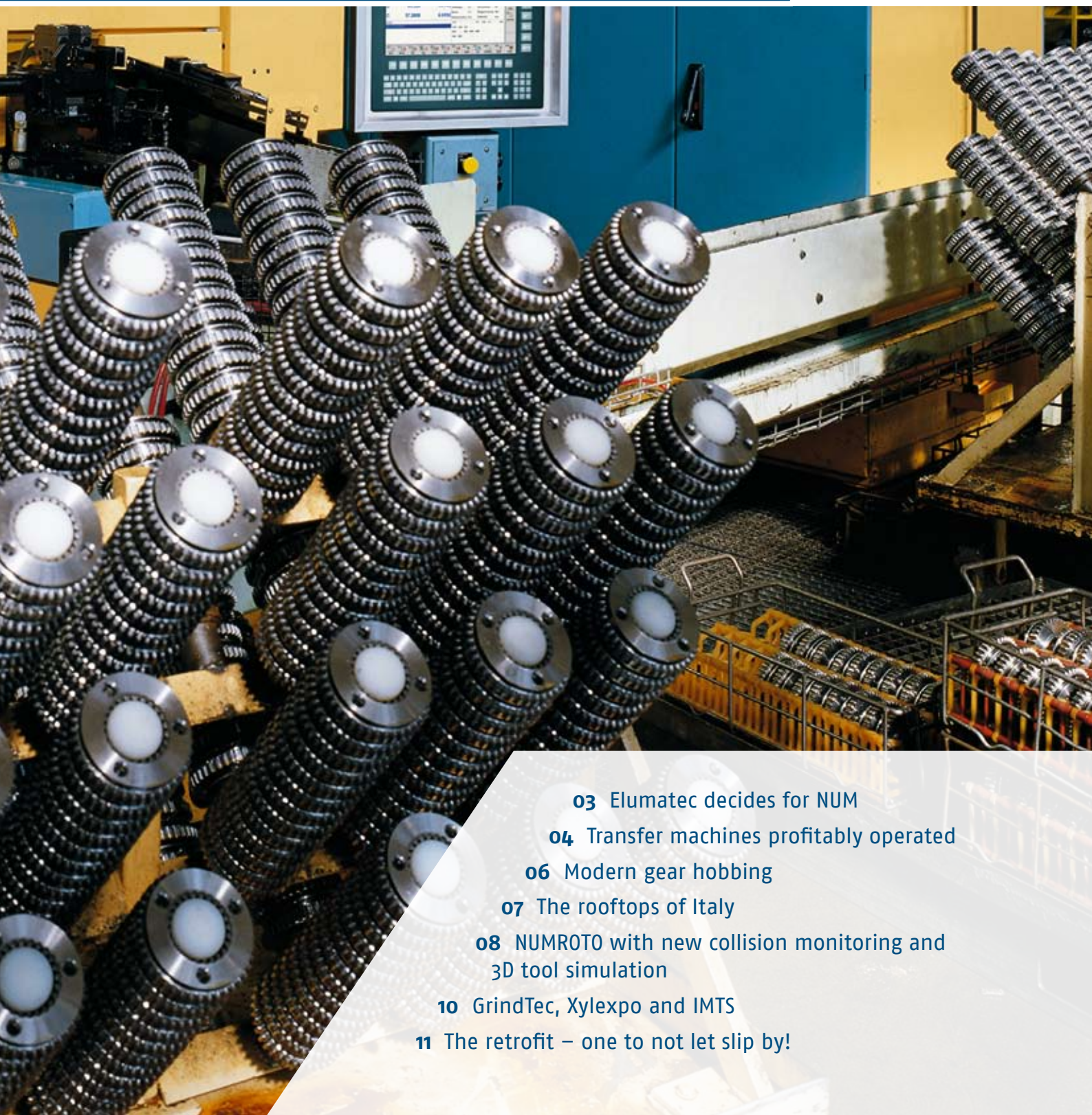


NUM

information

JOURNAL FOR CNC-TOTAL SOLUTIONS

No 45 - October 2006



- 03 Elumatec decides for NUM
- 04 Transfer machines profitably operated
- 06 Modern gear hobbing
- 07 The rooftops of Italy
- 08 NUMROTO with new collision monitoring and 3D tool simulation
- 10 GrindTec, Xylexpo and IMTS
- 11 The retrofit – one to not let slip by!



Your reliable partner

Dear reader

Marketing promises and the reality they refer to are often worlds apart. Our slogan, "CNC Power Engineering – Always on the move" is not one of these unrealistic marketing promises. We're working very hard to keep this promise world-wide, already in the first year after being hived off by the Schneider Electric Group.

The NUM Group's business trend is overwhelmingly positive, and we are striving for a healthy, steady expansion of our market position. In order to offer optimal solutions to our customers and users, we work closely with firms whose product portfolio ideally complements our own. Our strategy of offering customers and users complete solutions, and not just individual products, has been very successful. This foundation of this strategy has been the strengthening of our team in the areas of special application develop-

ments and customer support. The opening of a service facility in Germany, close to the Czech border, is just one example of this expansion. The organisation of the NUM Group will be continually adjusted to meet new market requirements in the future, so that we can constantly increase the benefits we provide to our customers.

Our development departments are working hard to make our products fit customer needs even better. For example, a few weeks ago we began including a new 20kW power supply unit with the NUMDrive C drives. Toward the end of this year, the industrial FS151i PC, which ideally supplements the FS151 industrial panel family, will also be available. In the field of transfer machines there have been developments aimed at simplifying the operation of these complex machines and optimising their

functioning. The brand-new Back-UpAgent was developed for users who want to save data on the machine in an uncomplicated manner. The Back-UpAgent is a component of the NUM-Pass HMI, which is available on all new NUM CNC's with PC.

In order to increase the productivity of tool grinding machines which are equipped with NUMROTO, the user is now provided with our newly developed 3-D simulation with an integrated collision monitoring system.

The demands made on people, machines and productivity are constantly rising. In the following NUM Information, we will show you, with the help of several application solutions, how you can turn this challenge into an opportunity for success. «CNC Power Engineering – Always on the move» – together with you, the customer.

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Elumatec decides for NUM

After a thorough selection process, Elumatec, the world-wide market leader for aluminium and plastic profile processing machines, has decided for Axium Power. NUM's employment of specialists for customer-specific applications was an essential argument in their favour.

Elumatec GmbH & Co. KG in Mühlacker-Lomersheim has developed over the years into the world market leader in processing machines for aluminium and plastic profiles. Bernd Renz, a member of Elumatec's executive board, believes this market is terrifically dynamic, with fields of application ranging across all sectors: "Profile processing for aluminium rod press profiles is a growing market. In Dubai, for example, many skyscrapers are being built which require a great deal of window and cladding elements. Whether it be in goalpost casings in football stadiums, car or other vehicle construction, marquees or convention tents, in the household or at the office, aluminium profiles are extremely versatile."

With the emergence of new fields of application, the requirements placed on the machines is also increasing. Free forms must be traversed which are beyond the capability of the controls which have been used up to now. Bernd Renz explains: "In order to provide profiles with free-form surfaces and contours, a CNC control is necessary. That's why we switched to a CNC Axium Power, which perfectly controls



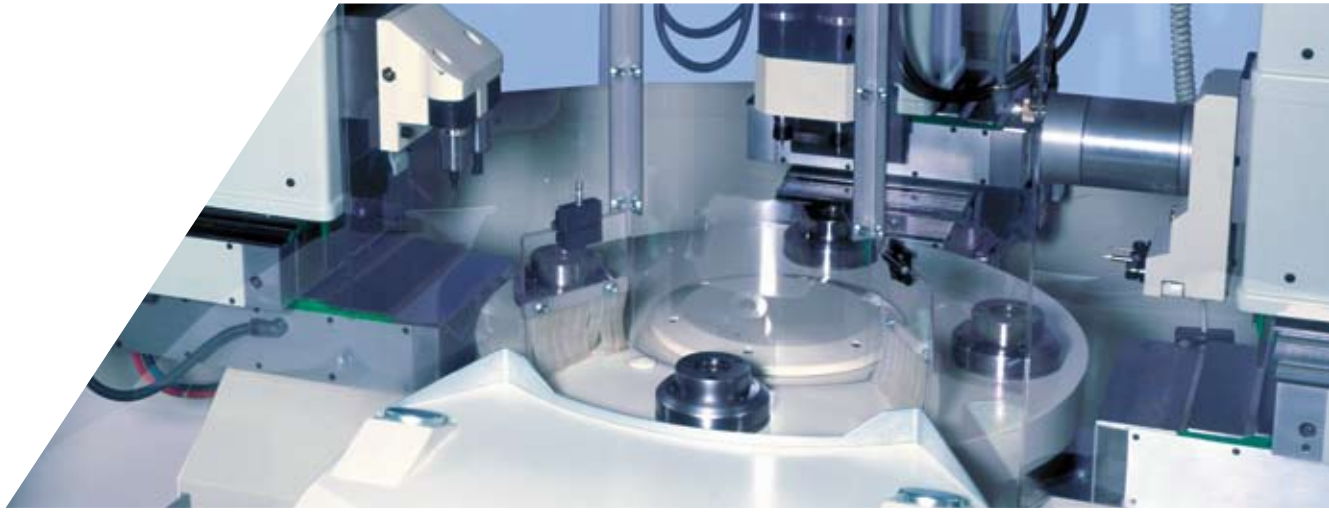
five simultaneous axis movements, with our new rod machining centre SBZ 151. The SBZ 151 is the largest model in a series of machines designed for processing rods. The six-axis processing centre is designed for the efficient processing of aluminium profiles. The X-axis traverse path can be as long as you like.

When several different makers of CNC controls were subject to a comparative test, NUM emerged as the winner. Jörg Vester, Director of the Electroconstruction department, summarises the results: "Most of the manufacturers were similar with regard to

general CNC capabilities. An essential reason for the decision in favour of Axium Power was the open structure of its control, which enabled access to all the relevant parameters. In addition, NUM guaranteed it would provide us with support for certain applications we needed." Bernd Renz adds: "That wasn't an empty promise: we received exemplary assistance."

The openness of the control and the support Elumatec received from NUM was of great importance because the users of profile processing machines usually have no experience with CNC controls. In order to guarantee easy and safe use, a suitable user interface which can receive data from the CAM system had to be developed and programmed. In addition to the CNC Axium Power, Elumatec employs the complete NUM drive package, i.e. the high performance motors NUM Drive BPH, which provide a high degree of stability even at low speeds. They are operated with the new drive boosters from the MDLÜ3 series, which are equipped with the SAM (Safety Monitoring) safety module.





Transfer machines profitably operated with NUMtransferCNC®

The effort required for set-up with simultaneously reduced machine running time has markedly increased for transfer machines. The new NUMtransferCNC® offers an intuitive and consistently operator-oriented machine guidance system, which has a positive effect upon set-up times and unit costs.

The increasing demand for smaller batches, greater variety and faster reaction times places increasingly high requirements on the set-up, conversion and handling of rotary-transfer, transfer and multi-spindle machines. The profitable use of these machines therefore requires flexibility and an efficient, intuitive operation that the user can easily navigate.

The new transfer machine control system NUMtransferCNC can be optimally adapted to the respective machine configuration. The CNC core controls up to 8 stations with a maximum total

of 32 axes, with up to 9 axes that can be interpolated within a single channel. For larger machines, several CNC cores can be switched in parallel to create machines with over 40 stations and more than 120 CNC axes. In doing so, the functions such as turning, drilling, milling, grinding and measuring, among others, can be mixed at the user's discretion. The operator works with known machine terms, such as the station names.

Machine and process-oriented operating concept

Due to the parametrisation, transfer machines from the simple to the highly complex are easily understood by the operator and are depicted just as they are operated. The names of the stations can be freely assigned and thereby clearly and quickly identified. For very large machines, the stations can be combined into "cells", which can likewise be assigned any name. Every station and every cell can be directly selected in any operating mode of the CNC system. The operator selects the corresponding function and does not have to bother about which CNC channel and which CNC controller executes these functions. This provides an improved

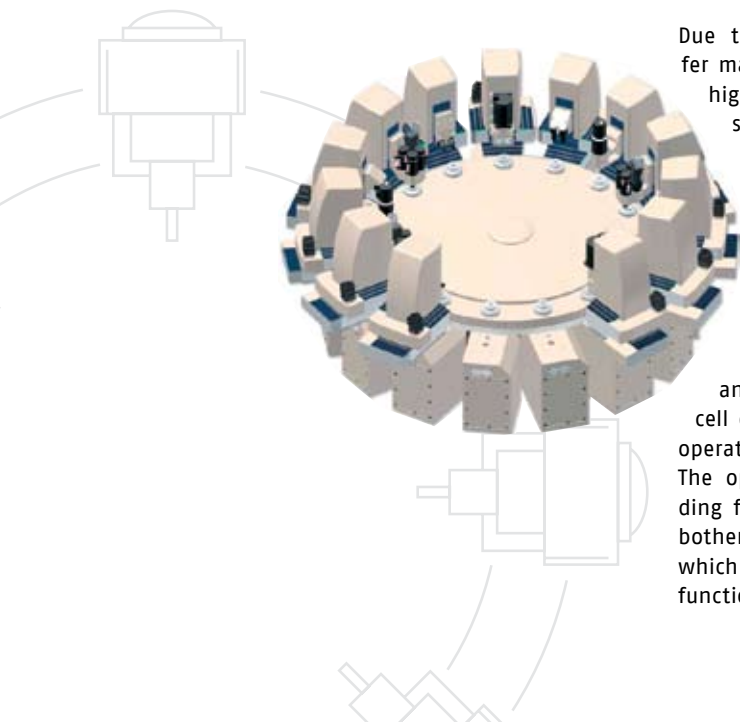
overview, increases operating speed and reduces inputting errors.

The workpiece programs can be uniquely identified as they are created and the assignment of workpiece programs and other CNC data to the individual stations and cells then occurs automatically. Tool modifications can then be assigned to the individual stations, greatly easing management and execution.

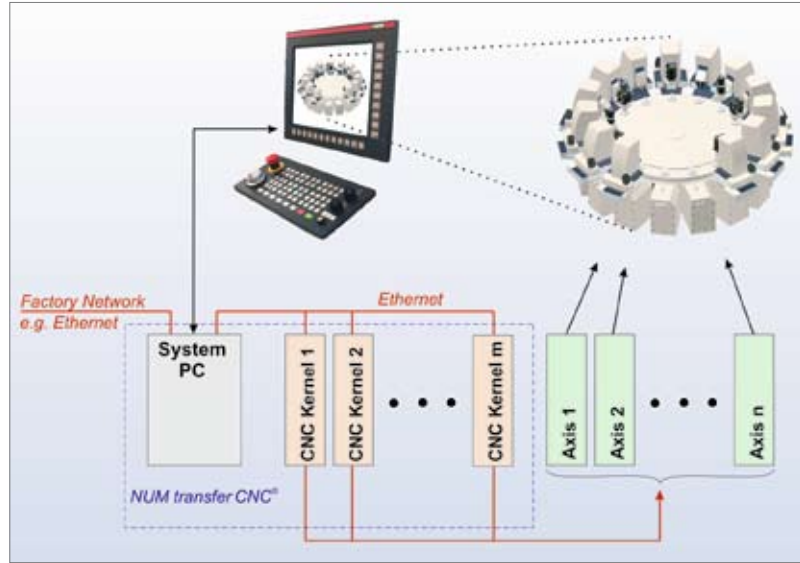
With such complex machines, availability plays a key role; it is therefore especially important that error messages are as comprehensive and precise as possible. NUMtransferCNC informs the operator of any errors, while unaffected stations continue, if possible, to operate unhindered. The error messages provide, among other information, details as to which physical CNC core and which CNC channel the error was reported from, and this simplifies the service technician's task of searching for errors on the physical components.

Machine-specific adaptations

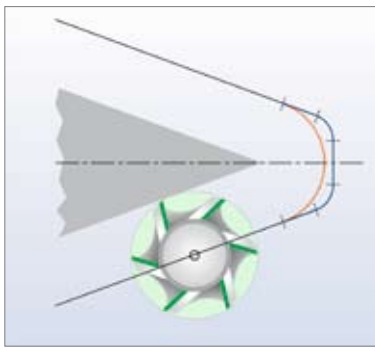
In order to fully capitalise on the strengths of each transfer machine, the CNC system is not only equipped with the standard configuration options already mentioned, but also



has a lot of room reserved for special adaptations. These adaptations can arise through the machine manufacturer as well as through the system supplier. Possible changes can extend from adaptations in the area of the user interface to developments in the real-time cores of the CNCs. The NUM-transferCNC gives you almost unlimited possibilities in achieving your goal of optimal and cost-effective machine operation.



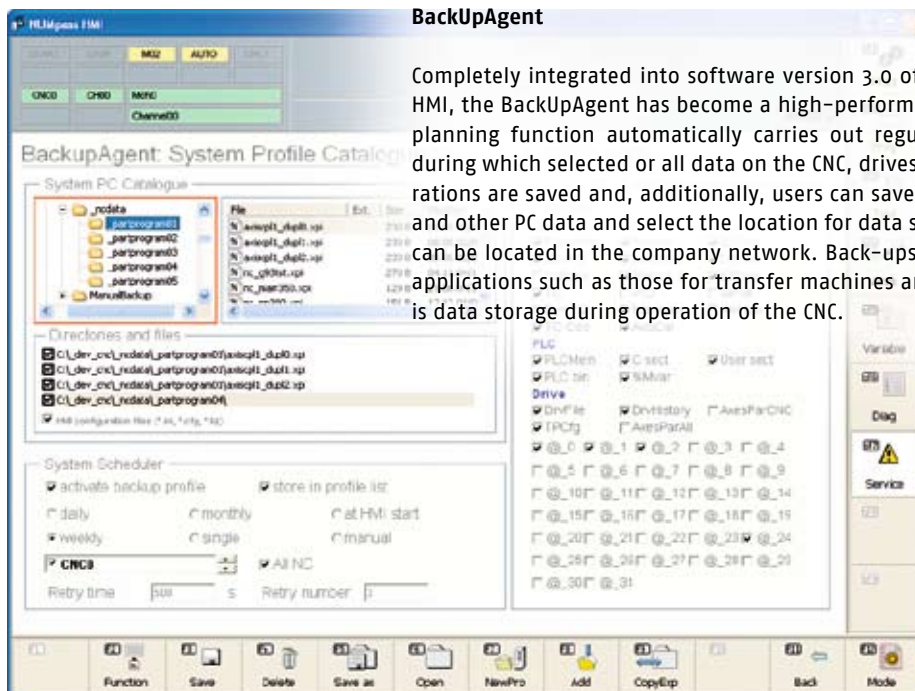
NUM News



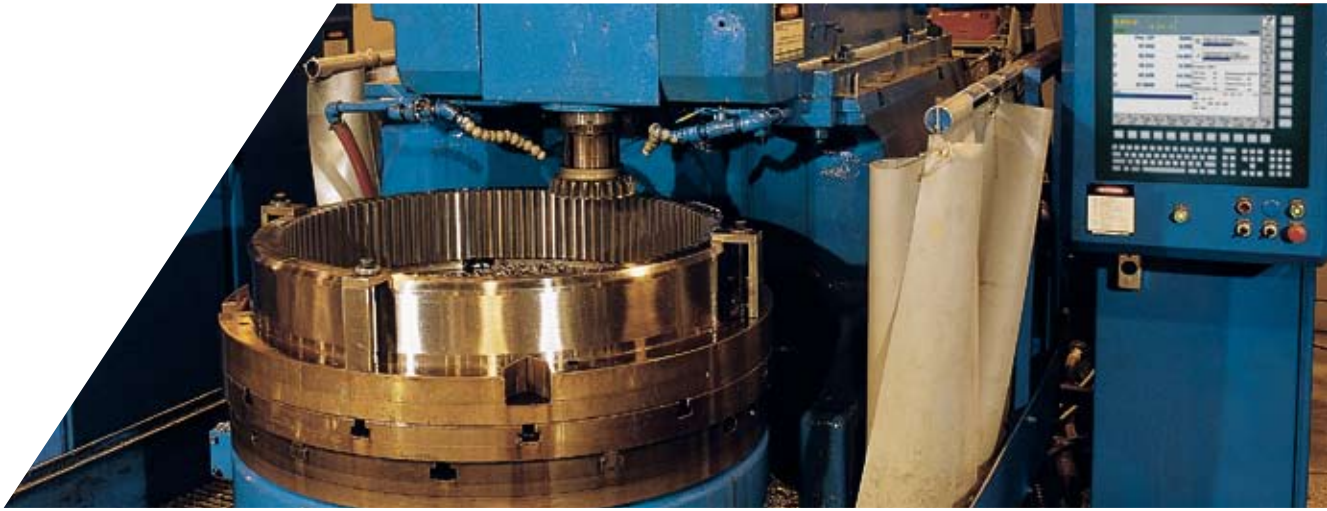
Radius correction for tapered workpieces

The edges of tapered workpieces, which are common in wood-working, are either flattened by the clean cutting of the tool, burnt or sloppily executed. The newly implemented radius correction in our CNC controls, Axium Power and Num Power, guides the tool around the edge at a safe distance and then back to the workpiece. The result is perfect, precisely executed edges and greater protection of the tool. The distance of the tool to the edge of the workpiece can be adjusted depending on the situation.

BackUpAgent



Completely integrated into software version 3.0 of the NUMpass HMI, the BackUpAgent has become a high-performance tool. The planning function automatically carries out regular back-ups, during which selected or all data on the CNC, drives and configurations are saved and, additionally, users can save CNC programs and other PC data and select the location for data storage, which can be located in the company network. Back-ups for Multi-CNC applications such as those for transfer machines are possible, as is data storage during operation of the CNC.



Modern gear hobbing

Adjusting the costs, quality and productivity of gear hobbing to meet the rising demands of the market: NUMgear, the comprehensive NUM application solution for gear hobbing, makes this possible for new and existing machines.

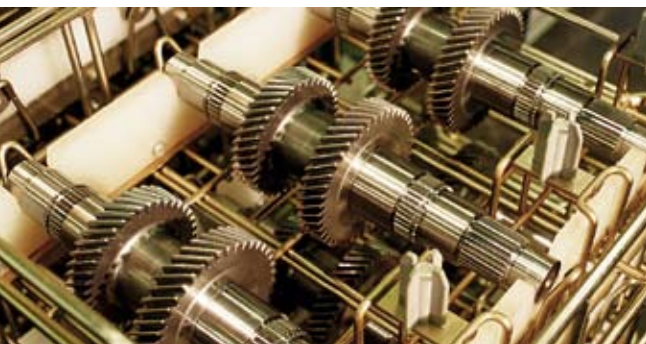
Increasing attention is being paid to the productivity and cost structure of gear hobbing. At the same time, the quality of the products high importance. This state of affairs makes flexible and cost-efficient control solutions a must, especially those that are equipped with an easy-to-use, dialog-based user interface.

codes. The tool, gear, teeth, dimensioning and setting data are clearly presented. After the data has been entered, the machine program is automatically generated and is available for use in production. Due to the considerable time-saving during programming and the rapid familiarisation of the operating personnel, productivity increases significantly and operating errors are all but eliminated.

The NUM gear hobbing application solution NUMgear is perfectly designed for the industrial production of highly precise precision gears with top-quality surface integrity. The electronic drive over three or four axes and the precision

algorithms are two key functions in this regard. The flexibility of the software allows it to be used for milling, honing and grinding gears on new machines or as a retrofitting on existing machines. All forms, straight and helically toothed gears, worm gears and threaded gears, can be produced and reworked. The flexibility of the software solution also enables you to program special solutions – on request with support from the experts at NUM.

In combination with the NUM CNC controls, the drives, the axis and spindle motors, customer-specific software adaptations and the comprehensive support services, the costs of gear hobbing are lowered and the increasing demands of the market are met.



The high-performance, precise NUM-CNC, equipped with the flexible software solution NUMgear for gear hobbing, as well as the corresponding drives and motors from NUM, is the most complete gear hobbing solution on the market. NUMgear is an application solution and thus possesses the specific functions and clear graphics necessary for all types of gear machining.

Logical menus, clear dialog boxes, and the graphic user guide markedly simplify operation, and programming can be completed within a short time even without previous knowledge of ISO



The rooftops of Italy

Through the intelligent combination of modern machine technology, high-performance CNC and a clear and precise user interface, Mornico Legnami was able to cut machining time in half.

Turn-key roofs, from planning to production of the individual parts all the way to completion of the roof superstructure, are Mornico Legnami's field of activity. The company based in Mornico Al Serio, a small town in the lowlands of Lombardy between Bergamo and Brescia, was started in 1989.



"We are active at a national level and are able to produce two medium-sized roofs per day," explains Adriano Ricci, the owner of the company. "In order to achieve this, we had to optimise the planning process for the roofs. This process involves first dimensioning work and then structural analysis, in order to develop the various wooden elements from which the primary and secondary structures are assembled. Then all the necessary data is transferred to the machines in production, so that the machining tools and their operating sequences can be selected without any interventions by the operating personnel. "The machine operator's work is limited to set-up and machine guidance", explains Davide Pagani, who is responsible for the planning and co-ordination of the company's manufacturing activities.

The challenge

Nicola Sella, owner of Essetre, which specialises in the manufacture of machining centres for woodworking, explains: "The challenge was to integrate into the CNC control of the machine the intelligence necessary to implement the construction technologies designed for the individual parts." In order to reduce the machining times, the number of implemented tools had to be optimised, one single indexing procedure had to be planned, and the parallel machining of symmetrical beam parts had to be made possible.

Essetre developed a machine with two bi-rotating heads, Techno PF. The system is divided into six different processes (groups), which can share axes and data with one another, and which can prepare the tools for the next machining step while the machine is operating. Being able to manage the thirteen axes and six work processes at the same time requires a great deal of computing power. The CNC control also had to function on a PC basis, so that a specific user interface could be developed. The Num Power 1080 proved to be the ideal solution to this difficult task.

The integration of a server in the CNC enables access to and display of the CNC data and locks, which facilitates operation and maintenance to a considerable degree. Complex geometries to be machined with five axes are realised with the Rotating Tool Centre Point RTCP, in which the CNC calculates the optimal machine path. Thanks to the structured programming and the dynamic operators, special geometric forms can also be realised.

Machining time: 50% less

"Using the new machine with the NUM control enabled our company to reduce the machining time for individual roof parts by fifty percent. The user-friendly, clear and precise user interface has made it much easier for machine operators to become familiar with the machine, and this allowed us to quickly integrate them into the manufacturing process", concludes Davide Pagani.





NUMROTOplus® with new collision monitoring and 3D tool simulation

With the integration in the NUMROTO software of 3D tool simulation with grinding process animation and collision monitoring with 3D machine simulation, a comprehensive total solution has emerged offering a wide range of functions and high operating convenience.

e.g. a step drill with profile steps and 13 machining steps amounts to less than 3 seconds. The accuracy of the simulation can be individually set.

3D tool simulation with grinding process animation

The "3D tool simulation" for NUMROTOplus simulates the actual grinding process and presents it in a three-dimensional display. To ensure clear identification during operation, each machining step receives a different colour coding. The zoom and pivoting functions allow

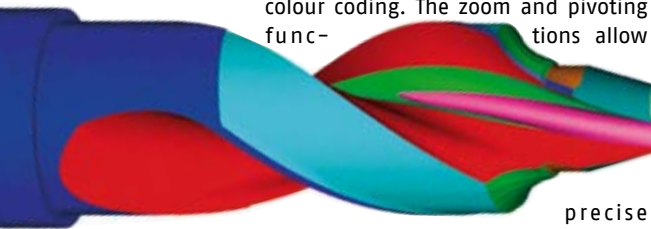
A complete step drill with double flutes is simulated in about 15 seconds. If the 3D tool simulation is used together with the collision monitoring software, the machine model is likewise displayed during the animation of the grinding process.

Collision monitoring with 3D machine simulation

The "collision monitoring" aspect for NUMROTOplus is a 3D simulation which immediately recognises kinematic problems based on the machine simulation. Known to be critical in practical use, the calculation time required for

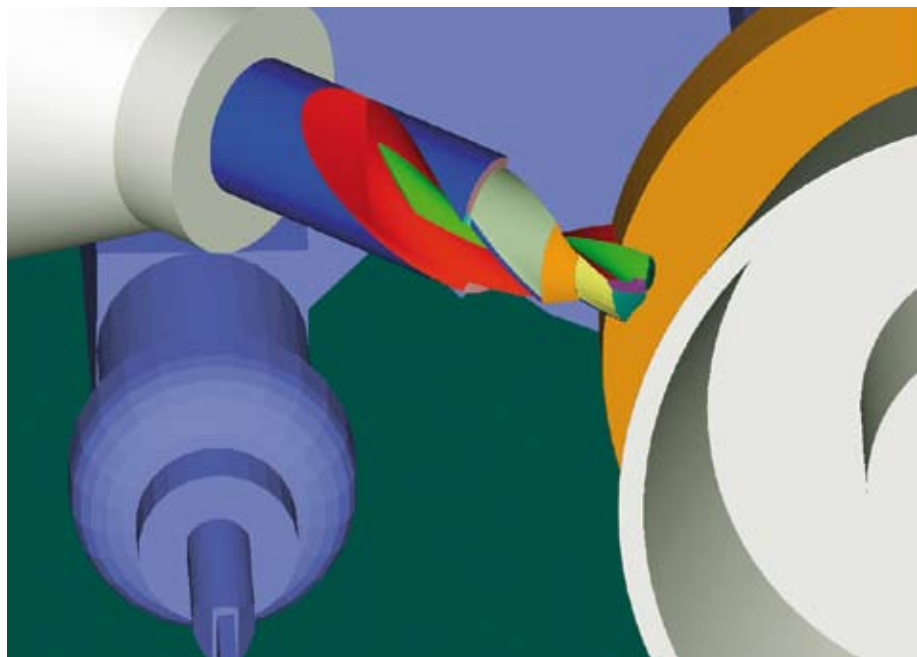
All the available elements in the 3D machine model of the machine manufacturer are integrated in the collision evaluation. Alongside this, additional machine-specific or processing-specific elements such as measuring probes, tailstocks, supports, spacer rings, cooling pipes, wheel flange nuts and more can be added.

The software tests for possible collisions of any individual machine elements with each other, any grinding discs with the machine and machine elements, as well as any unengaged grinding discs with the blank. With the "collision monitoring" option, the grinding process can also be simulated without material removal. This function



precise viewing and assessing of even the smallest movements and procedures. The exactness of the simulation can be individually set and the 3D model can be precisely measured.

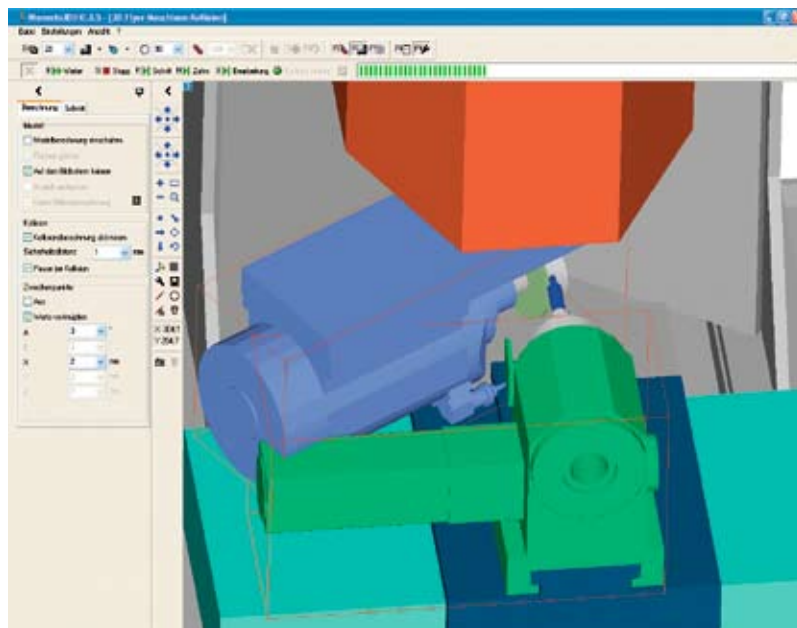
The simulation shows the material removal and allows estimation of the grinding disc load. This enables considerable optimisation of rough grinding. Even the most minute tools can be simulated and displayed with the highest precision. The ability of running the simulation forward as well as backward has proven especially useful with delicate processes and geometries. The software has also proven itself in practical use through the speedy calculation of the simulation.



is very useful for monitoring the grinding position and cooling as well as for assessing the disc contact.

The collision monitoring function in combination with the 3D tool simulation offers a high-performance, practical and flexible tool that can make the entire production process faster, safer and more calculable.

www.numroto.com



New drives MDLU 3 and NUMDrive C

The power of the new servo drives ranges from 5 to 105 A, and more powerful versions will be made available in the future. They are connected to the Axiom Power CNC via the high-speed digital bus DISC NT. The integrated control algorithms interpolate quickly and with great precision, and are suitable for linear and direct drive motors, as well as HF spindles. The safety equipment of the drives has been markedly improved and, equipped with the optional Safety Monitor Module (SAM), conform to the requirements of EN 954-1 category 3. The drives have a modular structure and are supplied without an integrated power supply unit.

New power supply units for drives

The new power supply units MDLL3 and MDLQ3 are replacing the previous models MDLL2 and MDLQ2. They are distinguished by the same form factor as the NUM Drive C and can attain a power rating of up to 30 kW. Series 3 thus offers double the power density of the previous model and costs less. The MDLL3 and MDLQ3 were developed for the Axiom Power CNC family and are compatible with NUM Drive C, MDLU3 and – with a few adjustments – the MDLU2 and MDLA.

Control panel FS151i

Unlike the passive control panels of the FS151 family, the new model FS151i has an integrated industrial PC at its command. Instead of video and data links, the CNC connection consists of one single Ethernet cable. The new control panel can easily be disconnected from the CNC and machine-installed, which considerably expands its range of use and facilitates integration into the machine. The excellent price-to-performance ratio makes the new FS151i control panel appealing not only for new installations, but also an attractive offer to raise the value of existing machine.



NUMROTO at GrindTec

Success through innovative solutions

As a partner of the manufacturer for the automation of CNC-controlled production machines, NUM has amassed a great deal of user know-how. The decision made several years ago to specialise in the development of complex CNC total solutions has been successful, as GrindTec once again confirmed.

CNC total solutions for tool grinding, under the product name NUMROTO, is one of NUM's most important market segments. This software is currently offered by fourteen machine manufacturers on about thirty different machines – a strong argument for tool manufacturers and regrinding specialists, who can then use the same software for different machines.

A trend-setter for some time now, NUMROTO has been continually subject to further development, and in turn GrindTec was able to demonstrate several dozen improvements. The new 3D simulation, which immediately recognises kinematic problems based on the machine simulation, was met with active interest.

Xylexpo: record numbers

Around 93,000 prospective buyers from 113 different countries attended the biennial world exhibition dedicated to woodworking technology. The 20th Xylexpo, which took place last May in Milan, was a smashing success due to this record number alone – and NUM took part in this success.

Technical expertise, superior hardware and software and customer-specific developments have made NUM a leader in the woodworking industry. This attracted a huge number of visitors, all of our important clients, and a multitude of further prospective buyers. The impressive combination of the Axiom Power CNC with the new, compact drives NUMDrive C with the Safety Monitor Module (SAM) was extensively evaluated.

Special algorithms for edge gluing, fine machining at high speeds and dowel connections are just a few examples of specific developments for the woodworking industry. Precision, user-friendliness and increased productivity for all types of machining are our strengths – and market advantages for our customers.

IMTS 2006, USA

Spinforming solutions

The broad range of NUM total solutions such as NUMgear, NUMgrind, NUMtransfer and NUMROTO was not only noticed by our clients, but also appealed to many interested machine manufacturers and end customers. In particular, our unique solution for spinning processes, NUMspinform, was received with great interest. Spinning processes, which up until now have been almost exclusively performed manually, can be automated with NUMspinform.

Various machine manufacturers displayed their products with solutions from NUM in the NUMROTO, NUMgear and NUMgrind areas, and confirmed the positive development of NUM USA.

Event	Place	Date
Educatec	Paris (F)	15. – 17.11.2006
SPS / IPC / Drives	Nürnberg (D)	28. – 30.11.2006
Ligna	Hannover (D)	14. – 18.5.2007
EMO	Hannover (D)	17. – 22.9.2007
SPS / IPC / Drives	Nürnberg (D)	27. – 29.11.2007



The retrofit – one to not let slip by!

At a time when return on assets and productivity gains are crucial issues for businesses, the retrofit is very often an economical and effective solution. However, given the number of factors to be considered, the decision is sometimes a difficult one.

Why retrofit?

For NUM, aware of the problem of machine ranges that are too old but still indispensable – the nightmare of any production manager – it wasn't a matter of proposing an adaptation, rather an interchangeability. The essential questions for this operation are: the downtime and the certainty of being able to get the machines back running according to schedule. To resolve these problems, a material solution for the retrofitting of the NUM 720/750/760 was created in 2003: the NUM Power 1760.

Equipped with the latest technologies of the NUM Power range as regards computing power and software package, the NUM 1760 is also compatible with the wiring of the 700 range, with the same ergonomics and installation constraints.

Building on this product, Num created in 2004 a service and methodology dedicated to retrofitting. This service developed a special approach to respond efficiently to the specific problems of this activity. In the spirit of the „Brainware“ developed as part of Num's new strategy, our specialist technicians first study together with the client the technical and economic feasibility of the operation. Their analysis determines, according to the specifications, what the required level of intervention is: changing the NC alone, changing the motors, the mechanical parts to be replaced or reinforced...

The NUM team's intervention planning in the workshop is elaborated while integrating the context of the individual machine: urgency, downtime, machine availability dates, etc...

Then comes the preparation for the operation, and there once more everything possible is done to ensure the change is performed securely. A video is made to memorise the operation of the machine and to reproduce it on the benches in the lab in order to simulate external events and verify automated programs. These programs are rewritten on the basis of tested modules and approved by our Quality Service. Thanks to this preparation, the downtime of even the most complex machine is kept to a minimum. The original manufacturer's programs are maintained and tested in their new environment. As a last resort and in order to keep to the client's production schedule, it is possible to return to the original configuration for an adjustment in the laboratory or to add a function: all is done to further the client's security and productivity.

The retrofit is not a simple makeover

Though a makeover succeeds in making one look younger, it does not make one able to run faster or for lon-

ger. The retrofit gives the machine a veritable second youth, with performances often better than when it was new. We have ascertained that in a factory making automobile engines one machine gained two seconds in a cycle of seventeen!

The retrofit has become a special, distinct activity for Num, and the largest businesses or their subsidiaries in France, such as CACIA, DACIA, la DCN, l'Education Nationale, KOYO, PSA, Renault, SNCF, SUPAERO..., have subscribed to this procedure and placed their trust in this team for key production machines, which are sometimes even equipped with concurrent NCs. Missions have been undertaken for them: in France of course, but also in Portugal, Romania and Turkey.

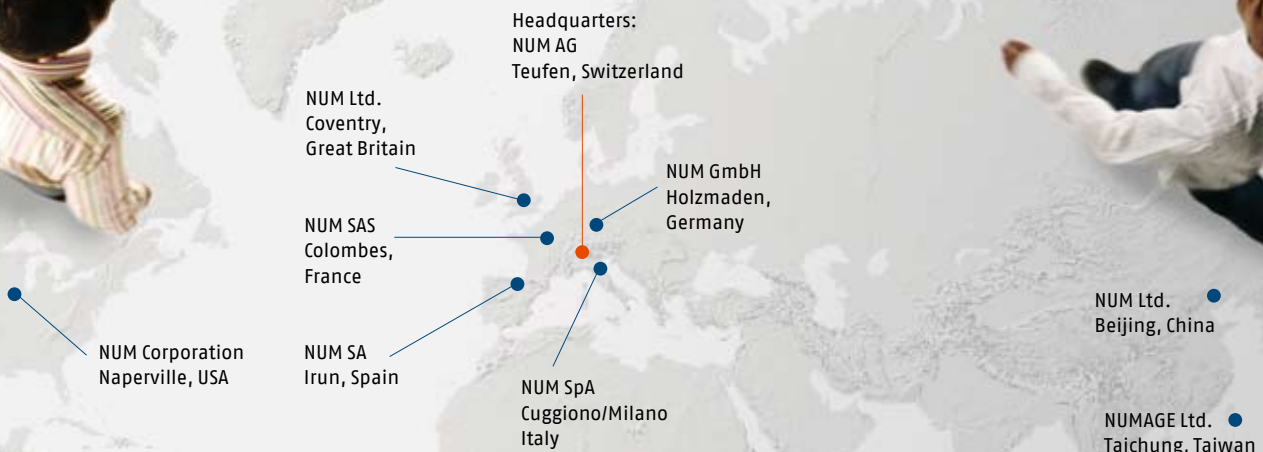
To give just a few figures, this service triples its turnover annually and currently accounts for 20% of Service Technique's turnover; proof, if needed, of their professionalism, competence and – above all – of the trust placed in them by clients.

Retrofit half-and-half, NUM 750 on the one hand, NUM Power 1760 on the other.



CNC Power Engineering Worldwide

NUM competence centres for CNC high-end applications:



New addresses and contacts

New premises:

NUM UK Ltd.
Unit 3 Fairfield Court
Seven Stars Industrial Estate
Wheler Road
Coventry CV3 4LJ
sales.uk@num.com

Customer support in Germany will be expanded by the end of 2006:

NUM GmbH
Servicestelle Waidhaus
Fabrikstrasse 7
92726 Waidhaus
reinhold.kraus@num.com

NUM has service centers around the world.

Visit our Website for the current list of locations.

www.num.com

NUM 
CNC HighEnd Applications