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Olivier Leclerc interview fluid technology with Oelheld increased productivity - ANCA GX7+ grinding small tools on the RX7 the three choices - Naxoforce the future of CNC development 3M deals with dressing off-line





PROFILE GRINDING WITH WINTERTHUR: PASSIONATELY PRECISE



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Cover image: GX7+ seven-pack wheel changer. See the story on page 12 to see how ANCA's new GX7+ is changing the regrinding industry.

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expanding further



A NCA is going through a large investment cycle to support its success in the global market. Our new factory in Melbourne, which houses three Mori Seiki flexible machining cells and a new innovation centre, is now operational.

The new ANCA operation in Thailand has already tripled in size to further boost capacity and to keep up with the demand for ANCA products. Besides these aggressive volume expansions, we are also streamlining our product management and logistics systems in order to shorten machine delivery times.

In all three ANCA Branches—the Americas, Asia and Europe—we continue to increase our staff to better serve our growing customer base. Our mission remains the same, no matter where in the world: being close to our customers and providing local technical and application support to make our machine users successful. One of the foundations of ANCA's success remains unchanged which is our focus on developing the core technologies in-house, including precision mechanical components, CNC systems and software applications. Thanks to this unique 'under-one-roof' strategy, customers around the globe recognize that ANCA equipment excels in the most challenging and demanding applications.

We are looking forward to another year of serving our customers and we are pleased to present to you this new edition of *The Sharp Edge*.

Jeroen Schmits Chief Executive Officer ANCA's new Mori Seiki LPPS is expected to improve machining times by up to 50%.

investing in the future

With unprecedented global demand for its products over the last four years, ANCA has set out on an aggressive path of expanding its manufacturing facilities. Over the last financial year, ANCA invested nearly \$A5.5 million in new manufacturing capability at the plant in Melbourne, Australia. ANCA purchased an additional block of land adjacent to its existing factory, on which a new \$A2.1 million, 1400 sqm building has been constructed.

This will house three state-of-the-art Mori Seiki machining centres that will be fully-integrated with a linear pallet pull system (LPPS). This is intended to enable production to continue around the clock with minimal labour requirements. The same building will contain a new mould shop for machine base production as well as an upgraded innovation and customer-hosting facility.

Mori Seiki LPPS

The new A\$2.6 million LPPS has a larger pallet system, which will enable ANCA to machine the largest castings

ANCA's new Bayswater factory extension.



unattended. With a tool changer capable of holding 180 tools and integrated tool measuring, the LPPS is expected to improve machining times up to 50%.

New Mould Shop

Relocating moulding operations to the new facility has given ANCA the opportunity to improve the working conditions to world-class, as well as enabling us to increase production capability from 250 to 400 bases per year. In the floorspace vacated by moving the mould shop, ANCA will set up a prototyping area to develop new products. Previously this was carried out by production staff, which hindered ANCA's productivity. The total investment will be A\$300,000.

Upgraded Innovation Centre

Also contained within the new complex will be an upgraded, state-ofthe-art innovation centre. Relocating this centre will enable ANCA to restructure current manufacturing operations to improve machine build capability and productivity. Environmental controls and a purpose-built customer hosting centre will bring the amount invested up to A\$500,000.

With the previous acquisition of two Dixi, and two Yasda H40 machining centres and a Voumard internal grinding centre, ANCA has invested over \$A11 million since the expansion program began. The benefits of increased productivity have enabled the company to keep pace with the growing demand and secure ANCA's position in the global market.



The new innovation centre

Strong fluids for your application



Quality as the key to success!

"Innovative fluid management and stringent product development and quality assurance are the key to the success of our products."

Numerous machine manufacturers therefore develop products together with us that are specially tailored to the demands of their machines. That naturally applies also to our customer.

Our many years of experience with high-tech lubricants also enable us to work intensively to the specific demands of our customers and to adapt existing fluids to a wide range of different production processes. In order to achieve this, oelheld GmbH works not only very closely with various universities but also has its own laboratories equipped with the latest analysis apparatus and numerous test rigs. The engineers and technicians in our Research department develop tailored products here that have proven themselves worldwide for many

years using the latest basic oil and additive technologies. Metal processing oils, dielectrics and water-miscible cooling lubricants account for the largest proportion of our broad assortment of basic products. We regard these areas as our spheres of key competence and have proved this through numerous patented and extremely successful products.

Health benefits



Human-Technology for man, environment and machines

- Dermatological approvals
- No health hazards
- Neutral odour
- Low evaporation
- No heavy metals
- Free from or low in aromatics

Human technology - a "must" at oelheld

Human technology is not just a trademark at oelheld GmbH - it is a guiding principle. Health endangering oil vapours, acrid odours and recurring cases of skin irritation are sadly commonplace in many production plants.

For this reason oelheld GmbH develops not only products that permit an optimum process, but also pays particular attention to the greatest possible health safety of the products.

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oelheld GmbH is not only represented with its own sales offices in France, Great Britain and the USA, but also has various representatives in more than 25 countries worldwide.

The benefits with oelheld

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- No filter problems
- Good compatibility with all • machine parts
- Manufacturers' approvals
- Low cobalt leaching
- No hairline cracks at the workpiece surfaces
- Resistant to ageing
- High flash points with low viscosity



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Tool grinding

Conventional grinding wheel

with competitor's product

In order to demonstrate the efficiency of our PAO grinding oils, we carried out a series of trials with leading companies from the grinding industry. The different ground parts were subse quently examined under a scanning electron microscope



Internally cooled grinding wheel with competitor's product

(SEM). The images below show clearly the difference in the surface quality of the parts ground using SintoGrind.



Internally cooled grinding wheel with SintoGrind

Foaming behaviour of the basic oils

Source: Rappold Winterthur, TCM und TB Schrottner

Poor foaming behaviour and air release properties result in filter systems foaming over and poor grinding results. Since the air trapped in the oil is compressed, the decompression that occurs when it leaves the cooling lubricant nozzle causes cavitation that results in increased wear. A laminar jet can no longer be directed onto the grinding

wheel. The use of low-foam grinding oil with good air release properties thus increases the process reliability. The tests carried out in our development centre illustrate the foaming behaviour and air release properties of different basic oils. In the figures below, the sample bottles were each filled with mineral oil, hydrocrack and polyalphaolefin and heavily

enriched with air. This creates foam and the air is trapped in the basic oil that is clearly visible as bubbles. A crucial factor for the foaming behaviour and air release property is how quickly the trapped air can escape from the basic oil and how quickly the foam thereby breaks down.



Evaporation loss

Despite a boiling point of the oil of 250° C, oil vapours are constantly produced due to evaporation. These result not only in a continuous loss of the medium (oil), but also significantly burden the surroundings of the machine and hence also the people employed in the company. The highest evaporation rates naturally occur with watersoluble cooling lubricants. Due to their uniform composition, polyalpha-olefin-based grinding oils have a roughly two-thirds lower



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evaporation loss than conventional hydrocrack and mineral oil products.







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grinding contours

Contour360^o in Maine, USA, has added two ANCA TX7+Xchangers to their machine fleet. The new capability has reduced their production costs as they look to expand beyond their traditional prime market. By *David Arnesen*.

For 30 years it was known as New England Tool, Cornish, Maine. Then John Moller, President, purchased the company in 1993, with partner Tom Gleason, both formerly in management at Parker Hannifin. They knew a thing or two about cutting tools.

TX7+Xchanger

"I always wanted to own my own business," John said, "and having been a user of cutting tools in manufacturing management, this business seemed like a good fit. The company was very small when I purchased it, and was primarily performing resharpening and reconditioning of cutting tools. I knew the capability of the company was beyond where it was and that I could grow it."

Now with 65 employees, the company has become a leader in developing solid carbide cutting tools for 5-axis milling applications. The recent name change to Contour360° reflects its mission to be a comprehensive source for state-of-the-art cutting tools designed for maximum productivity and tool life, including a wide range of solid carbide end mills and reamers.

Primary customers are aerospace companies and power generation turbine manufacturers, plus job shops. Most of the sales are not catalog end mills and reamers, but special cutting



Machine operators Marco Ercolani and Melissa Sanborn. The Xchanger machines have reduced set-up time by up to 30% compared to earlier TX7s.

tools: high-end special form tools, step tools, and reamers. "Customers come to us with tool designs they need produced," John said, "or they have an application and need a tool designed."

To keep up with the need to produce complex tools while reducing costs, the company has invested in ANCA technology over the years.

Currently, Contour360° operates eight ANCA machines producing about 40% of the company's output. The inventory includes a TX7 installed in 2002, a TX7+ installed in 2006 and two TX7+Xchangers installed in 2007. This investment in ANCA technology supports the cutting tool company's goal of producing high-precision, complex carbide tools over several shifts with minimum set-up times and consistent, high accuracy.

"We've had a long relationship with ANCA, primarily geared toward their software," John said, "which for form and step tools is superior. We've also kept up with the latest machine technology, including auto loaders and now the Xchangers, which we feel we need to take advantage of in order to reduce the cost of producing our types of tools."

Contour360° liked the Xchanger concept because it could set up the machine to run a number of different jobs automatically without involving the operator. The Xchanger machines have reduced set-up time by up to 30% compared to earlier TX7s.

"The thing that drew me to the Xchanger machine," John said, "is wheel management to achieve the most efficient grinding strategy. The last generation of ANCAs had two wheel packs. With the Xchanger, we can get up to 16 packs in them, so it gives us the opportunity to grind a variety of tools that may require

away in a green part of

multiple wheel packs, all in a single set-up. We can now leave the wheels in the Xchanger and call on them when we need them rather than stopping the machine and going to get the packs we need for the next job."

Labour and training issues motivated Contour360° to invest in the Xchanger concept. "We can have one or two technicians responsible for the system, designing the wheel packs and the coolant placement, adjusting the wheels and setting them up. We then have trainees or entry-level people simply call up the correct wheels and not be concerned with the technical aspects of the wheel packs," John said.

Currently, the company has a twoshift operation, but the TX7s run unattended at night and weekends when the product mix requires it.

As for the future, John sees continued partnership with ANCA.

"We're going to continue to play in our arena of special tools and applications," John said, "and these machines lend themselves very nicely to that type of product. We're certainly excited about the way the Xchangers have performed, and it makes sense that we would continue to invest in this type of technology. As Contour360° grows its business, and expands from the north-eastern USA to serving other parts of the country, we'll have a greater need for this type of equipment."







FLUTE GRINDING WITH THE "NEW" NAXOFORCE FAMILY: **"3 CHOICES"**

Put simply, lower productions costs demand increased material removal rates (MRR). In other words, this means deeper cuts at faster feed rates. SlipNaxos, a sister company of the Winterthur Technology Group, offers a solution called Naxo-Flute.

In solid tungsten carbide, NaxoFlute achieves material removal rates also called Q-primes (Q_w') of 8 to 10 mm³/mm/sec and higher. To calculate Q_w' multiply your depth of cut a_e (mm) by the feed rate v_w (mm/min) and divide the result by 60.

For example: Depth of cut $a_e = 2 \text{ mm}$ Feed rate $v_w = 300 \text{ mm/min}$ MRR (Q_w') $= \frac{2 \times 300}{60} = 10 \text{ mm}^3/\text{mm/sec}$

NaxoFlute wheels feature a metal-ceramic bond that works best at high loads and fast metal removal rates. The latest generation has an even higher porosity that adds more aggressive cutting capacity at extended dressing cycles. The New Naxoforce EZ and Naxoforce SURFACE were developed to further push the limits of productivity, obtaining even higher MRR. The Naxoforce EZ requires less force to keep the wheel open and is less prone to "clogging" or "loading", thus requiring less frequent sticking.

These metal-hybrid bonded diamond wheels can be easily dressed with silicon carbide wheels or even crushed dressed. With CBN, rotary dressers are ideal.



The NaxoFlute Surface is a finer wheel that can stand up to the increasingly demands for the finer surface finishes required today. A finer surface finish will be achieved at the best possible feedrates and total cost.



The NaxoFlute EZ is a more free cutting wheel that can stand up to the increasingly demands for a higher productivity and feedrates. A lower total cost will be the result of using the NaxoFlute EZ.

The result is 3 wheels for fluting:			
NaxoFlute	Best possible formholding, lifeleghth at a very good performance.		
NaxoFlute EZ	Even better feedrates, best possible performance.		
NaxoFlute Surface	Extremely good surface finish achieved when grinding deep in solid carbide.		

For further information, please visit our web site and contact SlipNaxos, Sweden, or Winterthur, Switzerland, or one of the sister companies or our local representative!



www.winterthurtechnology.com

ANCA engineer David Taylor demonstrates the value of exporting STEP files from CIMulator3D directly into UGS NX5.

a retrospective

This year, ANCA's CIMulator3D software will celebrate its 10th anniversary. *Simon Richardson* reviews its latest developments and how it changed the tool grinding industry.

Think about what your business looked like 10 years ago. Faxes were an essential form of communication, your first Pentium computer was still trying to figure out what e-mail was and the Chinese economic dragon was starting to stir. Similarly, today's tool industry is almost unrecognisable to what it was then.

CNC grinding machines were increasingly popular in the market, but still limited in their flexibility. Testing and proving new grinding cycles, even with highly-skilled operators, was a time consuming and costly business that often produced a lot of scrap.

All this changed at IMTS in 1998 when ANCA released the first CIMulator3D – the industry's first true 3D modelling software for tool grinding operations.

At the time, customer response confirmed that the CIMulator3D was going to change the CNC tool and cutter grinding market for ever. For the first time, it was possible to program and test a grinding program completely off-line. Wheel positions during grinding could be confirmed, interference issues eliminated and tools measured before the first tool was delivered. The excitement amongst customers was palpable. It's difficult to overstate the way ANCA's pioneering efforts with the CIMulator3D changed the tool grinding industry.

Now on its 10th anniversary, ANCA will release Version 6 of CIMulator3D with a host of new features. Most important will be the much-requested ability to export tool models in STEP 203, 214 and IGES formats. These model formats are widely used in most CAD-CAM packages and open up the ability to correctly dimension and tolerance tools, generate drawings, simulate cutting operations and apply them in FEA analysis programs. This closes the loop in allowing off-line tool design, production and application.

The new CIMulator3D version also has improvements to the calculation engine, ensuring significantly faster simulation times. A host of new solid models ensure correct simulation of all machine configurations.

With these new features, CIMulator3D is set to deliver yet another level of added value to today's tool grinding companies.

A CIMulator3D image imported and displayed in UGS NX3.



a few moments with

Olivier Leclerc

Several years ago, the two French companies, E.Leclerc and Fournel, combined resources to form ELCO – the machining expert. The ELCO brand covers a wide range of products including cutting tools, tool holders, shrink-fit units, presetters and balancing machines. ANCA's France representative *Christophe Chaumet* caught up with CEO Olivier Leclerc.

NCA: Why was ELCO formed?

OL: We have been manufacturing high precision cutting tools for over 100 years. The range we offered was standard tooling with an equivalent volume in special products. We found this was not enough to satisfy new requirements of our customers. ELCO was set up as a supplier of complete machining solutions. ANCA: What does that consist of?

OL: We can summarise the concept with four main points.

1. A process approach towards the customer's requirements. Our know-how enables us to work with our customers by taking into consideration their machining processes in their entirety.



This ANCA RX7 machine installed at E.Leclerc in Fougères has been an important part of ELCO's ability to offer a complete service to customers. 2. Using our strategy of vertical integration to provide a comprehensive solution to our customers.

3. Providing the customer with a tool management system that includes cutting tools, tool holders and most of the requirements of machining shops. The aim is to increase the customer's productivity levels.

4. Supporting the customer with our "Flash" departments, which makes it possible to deliver special cutting tools on very short lead times.

ANCA: How does the relationship with ANCA help in this approach?

OL: We were faced with the task of developing new types of cutting tools, so in 2000 we chose to invest in an ANCA MGX. The ToolRoom software gave us the capability to create new and innovative tool geometries. A few weeks later we placed an order for a second machine. Now, we work in partnership with ANCA and in 2008 have seven grinders in service including RX7 and TX7 machines. Thanks to the quality of ANCA's machines and software, ELCO can meet customer requirements.

Over the years ELCO has invested further in the partnership with ANCA. On their side, they ensure we have technical support of the highest order, good spare parts back-up and quick response. Our relationship is completely transparent. We exchange ideas for developing new tools and particular geometries and so we both keep pace with changing industry demands.

ANCA: What have been the commercial impacts of the relationship?

OL: Thanks to the quality of ANCA's machines and software, ELCO can meet customer requirements. We can quote a company like WALOR [an important sub contractor for automotive and aerospace], for which an ANCA machine operates 24 hours per day for six days out of seven. They are one of our customers who benefit from our tool management approach for complex new tools, and for which we run seven regrindings.

Without the time-saving afforded us by ANCA's technology, particularly relating to adjustments, ELCO would not be reactive enough to be able to deliver this type of service.

ANCA: Why do you think the relationship works so well?

OL: I have just mentioned a number of general aspects, which alone justify the choice of ANCA. We also share the same industrial values.



Our objectives are aimed at a constant improvement of quality and application of technology on which superior customer service is dependent. The search for constant improvement in productivity is another common point between our two companies. This is why the longterm partnership between ANCA and ELCO can only widen in a win/win spirit.

When I talk about the partnership widening, I essentially think about the Scientific Group of Interest Bretagne UGV that we created with Cachan's University Level College based in Rennes, Brittany and reputable manufacturers. Bretagne UGV will have about 15 research engineers in the long term.

ANCA and ELCO are therefore engaged in a durable and mutuallybeneficial industrial partnership.



Olivier Leclerc believes the ANCA software has contributed to ELCO's ability to meet customer requirements.



ELCO Statistics Factories: Fougères and Javené, Brittany Employees: 142 Floor space: 5000 m²

Below left: a selection of tools from the ELCO range. Below right: E.Leclerc's line-up of ANCA CNC grinders includes RX7, MGX and TX7 machines.







a better way to regrind

New enhancements for the GX7 resharpening machine have solved an age-old problem for regrinding companies. *Andrew Ritchie* explains.

ne issue that has plagued the regrinding industry for many years is productivity. By nature, batch runs are short and lead times just as short, making process automation almost impractical. ANCA's innovation centre worked closely with customers to create a solution that would give regrinding companies the sort of productivity levels normally associated with manufacturing. The result was the release of new enhancements for the GX7 resharpening machine: the GX7+ with wheel changer, and the GLX auto loader.

With these two enhancements to the GX7 available, regrinding companies now have a choice of several options, meaning they can select the machine configuration that

ANCA and Nikken jointly developed a unique system that enables the GLX to change either tool and collet, or the tool alone. This reduces tooling costs significantly.

best suits their business. And as all options were designed specifically for the resharpening industry, the range is an excellent match for customer requirements.

GX7+

The GX7+ is the standard GX7 machine, but fitted with a sevenpack wheel changer and HSK taper spindle. With such a wide range of cutting tools geometries in use today, and more being developed all the time, resharpening companies find themselves needing many different wheels on hand. The wheel changer makes up to 28 wheels available to the operator in a single setup. The speed with which the packs are changed means the cycle time on a





The GX7+ spindle uses a HSK40F arbor, providing contact with both the face and taper so the wheel pack is located more accurately and held more rigidly.

> On the GX7+, the seven-pack wheel changer is installed inside the machine canopy, enabling the customers to retain all the benefits of its compact size.

single tool is shorter and productivity is increased.

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The GX7+ machine also employs a 9.7 kW (13 HP) single-ended wheel spindle with a hydraulic auto-clamping HSK taper. The HSK system ensures the wheel pack is positioned rigidly by using contact with both the spindle face and arbor taper. It is also a more accurate mount, which reduces wheel run-out and results in a better surface finish on the tool.

GLX LOADER

The GLX loader, with its vertical belt design and small foot print, was specifically intended for use with the GX7+. It provides a high level of flexibility, which ensures the loader can be used to its full capacity of 84 tools, regardless of the batch size or tool type and geometry.

Operating the GLX loader is easy, with its own dedicated 380 mm (15") touch-screen panel. The operator can load tools or collets in the belt pockets and program the Loadermate software from the same position behind the grinder.

Tools are sorted into diameter groups when loaded into the GLX. The first tool is transferred into the machine with the tool and collet together. Subsequent tools for that diameter group will use this same collet. When the last tool in the group is done, both the tool and collet are transferred back into the loader. Only one collet is required for each tool diameter, which significantly reduces tooling costs.

Tools can vary in length up to a maximum of 200 mm and in diameters from 3 mm to 20 mm. Loading time from tool to tool is under 25 seconds. The user-friendly ANCA Loadermate software knows which pocket has collets and which has just tools and the loader arm will position itself automatically. ANCA, in association with Nikken, has developed a hydraulic work head clamping system that enables full automation for collet loading with increased work-holding rigidity and outstanding run-out results.

GLX

With the wheel changer reducing the need for manual handling wheel packs and the GLX taking care of the unattended operations, the GX7+ and GLX combination is proving to be a very powerful tool for resharpening companies that are chasing productivity levels that, until now, have been available only to tool manufacturers.

The vertical belt format of the GLX means that there is only a small increase in machine footprint compared with other loader options.





Sind the second seco

ANCA Product Specialist - Mechanical Andrew Ritchie examines the new small tool package for the RX7 machine.

A NCA's commitment to customer needs, innovative design and technical expertise, has driven the development of a special package for grinding small cutting tools. The small tool package was designed for the RX7 machine with the sole emphasis on consistently grinding tools down to diameters of 0.5 mm but with the capability to grind tools up to 12 mm if required.

The ability to accurately and repeatedly grind small tools in a production environment is essential for customers in the computer manufacturing, medical and dental markets. At such small diameters, the usual influences on the performance of a grinding machine are even more critical, which meant ANCA had to come up with some innovative solutions to meet the requirements.

Process R&D

Understanding and developing the grinding process proved critical to successful grinding of small tools. To this end, an intensive R&D effort was undertaken that resulted in a new grinding cycle for small ballnose grinding that dramatically reduces axis movement and its associated errors. In addition, ANCA engineers have developed a deep understanding of correct wheel selection and preparation, setting up work piece tooling to eliminate runout and techniques for ensuring process stability and consistency. Mastering these aspects of small tool grinding, has taken ANCA engineers and their customers to a new level of precision in all aspects of tool grinding.

A further element of successful small tool grinding is ensuring the right tools are in place. For this reason ANCA has a configured an RX7 package specifically optimized for small tool grinding.

New HSK Spindle

For small tool grinding, ANCA has optimized the standard double-ended,

direct-drive RX7spindle. Special control technology developed by ANCA has fine tuned the spindle performance for small tool grinding that minimizes thermal growth of the motor and hence increases process stability.

The motor itself is physically smaller, bringing the wheel closer to the machine centerline, and a new HSK40F taper system offers superb rigidity and repeatability for wheel arbors. Having two wheel packs available means both blank cylindrical grinding and actual tool grinding are done in the same set-up.

The small tool pack means the RX7 is now capable of grinding tools with diameters as small as 0.5 mm, such as these ballnose end mills.



The success of small tool grinding has added further value to the award-winning RX7 machine.



Linear Scales

Linear scales are fitted to both the X-axis and Y-axis, which means the positioning is more accurate. This translates to consistent results being maintained on small tools with tight tolerances.

V-block Clamp and Steady

The V-block clamp and steady is used to eliminate run-out and provides rigid support close to the grind area of the tool. Clever design delivers the highest accuracy but ensures set-up time is minimized.

PLX Loader

Also standard is the PLX pallet loader for automatic loading of tools to maximise production and to enable the machine to be operated unattended. The PLX contributes to the results by maintaining operational stability across the entire batch run.

iBalance

ANCA's iBalance software enables accurate wheel balancing to reduce vibration and increase the tool surface finish quality. Product Specialist Andrew Ritchie: "the small tool package was designed for the RX7 with the sole emphasis on consistently grinding tools down to diameters of 0.5 mm."

CTV Software

Thermal expansion is one of the most difficult problems to correct when it comes to grinding small tools. Differences in ambient, coolant and machine temperatures can affect overall process stability, resulting in tool geometry creeping outside tolerances. ANCA's CTV software compensates for thermal change in the machine ensuring critical tool dimensions stay within tolerances.

Coolant

A new coolant system for small tools is also offered. Coolant flow can be throttled to the appropriate pressure to avoid vibration of smaller tools or increased to provide necessary flow for larger diameters. Additionally a 5 micron Keiji Kosan filter system ensures the clean coolant supply and a digital coolant chiller unit maintains the machine's thermal stability.

The success of small tool grinding has added further value to the award-winning RX7 machine, and is providing customers with even greater flexibility in their product offering.

Visitors to EMO 2007 in Hannover were able to see the new package in action. Here ANCA Europe's Wolfgang Luser explains the intricacies of grinding small tools to an appreciative audience.



Linear scales increase the positioning accuracy of both the X and Y axes.



ANCA is about to launch on a seven-year development program to ensure its CNC controls can match the future demands of customers. This vital task has been placed under the guidance of CNC Engineering Manager John Koene.

A NCA's reputation as a manufacturer of high precision CNC grinding machines has eclipsed its beginnings as a developer of only CNC controls, but the core competency has been retained, and to this day ANCA still uses its own controls, something no other manufacturer of CNC tool and cutter grinders can boast.

As the working heart of the grinding machine, the CNC controls need to evolve to ensure the grinder is capable of meeting the everchanging needs of the customer. The task of overseeing the constant development of controls at ANCA is CNC Engineering Manager John Koene, who will guide his team of 21 engineers through a major redevelopment of the control systems.

"CNC Engineering is about to start a seven-year research program to develop key technologies that will become our next generation control solution. It is envisaged that these solutions will be more open and flexible," Koene predicts.

"Customers won't necessarily recognize many of the improvements because CNC technology is predominately transparent to the end user. However, they will experience machine performance enhancements as a result of these improvements."

Embarking on an ambitious development program like this one can easily go astray without setting measurable targets at the start. ANCA's aims have been dictated by what the customers will expect of a state-of-the-art control system in seven years time.

"One of our objectives is to improve axis performance by a factor of 10—that's an order of magnitude faster than they are now—and improve controllability by an order of magnitude than we currently operate at. We also want the axes to cope with acceleration loads of 10g, yielding capability for the machine to move quicker and reduce process cycle times.

"Our team will also be placing significant emphasis on making our CNCs more adaptable so they can be more readily used across multiple applications without the need for significant engineering when they are customized.

"Another of the advantages we will build into the 6DX generation digital servo drive system is that it will be made as a single component so it won't have to be dismantled to be

Design and manufacture of CNC controls continues to be one of ANCA's core competencies. The reputation for excellence is the result of over 30 years of research and develooment.



assembled on to the machine. We ideally want to get to the point that it is simply 'plug and play.'"

As with all ANCA innovation programs, the CNC development will start with having the right people in the right places to ensure success. Over the past year, the CNC engineering group has been expanded to make sure the right resources are available to work on the solutions.

All the people in the CNC team are qualified in either mechatronics, software/computer science, electronics or electrical engineering. The group comprises three primary areas of focus which are electrical/ PLC engineering, machine control and electronics systems; and core CNC software.

"To be on the leading edge of technology you need to have experts in a myriad of relevant areas," says Koene. "It's important to be able to extract the most out of technology, and have people who are very wellversed in their fields to enable us to do that."

But the CNC group will not be working alone. One advantage ANCA has over other manufacturers of tool and cutter



Electrical Engineer Patrick Ulrich and John Koene discuss CNC design at ANCA's Melbourne, Australia manufacturing plant. To be on the leading edge of technology, ANCA draws on expertise from several engineering disciplines.

One of our objectives is to improve axis performance by a factor of 10.

grinders is vertical integration, which means that the CNC systems are not developed in isolation, but rather as part of the entire machine. This holistic understanding shows through in the quality of any ANCA machine.



ANCA's John Nicolaidis assembles another CNC unit. ANCA builds all CNC units in-house, which means greater quality control can be exercised. "The enthusiasm for innovation is ubiquitous," says Koene. "It covers the mechanics, controls and applications of our machines. It's a complete package looking at every facet and how we can extract the best performance possible. Mind, it's not technology for technology's sake; it's using the right technology to provide solutions.

"At ANCA, CNC engineering and mechanical engineering are very closely coupled. New machine designs are performed by integrated teams so the parameters and performance are well understood. So rather than have a machine design and having to develop controls to make it work, we develop both in concert to make sure the machine can perform optimally in the most reliable and repeatable fashion."

CNC engineering is no longer ANCA's sole core competency, but rather one of several that enables the company to continue to produce world-class grinding machines. The challenge for John Koene and his team of engineers is to make sure that the 6DX control system surpasses the expectations of future industry.



ANCA Motion has its sights set on being the leading specialist in the design of custom control systems.

A new division of ANCA is selling CNC controls to manufacturers world-wide, as *Dörte Drews* found out.

omputer numerical controls have always been a part of ANCA's business, in fact, the company started out manufacturing CNCs exclusively, and continued to develop controls for the machine tool and automation market even after the main focus switched to building CNC grinding machines.

Newly-founded division ANCA Motion is now taking this time-honoured practice to a new level. ANCA Motion will focus on the supply of CNCs, servo drives and motors to OEM customers, something that was difficult to achieve in-house at ANCA Pty Ltd, as most of the energy of the CNC department has to be directed towards developing controls for ANCA machines. With ANCA Motion not tied down by these constraints, the target now is to become recognised as the leading specialist in the design of customised control systems.

David Fisher, General Manager of ANCA Motion, explains its growth potential.

"The OEM market is considerably bigger than the tool and cutter grinder market. The beauty about selling controls is that once a CNC has been contracted by an OEM company, it is not just the one unit that has been sold, but the contract usually extends to supplying controls for all machines manufactured by this company. This enables ANCA Motion to focus our engineering effort into customising our products to OEMs' needs."

This kind of objective requires a high level of expertise and experience, and

The man at the helm: ANCA Motion GM David Fisher. who better to take on the challenge than people with a solid background in ANCA CNCs? When it came to recruiting his core team, David simply could not go past old ANCA hands Troy Robinette, Gerard Cullen, Renee Bonnett, Nicholas Baptiste and George Mikhael. The electronics side of things is headed by another former ANCA employee, Dr Roy Ko, who is General Manager of AAT, the Taiwan facility of the company.

Aside from existing customers such as Techni, TNA and Speedflow in Australia and HGFLL Laser Cutting in China, new customers are being quickly added to the order books. The future is looking bright and David Fisher and his team are very optimistic about the company's prospects.

ANCA Motion can be contacted at sales@ancamotion.com.





Techni Waterjet's i35 is just one CNC machine that uses ANCA-designed control systems.

RN30 unleashed

Duncan Thompson

reviews features in the latest iGrind software release, RN30, and what it means to your business's bottom line.

C ompanies prosper by differentiating themselves from their competitors. Differentiation comes by offering unique products, or delivering products at lower cost. Understanding this fundamental business concept underpins ANCA's approach to delivering flexible yet easy-to-use software. ANCA software flexibility enables customers to create new and different tools, while its userfriendly interface means operators spend more time grinding and less time programming machines.

Time saving was a major driver behind the new Drill Wizard, which delivers a new level of sophistication and ease of use for developing drills and step tools. From a graphical menu, users select the drill point type and enter diameter. This single step generates a complete toolgrinding file with standard grinding parameters and recommended



Drill Wizard's graphical menu is a real time-saver.



Customers using the RN30 software release need only specify the angle and width of the C-land (in red above) and the software immediately shows the feature geometry and wheel path.



The flute grinding cycles allows complete flexibility in defining tools with variable core.

wheel configurations. From there, the user can start to customise particular geometric features as well as add steps in a step-tool design. Again, each step added comes with functional default parameters and wheel recommendations.

Drill developers will love the scripting feature, which allows them to add their own special drill points and geometries to the standard menus.

The new multiple-core feature opens up a whole new world of possible tool designs for drills and tools with more than one diameter, such as step or profile tools. Aided by a simple graphical user interface, users can vary along the length of the flute the core diameter, flute hook angle and wheel clearance. The new C-land function greatly simplifies the process for programming a fine chamfer on a tool's cutting edge and is bound to excite drill and endmill manufacturers. Users need only specify the angle and width of the C-land and the software immediately shows the feature geometry and wheel path.

iPunch is a new software suite that allows ANCA tool and cutter grinders to be used for punch grinding and blank preparation. This opens up the possibility of combining conventional and super abrasive grinding of punch tools and brings a new level of versatility to the TX7+.

These and other new features in ANCA's latest iGrind software release confirm ANCA's reputation as the market leader in grinding machine software development.

true for quality

Truing and dressing off-line can improve part quality and productivity – by Wayne Wheeler, 3M.

There is no restriction as to the type of wheel that can be trued in this manner allowing for optimization of the wheel specification without compromising wheel performance. All bond systems may be quickly trued and dressed, and with guick change adapters, the wheels are trued to very exacting tolerances while mounted on the spindle on which they will run in the grinder.

Wheel packs for the next job can be created while the CNC grinder itself continues to produce parts,

minimizing changeover time between runs. In addition, it affords quick touch-up capability with minimal down time for those machines without online dressers.

The bottom line is that off-line truing and dressing capability will increase your productivity through always having the next wheel pack ready to go. In addition, the ease and speed with which wheel shapes can be maintained affords greater opportunity to maintain part quality through more consistently accurate wheel shape.

Stand-alone wheel dressers mean you can have the next wheel pack ready to go.

ver the past decade, CNC grinders have been developed to a level of capability for producing round cutting tools and special parts almost beyond imagination. At the same time, superabrasive wheel manufacturers have developed wheel formulations to keep pace with this increased capability.

However, unlike truing and dressing of conventional abrasives, superabrasive wheels often require two distinctly different operations. Wheels are trued to make them perfectly concentric to the spindle and/or to create a specific form in the grinding face. Then in many cases they then must be dressed to make them ready to grind.

This is where stand-alone truing and dressing machines-such as the 3MTM Truing & Dressing Machine E339 VHM-come in. They are designed to simultaneously true and dress single wheels or multiwheel packs away from the grinding machine. While an absolute necessity for machines without on-line truing capability, they enhance the onmachine truing systems by minimizing the amount of stock that they need to deal with.



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With over 100 years of experience in the manufacture of advanced abrasives, 3M is uniquely equipped to help you meet today's toughest grinding and finishing challenges.

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All 3M superabrasive products are precision-engineered to deliver fast, consistent, predictable cut rates, to help you achieve higher throughput and improved productivity. Learn how 3M technology and applications expertise can benefit you, by visiting us online at: www.3M.com/superabrasives or call us at 1-866-279-1288 ext. 1673.

Check out our website to view the full range of 3M[™] Superabrasive wheels, belts, discs, tools, accessories and more!





carbide solution

Duncan Thompson examines how ANCA was able to use the unique TapX tap grinding machine to develop a smarter way to manufacture carbide taps.

Carbide taps clearly sit at the leading edge of tool technology. Considering how they are manufactured, and how they are used, they present special challenges as well as offering exciting new opportunities to tool manufacturers and users alike.

Carbide taps offer significant benefits over equivalent high-speed steel taps, delivering longer tool life and greater productivity through faster cutting speeds. Successful application of these tools is coming on the back of new developments in tougher grades of carbide that are less susceptible to chipping. Additionally, more rigid and precise machines with specialised tooling for high-speed synchronous tapping operations ensure constant cutting forces and reduce likelihood of tool breakage.

This left actual tool production as one of the key challenges in making carbide taps viable in the market, and ANCA's TapX is providing this missing link, a point not lost on engineers at Sutton Tools in Melbourne, Australia, who have worked closely with ANCA in developing this grinding process.

Since its introduction to the market, ANCA's TapX machine has opened up new opportunities for tap manufacturers seeking greater production flexibility and consistency. The TapX is able to complete all tool grinding and wheel dressing operations for tap manufacture in a single set-up.

Complemented by the application software packages iTap, iFlute and CIMulator3D, ANCA comprehensively covers all the requirements of the tap grinding application. With a smaller capital investment, manufacturers can grind smaller batch sizes of either high-speed steel or carbide taps, allowing them to better respond to the needs of their customers. These benefits prompted engineers at Sutton Tools to join forces with ANCA in applying the TapX to a new program of carbide tap production.

Building on knowledge and features developed on the TapX for HSS tap grinding applications, and with input from Suttons engineers, ANCA tapgrinding specialist Tim Akinkugbe developed a process optimised for carbide tap grinding. Robert Sutton from Sutton Tools explains.



A carbide tap held firmly with a steady and centre during the grinding process.



ANCA's tap-grinding specialist Tim Akinkugbe: a critical part of the development of carbide taps for Sutton Tools.

II ... such versatility on a single machine ensures we can better meet the requirements of our lean production facility.

"For carbide tap production, which is a niche market we wish to grow, we needed a grinding machine that was flexible enough to allow easy production of tool batch sizes less than 50. The TapX package allows this in a single set-up."

Features such as the dual wheel packs ensure the right selection of wheels is available for roughing and finishing operations to complete tap grinding in a single set-up. The two wheel dressers built into the machine for in-process dressing ensure wheels are running perfectly true; essential to ensure good tool surface finish. CTV (Compensation for Thermal Variation) software ensures tap pitch diameter is not influenced by subtle changes in the coolant or factory ambient temperature.

As always, the ANCA application software for grinding taps also offers superb flexibility and ease of use. Sutton draws attention to the forming tap software that enables any forming tap profile to be imported as a standard DXF.

"This is allowing us to quickly and easily trial new tap concepts that previously were not considered. In addition, the flexibility of the machine and its software will allow us to apply it to boost our thread mill line of tools as well; such versatility on a single machine ensures we can better meet the requirements of our lean production facility."

Carbide taps used in the right applications are delivering tremendous gains in performance and productivity, and companies like Sutton Tools see that this opportunity is only going to grow. The TapX is a timely development for companies looking to take the next step in tapping technology.



A carbide tap in the measurement rig at Sutton Tools. Accurately-ground taps mean longer tool life.





GX7+ technical specifications

CNC data

ANCA 5DX, Intel Core 2 Duo, min. 1GByte, 15" Touch Screen, Ethernet card, 56kbps modem, CD Read and Write/DVD Read only, UPS

Mechanical axes					
	X-axis	Y-axis	Z-axis	C-axis	A-axis
Position feedback resolution	0.0001 mm	0.0001 mm	0.0001 mm	0.0001 deg	0.0001 deg
	0.0000039″	0.0000039″	0.0000039″		
Programming resolution	0.001 mm	0.001 mm	0.001 mm	0.001 deg	0.001 deg
	0.000039″	0.000039″	0.000039″		

Software axes (patented): B, V, U, W,

Work piece: Maximum tool diameter / Maximum weight: 220 mm (9.4") / 20 kg (44lbs)

Drive system: ANCA Digital (SERCOS standard) / Linear axes direct drive ballscrew / Rotary axes direct drive

Machine data				
Grinding spindle: ANCA single-ended HSK40F / 9.5 kW (12.7 HP) peak power / 4.2 kW (5.6 HP) (S1 at 6000 RPM) / 10000 RPM / integral direct drive				
Grinding wheel max. diameter 202mm (8") / Wheel bore: 31.75 mm (1.250") / up to 7 wheel packs with max 4 wheels each				
Other data				
Electrical power	13.2KVA (18.2KVA with entry level coolant system)			
Probe system	Renishaw			
Coolant system	External			
Machine base	ANCACRETE (Polymer concrete)			
Colour	RAL 7035 / RAL 5014			
Weight	Approximately 4500kg			
	Width	Depth	Height	
	2508 mm	2010 mm	1905 mm	
(including coolants)	99″	79″	75″	

ANCA reserves the right to alter or amend specifications without prior notice





ANCA world wide

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Productivity speaks for itself

At last regrinding companies have access to production-level efficiency. New automation for the ANCA GX7 re-sharpening machine has created a CNC grinder that gives production performance on small batch runs.

- GX7+ up-grade with a seven-station wheel changer for increased flexibility and reduced set-up times.
- GLX auto-loader with a unique collet-changing system and 84-tool capacity is ideal for mixed batch runs and long periods of unattended operation.

Need we say more?





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