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Nigel Atherton
XYZ MANAGING DIRECTOR

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Editor: John Barber - 01403 266022
Email: john@rbpublishing.co.uk

Accounts: Jackie Barber - 01403 563791

Production manager: Anna Rodrigues - 01472 210712
Email: studio@rbpublishing.co.uk

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LR machines provide the perfect step up to CNC

XYZ Machine Tools' LR series of linear rail vertical machining centres are providing an ideal cost/performance ratio for those looking to make the step up to CNC machining centre use, as well as providing existing users with a cost-effective route to increasing machining capacity.



The three-machine series consists of the XYZ 500 LR, XYZ 750 LR and XYZ 1000 LR, with the designation relating to X-axis travel. The impressive specification of the LR range includes use of the latest Siemens 828D control, with the option of the ShopMill Advanced software package, a standard 8,000 revs/min spindle with 10,000 revs/min or 12,000 revs/min spindles as options across the range. Other generic specifications include feedrates up to 20 m/min in all axes and 12 or 20 position carousel toolchange as standard, dependent on machine size, with the option of a 24 position arm type on the two larger machines. Table capacity is 250 kg, 500 kg and 800 kg respectively.

The LR series sits perfectly alongside and complements XYZ Machine Tools' existing box slideway series of heavy-duty VMCs and has been developed after extensive research into the development and capabilities of modern linear rail technology.

Nigel Atherton, managing director of XYZ Machine Tools, says: "While the use of linear rails has been common for many years, here at XYZ we have resisted their introduction as we felt that the technology, up until now, did not meet our stringent performance criteria in the same way that box slideways do. However, with recent advances in linear rail design those concerns have been laid to rest and these machines will allow users to maximise the improvements in digital motion control and modern cutting tool technology, while providing a cost advantage to customers by helping them to migrate to CNC machining centre ownership at reduced cost."

XYZ Machine Tools is constantly looking to maximise the performance and productivity of its customers, with the XYZ LR range just one example of this. Other recently introduced machines, such as the UMC-5X which provides efficient gantry-type simultaneous 5-axis machining, alongside the UMC-4+1, for those who do not require simultaneous 5-axis performance, are further evidence of how XYZ Machine Tools has the optimum machining solution.

XYZ Machine Tools Tel: 01823 674200

Email: nigel.atherton@xyzmachinetools.com www.xyzmachinetools.com

Rigid 5-axis machining centre achieves high accuracy

Okuma's GENOS M460V-5AX combines productivity and precision

With the GENOS M460V-5AX, Okuma, represented in the UK by NCMT, offers a 5-axis machining centre that provides the highest quality at an entry-level price. Equipped with multiple hardware and software solutions for accurate and productive operations, the machine satisfies even the most demanding needs.

The Okuma GENOS M460V-5AX is an entry-level 5-axis machining centre that combines high manufacturing quality with economic properties. Capable of handling workpieces with 600 mm in diameter and 400 mm in height with a maximum weight of 300 kg, the CNC machine is suitable for various applications. The new generation possesses a tool magazine capacity of 48, making the latest version of GENOS M460V-5AX also the most versatile model. Currently, the previous model with a tool magazine capacity of 32 is for sale at an exceptionally low price.

High-performance spindle

Equipped with a spindle that offers 15,000 min⁻¹, the machine tool achieves high productivity for a wide range of applications. Providing a maximum output of 22 kW and 199 Nm of maximum torque, the spindle processes even demanding materials with ease. Its five sets of bearings are lubricated with oil mist and therefore do not require maintenance. By providing

through-spindle coolant, the spindle adds to the shower coolant function. Manufacturers benefit from a three-year spindle warranty that is not limited by any number of shifts or operating hours.

Built for precision

The machine tool guarantees close manufacturing tolerances and high precision. For efficient and accurate measuring, the machining centre is equipped with a Renishaw touch probe RMP60. The X, Y and Z axes possess an absolute scale. In addition to the hardware, Intelligent Technology applications like Machining Navi for reducing chatter or 5-Axis Auto Tuning System for compensating geometrical errors enhance the machine's accuracy further. As a result of these precision-improving measures, GENOS M460V-5AX achieves a positioning accuracy of 2 µm in X, Y and Z.

Greatest rigidity

The GENOS M460V-5AX was created for maximum precision, stability and reliability. Its cast iron double-column machine bed is the most rigid and proven machine base in its class. Weighing 8,300 kg in total, it provides an extremely stable foundation. With more than 10,000 sets installed worldwide, the base proves its reliability. Also, the double-side support NC table stands out as it is the most rigid in its class as well.

Thermally stable

For highest precision, the 5-axis machining centre is equipped with Okuma's Thermo-Friendly Concept. The concept includes a symmetric box-built double-column construction made of cast iron. To eliminate negative influence from the coolant and the heat of hot chips, the machine possesses a thermo-shield design. In addition, five temperature sensors in the machine and three sensors in the spindle measure temperature changes and allow for an active compensation of thermal deformation.

Okuma Europe GmbH is the Germany-based sales and service affiliate of Okuma Corporation, a leader in CNC



machine tools, founded in 1898 in Nagoya, Japan. The company is the industry's only single-source provider, with the CNC machine, drive, motors, encoders, spindle and CNC control all manufactured by Okuma. Okuma's innovative and reliable technology, paired with comprehensive, localised service protection, allows users to run continuously with confidence to maximise profitability. Along with its industry-leading distribution network, Okuma facilitates quality, productivity and efficiency, empowering the customer and enabling competitive advantage in today's demanding manufacturing environment.

Formed in 1964, NCMT operates from three strategically located sites in the North, Midlands and South of England. It delivers high technology engineering solutions for metal cutting and grinding applications in the UK and across Europe, from stand-alone machines to complete production lines involving a high degree of automation. NCMT tends to specialise in the more demanding fields of engineering that are avoided by companies that just deliver a machine tool and little else.

It prides itself on its technical competence, innovative production solutions and reliable technology, based on some of the best machine tool platforms available anywhere in the world. Its own agency ranges of toolsetting, tooling, workholding and shop floor diagnostic products often form part of the turnkey systems it supplies.

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Diecaster to install automated mill-turn cell

Andover-based aluminium diecasting company MRT Castings uses robotic systems in its foundry, but until now automation has not featured in the company's machine shop, apart from twin pallet change on machining centres from Japanese manufacturer Brother, supplied through sole agent Whitehouse Machine Tools.

That situation is due to change following an order placed by MRT's managing director Phil Rawson at the Southern Manufacturing show in February for a Brother Speedio M140X2 mill-turn centre, plus a Feedio robotic component handling system to supply raw material automatically to the machine and return finished components. The cell, which will be the first 5-axis machining capacity on site, is due to be operational by May 2019.

Phil Rawson says: "We had been looking to introduce automation into our machine shop for several years, as we see it as the future for our company.

"At present we operate a day shift with a few hours' overtime in the early morning and evening. The Brother cell will add to this by allowing us to run lights-out for up to eight hours, depending on component size and cycle times, as well as unattended during the day. We expect it to have a big impact on our productivity."

The first family of components to be produced on the new automated equipment will be a family of aluminium bodies for a range of LED light fittings. Initial prototypes have been produced on twin-spindle lathes with live tooling, but the problem is that only around 30 percent of the machining content is rotational and the remainder prismatic. Ideally, the reverse should be the case if a part is put on a lathe, so that the power of the main spindle can be exploited for turning, while the use of less powerful driven tools constitutes a smaller part of the cycle.

Before the latest Brother order was placed, Whitehouse Machine Tools carried out cutting trials at its Kenilworth showroom and technical centre, demonstrating that the cycle time for producing the light fitting bodies from billet could be almost halved from 15 to eight minutes.

Efficiency on this scale for the prismatic element of a machining cycle is delivered by a 16,000 rpm spindle with 0.2 second start /



stop time, 30 m/min cutting feed rate, 50 m/min rapids, 0.9 second exchange of the 30-taper tools from the 22-position magazine and repositioning in four of the five CNC axes simultaneously together with tool change. Synchronised tapping is world-leading at 377 m/min peripheral tap speed.

With 30 percent of the cycle being rotational, the Speedio's integrated, direct-drive, C-axis motor powering the 2,000 rpm turning table with 0.3-second start-up from zero to full speed is also important. The A-axis trunnion holding force of 400 Nm without the need for a mechanical clamping mechanism, delivers rigidity when turning parts in the horizontal plane as well as when milling them at an angle.

When not performing a turning function, the C-axis and +120 / -30 degree A-axis can be employed to position a component in the two rotary axes for 3+2 prismatic machining, as is the case for the aluminium body, but the Brother CNC-C00 control is also capable of 4+1 mill-turning by interpolating the

X/Y/Z travels, 200/440/305 mm, with one of the rotary axes.

The plug-and-play Feedio automation unit communicates with the machining centre via a Profibus interface. It is supplied with a 6-axis ABB robot and the manufacturer's smart teach pendant incorporating a customised Speedio page. The robot is equipped with interchangeable grippers capable of handling MRT's billets, which are up to 80 mm diameter, or aluminium castings to 120 mm diameter, delivering them to a hydraulically actuated chuck on the machine table.

A vision system and built-in PC allows the robot to detect where on the upper inlet conveyor of the Feedio a workpiece has been placed. After machining, components are returned to an output conveyor positioned below the first for compactness.

Phil Rawson concludes: "We plan to target a wide range of different components for production in the new mill-turn cell and will be looking in particular at parts where the turning content is less than half of the cycle."

"If it is higher, we will continue to produce the component on a lathe unless there is a compelling case to transfer it to the M140X2 to take advantage of its 5-axis milling capability."

Entry-level 5-axis machining centre

Manufacturers looking to progress from 3-axis or 4-axis CNC prismatic metalcutting and invest in a 5-axis facility may now consider a new, affordable, vertical-spindle machining centre from WELE, Taiwan, whose machine tools have been offered in the UK and Ireland since mid-2018 under a sole agency agreement with Whitehouse Machine Tools.

Managing director Tim Whitehouse explains that neither performance nor longevity has been compromised in the manufacture of the UQ400, despite the machine's competitive price, as WELE maintains a high level of build quality as befits a company that is part owned by Japanese machine tool producer, Toyoda.

The machine has an installed weight of 6.5 tonnes and occupies a compact footprint of 2.95 x 2.35 metres. Capable of interpolating four of the five axes simultaneously, it is intended for 5-face



machining of workpieces weighing up to 200 kg with fixture. A Fanuc OiMF control allows an easy gateway into 5-axis operation for users more familiar with this CNC system than others on the market.

The working envelope is defined by 400 x 650 x 485 mm ballscrew-driven travels in X, Y and Z together with two rotary, hydraulically clamped axes, which are provided by a 360 degree C-axis table and a +30 / -120-degree A-axis swivelling trunnion.

The BT40 direct-drive spindle, served with cutters exchanged from a 24-station tool magazine, offers 11 kW of continuous power, 15 kW for 30 mins and speeds up to 12,000 rpm or optionally 15,000 or



20,000 rpm, HSK-A63. High production output is assured by a cutting feed rate of 10 m/min and rapids of 36 m/min in X, 24 m/min in Y and 10 m/min in Z.

Standard equipment includes chip wash-down for the table and twin augers in the Y-axis plus one in the X-axis to evacuate the swarf, while bed wash-down and different styles of chip conveyor are available.

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OPEN POSSIBILITIES

Tebis implements innovative 5-axis milling technology

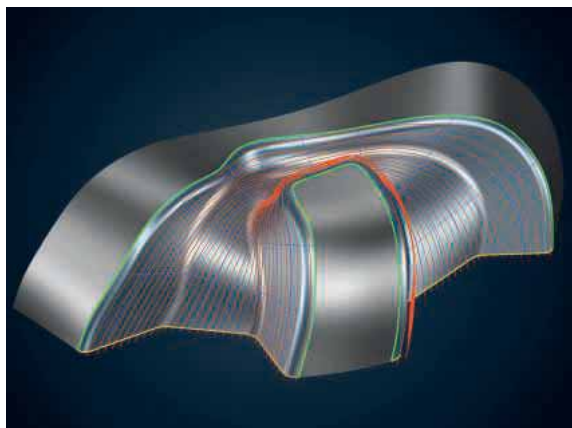
Tebis, a specialist in CAD/CAM and MES process solutions in model, die and mould manufacturing, supports a variety of machine technologies such as milling, turning, drilling, laser cutting and much more in the CAM environment. In the area of milling, the company from Martinsried, Germany, is currently focusing on 5-axis milling and is significantly expanding its spectrum of NC strategies and implementation options.

Bernhard Rindfleisch, Tebis founder and chairman of the board, explains: "Tebis users have been programming 5-axis NC programs for more than 20 years. We've continuously developed the technology, but we recognised the need for a change in direction. In the past, creating good 5-axis programs meant a significant amount of design effort and strong expertise in CAD surfaces.

Users have become more specialised

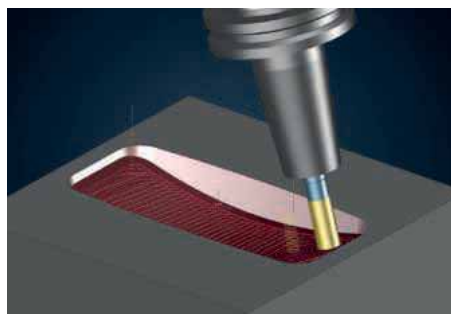
"In many cases, additional guide geometries had to be designed in our software in order to define how the cutters should traverse the part: specifically, their spatial orientation and path distribution. However, this requires that the NC programmers have the requisite skills, which are becoming increasingly rare. Therefore, we have modified, simplified and extended our 5-axis milling technology over the years.

"Now, any CAM user with no CAD experience can calculate 5-axis NC programs for roughing, face and side finishing, machining contours and engraving. NC programming is just as easy as for 3-axis machining operations."



Substantial time-savings, thanks to maximised cutting performance

Experience shows that 5-axis NC programs can save a lot of time on the machines, if they are operated with special high-performance cutters like circle-segment cutters. This applies to prismatic 2.5D geometries like pockets as well as 3D free-form geometries.



5-axis machines need 5-axis NC programs

In addition to the X, Y and Z coordinates, 5-axis NC programs have two additional specified axes, typically rotational axes like the A and B axis that are used to define the 3D orientation of the tool. NC programs with specifications for five machine axes are generated in various ways:

By 3-axis NC programming with constant 3D tool tilt direction. This is also known as multi-sided machining. These are not simultaneous 5-axis programs, because only three axes are traversed simultaneously.

By 3-axis NC programming with automatic conversion to simultaneous 5-axis programs. The conversion is performed for collision avoidance and to achieve better cutting conditions through a constant change in the tool direction. This is frequently known as 5-axis avoidance milling.

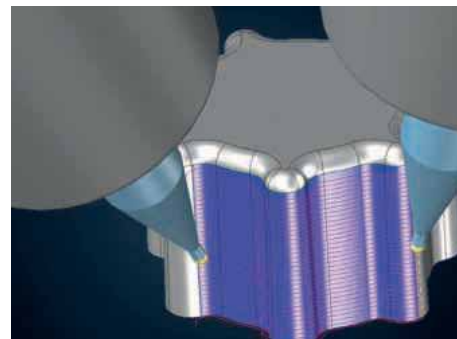
The third possibility involves using specialised 5-axis simultaneous NC functions. With this, Tebis includes roughing free-form geometries and free-form pockets, also with curved bottoms, milling along contour curves, side and face finishing.

The NC programmer often decides which program will be

the most efficient and generates the best surface quality for each application. The availability of milling tools and knowing the correct cutting data like feed rates and speeds are also important. Automill NC automation is integrated in Tebis. This helps to save and optimise programming expertise as well as cutting data in NC templates, making them available on a continuous basis to the NC programmers.

5-axis programming functions as optional add-ons

Tebis software is provided in specialised industry packages. All of the packages are designed for 5-axis NC machine programming and can be upgraded with special add-on modules. Tebis offers add-ons for multi-sided machining, 5-axis collision avoidance, 5-axis roughing, 5-axis finishing, side milling and undercut milling. A large range of cutter types are supported, from ball cutters and lollipop cutters to flat, torus and circle-segment cutters.



For further information regarding the Tebis' Open House or products and services, visit the company website: www.tebis.com/uk/en/.

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Efficient workholding for 5-axis machining

Under its sole agency agreement with Japanese manufacturer, Kitagawa, Salisbury-based 1st Machine Tool Accessories is offering the new Swift Klamp to machinists in the UK and Ireland. The rigid workholding product uses proven HSK tool interface technology to provide a secure, low interference, quick-change clamping arrangement that resists bending forces generated during metalcutting operations.



Designed for 5-axis machining applications but equally suited to use on 3- and 4-axis machines, the system consists of three parts: clamping head, workholder and workpiece. The head is supplied either as a manually or automatically operated HSK clamp, while the workholder comprises an HSK interface at the base and multiple options at the top for holding the workpiece, including flange clamps and side clamps.

The most efficient clamping system, however, is the dovetail interface. Its small clamping surface area allows enhanced tool access and its low profile maximises the machine tool's Z-axis travel. Workpieces up to 200 mm square or diameter can be accommodated.

The final element is the workpiece to be machined, which in the case of the dovetail holder requires a slot to be pre-milled into the raw billet to match the holder profile. A solid carbide cutter is available specifically for this purpose. Additionally, pre-machined dovetailed EN3B (070M20) steel and HE30 (6082) aluminium blanks can be supplied in various sizes for immediate use.

The manual clamping head has a versatile flange that suits multiple mounting options. Available in HSK-A40, HSK-A63 and HSK-A100 sizes, it may be set up off-line and the workholder can be exchanged within 10 seconds, minimising machine downtime.

For automated manufacturing processes, a hydraulically-actuated clamping head is available in the same HSK sizes, with seating detection and air-blow. The workholders have a standard profile to enable them to be handled by any general-purpose robot arm.

An explanatory video showing the range of Swift Clamp products available through 1st MTA and the methods of operation may be viewed at: www.youtube.com/watch?v=D7WwtE4QWn4

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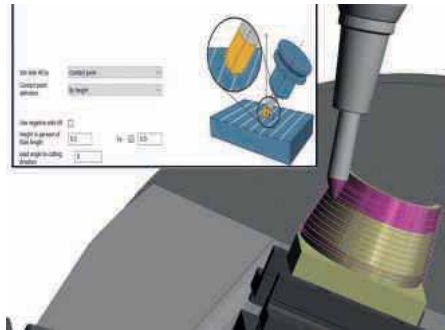
EDGECAM now supports one of the fastest 5-axis machining tools

The introduction of a specific 5-axis 'Tilt' control strategy, combined with a 'Barrel Cutter,' is said to be the most significant enhancement in the latest release of EDGECAM, from Hexagon Manufacturing Intelligence's production software division. Brand manager John Buehler says barrel cutters are recognised as one of the fastest tools when 5-axis machining and are now fully supported in the EDGECAM Toolstore. As well as the new 'side tilt by contact point' capability, the advanced 5-axis cycle also offers further gouge checking in the Swarf command, along with extra "ink" control in all strategies.

A number of new and enhanced features in EDGECAM 2020.0 provide increased productivity for both milling and turning users, while the recently introduced EDGECAM Inspect module includes 13 upgrades.

Firstly, mindful of the need to generate quick toolpaths to reduce production costs, EDGECAM 2020.0 offers a significant performance boost when either roughing or profiling a solid model. Essentially, the machining engine will only compute data constrained within the boundary, ignoring the rest of the model. This significantly decreases the cache size, while generating faster toolpaths.

Formerly introduced in the Hole cycle in the 2018 R1 release, the "Deep Hole" strategy has been enhanced, justifying the creation of its own individual cycle. The



original modifiers have been improved and further control tabs have been added to the cycle, giving greater control over the toolpath.

The turning environment offers a new machining cycle: Thread Profiling. John Buehler says: "Reacting to a high frequency of enhancement requests from customers in this area, EDGECAM 2020.0 allows users to effortlessly machine complex form threads such as VAM and Acme. The cycle provides both roughing and finishing strategies, allowing users to specify their own thread forms."

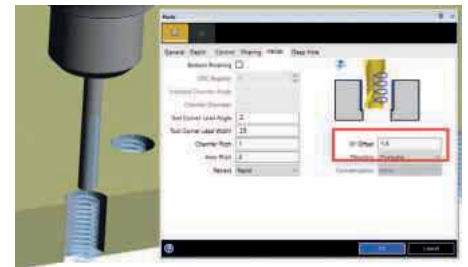
The ever-popular Waveform Machining Strategy has been enhanced with chip prevention control. Under certain conditions, a toolpath can generate a thin island of material, chip, which, as it gets thinner can cause machining stresses, and potentially break the tool.

Supporting the growing number of machine tools possessing an 'Auxiliary Z', Quill, EDGECAM 2020.0 introduces a Code Wizard enhancement, letting users add a secondary working spindle. This supports multi-task machine, along with any combination of table/head milling machines. Coupled with that, a new 'Quill Command, Move menu, offers greater control when commanding the second working axis.

When using the Finish Grooving cycle, users can now control the 'Break Edge' angle. In previous EDGECAM releases, the break angle was set at 45-degrees.

In the Finish Turning cycle a 'stand off' value can now be defined when using 'Up Cut' control.

An XY Offset can be set when deploying the Hole Cycle's 'Helical' strategy, allowing users to control both surface finish and tool wear.



Two new tool types, Dovetail and Double Angle, have been added to the Toolstore. This does away with the need to create custom graphics for them, saving time and programming costs. And the tools work automatically with the Slot Cycle.

Moving to EDGECAM Inspect, brand manager for R & D, Andy Mears says developers have responded to numerous customer requests by expanding the ability of Inspect components in both the turning and mill-turn environments.

The overall interface has been upgraded to adopt the workflow ribbon toolbar, improving interactivity. The 'Probing Options' menu has been split into two separate dialogs, meaning users can concentrate on output and inspect preferences individually.

Safe Retract controls have been added to the inspection cycles, for users to state multiple positions while controlling the probe's movement. The 'Index' command now contains the ability for further positional manipulation, where an alternative angle may now be specified in order to view the components on the machine tool.

The new 'Angle To Line' feature merges three previous commands into one function, allowing the angle direction to be specified in the data report.

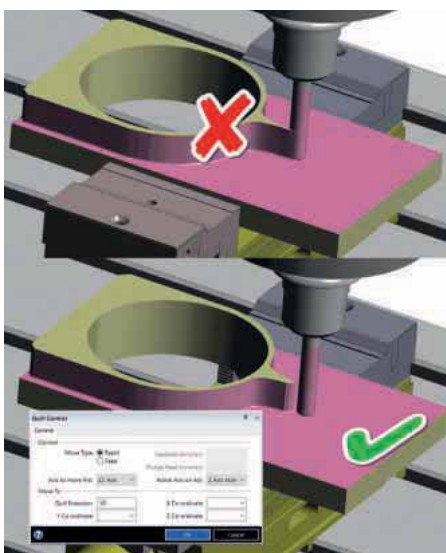
Finally, around 50 enhancements have been made to the optional EDGECAM designer module, which bridges the gap between CAD and CAM, focusing on the specific needs of machinist programmers.

Hexagon Manufacturing Intelligence

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A decade of success with Bumotec

A premium top-down concept: four words to describe an exclusive location in Geneva. Upstairs is a Lamborghini showroom, while the bottom level is home to Niru Swiss, which machines highly complex components for the jewellery and watchmaking industry. However, the most exclusive piece on display is not an Italian sports car, but a Bumotec s191V 5-axis machining centre from Starrag.



"It is not possible to create the unusual case design with conventional production technology," says Felix Baumgartner, founder of chronometer brand Urwerk. There is much talk in the industry of the case of the new UR-111C wristwatch, which is just 15 mm high and 46 mm wide and does not require a screw-on bottom plate. Instead, it is cut in a single piece from an aluminium blank and includes a 20-mm-deep side compartment to accommodate the movement. This all takes place at Niru Swiss AG with the typically high quality of the Bumotec s191V 5-axis machining centre, which delivers excellent repeating accuracy to the last micrometre.

Managing director Julien Ducommun and his four employees have the Bumotec s191V vertical CNC high-performance machining centre to thank for producing such specialised products. This machining centre is capable of precise and productive machining of highly complex components for the jewellery and watchmaking industry. The team in Geneva uses a total of four CNC machine tools, three of which were already owned by a company that Niru acquired. Choosing Bumotec for its fourth machine was a conscious decision for Niru.

The combination of linear motors, direct drives, nano interpolation and a high measurement resolution of 1/100 µm enables excellent contouring accuracy. The "excellent thermal stability" allows Ducommun and his team to turn and cut components continuously from early in the morning until late at night without any loss of precision. With this technology, the team can work across five axes simultaneously and components are machined using a single clamping operation.

As a result of the company's investment, Julien Ducommun is also setting his sights on conquering new industries. His company is not only machining metals, but also plastics such as PEEK. It is little wonder that following this success, he is already turning his attention to a new workshop, which will provide much more space for both staff and machines.

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CNC investment helps Merc Aerospace capitalise on £500,000 sales boost

Moving to 'one-hit' machining has delivered Lancashire precision engineering specialist a £500,000 boost after securing a string of new orders

Merc Aerospace, which employs 50 people at its facility in Barrowford, has seen turnover rise to £4.2 m thanks to a sustained investment drive that has included the purchase of two state-of-the-art CNC machines from the Engineering Technology Group (ETG).

The company has replaced five older models with two Nakamura WT150IIs as part of its commitment to lean manufacturing and reducing lead times for customers including Airbus, AgustaWestland, BAE Systems and Bombardier.

Equipped with industry-leading FANUC and Smart X control software, the multi-axis CNC machines will drastically cut down on setup and programming times, as well as freeing up over 150 m² of floorspace for future acquisitions.

"We are focused on offering our clients the lowest total cost of acquisition solution for their precision components," explains Richard Meade, commercial director at Merc Aerospace.

"This is where the two Nakamuras really come into their own and ensure we live up to our promise, delivering fantastic control, speed and repeatable quality. Our customers have been so impressed with these new capabilities that they've even



placed new product orders with us, building on a £500,000 increase in annual sales for 2018.

"ETG is a solution provider and engaged with us to explore which machines would help us explore new opportunities. It was a seamless transition from order placement to delivery and operator training, with the initial results being extremely impressive.

"The turret mounted power tooling ensures components with complex milled features are coming off virtually burr free and generally as a one-hit operation."

John Brimblecombe, regional sales manager at Engineering Technology Group, adds: "Nakamura technology has really grown in popularity in the UK, with many sub-contract manufacturers switching on to the outstanding performance and value for money it offers.

"The WT150II gives provides up to 26 kW of cutting power available for turning shaft-work with synchronised spindles, while the driven-tool motor power is suited for heavy cutting with very small tools.

"This is perfectly suited for the complex precision components that the customer specialises in. In addition, Merc has also benefited from replacing five machines with two Nakamura WT150IIs, with the twin spindle and twin turret configuration and driven tooling and Y-axis helping to remove milling operations and reduce both setup and cycle time considerably."

Merc Aerospace has over forty years' proven expertise in serving the aerospace, defence, energy and oil and gas sectors. The company offers 5-axis milling, CNC turning,



EDM and aerospace assembly services from its 20,000 sq ft factory, as well as capitalising on increasing demand for 'fast make' short lead time parts.

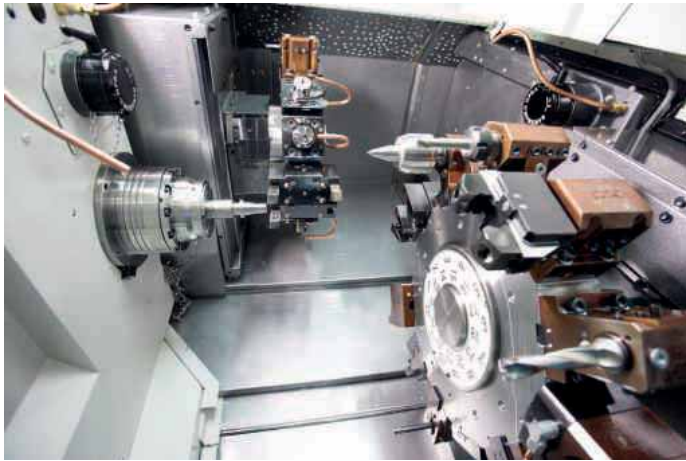
Richard Meade concludes: "Our 'one-hit' machining approach has really improved our productivity and, in turn, made us more competitive when looking to secure new opportunities both at home and overseas.

"We're not going to stand still though. The emphasis is on continuous improvement and we have already signed-off further investment, with delivery of a twin spindle, triple turret Nakamura NTY3-150 multi-axis lathe scheduled for April 2019."

Engineering Technology Group (ETG) delivers highly productive turnkey solutions to customers involved in automotive, aerospace,



Merc Aerospace's Les Nuttall (l) with John Brimblecombe from ETG



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Well prepared and well resourced

Mills CNC, the exclusive distributor of Doosan machine tools in the UK and Ireland, has recently supplied three new Doosan machines to Mellish Engineering Services, a private, family-owned specialist precision manufacturer of performance-critical, high-integrity and fully-traceable fasteners and hot forged bolting used extensively, but not exclusively, in the oil and gas sector.

The machines, a Mynx 6500/50 large-capacity vertical machining centre, a Puma 2600SY Mk II multi-tasking lathe and a compact, high-performance DNM 4000 vertical machining centre, were installed at the company's 26,000 sq ft facility in Aldridge during August and September 2018.

The new Doosans are being used to machine a range of high-precision, performance-critical standard and non-standard fastener components that include bolts, pins, clamps, studs, nuts, washers etc. These components are all made from hard and difficult-to-machine materials and are machined to tight dimensional tolerances and high-quality surface finishes.

They are machined in small batches right through to larger volumes to suit individual customer requirements.

Mellish-manufactured fastener systems and solutions are in high demand. This demand has been fueled, in no small part, by the company achieving API (American Petroleum Institute) certification back in 2017.

Mellish's managing director, Mark Rattenberry, explains: "The global oil and gas industry has always been volatile and oil price fluctuations are nothing new. However, the spectacular and rapid fall in oil prices had a serious knock-on effect on our business resulting in reduced sales revenues and an unwelcome squeeze on company profitability."



2014 proved to be a watershed year for Mellish, as the company made the strategic decision to plan ahead and invest in its future.

Mark Rattenberry continues: "We took a long-term view and looked at ways to increase our share in a relatively flat and sometimes declining, market.

"A key decision we made was to gain API certification which, we believed, would not only differentiate us from our competitors but would also, in the highly-regulated oil and gas sector where environmental and health and safety (EHS) concerns are paramount, position us as an approved quality supplier." In 2017 Mellish achieved its ambitions gaining API Q1, API 20E and API 20F certification.

Since 2017, Mellish has experienced a marked increase in the number of companies, from around the world, making contact, enquiring about the company's solutions and, ultimately, placing orders.

To meet the growing demand for its fastener systems and solutions Mellish, as part of its company-wide continuous improvement programme, makes regular investment in its people, plant, equipment, processes and systems.

The recent acquisition of the three new Doosan machines is a case in point and is evidence of Mellish's continuous improvement programme in action.

Mark Rattenberry says: "The Mynx 6500/50 is a rigidly-built and constructed machine that is ideal for heavy-duty machining operations and for machining the hard materials we use to manufacture our fasteners.

"In the machining trial, the part cycle times for machining each titanium component was reduced by 15 minutes.

"This improvement in productivity combined with the machine's large working

envelope, which we knew we could exploit to machine multiple parts in a single setup, were the principal reasons why we purchased the machine."

Since being installed, Mellish has its focused efforts on refining and optimising the machining process and has invested in a state-of-the-art manual twin pallet change system that is positioned in front of the machine enabling virtually continuous production with minimal operator intervention.

Mark Rattenberry concludes: "The Puma 2600SY Mk II is a high-productivity lathe that has helped us reduce part cycle times, improve part accuracies, as components no longer need to be transferred between machines and help avoid production bottlenecks.

"Despite its compact footprint the DNM 4000 certainly packs a punch and we have been impressed with its cutting capabilities and performance. To improve the productivity of the machine we have designed special purpose fixturing that enables multiple parts to be machined in a single setup.

"Our decision to go for API accreditation has been vindicated and business is booming. We are focused on maintaining our market-leader status in the oil and gas industry and capital investments, such as those made in Doosan machine tools from Mills CNC, will enable us to do this."

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Cincom & Miyano

Citizen sliding-head lathe gains patented chipbreaker software

Citizen Machinery has incorporated its LfV (Low Frequency Vibration) chipbreaking technology into the 12-axis, 25 mm capacity Cincom D25-VIII CNC sliding-headstock turn-mill centre. It considerably enhances the lathe's production flexibility and efficiency, especially when turning difficult-to-chip materials that traditionally produce long, stringy swarf, such as copper, plastics and steels with high alloy content. LfV can also be applied to grooving, thread cutting and drilling.

The latest D25-VIII features the Industry 4.0-ready Mitsubishi 800 CNC system with touch screen and QWERTY keyboard. Providing three axis control groups so that three tools can be in cut at the same time, as well as simultaneous 5-axis machining capability for producing complex parts, it is an advanced control whose operating system incorporates the patented LfV software.

When the technology is applied to a cutting cycle, it encourages chipbreaking without the need for high-pressure coolant by rapidly oscillating the tool in two axes in synchronisation with the rotation of the machine spindle. This is in contrast to the intermittent chipbreaking action being programmed into a cycle as a macro, which can generate heat and cause tool tips to wear prematurely.

In addition to offering other advances in the machine's operational functions, the simultaneous 5-axis control ensures the contact angle between each engaged cutter and the component is maintained during the production of complex parts, enhancing surface finish, reducing cycle times and extending tool life.

The Cincom D25-VIII LfV has gang toolposts in front of and behind the spindle centreline, with Z-axis motion provided on the rear carrier to allow balanced turning, milling or drilling, or simultaneous rough and finish turning. There is also a 135-degree swivelling B-axis on the front post carrying up to four driven tools on either side to service both the main and counter spindle. This configuration is believed to be a world first.

A manually set tilt spindle can be mounted on the rear gang carrier and the back toolpost. Together with the major



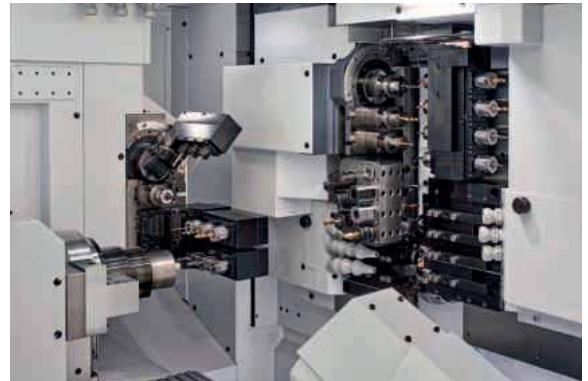
Citizen's new Cincom D25-VIII LfV sliding-headstock, 12-axis turn-mill centre now features low frequency vibration chipbreaking software plus the Mitsubishi 800 simultaneous 5-axis control

advantage of programmable control of chip size, the tilt spindle has the ability to help eliminate deflection when turning very small, precise diameters. An optional, two-axis, opposite tool carrier next to the counter spindle provides a facility for reverse end machining at the main spindle.

For executing complex cycles, operational flexibility is maximised by deploying up to 59 tools in the cutting area, coupled with the advantage of being able to remove the guide bush for more economical material usage when producing shorter components up to 2.5 times bar diameter.

The main and counter spindle are rated at 5.5 kW and 3.7 kW respectively and both have a maximum speed of 10,000 rpm. The gang driven tool stations are powered by 2.2 kW drives with maximum speeds of 9,000 rpm, while live cutter speed in the back toolpost is up to 6,000 rpm. Rapid traverse rates are 32 m/min, with 24 m/min available in the Z-axis of the rear gang toolpost.

The machine footprint is compact, requiring just 1.5 metres by 2.55 metres of space on the shop floor. To meet LfV



The Cincom D25-VIII LfV has triple X, Y and Z axes plus B-axis swivel on the front gang toolpost and two C-axis spindles

technology demands, the 3.4-tonne machine is mounted on six legs and drive is through 25 mm diameter ballscrews, adding a massive 16 percent to the rigidity factor of the lathe.

A fully opening guard gives excellent access to the work zone for easy setting and an additional sliding door is incorporated at the rear of the machine. Twin coolant pumps are included with a 200-litre tank. A 90 mm wide workpiece conveyor is standard.

Citizen Machinery UK Ltd

Tel: 01923 691500

Email: sales@citizenmachinery.co.uk

www.citizenmachinery.co.uk

Engineering company invests in low volume cell

Coventry-based steering system manufacturer, Pailton Engineering has invested in a LVC (Low Volume Cell) specifically for small batch orders and pre-production sample manufacturing. This collection of new high-quality machines is set to increase workflow efficiency and cut lead times significantly. The investment has also reduced changeover times between batch and full-scale production.

The investment includes three full CNC machines from Haas and three semi-CNC machines from XYZ. These high-quality machines form the upgraded low volume cell to provide the business with a dedicated area for small batch processing, away from the main factory floor. This will result in faster processing of complex small batches that would have otherwise taken up resources on the main shop floor.

When new steering parts are requested, samples are produced, proven and validated by Pailton Engineering before they are sent to the client as part of the pre-production phase. By upgrading the machines in the low volume cell and redirecting this part of the business away

from the main production, overall manufacturing efficiency has been boosted.

A large part of the efficiency boost is that the new machines remove the need for production changeovers in the main production line. These were previously required to get small batches through the pre-production phase. The new high-spec machines also bring benefits of increased metalworking capabilities and complex machining techniques.

The new machines use the same programs as the main shop, making the seamless transition from pre-production to volume production.

Richard Poole, LVC tooling manager at Pailton Engineering, says: "By upgrading the low volume cell, we have taken a more streamlined approach to small batch production. The new machines have smoothed out the entire process. For example, the new machines have reduced our need to grind certain parts later in the



process as the initial quality has improved. This has cut down on the time that it takes to make a variety of products, cutting lead times considerably."

With this new development, Pailton Engineering has added to its already broad skill range, taking the quality of its steering products to the next level.

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Protect your machines with Kraft & Bauer

New automatic bottle weighing systems

Kraft & Bauer, whose automatic fire extinguishing systems are fitted to all kinds of machine tools, offers a complete range of systems from small 5 kg CO₂ based models to protect the smallest of machines up to huge multi cylinder variants having multiple 50 kg bottles.

One popular option is to have the CO₂ or argon gas cylinders contained within its own stand-alone cabinet that can be bolted to the factory floor and/or placed directly against a machine. These may be optionally equipped in the case of using CO₂, as the fire extinguishing media, with automatic weighing systems. These monitor the weight of the CO₂ cylinder and, in case it is empty, will not allow the machine to be run, thus providing added protection.

From its base in Coventry, Kraft & Bauer UK offers a full installation, retrofit and service facility for all Kraft & Bauer fire extinguishing systems. These must be checked at least annually by a qualified technician and signed off for companies insurance purposes. In the event of an incident, if there is not an annual service certificate in place then it is likely that any insurance claim will be declined.

It is mandatory to have fire extinguishing systems fitted to machine tools that provide some form of a fire risk. These are generally acknowledged as any machine that works with an oil-based coolant, ie. most grinding machines and turning machines and any



machine that causes a spark such as an EDM machine or laser machine. Engineering manufacturing companies must have documents for risk assessments in place and these need to highlight risks such as fires on machine tools. Companies must act using mitigating measures to overcome those risks. In the case where machines are run automatically, fully automatic fire systems need to be used that can react in seconds to put fires out.

Kraft & Bauer UK, whose fire extinguishing systems protect many hundreds of machines here in the UK, has expanded further with the addition to its fleet of a larger long bed van that doubles as a mobile workshop. A further service engineer has also been employed and



additional stock has been added to both of its storage facilities in Coventry and in Cork.

As more and more new machines are fitted with Kraft & Bauer's systems, naturally the global annual servicing of those systems increases. Kraft & Bauer notes that partly due to insurance companies being ever more vigilant and refusing insurance for machinery that's not adequately protected against fire risks, the retrofit market is driving many sales here in the UK and in Eire.

Louise Boraston, MD at Kraft & Bauer, who has been championing fire protection on machine tools for a number of years now, is naturally pleased to see the increases in sales but stresses that its far more satisfying to see sales due to companies understanding the importance of fire protection and acting responsibly rather than only reacting to fire incidents that have sadly resulted in the loss of machines and therefore production.

Kraft & Bauer urges those using all kinds of machine tools to understand the need to protect their workers and machines from the risks of fire. It points out that in the event of a machine being damaged and put out of action the replacement costs will almost certainly not be covered by any insurance policy unless a fire system has been fitted to it. Also, it should be understood, that even if end users are eventually successful in making a claim, it can take many months and then several more months to take delivery of replacement machines and very few end-customers will wait for production to recommence. Most will likely simply go elsewhere and therefore important contracts can be lost, in some cases, forever.



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SICK launches its Safe EFI-pro System for network integration

With the launch of its Safe EFI-pro System, SICK has delivered standard industrial Ethernet-based safety network integration for highly-adaptive and dynamic safeguarding in automated production and logistics environments to SIL 3/PLe.

The SICK Safe EFI-pro System is a single-source solution that provides the foundation for simpler, more productive and responsive machinery safety, particularly valuable for dynamic applications like autonomous vehicles and human/robot collaboration. It comprises the SICK microScan3 EFI-Pro safety laser scanner and the SICK Flexi Soft safety controller with EFI-Pro gateway.

Dr Martin Kidman, SICK's UK safety specialist, says: "Safe EFI-pro is SICK's safety network for industrial automation, based on the CIP Safety protocol. The next step in the development of SICK's successful EFI interface, the system offers the prospect of more productive and flexible safety solutions founded on rapid, high capacity transmission of both safe and non-safe data across all levels of communication."

The innovative SICK Flexi Soft EFI-pro Gateway facilitates simple and safe system integration via EtherNet/IP™ CIP Safety™ and EFI-pro, allowing connection to SICK EFI-Pro devices like the microScan3 as well as third party CIP-Safety™ devices, like robot controllers from leading manufacturers, remote I/O modules and safety PLC's. Connected to SICK's Flexi Soft modular controller, the system provides scalability, facilitating the integration of encoders for Safe Motion Control, devices



with analogue outputs, hardwired I/O as well as additional gateways for non-safe communication to any other network, such as PROFINET or ETHERCAT.

The SICK microScan3 EFI-pro safety laser scanner enables simultaneous field evaluation with the possibility of monitoring up to eight protective fields, at the same time, on one device. The user can also configure up to 128 monitoring cases per scanner. Powered by SICK's robust safeHDDMTM scanning technology, the microScan3 EFI-pro minimises machine downtime, even in challenging industrial conditions such as welding, reflections, high ambient light, dirt and dust.

With SICK's new license-free engineering tool, Safety Designer, configuration of the Safe EFI-pro system is facilitated with an intuitive 'drag and drop' user interface. System-wide access to all networked components ensures commissioning is easy and extensive diagnostic options are available to optimise processes, e.g. for analysis of machine downtime.

The SICK Safe EFI-pro system offers an open and powerful system to enable safe human and robot collaboration with minimal effort. Especially where speed and distance are issues, it offers intelligent and responsive safeguarding for situation-dependent robot protection. Integration of robot controls into the safety system is straightforward via EtherNet/IP CIP Safety.

With Safe EFI-Pro, automated guided vehicles and carts can work more quickly, intelligently and safely. High-performance

simultaneous protective monitoring of multiple fields means less need for switching between monitoring cases, so dynamic protective fields can be shorter and therefore more responsive and efficient. The safe contour detection field, which is unique to the microScan3, supports applications such as safe AGV docking, protecting workers at narrow access points as well as providing signals for self-muting.

The microScan3 can also provide accurate Ethernet-based measurement data for navigation, a non-safe function that saves the need for additional scanners. Data is available as part of UDP frames either on request or through continuous transmission. As well as data such as the number of beams, distance, status and reflectivity of every beam, additional data such as field interruption, application I/O, device status and configuration can all be output.

Dr Martin Kidman concludes: "To be truly productive, autonomous and/or collaborative robots and mobile machinery all need safety that can adapt in real time. So, SICK has developed intelligent and responsive on-board sensing with simultaneous protective fields and highly accurate measurement data.

"To operate effectively and productively, systems also require fast, high capacity data transmission with time synchronisation of multiple devices. By basing the SICK Safe EFI-pro System on CIP Safety, we have assured this with industry standard communication over Ethernet for Industry 4.0-ready applications."

SICK (UK) LTD
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Three steps to machine safety

According to accidents reported in 2017, nine percent of fatal injuries were found to be caused by contact with moving machinery. In the self-reported list of non-fatal injuries, moving machinery was found to have caused seven percent of accidents. Improving facility safety is critical to safeguard staff, but did you know safety can impact productivity and machine effectiveness too? Here, Jonathan Wilkins, marketing director at obsolete equipment supplier EU Automation, shares his three tips for machine safety.

Machine safety is of the utmost importance to manufacturers to reduce the risk of accidents and safeguard staff. However, the benefits of a comprehensive safety strategy can extend far beyond this. But how can manufacturers reap the rewards safety brings?

Consider each machine individually

When installing a new machine, the plant manager must carefully consider how it fits into the manufacturing facility as a whole to develop safe and ergonomic working practices. The plant manager should

conduct risk assessments to ensure that the environment is safe, considering factors such as machine emissions, which may impact the ventilation needed in a facility.

Each type of equipment will have different safety considerations. Manufacturers must ensure their equipment has been manufactured according to the relevant standards, but also that they operate to them.

Train staff

Without a full understanding of how to operate machinery, staff could be at risk of injury. Performing detailed training to help your staff get to grips with the correct processes and procedures for machine operation is essential in managing safety. This should also cover the required Personal Protective Equipment (PPE) that is to be worn during operation.

Connect

Adding sensors to the production line to monitor the performance of your equipment can improve workplace safety. By making



the best use of Internet of Things (IoT) technology, plant managers can gather and analyse real-time information on the performance of their equipment and staff. This can help reduce common accidents and help identify any issues with machinery, which may also be a safety risk to staff.

Workplace safety is critical to reduce the risk of fatal and non-fatal accidents. The benefits it offers to workers is enough, but connecting systems to improve productivity, can only be a bonus.

EU Automation

Tel: 0845 521 3088

Email: jonathan.wilkins@euautomation.com

www.euautomation.com

Reliable navigation with the RSL 400 safety laser scanner

With its RSL 400 safety laser scanner with measurement value output, Leuze electronic is setting new standards in the reliable navigation of automated guided vehicles (AGVs).

The new RSL 400 safety laser scanner with detailed measurement value output for AGV navigation is the result of many years of experience in the development of safety technology. This compact device from optical sensor system manufacturer Leuze electronic is a safe scanner that combines safety technology and qualitatively superior measurement value output in a single device. This enables reliable safeguarding and navigation of AGVs.

Measurement value output is optimized to navigation software that functions according to the principle of natural navigation with SLAM (Simultaneous Localisation and Mapping). Due to its high angular resolution of 0.1 degrees, the RSL 400 offers extremely detailed scanning of the environment across the entire measurement range of up to 50 m. This is achieved through a particularly narrow laser

spot that maintains its perpendicular shape over the entire scanning angle. The distance values have a high accuracy and are not influenced by the reflectance of the object.

The additional output of the received signal strength value for each beam allows autonomous detection of reflectors by the navigation software. When beams strike a reflector, the values differ greatly from any other environment, which makes simple and reliable detection possible. With up to 100 switchable field pairs, the RSL 400 offers optimum adaptation of the protective fields, even in cases where there are many different movements and loading conditions. Parallel monitoring of multiple protective fields enables safe and reliable reduction of the speed of AGVs. These new functions are also available as a device model with PROFINET/PROFIsafe interface, thereby making integration extremely easy.



Leuze electronic Ltd

Tel: 01480 408508

Email: gary.hockin@leuze.co.uk

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Rifle maker shoots to success with ITC

Many of us may have fired a rifle, but for Robert Nibbs it has been a lifelong passion that has evolved from childhood enthusiasm to the founding of a high-end rifle manufacturing business. Since joining his first rifle club at the age of 14, he has immersed himself in the sport, representing Team GB during his career. For the last 26 years, Robert Nibbs has proudly been making rifles of distinction and precision.

Located in rural Somerset, Robert Nibbs runs a small business that designs, manufactures, builds and sells high-end target and professional rifles. As an SME, the company relies on a blend of innovative manufacturing techniques and highly-productive processes. It is here that Industrial Tooling Corporation (ITC) Ltd has stepped into the sights of this company.

At the end of 2017, Robert Nibbs was having tool life issues when producing a component from 303 stainless steel. Existing solid carbide end mills were struggling to cope with the skin on the stainless and the intermittent machining process. Applying an existing solid carbide end mill, the small business could only produce 25 parts prior to tool failure. This limited tool life resulted in increased tool costs and inconvenient and repeated tool changes. Recalling the introduction of ITC cutting tools, after a visit to its MACH stand, Robert Nibbs says: "I was familiar with the ITC brand and I made an enquiry via their website. They came in to review the stainless-steel components and we haven't looked back since. The ITC engineers initially trialed the WIDIA M1200HF high-feed face mill, but this was a little too aggressive for the machine

parameters. We moved to the WIDIA M200 button end mills and the results have been exceptional."

The 40 mm diameter WIDIA M200 button mill cutter with WP25-PM grade inserts, instantly ramped up productivity and decreased tooling costs. Commenting on this first installation, ITC's Matt White says: "The M200 increased the feed rate from 0.1 mm/tooth to 0.3 mm/tooth, cutting the cycle times by more than 50 percent. For all of his machining processes, he would use the Microloc workholding system to set up to 20 parts in a single cycle; the M200 slashed the cycle time from over one hour to 35 minutes. This would give Robert Nibbs valuable time to leave the machine to run while he moved to other tasks, knowing that the tooling would finish the cycle intact."

In addition, the tool costs and changeovers were drastically reduced. As Matt White recalls: "The solid carbide end mills would need to be replaced after 30 components. The 40 mm diameter M200, with four insert seats, has six edged double-sided inserts with a location lug for precision indexing. This reduced tool changeovers and setups drastically, but more importantly was the reduced tooling costs. Each edge of the inserts could achieve the same performance as the previous solid carbide end mill; but with 12 edges, the M200 is 12 times more cost-efficient. Machining to a 2 mm depth of cut, we suggested that Robert use the WIDIA M1200 for finishing operations. Applying a 0.2 mm depth of cut, the M1200 has machined over 300 parts without changing an insert edge to date."



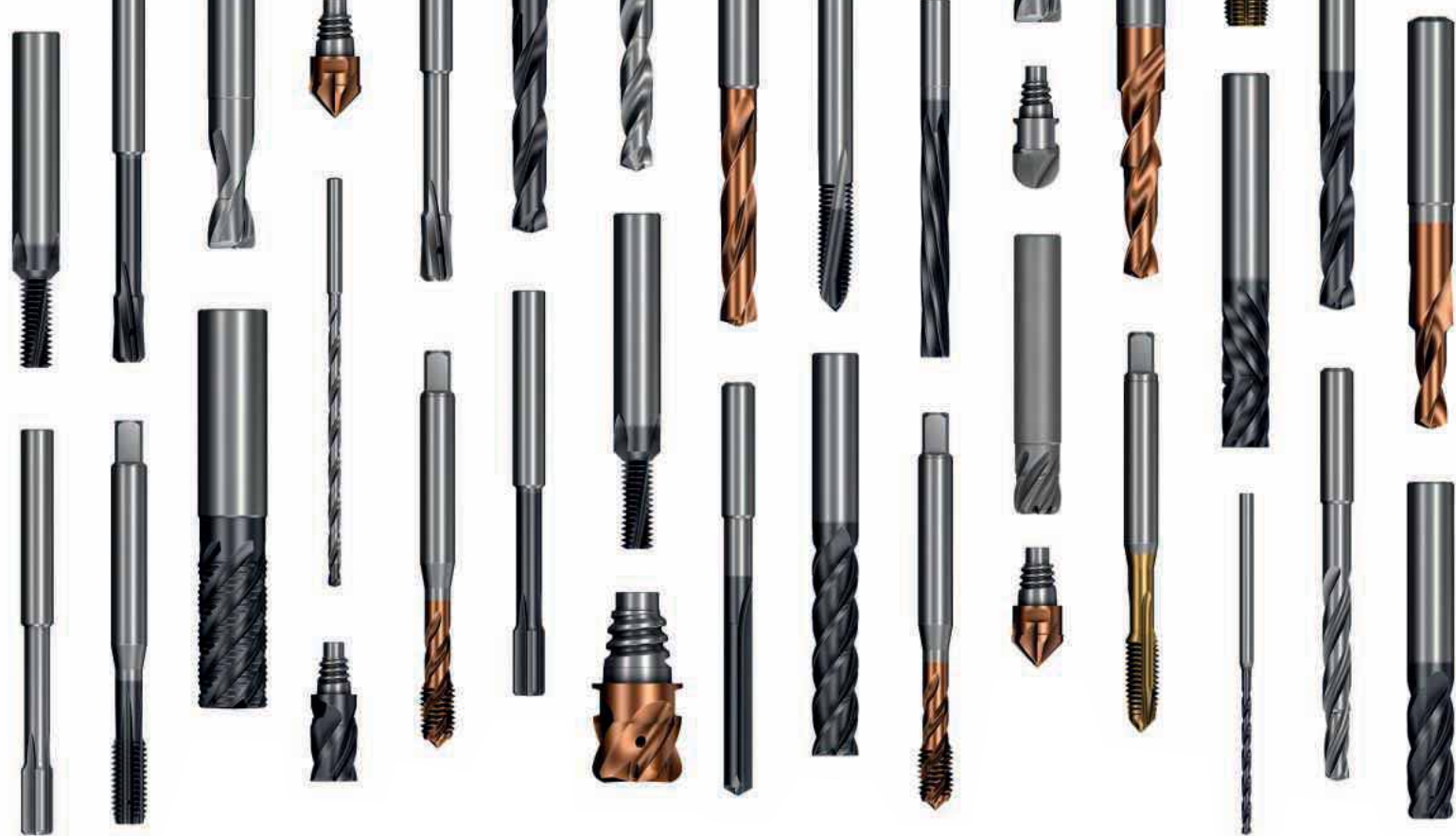
The success of the ITC WIDIA face milling tools opened the door to trial other ITC products on the company's HAAS VF2-SSYT 3-axis machining centre.

Robert Nibbs says: "The performance of the WIDIA face mills was exceptional, so we introduced the WIDIA 49N9 solid carbide 3-flute rougher to the profiling of pockets on 6082-T6 grade chassis sections. We previously used solid carbide end mills from two well-known brands with limited success. Then Tom Lindley, the area sales engineer for ITC, suggested running the ITC WIDIA 49N9. I was very apprehensive, but the WIDIA tool cut through the aluminium like a hot knife through butter."

The resounding success of the WIDIA face mill and solid carbide end mills gave Robert Nibbs the confidence in the application expertise of ITC's Tom Lindley and Matt White and, moreover, the quality of the products applied. This opened the door for more ITC innovations to be introduced to the Somerset-based company.

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Walter addresses Industry 4.0 with real-time data for process optimisation

Tooling expert Walter GB says Industry 4.0 means different things to different people and, indeed, the phrase very often causes uncertainty among production engineers, especially those in small/medium-sized companies. However, after addressing digitalisation some years ago, Walter has specifically developed, for such users, its Nexxt digital products and Industry 4.0 solutions.

These include the Comara iCut software tool, which is based on the real-time analysis of incoming machine data. Comara has not re-invented milling or turning with the iCut adaptive feed control but has focused on getting the most out of a machine without making major changes to the existing process or carrying out complex and time-consuming programming work.

The software is integrated into the existing control program and applies the data for the machining process. In the first cut, iCut 'learns' the idling output of the spindle and the maximum cutting efficiency per cut. Then it measures spindle output, at up to 500 times per second and automatically adjusts the feed and, as a result, the machine operates at the maximum feed that iCut has 'learned for each tool, whenever possible.

If the cutting conditions change, perhaps owing to varying contact angles and depths of cut, fluctuations in allowance or due to signs of tool wear, iCut adapts the speed and output in real time and the resulting optimised milling increases process reliability and boosts production output, at least by 10 percent.

In addition, the forces on the spindle are more constant which increases its service life and, if the tool is in danger of breaking, iCut immediately reduces the feed or stops the action.

Comara has also developed the appCom software platform to make all the data generated during the machining process usable for process optimisation. Comara appCom comprises two components: a PC, which is installed in the machines and integrated in the control system and the software, which analyses and displays data.

Walter uses the app principle for this and even the basic version of appCom features



Part of Walter's Nexxt digital products and Industry 4.0 solutions, the Comara iCut software makes all machining data instantly available



more than 13 apps which can be used to collect and monitor parameters including machine status, productivity and the stability of the programs being run. Company-specific apps can also be programmed and displayed.

In addition, the system can identify current problems and critical processes as well as analyse all production processes on a machine. Parameters include efficiency, costs per tool or per workpiece and process reliability. This produces live data to be used to optimise and plan production. Comara appCom can also be connected to ERP systems.

According to a spokesman at Walter GB: "While various factors determine the

potential efficiency and savings that result from the use of a monitoring and analysis software platform such as appCom, we can say that appCom users do see a significant increase of productivity and process reliability."

Walter AG was founded in 1919 and is now one of the world's leading metalworking companies. As a provider of specialised machining solutions, Walter offers a wide range of precision tools for milling, turning, drilling and threading applications.

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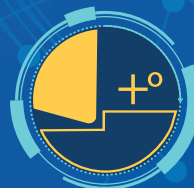
Medium Finish



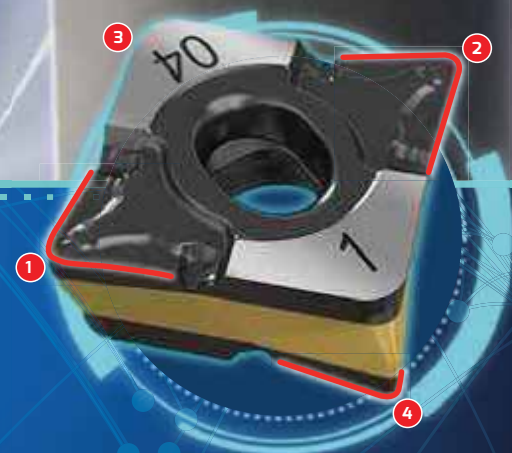
Double sided
Insert



Dovetail



Positive Rake
Insert



Investment supports business development at M.A. Ford Europe

Continued business growth, new product development and the need to expand its UK manufacturing capacity has seen high performance tooling manufacturer, M.A. Ford Europe, invest more than £5 million in production machinery and support systems.

After 20 years of trading, the company has also moved its Derby HQ to larger premises, which officially opened on June 25th. This year also marks the 100th anniversary of its US based parent company M.A. Ford Manufacturing Co. Inc, which was originally founded by Matthew Ambrose Ford in Davenport Iowa, where the company is still based.

The company's European operation is split across two UK sites, located in Derby and Leeds, both of which have been transformed over the past two years with significant planned investment. Manufacturing capacity has doubled at its Custom Tools Division in Leeds, which now manufactures standard tools from the company's range of high performance end mills alongside the custom tooling for which it is already well known.

However, the most recent development has been the relocation of its HQ to a building almost four times the size of its previous workplace. In addition to the increased office space, meeting rooms and conference facilities, the warehousing and storage capacity has more than tripled in size to 4,000 sq.ft, which enables a wider range of tooling to be held in stock and allow rapid despatch to meet customer orders.



A key feature of the new premises has been the creation of a dedicated technology centre on the ground floor, which is being used for UK and international distributor

training, tool prototyping and diagnostics, as well as testing customer tooling to ensure they are being run to deliver optimum performance. At the heart of the technology centre is a new Spinner U-630 5-axis universal machining centre, which uses Siemens Sinumerik 840DE SolutionLine Control CNC software.

M.A. Ford Europe's managing director, David Ward explains: "Our original technology and training centre is still working perfectly well at our Leeds manufacturing facility, but it gradually became clear that we needed to augment this with a more centrally located operation to cope with the additional interest and demand for support from UK and European customers.

"We also took the opportunity to increase the capacity and flexibility of the Derby technology centre by installing the Spinner machine. This has enabled us to accurately reproduce the cutting conditions that our customers are running, so that we can advise on how to achieve the best performance from our tooling. Also, we're using it to test our own new tool designs on a range of materials to ensure our quoted cutting data is robust and reliable. We push our tooling beyond the accepted working envelope to obtain data at extreme operating conditions, so that we can identify the absolute performance limits."

During the past 12 months, M.A. Ford Europe has continued to introduce new tooling ranges under its APG (Advanced Product Group) and FordMAX brands, which have extended its appeal to the subcontract-manufacturing sector.

APG tooling is designed for ultimate high performance, long-life and extended production runs to deliver exceptional productivity levels, while the FordMAX range has the same levels of precision and quality, but is designed for lower volume



manufacturing and batch production applications, which has the advantage of reducing the initial tool cost.

Alongside the recently introduced TuffCut® XT9 end-mill, which is designed for high speed machining of Titanium, Inconel and super-alloys, other new products under the APG banner include the TuffCut Series 3 MVS and MVR micro-diameter coated carbide end mills, which range from 0.5 mm to 3.0 mm diameter and the Twister® Series M coated carbide micro-drills, which covers diameters from 1.00 mm to 2.95 mm.



It's a similar story for FordMAX, with the introduction of six new product lines, including the UK-made Series MV4 solid carbide end mills, universal HP taps and four new indexable insert ranges. These include indexable high-feed milling, shoulder milling and spotting & chamfering tools, as well as an indexable turning tools range.

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Unravelling the challenge of threading

Tapping is one of the most demanding and problematic machining applications. Threads are usually made in the last stage of the manufacturing process and therefore, it is the operator's job to make sure the process is secure and finished correctly. The thread quality and tolerance should be constant to ensure tool life is at its maximum with preferably no interruptions.



Dormer Pramet's Johan Bodin, product manager for threading, answers several questions about the company's solid taps program, key challenges faced by machinists and the options available to end users.

What are the different tap designs?

JB: "There are several tap designs, which the most commonly used is the straight flute. This design is suitable for blind or through-hole thread production in most materials, especially steel and cast iron. Spiral point taps are recommended for threading through holes as they feature a straight, shallow flute with a point designed to drive the swarf forward.

"Finally, spiral flute taps transport swarf back out of the hole, away from the workpiece material and therefore are primarily used for threading blind holes. A less common but still an important part of our threading program are fluteless taps and thread milling cutters."



What are the different base materials in the taps you offer?

JB: "Our broad range of High Speed Steel (HSS) taps and dies support a variety of general purpose applications for use by hand or machine. All common thread forms are available in straight flute, spiral point and spiral flute designs.

"Also, our popular Shark Line program of material-specific taps is manufactured from powder metallurgy cobalt steel (HSS-E-PM). This offers optimised geometries for high performance threading in stainless steel, steel, cast iron and non-ferrous material.

"Solid carbide taps provide the highest rates of productivity in hard and abrasive materials up to 63 HRC. The highly stable design means low risk of tap breakage and optimum process security. They are available in a variety of styles including straight flute, spiral flute and fluteless, with internal coolant options for optimum chip evacuation when threading short-chipping materials."



What are forming taps?

JB: "Forming taps produce a thread by deformation of the component material rather than the traditional cutting action. This means no swarf is produced and the resultant thread is stronger. Also known as roll form or fluteless, the same tap can be used to create blind and through holes in most material types, including steels up to 1,200 N/mm². This makes them extremely versatile.

"An important benefit of forming taps is that the highly stable design means less risk of breakage and greater dimensional accuracy. This is critical in applications where a reliable and dependable option is required.

"The chamfer design determines the threading depth and type of machining. Standard forming taps with a chamfer form C are universal for semi-bottoming



below 3 x D. A chamfer form E has a lead of 1.5-2 mm times the pitch, which is the closest for what is called full-bottoming.

"Forming taps with through coolant, radial outlets and oil grooves further support tool life and process security. The lubricant is being delivered precisely at the point where the forces and friction is the highest."

Why is thread milling part of the taps program?

JB: "Thread milling is classified within our taps program as they provide a highly accurate, larger diameter threading option on CNC machines. Dormer Pramet's assortment covers M, MF, UNC, UNF, G & NPT thread forms.

"All provide a high level of security, stability and surface finish. Extremely versatile, the same cutter can be used in almost all workpiece materials including hardened steels, stainless steels and difficult to machine alloys."

Dormer Pramet is a global manufacturer and supplier of tools for the metal cutting industry. Its comprehensive product program encompasses both rotary and indexable drilling, milling, threading and turning tools for use in a wide variety of production environments. An extensive sales and technical support service operates from 21 offices, serving more than 100 markets worldwide. These are assisted by dedicated production facilities in Europe and South America and a highly developed distribution and logistics network.

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Model: GARANT Master Steel SlotMachine

Thread milling to the fore

ANCA's LaserPlus in process measurement enables lights out manufacturing of large volumes of threadmills

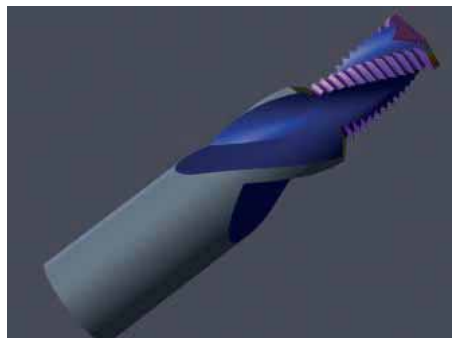
Thread milling is a versatile, cost-effective process for cutting a variety of threads, parts and workpiece materials on the same machine. This process produces an internal or an external thread by doing a helical interpolation on a CNC-machine which can make helical paths.

Thomson Mathew, ANCA product manager comments: "Threadmills generate superior burr-free surface finishes and reduce tool inventory costs. Shops can use the same tool for both left and right-hand threads as well as for different thread tolerances. A broad range of materials and hole diameters can also be thread milled with the same tool. Unlike tapping, threads produced through milling can be machined to full depth at high accuracy, even in hardened materials. Some of the other advantages are faster cycle times and less tool breakage. Basically, these are a really effective tool."

Advantages of the threadmill include: a 20-40 percent increase in tool life compared to other threading processes; increased strength and rigidity specially on hard material when cutting forces are applied; reduced inventory costs of tooling; threadmill inserts allow for small to larger cutter diameters.

Thomson Mathew continues: "Our tool and cutter grinders can effectively manufacture a range of thread milling cutters. Customers wanting to manufacture these cutters in large volume or for lights out manufacturing can make use of the Blum laser for measurement and compensation inside the machine."

"There are so many great applications available that people are not familiar with.



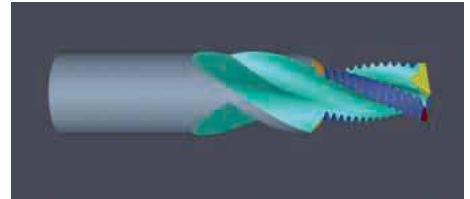
For example, thrilling. This is the process of threading and drilling (accomplished in the reverse order). The cutting tool tip is shaped like a drill while the body has a thread-shaped form with a countersink cutter form near the shank. The cutter first plunges to drill the hole and then the thread is circularly interpolated while the chamfer is also formed. The advantage is this process eliminates a tool, toolholder and tool change."

Blum laser support measurement and compensation

The Blum laser inside the machine can measure and compensate the tool diameter and crest width as shown above. There is option in software to control the upper and lower tolerance for the diameter compensation.

The software has two different operations for thread grinding and cresting. This allows you to choose roughing and finishing wheels for threading and to use number of passes if required. The laser measurement is done after the cresting for diameter and width compensation.

ANCA is a market leading manufacturer of CNC grinding machines. It was founded in 1974 in Melbourne, Australia where the company still has its global headquarters. ANCA has offices in the UK, Germany,



China, Thailand, India, Japan, Brazil and the USA as well as a comprehensive network of representatives and agents worldwide.

ANCA CNC grinders are used for manufacturing precision cutting tools and components across a diverse range of competitive industries including cutting tool manufacture, automotive, aerospace, electronics and medical.

More than anything else, what has driven ANCA's growth over the past 44 years have been a series of innovations that have revolutionised the production of cutting tools and have impacted the whole of manufacturing.

Its first significant innovation was the measurement of tool geometry inside the grinding machine by use of a touch probe. This technology seems basic today, but in 1986 ANCA was the first company to apply this technology, changing tool grinding forever.

Other firsts by ANCA include in-machine measurement using a CCD camera, 3D tool simulation, tubular linear motors, redundant axes generated in the coordinate transformations, wheel balancing and many more.

The company strives to deliver on its goal of being number one in customer lifetime experience every single day.

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New 6-flute conical taper barrel end mills

VQ, the latest series of end mills from Mitsubishi Materials, has been further expanded to include an innovative new 6-flute, conical taper barrel type. This latest addition has been specially designed for the high-efficiency finish machining of titanium alloy blades and for milling other materials from mild steel through to aluminium alloys.

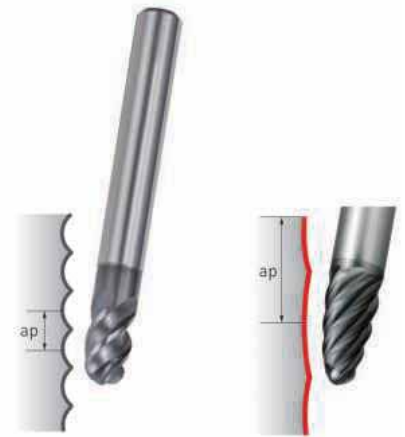
The ability to outperform standard ball nose end mills is provided by the large conical taper barrel form that blends seamlessly with the nose radius. This larger, tangential radius permits a much greater overlap (ap) and therefore greatly reduces the number of passes required to cover the surface area of the material being machined. The larger overlap also leads to significant improvements in the surface finish. Additionally, the 6-flute geometry permits greater feeds and promotes further savings in machining time.

When compared to ball nose end mills, the conical taper form, with the much larger area of contact with the workpiece during barrel milling, could lead to chatter and vibration, but this concern is negated by the irregular pitch geometry of the flutes. The

radial accuracy of ± 0.01 mm for the end, RE1 and barrel radii, RE2 are also key factors in maintaining consistent geometrical accuracy of the finished component. Furthermore, the 6-flutes are reduced to 3-flutes to widen the area at the nose radius to promote improved chip evacuation. This end geometry is ideal for root form machining.

Coating

VQ solid carbide end mills have been treated with an innovative Al-Cr-N group MIRACLE SIGMA based coating which delivers substantially improved wear resistance. The surface of the coating has been given a smoothing treatment, resulting in better machined surfaces, reduced cutting resistance and an increased chip discharge capacity. The extreme heat, oxidation resistance and lower coefficient of friction of the new coating means this next generation of end mills can maximise performance and help prevent tool wear even under the harshest of cutting conditions when machining difficult to cut materials.



VQT6UR sizes

Four sizes are available, $\text{\O}8$, two $\text{\O}10$'s and a $\text{\O}12$. They have an end radii, RE1, of 2 mm, 2 mm, 3 mm and 4 mm respectively and a barrel radii, RE2 of 75 mm, 75 mm and 100 mm respectively.

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Reducing vibration in long-overhang milling

Lower cutter weight increases stability and productivity

In a move designed to offer customers a host of in-process benefits, cutting tool and tooling system specialist Sandvik Coromant is introducing its lightweight CoroMill 390, which features a cutter body produced using additive manufacturing. The lighter overall weight of the tool helps to minimise vibration and improve security during machining with long overhang. In turn, the productivity is also increased.

Additive manufacturing offers a superior way of producing complex structures with high precision and without joints. Use of the process can make components lighter, stronger and more flexible than ever before. With regard to tool bodies, additive manufacturing allows for the generation of shapes and features not possible with metal cutting. In addition, virtually any material can be printed, as in this case, a titanium alloy.

Thomas Wikgren, manager for product application management at Sandvik Coromant, says: "When designing our new lightweight CoroMill 390, material has been tactically removed to create the optimal cutter design for minimising mass. This is called topological optimisation and it makes



the cutter more compact and significantly lighter than a conventional version, thus helping machine shops to boost the productivity of their long-overhang milling operations. Moreover, a shorter distance between the damper in the adaptor and the cutting edge improves performance and process security."

Process security is paramount in a number of metalcutting applications, not least when milling with long overhangs, which is a common requirement in components used by the aerospace and oil and gas sectors. Here, the generation of features such as deep cavities can be compromised by vibration, leading to slower production, shorter tool life and poor surface finish. The new lightweight CoroMill 390 provides the solution. Combined with Silent Tools™ milling adaptors, this optimised tooling combination subdues vibration to help maximise productivity and process security in demanding applications involving long overhangs. In addition, the inherent CoroMill 390 concept delivers light cutting action for a smooth cutting performance.

Lightweight CoroMill 390 can perform long-reach face milling, deep shoulder and side milling, cavity milling and slot milling.



The tool is available in 40 mm, arbor 16 coupling and 50 mm, arbor 22 coupling, diameter variants. Three or four inserts, size 11, can be specified to suit the application. Differential pitch and internal coolant are provided on all cutters.

Part of global industrial engineering group Sandvik, Sandvik Coromant is at the forefront of manufacturing tools, machining solutions and knowledge that drive industry standards and innovations demanded by the metalworking industry now and into the next industrial era. Educational support, extensive R&D investment and strong customer partnerships ensure the development of machining technologies that change, lead and drive the future of manufacturing. Sandvik Coromant owns over 3,100 patents worldwide, employs over 7,900 staff and is represented in 150 countries.

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Know where to turn to for any application

Hoffmann Group expands ToolScout to include online purchasing consultant for torque wrenches and dynamometric screwdrivers

The Hoffmann Group has enhanced its digital ToolScout service to include an online purchasing and application consultant for torque wrenches and dynamometric screwdrivers. As a result, in just a few clicks, users can now determine the most suitable tools for a particular application and order them from the Hoffmann Group's eShop. The system currently offers 400 torque tools. The ToolScout is available in 16 languages at <http://www.toolscout.com>.

Torque tools are available in many different versions and sizes. Yet the abundance of products on the market makes it increasingly difficult to choose the right tool to meet a specific requirement. This is further highlighted by the emergence of new areas of application, such as lightweight construction, which involve ever-more sensitive components. The Hoffmann Group has responded to this

trend with the new "Torque" function in the ToolScout.

This online service enables users to select the right tools for specific applications, on the basis of relevant parameters, ensuring a controlled screw-tightening process to defined torque values. In order to find the right tool for tightening screws, users can select from individual criteria such as thread type, strength class and tightening direction. The system then calculates a non-binding suggestion on the torque required. Once the desired torque is known, the torque wrenches and dynamometric screwdrivers can be filtered by properties such as torque range, trigger principle, display procedure and measuring accuracy. If a plug-in head that changes the reference dimension is being used, the service calculates the corrected torque value by drawing on a database that currently



contains around 700 plug-in heads from leading manufacturers.

The service is also connected directly to the Hoffmann Group's eShop, which means the desired products can subsequently be added to the shopping cart and ordered from the Hoffmann Group with just a few clicks.

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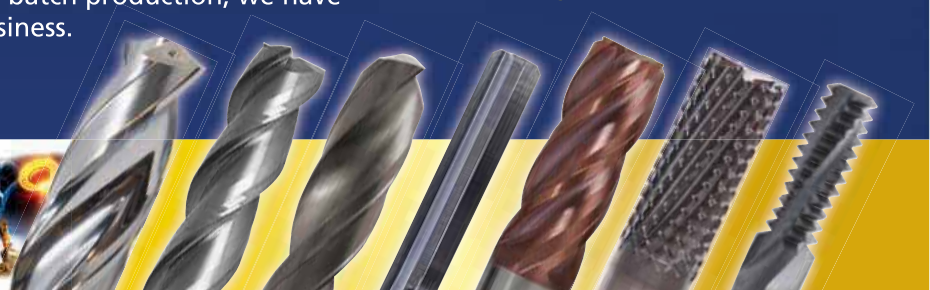
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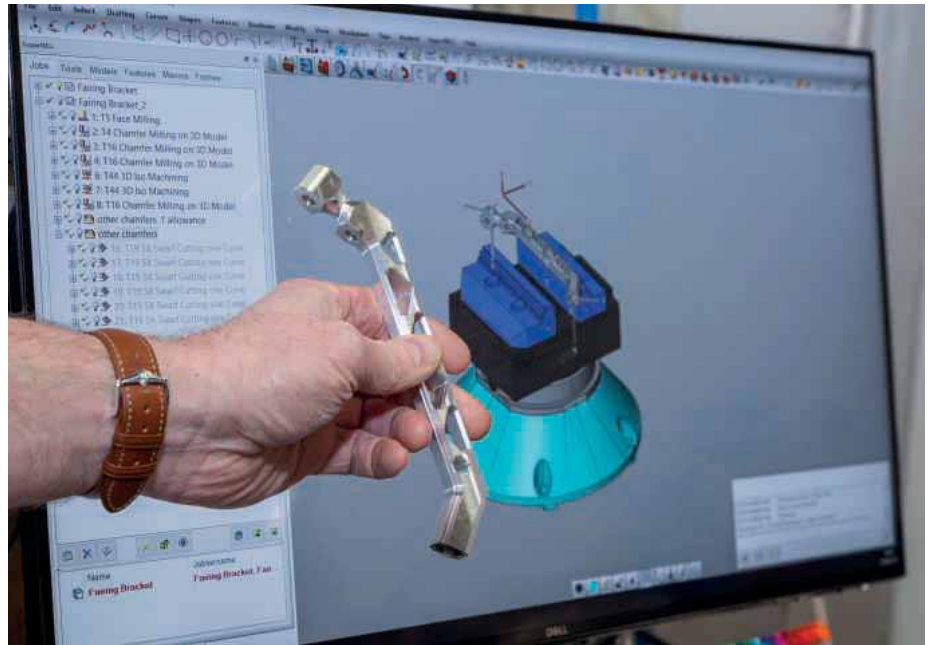
Complete Engineering Services delivers

When not busy running Carlisle-based Complete Engineering Services, co-founders and joint managing directors, Alan Walker and Andrew Monkhouse enjoy their motorcycles, in particular road racing. This passion has seen them work with several riders to develop their race bikes and, in 2018 to celebrate Complete Engineering Service's 20th anniversary, they sponsored the race helmets of WNT Burman Racing's Sam Burman.

For the 2019 HEL Performance British Motostar Championship, Sam Burman has a new motorcycle and so Alan Walker and Andrew Monkhouse decided to increase their involvement with additional sponsorship of the team. As part of this, they offered to machine components for the bike that would not only improve the performance of the bike through weight reduction but also improve its looks through component design. Eager to take up the offer, Sam and her father Phil provided sketches of the parts required, which included fairing brackets, rear brake rods, mudguard bolts and a specialist ride height tool. All manufactured from a mix of aluminium, stainless steel and titanium.

Alan Walker says: "The sketches were detailed but when we gave them to our Sam, who programs and operates our Mikron 5-axis machining centre, he wanted to develop them further. As the bike is situated some distance from us, we modelled up the parts and emailed designs across for a stage approval and we then produced sets of 'trial parts' for fitting to the bike. These will of course then be tested on track, as part of the 'shakedown' process, so now the race is on getting everything ready for the start of the season."

Transferring the original drawings to CAD files allowed Sam to create parts that were both aesthetically pleasing and functional, making use of the 5-axis capability and a selection of WNT cutting tools from Ceratizit UK & Ireland, including



diamond-like coated solid carbide milling cutters, ALU line milling cutters and the WNT ZSG4 workholding solution that allowed parts to be gripped on minimum material so that they could be 'snapped off' once machined. A further advantage was the fact that all of the WNT tools and workholding systems come with CAD files, making programming straightforward, while the Diamond Like Coated milling cutters allow elevated cutting data to remove material quickly.

Alan Walker concludes: "Ceratizit UK & Ireland's Matt Darbyshire introduced us to the DLC cutters when they first came out



and we have never looked back. They are now our first choice for ultimate metal removal and surface finish."

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New Cutline cutting tools range from Brammer Buck & Hickman

Brammer Buck & Hickman, a leading UK industrial supplies specialist, has announced the launch of its Cutline range of high-performance cutting tools.

Featuring 7,800 lines, the Cutline range has been specially developed by the Rubix group with leading cutting tool manufacturers based on customer research and in-depth machining studies. Every tool in the Cutline range has been expertly produced and tested for an exceptional level of quality and performance.

The Cutline range includes hole making, milling, threading, reamers, countersinking, profiling, ISO milling and turning products, to name but a few. The full range is covered in the new Cutline catalogue which provides an easy to read overview with technical features and machining recommendations, making product selection for the right material and application quick and simple. The catalogue is available from Brammer Buck & Hickman branches and in electronic format, as well as all products listed on the company's website www.bbhhubix.com

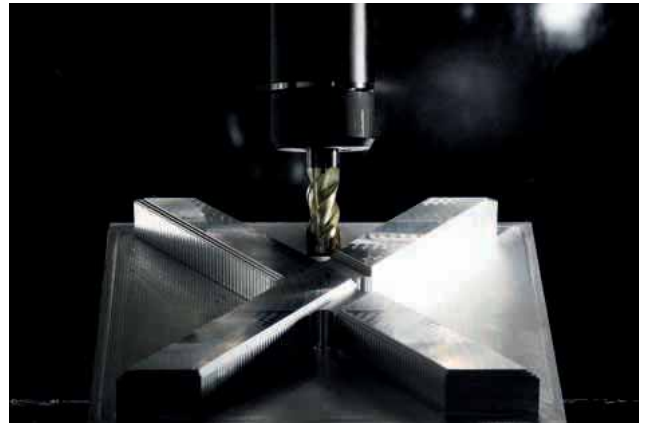
Simon Pearson, Brammer Buck & Hickman category manager for machining, comments

on the launch of Cutline:

"In line with Brammer Buck & Hickman's commitment to deliver customers cost savings, the Cutline range delivers excellent value for money while the quality and performance of the tools will deliver further production efficiencies and cost savings by reducing machining costs."

Brammer Buck & Hickman is part of the Rubix group. With turnover of more than €2.2 billion in 2017, Rubix is Europe's largest supplier of industrial maintenance, repair and overhaul, MRO products and services.

Brammer Buck & Hickman is a leading UK distributor of maintenance, repair and overhaul, MRO products, as well as supplying multiple value-added services. Branches across the breadth of the UK provide customers with quick and easy access to more than 5 million products, from bearings, power transmission and fluid



power through to tools and health & safety products. This extensive product portfolio is underpinned by specialist engineering services as well as condition monitoring.

Brammer Buck & Hickman is part of the Rubix group, Europe's largest supplier of industrial MRO products and services.

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Hexagon showcases advanced solutions at Control 2019

TESA shows more product innovations

At Control 2019, TESA presented a new generation of height gauges, two new inclinometers, as well as some inspiring 1D-probe applications for the in-line inspection and industrial solutions for data transmission.

The TESA-HITE range has evolved to create a new generation of gauges including some characteristics to better meet the needs of the user. The new TESA-HITE range includes the TESA-HITE MAGNA and the TESA-HITE models. The TESA-HITE MAGNA is equipped with a robust magnetic reading system, particularly suitable for measurements in difficult conditions, while the TESA-HITE is provided with an optical reading system for users looking for greater accuracy and value easy handling.

Furthermore, TESA presented several innovations in the "inclinometer and level" product family with the objective of offering the best solutions for inclination measurement. With the new TESA CLINOBEVEL 3, TESA offers its clients a top of the range portable precision inclinometer. Robust and easy to use, it is available in aluminium or cast iron and in three different measuring ranges: $\pm 1^\circ$, $\pm 10^\circ$ and $\pm 60^\circ$. The free TESA CLINOBEVEL 3 App allows one to use a smartphone as a remote display.



The compact and manageable TESA CLINOBEVEL 1 USB, now with a new look, can be used directly on the piece to measure inclinations up to $\pm 45^\circ$.

Applications for in-line inspection, data transmission and inductive probes show visitors how the innovative TESA products can be used to make reliable measurements in order to maintain and effectively increase the productivity.

Established in 1941 and headquartered in Renens, Switzerland, TESA manufactures and markets precision measuring instruments that stand for quality, reliability and longevity.

For more than 75 years, TESA has distinguished itself in the market through its excellent products, its unique expertise in micromechanics and precision machining as well as its proven experience in dimensional metrology.

The TESA brand is the global market leader in the field of height gauges and a pioneer thanks to its wide range of instruments, including callipers, micrometres, dial gauges, lever-type dial test indicators and inductive probes. TESA is a true benchmark for the inspection of incoming goods, as well as for production workshops and quality assurance laboratories.

Through its worldwide distribution

network, the company focuses on the mechanical engineering, micromechanical, automotive, aerospace, watchmaking and medical industries.

In 2001, TESA became part of Hexagon, a leading global provider of information technologies. For more information, visit www.TESAtechnology.com

3D goes long-range with the first Scanning Laser Tracker

The ATS600 is the world's first metrology-grade Scanning Laser Tracker and delivers a new level of 3D scanning functionality, with targetless 3D scanning possible for the first time, directly from the laser tracker. The ATS600 can scan a surface with metrological accuracy from a distance of up to 40 m, with no need for targets, sprays, reflectors or probes.

Following in the footsteps of the Leica Absolute Scanner LAS-XL that was released in 2017, the ATS600 delivers as much accuracy as is needed by targeted metrology applications, with its focus more on measurement usability and processing speed. Previously difficult to reach areas are simply measured without even the need for tracker repositioning, while surfaces that would previously have taken hours to manually scan can now be digitised in minutes.

"We're always very focused on usability and productivity throughout our research and development process, so large-scale scanning is a very interesting concept for us," says Matthias Saure, Laser Tracker product manager at Hexagon. "Like the LAS-XL before it, the ATS600 introduces a fundamental change to the scale in which we think about non-contact scanning. We know that users are increasingly interested in digitising parts as a way to absolutely ensure production quality and we think the ATS600 is a product that can really take digitisation into new places of industrial production and play a key role in expanding the role of quality assurance."

The system works by identifying a scan area within its field of view and then creating a sequentially measured grid of data points that define that surface, with accuracy to within as little as 300 microns. Measurement point density is fully customisable, so that users can choose the ideal balance between detail and process speed for their specific application. The ATS600 Leica Absolute Tracker is unique in delivering this functionality at metrology grade accuracy and alongside easy integration with established metrology workflows. The ATS600 is compatible with all major metrology software platforms and has been designed to sit comfortably within a wider metrology toolkit. The ATS600 also delivers all the renowned features of Hexagon's existing laser tracker products, from easy portability and usability to key functionalities such as PowerLock and the built-in MeteoStation.

Hexagon launches advanced positioning system for automated 3D optical measurement

Premiered at Control 2019, The new LightRunner from Hexagon's Manufacturing Intelligence division speeds up surface data capture while simplifying setup and operation for shop floor users. LightRunner is a new advanced positioning tool that transforms automated 3D optical measurement by eliminating mapping time during the setup and measurement of parts. 3D optical measurement systems enable manufacturers to rapidly capture rich data sets from large surfaces and assembly features for defect detection and process control, making them essential in industries including automotive and aerospace. Until now such systems typically required a lengthy mapping process during setup, with each new part referenced by the placement



of markers before automated measurement could begin. This approach is time-consuming, so Hexagon has developed LightRunner's patented pattern projection technique and advanced software algorithms to improve productivity and shorten cycle times by removing mapping and robot stabilisation time. LightRunner automatically projects millions of reference points on to a part's surface to provide constant absolute positioning for high-speed, non-contact, 3D optical measurement

systems, providing confidence in the results without the need for CMM correlations. The LightRunner solution also accelerates initial part programming and eliminates the need to store reference panels or the use of reference frames on the fixtures, reducing operator workload and minimising training requirements for shopfloor users.

Senior product manager Fernando Funtowicz explains: "Manufacturers are increasingly turning to fully automated 3D optical measurement systems to help them digitally transform production, gain greater insight into their processes and build on their investments to develop faster, more accurate techniques that drive productivity."

"LightRunner removes some of the major challenges of implementing automated 3D optical measurement, enabling more manufacturers to benefit from the rich data capture it offers. This system has a major



effect on the utilisation and productivity of automated optical measurement and enables better process control without the need to buy new tooling, fixtures or robots."

LightRunner is now available worldwide with the 360° Cell, Hexagon's turnkey solution for automated 3D optical measurement.

Hexagon Metrology plc

Tel: 0870 4462667

Email: enquiry.uk@hexagonmetrology.com

www.hexagonmetrology.com

Components and system solutions for measurement and testing

Aerotech demonstrated its extensive know-how as a system supplier for measurement and testing technology in Stuttgart at Control 2019. The manufacturer of high-performance motion control and positioning systems focused on automation solutions and components for measuring and testing equipment in addition to its position controls.

For the first time and in a live display, the Integrated Granite Motion (IGM) system was showcased as an alternative to traditional granite-subbase positioning stages incorporating Aerotech's latest components: a high-performance XR3 controller, a GL4 galvo controller, and the A3200 automation platform with HyperWire® drive bus. This allows the IGM linear stages, which are tailor-made and unique in terms of stiffness, to be configured to meet the requirements of various applications with greater flexibility. Depending on the intended use, travel distance, payload and dynamic performance can be adapted to the specific application.

"Compared with conventional positioning stages with a granite base, our IGM systems offer significantly more flexibility, higher rigidity and reduced overall height," says Norbert Ludwig, Aerotech GmbH managing director. The higher stiffness is due to the fact that fewer construction elements have to be integrated. This increases the positioning accuracy as well as the dynamic performance. To demonstrate how high-precision laser technology can also be incorporated into the positioning system,



Flexible motion platform: With the IGM positioning stages, travel, payload and dynamic performance can be adapted to specific applications

the new AGV-SPO galvo scanner is integrated into the linear axes. The so-called IFOV (Infinite Field of View) function ensures that linear or rotary servo axes are synchronised with a laser scanner. IFOV significantly improves throughput and eliminates stitching errors that otherwise frequently cause part quality issues due to superimposed and incorrectly aligned laser processing.

The manufacturing of optical components in varied sectors like laser material processing, biotechnology, medical technology and semiconductor technology, requires high-precision surface measurements including non-destructive quality assurance. According to Aerotech, the SMP is the perfect multi-axis motion system for such applications. "Optical components are used everywhere, for example in medical technology for prevention, diagnostics and therapy or for laser processing of materials in additive manufacturing", explains Norbert Ludwig. "High-precision optics require high precision measurements of spherical, aspherical and cylindrical shapes in the nanometre range. This requires flexible 2D and 3D contouring." The measuring device benefits from the performance of Aerotech's controllers with their advanced motion control and Position Synchronised Output (PSO), enabling very smooth movements even at low speeds.

A generic high-speed electrical interface between motion and sensor control enables axis repeatability in the lower nanometre range by synchronising measurement and position data in real time. This minimises incremental movement at the nanometre level, supporting the generation of accurate scan or point-to-point motion profiles. Field tests and practical applications have shown that the excellent positioning properties reduce the processing time for surface measurements by up to 40 percent. A further advantage is space saving: an SMP



The IGM positioning platform can also be used to integrate Aerotech's new AGV-SPO galvo scanners, which are used in additive manufacturing and medical technology



The SMP surface measurement motion platform is open for the connection of various peripherals, for example the integration of different sensors such as white light or multi-wavelength interferometers, camera systems or capacitive probes

requires up to 60 percent less floor space than Cartesian measuring systems.

Aerotech Ltd
Tel: 01256 855055
Email: ltdsales@aerotech.com
www.aerotech.com

A new level of perfection

Automated defect detection and shape measurement of large and complex reflective components

A new system from ISRA Vision for measuring large, complex and curved components ensures maximum speed and reliability through optical inspection. Where manual processes were previously used to inspect reflective surfaces, intelligent automation now enables constant and comparable quality decisions.

Sophisticated industrial environments such as automotive production place tough demands on inspection, while complex components with reflective surfaces from the automotive exterior and interior segments make mechanical inspection difficult. However, the manual inspection processes often used for this result in subjective decisions, a lack of comparability and thus inconsistent quality levels, which in turn leads to increased reject rates.

Until now, there have been no efficient alternatives for large, complex and curved components. However, the SpecGAGE3D XL makes quality objective and traceable for

the first time. Top speed combined with reliability provides maximum efficiency.

At Control 2019, ISRA presented this system for inspecting reflective components, with simultaneous shape inspection for especially large components. The sensor measures glossy and reflective surfaces down to the nanometre range. The software detects defects such as inclusions, spalling, spots and varnish tears. At the same time, classification enables reliable traceability that enables process errors to be eliminated, overall quality enhanced and rejection rates minimised.

Multiple components can be inspected at the same time with the multicamera system. Equipped with Wi-Fi as standard, the system can also be used in a connected production environment. Its high level of user friendliness and the remote desktop function, with which SpecGAGE3D XL can be controlled via a tablet, make the system easy to use.



Inspection with SpecGAGE3D XL enables absolute perfection for B pillars

With a large portfolio of production analytics tools, ISRA offers the ideal addition, as all the process and production data collected is linked together and analysed. The Enterprise PROduction Management Intelligence Software PROMI uses the production line's entire data set to provide transparency and an overview of manufacturing processes.

This knowledge and SpecGAGE 3D XL's state-of-the-art system architecture form the basis for closely connected and INDUSTRY 4.0 compatible production.

ISRA Vision AG
Tel: 0049 6151 9480
Email: info@isravision.com
www.isravision.com

API launches updated Radian laser tracker series

Automated Precision Europe (API) has launched its updated series of Radian Laser Trackers, offering the lightest, most compact and highest accuracy trackers available. The extended Radian laser tracker range comprises three models: Radian Pro, Radian Plus and Radian Core.

The Radian Pro offers both absolute Distance Measurement (ADM) and interferometer (IFM) capability and is available with 20, 50 and 80-meter range options and offers 6 degrees of freedom (6DoF). The Radian Plus is supplied standard with the API vProbe™ or iScan™. The vProbe is a hand-held light-weight tactile probe that extends the laser tracker coordinate measuring capabilities, by permitting intricate features and part characteristics outside the line-of-sight tracker setup. The vProbe has more versatility than a CMM portable arm and is inherently suitable for large parts and styli lengths up to 500 mm. API iScan is a hand-held, lightweight, non-contact scanner with new higher data-rate, point cloud capture speed, and a new global position sensor system. The



Radian Core is a spherically mounted retroreflector (SMR) tracker only, with measuring ranges of 50 and 80 m. The Radian Plus and the Radian Core have also an integral battery offering four hours of battery operation with automatic recharge when the tracker is connected to the main power supply. An external power pack can add an additional four hours of remote operation and can be used for tablet and smart phone charging, in the event of device battery failure.

Radian Pro trackers can be provided with calibration tools to perform dynamic calibration and dynamic tracking of industrial robots and machine tools delivering enhanced performance of manufacturing processes by reducing process variation.

API provides inclusive tracker calibration and maintenance contracts that can also include a loaner tracker program and an advance calibration reservation program.

API founder and CEO, Dr Kam Lau invented the laser tracker while working at USA's National Institute of Standards and Technology (NIST) to allow industrial robot accuracies to be determined.

Today API is a global company with its laser trackers, machine tool and robot calibration equipment, optical sensors and coordinate measuring products continuing to be the benchmark for metrology automation, precision and Innovation. API measurement and calibration products are at the heart of manufacturing organisations worldwide ensuring product quality and performance. API also provides on-site dimensional inspection, metrology and calibration services.

Automated Precision Europe GmbH
Tel: 0049 6221 729 80511
Email: melanie.duester@apimetrology.com
www.apimetrology.com

Where simple handling is as important as measurement accuracy

Reliable verification of the micro geometry of their milling cutters is one of the top priorities in the research and development work of US carbide tool manufacturer IMCO. The high measuring accuracy, repeatability and easy handling of the EdgeMaster tool measuring system impressed the management so much that, shortly after investing in its R&D centre, an additional system for production was purchased.



Matthew S. Osburn, vice president and technical director, IMCO Carbide Tool Inc

"Four features determine the service life and machining result of modern-day cutting tools. These are substrate material, coating, macro and micro geometry." Matthew S. Osburn, vice president & technical director of US manufacturer IMCO Carbide Tool Inc knows what he is talking about. Specialised in the development of milling cutters with multiple flutes, he also knows about the importance of the right measuring technology, stating that "The cutting edge is the wear part of a milling cutter."

IMCO views micro geometry as being so critical that it desired a system tailored to only those types of measurements. Recently, the supplier of carbide cutting tools has replaced its existing "outdated device with an upgraded and highly accurate measuring system." Matthew S. Osburn continues: "We are well known for our high level of research and development activities, and reliable verification of edge preparation is of major importance. The most important criteria for the evaluation of suitable measuring systems for us were accuracy and repeatability of the

measurements." In the end, the decision to invest in an Alicona measuring system for prototype development was an easy one. "I have the utmost confidence in the measurement values the EdgeMaster delivers," he continues. However, accuracy is only one advantage that the IMCO vice president sees in the Alicona system. "We primarily measured edge hone radius sizes with our old system. With the EdgeMaster and its ease-of-use, we now routinely measure many more attributes than before, and we do it quicker and with more confidence in the measurement results."

As a result, Alicona has not only met but exceeded all expectations in terms of accuracy, repeatability and reliability of measurements. Shortly after the investment in its R&D centre, the management was so impressed by the easy operation and robustness of the optical measuring system that a second EdgeMaster is now being used in production.

Shortened prototype development time of carbide tools

IMCO's tool design offers "greater productivity results for very small to very large operations," according to the supplier, adding "higher productivity is due to increased chip flow and elimination of chip packing." IMCO customers further report on higher metal removal rates and fewer tool changes. All these attributes can be traced back to the supplier's commitment to the four pillars of a modern cutting tool, one of them being micro geometry and verified by high resolution measurements with Alicona's EdgeMaster system. Parameters such as shape and contour accuracy, rake angle, undercuts, chipping and roughness on for example the chip surface are decisive for the quality of the cutting edge and thus for the machined workpiece. IMCO offers milling cutters with up to thirteen flutes that achieve above-average surface finish even with materials that are difficult to machine. Development and testing take place in the internal research and development centre, where IMCO can grind, hone, inspect and machine with prototype cutting tools. The EdgeMaster is also used to measure the surface finishes of the flute at various



grinding parameters to optimise surface integrity. Matthew S. Osburn further explains: "All tools in prototype development are measured and documented with Alicona. We then machine with these tools, meticulously logging our machining results. This process enables us to quickly correct the tool geometry if required. The EdgeMaster guides us to developing the highest performance cutting tools on the market."

Another important aspect in prototyping is the use of a flexible measurement system that enables highly accurate measurements on different tool shapes, types and sizes. IMCO needs to measure a wide variety of sizes and helix angles. According to Matthew S. Osburn, it is easy to cover this wide variety of tools with the EdgeMaster. He sees the right measurement technology as one of the decisive factors in ensuring a steady flow of new products and to improve upon the tools that are already offered. "Focus-Variation is critical to our ongoing success," he says. With a second EdgeMaster in use, the intensive research is now carried through to the production environment.

Shop floor swears by easy handling

Measurement accuracy, repeatability and robustness of the Focus-Variation technology in combination with the easy handling of the EdgeMaster system has led to the decision to purchase an additional device in manufacturing. "Our R&D centre

develops exact specifications for the edge treatment on our high-performance cutting tools. Once newly developed tools are released for production, using the same measurement technology as applied in research makes perfect sense," Matthew S. Osburn explains. "In production, the EdgeMaster is used to verify that the precise edge treatment developed in the R&D is applied to the tools going to our customers." He is particularly enthusiastic about the ease-of-use. "The system worked so well and was so easy to learn that we started training staff on the shop floor. The operators love the new EdgeMaster, it is so easy to learn and use." He is convinced, that on the shop floor, simple handling is just as important as measuring accuracy. Alicona understood that 100 percent. A series of clamping tools for easy fixturing, user friendly controls and single-button solutions to perform measurements create this simple user guidance. High-resolution measurements also at vibrations, extraneous light or temperature fluctuations complete production suitability of the system.

According to Matthew S. Osburn, IMCO also gains an advantage for research & development through measurements in



production: "It is an additional benefit for our research that we can store all measurements for future reference," he explains. In his view, the EdgeMaster ensures that IMCO customers consistently get end millers with optimal micro geometry. "The Alicona technology is unique. We have seen a 75 percent reduction in the time necessary to take

readings on the factory floor. Most of this time savings is attributed to the ease of use of the measurement system," he concludes.

Alicona UK Ltd
Tel: 01858 462799
Email: sales.uk@alicona.com
www.alicona.com

Precimar SM 60 – the "compact one" in length metrology

New, mobile micro measuring bench for short lengths enriches Mahr's Precimar portfolio

The youngest member of the Precimar family is also the smallest. The Precimar SM 60 is a perfect tool for quality-conscious production due to its simple and therefore fast operation, robust design and great flexibility. With this small length measuring bench, external measurements can be carried out quickly and precisely and it is suitable for both left-handed and right-handed users.

Mobile and individual in use

Due to its small size, simple design and robust construction, the bench is ideally suited for immediate use in the workshop or other production environments. The relatively large measuring table can accommodate workpieces up to 60 mm in diameter. The measuring sleeve can be moved by 25 mm, depending on the dial gauge. Integrated coupling additionally protects the measuring equipment. The small length measuring bench is mobile and individually adaptable to new workpieces, allowing the measuring equipment (for

example digital dial gage or measuring probe) to be freely combined as required. With different measuring attachments, different types of measurements can also be carried out on the workpiece.

The Precimar family from Mahr

Precimar stands for dimensional metrology in highest precision for both absolute and relative measurements. Typical areas of application are products and test equipment for the aerospace and automotive industries as well as series testing of test equipment in calibration laboratories. With various universal length measuring machines, lengths, outer and inner diameters, cylindrical and tapered threads, smooth tapers, micrometers, snap gauges, dial gauges, fine pointers, probes and gauge blocks as well as precision products down to the nanometre range can be reliably measured and tested with maximum.

Highest precision, modern technologies and international presence: this is what



Mahr stands for. As a manufacturer of innovative production measurement technology, it has supported its customers in the measurement room and in production for more than 150 years. This experience makes it an expert for quality assurance in the automotive industry, mechanical engineering, aerospace, optics and many other industries. From manual calipers to fully automated measuring stations, all products contain the passion and know-how of the 1,900 Mahr employees worldwide.

Mahr UK Tel: 01908 563700
Email: info@mahruk.com www.mahruk.com

Intelligent gripping system for integrated battery cell inspection

The intelligent SCHUNK battery cell gripper offers an efficiency advantage for the production of lithium-ion batteries. The smart gripper combines flexible handling, identification, and the 100 percent quality inspection of li-ion cells in one compact module. All recorded process data and characteristic curves on geometry, temperature and charge levels are processed via an integrated PC system on the level of the gripping module and transferred as purified information via Ethernet TCP/IP both to the plant controller and the super-ordinate database systems. In so doing, the battery cell gripper is making an important contribution towards shaping autonomous processes within the intelligent production environments of Industry 4.0.

Lithium-ion batteries are considered as technologically essential components of electromobility and stationary storage systems due to the high level of efficiency and storage capacity. Intensive R&D activities have recently resulted in performance rapidly increasing, and charging times being significantly reduced. At the same time however, the revenue per unit has also been declining by as much as 20 percent per year. The portion of manual workstations in the production of battery packs has, until now, made cost-attractive production in large quantities more difficult. Today, for instance, the condition of the individual li-ion cells, both when being sent from cell production and when being received in battery pack assembly, was largely monitored manually with the aid of measurement equipment. This is very time intensive and often associated with erroneous measurement results due to operating errors. In order to overcome the rapidly growing demand predicted for the

years to come, this process can now be completely automated.

Autonomous monitoring of all relevant parameters

For this purpose, SCHUNK, a competence leader for gripping systems and clamping technology, has developed a highly integrated gripping system that actively uses its strategically exposed position "closest to the part" in order to autonomously complete all procedural steps required for handling and quality inspection.

The gripper gently picks up the prismatic li-ion cell and moves it into a defined test position within the gripper during the handling process. Here, the cell is automatically identified and geometrically measured using a bar code or data-matrix code. At the same time, the temperature and curvature of the cell surface and important electrical parameters are determined; Open-circuit voltage for determining the charge level, SOC, isolation resistance, impedance at two frequencies to determine the capacity.

By means of an integrated PC system at the same level of the gripping module, the prepared information can be provided in real time via Ethernet TCP/IP, both to the plant controller as well as to ERP systems and the superordinate database systems. Here, the evaluations on erroneous or deviating modules can be automatically documented and, if necessary, are sent directly to the supplier. The data curves can be displayed separately from one another in the visualisation. From the analysis of the measurement data, information on the product and its improvement can be gained. After completion of the integrated quality inspection, the gripper inserts the cell in the



module production into the right line or inserts the cell in the dispatch tray of the cell manufacturer. NOK parts are automatically discharged.

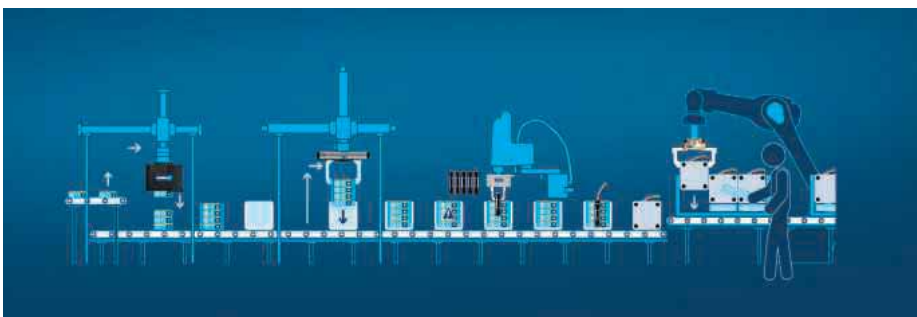
Modular concept facilitates tailored process planning

By means of standardised interfaces, the SCHUNK battery cell gripper can be connected with a wide range of robot or gantry systems. The actuation takes place via digital I/O. Due to the modular concept and freely configurable control loops, both the type and scope of the individual test procedures can be individually defined. Furthermore, additional measurements and evaluations can also be integrated upon request. The modular sensoric concept and configurable control loops ensure highly flexible implementation possibilities. At the peak, cycle times of less than two seconds are possible.

Intelligent automation facilitates efficient battery production

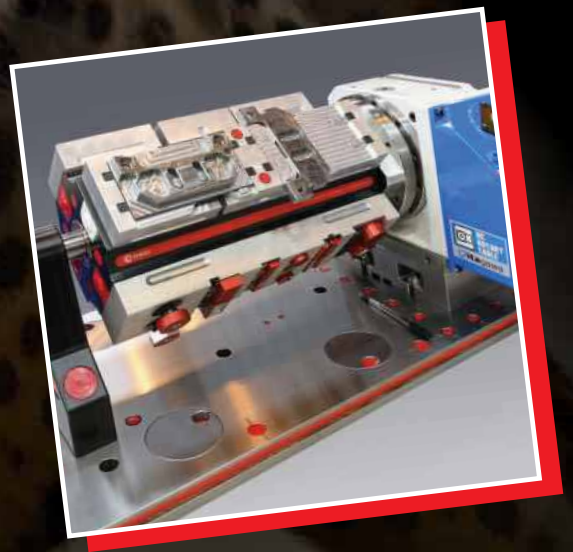
Intelligent gripping systems, like the SCHUNK battery cell gripper, provide the opportunity for autonomous processes and make an important contribution to the production of tomorrow. Fully integrated solutions reduce the cost of the entire system, as no additional measurement technology is required and both the space requirements and commissioning outlay are reduced. Moreover, with considerably reduced personnel outlay, the process speed can be noticeably increased.

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Leader now offers Autogrip

The Autogrip range of power chucks and rotary cylinders is now available from Leader Chuck Systems

Workholding specialist, Leader Chuck Systems recently signed a contract with Taiwanese workholding manufacturer, Autogrip Machinery. Under this new agreement, the Tamworth-based company will assume full responsibility for the sale of Autogrip's extensive range of high precision power chucks and rotary cylinders in the UK, which includes pre-sales technical support, stocks of popular items and spare parts being held by Leader at its extensive logistics facility in Leamington Spa.

For bar feed or billet loading precision turning applications, Autogrip has a range of through-bore and closed centre standard and long stroke 2-, 3- and 4-jaw power chucks, designed to operate at up to 8,000 rpm. For drilling, milling, grinding and other machining operations, a range of 3-jaw stationary power chucks is available. All the chucks are produced from hardened and ground steel and feature direct lubrication.

All Autogrip hydraulic rotary cylinders are constructed from lightweight materials, with through-bore and closed centre workholding solutions offering class-leading performance characteristics.

Managing director, Mark Jones, says: "Autogrip has an established reputation for producing high quality workholding products, manufacturing power chucks and hydraulic rotary cylinders for a number of world class OEM machine tool builders. With our new contract in place, Leader can now offer the complete cost-effective workholding range from Autogrip."

Based in Changhua County, Taiwan, Autogrip Machinery has been producing its extensive range of precision chucks for over two decades. Today, the ISO 9001 accredited company employs around 600 people and produces a wide range of standard and special high rigidity, high precision power chucks and rotary cylinders.

Patented large through-hole air chuck

The Patented Autogrip AP range of large through-hole power chucks are now available from Leader Chuck Systems.

Autogrip's extensive range high precision power chucks and rotary cylinders are available in four through-hole diameters, 52,



66, 86 and 115 mm, the AP range features an integrated pneumatic cylinder which powers the opening and closing of the chuck jaws. This design negates the need for a draw bar to provide the jaw clamping force, resulting in a larger through bore capacity for bar feeding raw material.

Although the AP chucks have been extensively tested and proven by Autogrip to maintain internal air pressure for more than two weeks, a pressure detection device is built into the chuck to guarantee safe operation up to maximum speeds that extend from 4,200 rpm for the AP-52 to 3,000 rpm for the AP-115.

Mark Jones says: "The Patented new air supplied chuck is even further proof of the company's technical capability, offering a complete range of cost-effective workholding solutions."

Leader rings the changes with RotoRi

Leader Chuck Systems has also recently expanded its product portfolio with the addition of the RotoRi range of chuck jaw boring rings. Able to precisely support the 'truing' of jaws fitted to manual or power chucks the RotoRi sets have been specifically designed to be used to bore, turn or grind jaws very accurately under a clamping pressure that reflects that required to hold the workpiece.

Available in seven standard sets designed to match the diameter range of the machine tools on the shopfloor as well as the types of chucks used, these multiple-patented innovative ring sets allow precise machining of the jaws thanks to the complete adjustability of the segments.

Creating perfectly concentric bores on hard or soft jaws, the RotoRi boring rings allow fine adjustments for minimal skimming of jaws, so only the minimum amount of material from the jaw face ever needs to be removed maximising the life of the jaws. As they can be through bored in one operation it results in better T.I.R (Total Indicated Runout) for any subsequently machined parts. The patented curved segments support easy readjustment of the clamping diameter which saves both time and tool costs.

Mark Jones says: "Every machine shop that has to regularly set up chucks for the production of accurate components can benefit from the advantages these ring sets offer. First, the precision adjustment saves

jaw usage as only fine skims are required to achieve the accuracy required; secondly it reduces the time wasted looking for, or making, turning clamping rings and, finally, one RotoRi set can be used to support many chucks."

Made from high-tensile steel, the RotoRi sets range from 10 to 52 rings for chucks up to 1,200 mm diameter. For 3-jaw chucks, each ring consists of three curved segments (3 x 120°) that can be used both on the internal and external diameter of the jaws to support OD and ID workholding. For 2-, 4- and 6-jaw chucks Leader recommends the RotoRi-Quattro sets with four (4 x 90°) or RotoRi-Six with six segments (6 x 60°). A patented expansion joint is provided to ensure even power distribution.



To compensate for large counter-bore tolerances of different jaw manufacturers, RotoRi offers the flexible and patented clamping bolt 'RotoFix'. With the ability to adjust up to 2 mm there is no need to remachine any screw counterbores.

"If the chuck-to-workpiece interface is not optimised then any investment made in a high precision machine tool can be negated. The RotoRi boring ring sets offer a simple and cost-effective way of ensuring the accuracy is achieved and maintained," concludes Mark Jones.

Leader Chuck Systems Ltd Tel: 01827 700000
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Thin walled part made easy by the application of InoTop

Headquartered in the West Midlands and employing over 1,000 people across 13 sites, the LoneStar Group manufactures and supplies a wide range of high-performance fasteners, precision engineered components and sealing technologies for the world's energy markets. Group member, LoneStar Leeds specialises in the manufacture of products such as valve gates, stems, seats and metallic seals. In addition to the global oil and gas industry, LoneStar Leeds serves several equally challenging sectors, including the petrochemical, power generation and renewable energy markets.

To enable the delivery of the highest levels of quality, precision and efficiency LoneStar Leeds' team of skilled, engineers have access to a range of advanced manufacturing technologies. In addition to impressive CNC turning, surface grinding, wire eroding and honing facilities. The company's West Yorkshire based manufacturing facility houses 13 advanced machining centres, consisting of vertical, horizontal and twin pallet machines with capacities of up to 2,300 mm x 800 mm and a maximum loadbearing capability of 1,000 kg.

Like all such oil and gas related manufacturing businesses, LoneStar Leeds was hit by the global downturn in the industry in 2014, although, over the past five years, the company has experienced a spectacular recovery. Welcome as this revival has been, the nature of LoneStar Leeds' business has changed since the 2014 oil industry slump. As the company's production runs are now shorter than those undertaken pre-2014, to ensure the best possible levels of efficiency whilst manufacturing smaller batches, the management of LoneStar Leeds have been busy exploring ways of minimising job changeover times and searching for ways of maximising the available productive times of the company's manufacturing plant.

In addition to employing methods such as making sure that, at the end of each production run, comprehensive 'kits', consisting of cutting tools, and all other necessary ancillary equipment, are always instantly available for the next job,



investments have also been made in advanced workholding equipment that further reduces job change-over times and increases production efficiencies.

LoneStar Leeds managing director, Jon Collinge explains: "As the markets we operate in are extremely competitive, we are always seeking ways of ensuring that our machine tools are able to reach their full productive potential. In addition, given the potential economic and environmental costs of the failure of any of the products we manufacture, while for example extracting,

storing or transporting natural gas and oil, the premium quality of our output is of paramount importance to all at LoneStar Leeds.

"Stewart Whiteman, the MD of our sealing division had reaped the benefits of using Thame Workholding products and, as he and I continually exchange ideas, he was happy to recommend the company to me.

"Having invited Thame Workholding's sales engineer, Tony Lewis to visit our site and to recommend an effective workholding solution for a series of soon to be

manufactured thin walled parts with challenging specifications, Tony recommended Thame Workholding's InoTop jaw system. The ingenious system proved to be the perfect solution for securely holding our thin walled parts without causing deformation and for achieving the best possible roundness results. In addition, the use of the InoTop jaw system speeded-up production in this potentially problematic area.

"As the InoTop jaw system ensured quick setups and resulted in the production of high-quality parts, it satisfied our twin aims of continually improving our manufacturing efficiencies and ensuring the consistent production of quality parts. Given the elimination of scrap and the significant time savings we now achieve on our regular thin walled machining jobs, our InoTop jaw system is now ahead of schedule on its projected ROI time.

"The great success of the InoTop jaw system means that we have since invited Tony Lewis to look at several of our other machine tool applications. His recommendations and our subsequent purchases of additional Thame Workholding products have enabled us to achieve further

efficiencies and helped us to uphold our demanding quality standards."

Thame Workholding's Tony Lewis adds: "As engineers throughout the world use cost-effective InoTop jaw systems to clamp deformation sensitive parts that would otherwise prove troublesome to machine accurately, I was confident that this highly effective system was the ideal solution to LoneStar Leeds' quest for improved machining efficiencies.

"Working on the principle of centring the workpiece on its outside diameter without the application of pressure, then clamping from the inside diameter, InoTop prevents unwanted polygon formations in the clamping process and results in the efficient production of high-quality parts."

Based in Long Crendon, Buckinghamshire, Thame Workholding designs, manufactures and supplies a wide range of cost-effective workholding products to its global customer base. Complementing its own products, the company also provide a range of highly efficient workholding solutions from several leading global manufacturers on an exclusive UK agency basis.

To ensure the in-house production of

cost-effective, premium-quality products, Thame Workholding uses a range of modern 3-, 4- and 5-axis machine tools with multi-pallet and automated loading for unmanned machining. The company's impressive manufacturing facilities are supported by modern 3D CAD and CAM modelling facilities and a high-accuracy CMM inspection provision.

Thame Workholding is accredited to ISO 9001:2015 with the scope of design, manufacture, assembly, supply and maintenance of workholding equipment. With a high proportion of products being designed and manufactured in-house, the company has developed into a leading international provider of highly effective, standard and bespoke workholding solutions that are suitable for all categories of machining.

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Gripper with adjustable forces

AMF expands its programme for automating machine tools with an innovative new gripper

AMF is presenting a modular gripper with adjustable gripping forces. The new gripping system for machine tools has a shaft interface and is exchanged like a tool from the magazine. Users can thus achieve fully automatic workpiece change on a machine tool during the machining process. Gripper jaws for different geometries and workpiece weights enable broad use of the new development. With the gripper, the manufacturer promises longer machine run times and automatic processing, even in additional shifts.

"Our new grippers with adjustable gripping forces let users turn their machine tools into automatic machines that run without labour and with longer machine run times," promises Martin Tinger, product management group leader for Andreas Maier GmbH & Co. KG (AMF). With the new modular gripper, machining processes can be automated on the machine tool without need for a robot. The gripper has a Weldon shaft and so can be exchanged fully automatically like a tool from the machine tool's magazine. It can move workpieces of up to eight kilograms on the machine table and put them in place for machining.

Adjustable gripping forces for the first time

Different geometries can be gripped with three different grip inserts: finger, prism and universal. The prism-shaped grip inserts can be turned for even more flexibility. The gripper is actuated via the machine spindle either hydraulically with cooling lubrication or pneumatically by applied compressed air. The gripping forces of the jaws can be continuously set from 250 to 1000 N in the



hydraulic version and between 200 N and 700 N with pneumatic control. "This flexibility through continuous adjustment of the gripping forces is unique and protects thin-walled components, for example," emphasises Martin Tinger.

In addition, the gripper has compensating play for the C-axis of plus-or-minus three degrees and for the Z-axis of 5 mm, permitting secure gripping of approximate geometries and positions as well. AMF offers the gripper with two different gripper carriers, which can grasp and transport workpieces of up to 70 mm.

Building block for automatic machine tools

The inserts are hardened and have a wear-free surface. On request, the manufacturer produces gripper inserts that are adapted to the workpieces. Blanks are also available, which customers can adapt individually for their application. With the new gripper, AMF is expanding its

programme for automating machine tools, which already includes zero-point clamping technology, a collet chuck and a similarly interchangeable cleaning tool.

Over a hundred years of continual improvement

The success story of AMF began with the founding of the company by Andreas Maier in 1890. An international company quickly emerged from the lock manufacturer in Fellbach to develop into a competent partner for many sectors through specialising in different systems of clamping technology. Technologies that contribute towards process optimisation and increase in productivity have more significance than ever today as competitive advantages. With modern team structures and focus on its core areas of expertise, AMF assumes responsibility for new challenges and exciting projects in the future. Since the foundation of the company in 1890 until today the goal has remained the same: the highest quality in products and services. Nevertheless, the circumstances, tasks and challenges have changed, of course. By focussing on its core areas of expertise, AMF has long set new standards for innovative clamping technology, driven by its own development, the greatest possible flexibility and passion for individual solutions.

Andreas Maier GmbH & Co KG
Tel: 01924 242972
Email: fornsworth@amf.de
www.amf.de



The effects of centrifugal force on hydraulic clamping

A paper has been published by the Manufacturing Technology Centre (MTC) entitled "Effects of Centrifugal Force on Hydraulic Clamping", which reports on the influence that rotation has on the efficiency of workholding equipment. The clamping equipment chosen for the study was provided by MTC member, Roemheld UK.

The purpose of the experimental trials was twofold. First, it was to understand the effects of centrifugal force on three types of hydraulic clamps i.e. swing clamps, block cylinder clamps and work supports, to avoid potential over-engineering or under specification of fixtures during rotational machining. Secondly, it was to gain an idea of how to optimise the force required to hold a component for turning.

Experiments were carried out on a DMU 160 P duoBLOCK. 5-axis machining centre from another MTC member, DMG MORI. Two key parameters were measured: the pressure in the hydraulic system and the clamping load at different rotational speeds. The results showed that the centrifugal force had some effect on the workholding systems, the degree of change in the

pressure and load readings being dependent on the type of clamp as well as its orientation on the fixture.

Overall, the clamps that showed least susceptibility to centrifugal force, i.e. change in holding force, were block cylinder clamps, recording an average change in load of 1.4 percent between zero and 400 rpm. Swing clamps and work supports were affected to a greater degree, recording a higher average change in load of 3.14 percent and 18.3 percent respectively over the same speed range.

The report concludes that although the changes in load readings were minimal in some instances, it is still recommended to account for the effects of centrifugal force when designing a fixture for rotational machining in the horizontal, vertical or indeed any orientation.

Furthermore, if the component material is sensitive to compression due to clamping load, workholding devices should be positioned in a manner that lessens the increase in load due to the centrifugal force so that the part is not compressed. However, where material deformation due



One of the Roemheld setups used by the MTC to investigate the effects of centrifugal force on hydraulic workholding

to workholding is not a concern, the clamps could be orientated in a manner whereby the load increases due to centrifugal force, offering more secure fixturing.

A copy of the full Manufacturing Technology Centre report is available as a PDF from:

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60 percent higher productivity with Duo-Lock

O-rings require a perfectly plane fit to reliably fulfil their sealing function. In order to produce the highest quality fit, the INDEX Group has been using the HAIMER Duo-Lock™ system, a modular interface for carbide cutting tool heads and extensions, for two years in all German production plants. With specially ground Duo-Lock milling heads, the lathes manufacturer obtains 60 percent higher productivity compared to their previous manufacturing solution.

The INDEX Group, with its brands INDEX and TRAUB, is one of the world's leading manufacturers of CNC lathes, automatic lathes, multi-spindle machines and turn-mill centres. In order to continually control the quality of its machines, the company relies on its German sites at Esslingen, Deizisau and Reichenbach and produces the important core components for its machine tools at those plants. Also, wherever possible, it produces parts on its own lathes and turn-mill centres.

Experienced and well-educated employees pay attention to the highest quality down to the last detail. One of them is Klaus Andres, who is responsible for the production of parts, programming and tool purchasing as a team leader in Production Planning. In his considered opinion: "It's often the small features that make a big difference in quality." As an example, he mentions the O-ring fit, which can be found on numerous machine components. Everywhere a medium flows through the component, the connections must be sealed with an O-ring. For the sealing surface, evenness is required. "It cannot be machined by a circulating milling strategy," he explains, having previously worked as a foreman focused on turning for 16 years. "That would create a minimal screw geometry, in which the medium finds a way out. Instead, we need to countersink the O-ring fit with a special end mill characterised by its facial cutting edges being parallel to the surface, not having the usual eight-degree angle."

The alternative: a modular milling head with a special geometry

Since it was not possible to buy milling cutters with this special geometry and the desired diameters, the production managers at INDEX initially decided to grind



Klaus Andres, team leader of Production Planning at INDEX Group, HAIMER representatives Martin Bauer (left) application engineer Cutting Tools and Christian Bauer (right) key account application engineer discuss the milling results on a tool turret

the tools themselves and later outsource the tool grinding for these cutters. However, two years ago, Andres found a better solution. He got the inspiration from Christian Bauer, key account application engineer at HAIMER GmbH, Igenhausen. He had introduced him to the new HAIMER Duo-Lock system, a modular tooling system with interchangeable solid carbide milling heads and extensions in various geometries and lengths.

Specialists in tool and tool clamping technology

The HAIMER Group is a family-owned company. For 42 years, it has developed into the world market leader in tool clamping technology and has become a system provider around the machine tool. At INDEX, HAIMER has been well-known for many years, both as a customer using INDEX turning machines for the production of its quality products and as a supplier of tool holders, shrinking and balancing technology.

Klaus Andres came up with the idea of having the Duo-Lock special cutters designed for his O-ring countersinking needs. "We are pursuing the strategy of using the same tools in our three German production plants, where possible," he described. In the case of O-ring end mills, in terms of geometry that is generally possible. However, in the large-scale production in Deizisau, since the tools have to be with much more overhang, these have been

procured individually so far. "With the Haimer Duo-Lock system and their extensions program, I saw an opportunity to standardise the milling heads," he explains.

Quality criteria: a robust, high-precision interface

Why choose the HAIMER system when other manufacturers have been offering similar exchangeable end mills for a long time already? "Haimer's Duo-Lock interface is extremely rigid and precise. Therefore, we can use these modular cutters like a solid carbide tool," states Klaus Andres. Christian Bauer adds: "The difference is the thread of our screw-in end mills. A double cone with an additional third support area in the back part of the interface ensures maximum stability and rigidity." The Duo-Lock tools offer a total system runout of less than 5 µm and can be exchanged with a repeat accuracy of 0.01 mm in Z in the machine tool. Time-consuming presetting or setup processes can thus largely be eliminated. This is a true reflection of HAIMER's high quality and precision.

60 percent more efficient

In close cooperation with Klaus Andres, HAIMER developed a special geometry and transferred it to the Duo-Lock modular end mills. For the first tests, the team leader of Production Planning used them on an INDEX R300 turn-mill centre, machining among other things complete base bodies of tool turrets. This challenging workpiece is

particularly suitable for the trial because, depending on its design, it has at least twelve O-ring fits which the milling result can be assessed.

Klaus Andres and his colleagues in the manufacturing department were happy with the test results. "Haimer did a very good job at grinding the tools. Despite the difficult geometry, the cutters are designed to be extremely aggressive. We get a perfectly plane surface meeting the high demands in quality and precision of the turret," Klaus Andres explains.

Compared to the previous solutions, the Duo-Lock tools reduce the O-ring countersinking machining time, improve the surface finish and extend the tool life. It passed the test. "We calculated that the overall profitability improved by about 60 percent," says Klaus Andres. Logically, the INDEX Group is now using the HAIMER Duo-Lock system in 18 different diameters and with various extensions.

Fast installation without calibration

At the Esslingen plant, the Duo-Lock™ system is used on all machines making such O-ring countersinking operations. There are five stations available for the modular tool assembly, each being equipped with a two-hand torque wrench supplied by HAIMER along with the setting parameters depending on each diameter. "The two-hand torque wrench was particularly important to me," reveals Klaus Andres. "It gives better handling compared to a single-lever tool which tilts easily and may damage the solid carbide." It also makes it easier to set high torques. For example, 60 Nm for the 16 mm Duo-Lock tool head.

Also, at the Deizisau and Reichenbach sites, the interchangeable



Duo-Lock heads have replaced the previously used customised cutters for O-ring countersinking. Thanks to the available standard extensions in sizes S, M and L, they can furthermore be used in the large parts production. Even for other applications, INDEX now uses the Duo-Lock system. For example, Klaus Andres requested customised 30-degree countersinks and with HAIMER's steadily growing range of standard geometries, Duo-Lock solid carbide cutting tool heads offer promising prospects for further machining applications.

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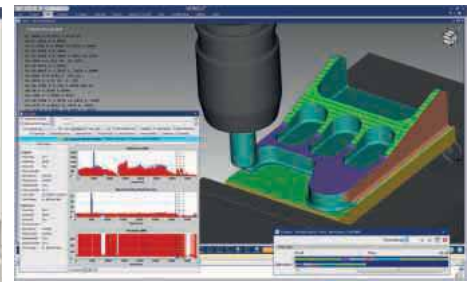
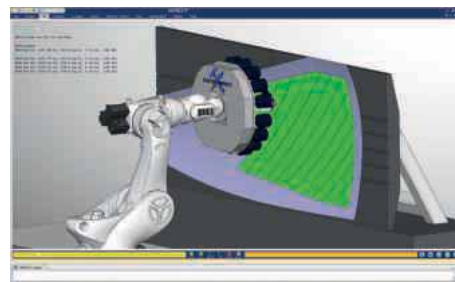
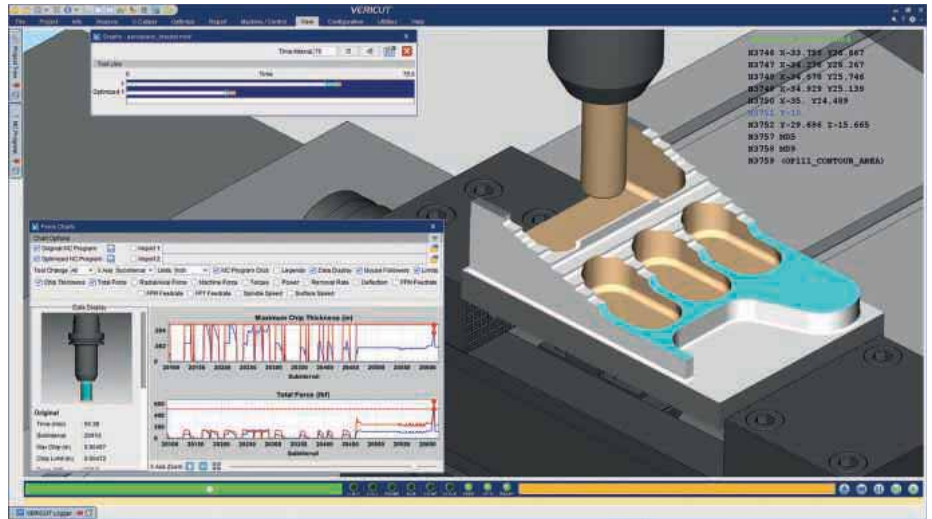
CGTech to show expanding range of aerospace applications at Paris International Airshow

CGTech will showcase its expanded range of software applications for the aerospace industry at this month's Paris International Airshow, taking place from 17th-21st June.

CGTech's VERICUT is widely used in aerospace and defense to improve the efficiency of all types of CNC machine tools. VERICUT is CNC machine simulation, verification and optimisation software that enables users to eliminate the process of manually proving-out NC programs. VERICUT simulates all types of CNC machining, including multi-axis milling, drilling and trimming of composite parts, waterjet cutting, robotic machining and mill/turn, additive and hybrid machining processes. VERICUT runs standalone but can also be integrated with all leading CAM systems used in aerospace.

Throughout the show, CGTech will be demonstrating VERICUT's Force optimisation module. Force, which now offers optimisation capabilities for both milling and turning operations, reduces machining times by as much as 30-70 percent while also extending the life of cutting tools. Force is a physics-based optimisation method that determines the maximum reliable feed rate for a given cutting condition based on four key factors: force on the cutter, spindle power, maximum chip thickness and maximum allowable feed rate. It calculates ideal feed rates by analysing tool geometry and parameters, material properties of the stock and cutting tool, detailed cutting tool geometry and VERICUT cut-by-cut contact conditions. Force interpolates cutting conditions using a proprietary set of materials coefficients to account for the strength of material and the effects of friction and temperature. The materials data is generated by actual machining tests and does not rely on extrapolating from finite element analysis results. The bespoke cutting coefficients, used by Force, result in the most accurate cutting force calculations available today.

CGTech will also be demonstrating the latest versions of VERICUT Composites Programming, VCP, & Simulation, VCS, Software. The aerospace industry continues to push for lighter, faster, and more cost-effective parts and, to support these goals, VCP now puts more power into user's



hands. With more information available than ever before, part programmers can generate and export part statistics directly from VCP. The addition of the all-new summary reports allows engineers to compare different layup strategies and rest assured that the optimal design prevails.

André Colvin, CGTech's composites product manager, says: "However, one should not stop at the programming stage. Companies, now more than ever, are realising the importance of simulation and the digital twin model. With VCS, users can watch parts come to life on their machine, leaving them confident that the intended design will match what is manufactured."

CGTech joins forces with KYOCERA SGS and LMg Solutions

CGTech has partnered with KYOCERA SGS and LMg Solutions to hold an event which demonstrated emerging technologies that help manufacturers realise productivity improvements.

Held at the KYOCERA SGS head office in May, the theme of the Lunch & Learn event was single operation manufacture and

optimisation of complex components. Attendees were able to hear from industry leaders on how to apply new technologies to make significant time savings, improve cutting tool and machine life and maximise and reduce the costs of manufacturing machined aerospace and automotive components.

At the event, CGTech focussed on the features and benefits of its VERICUT Force Milling module with live software demonstrations and presentations.

Managing director, Tony Shrewsbury, comments: "Force is based on the basics, it is easy to set up and really easy to use. After materials have been characterised, they can also be applied to a broad range of cutters and machines in other NC machining operation."

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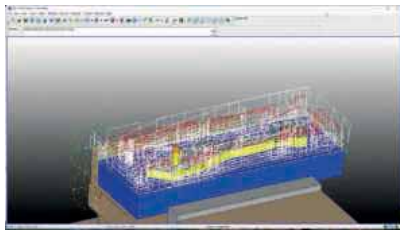
High-speed bulk material removal engine

NCCS Corp, a developer of NCL multi-axis machining software that is used extensively in the aerospace, automotive and turbo-machinery industries, has further developed an add-on module to NCL for high-speed bulk material removal.

The add-on module enables increased performance and a reduction in costs. It also provides shorter cycle times, as much as three to one, or more, over traditional milling. Less wear on your machine and greater tool life are further benefits.

Efficient toolpaths for open shapes

The programmer can cut any combination of part/stock boundaries easily. All open edges are fully leveraged for efficient machining and to minimise plunging into the material.



Intelligent slot milling and side milling options

For softer metals, the software provides the fastest possible cycle time and intelligently selects slot milling or side milling to maximise the material removal rate. Feed rates and axial depths of cut are automatically adjusted in slot milling to maintain a constant material removal rate and can be overridden by the programmer. For harder materials, users can configure side milling over the entire toolpath to avoid burying the cutter.

Fast machining of small pockets

The program offers the fastest way to clear out small pockets as well as efficient specialised tool motion for tight spaces.

High-feed repositioning with floor clearance

The software fully leverages the machine's capabilities allowing the tool to move safely and as quickly as possible when not engaged in material. Additionally, it clears the floor by a small amount when repositioning at the highest possible speed without dragging it across an already-machined floor.

Automatic feedrate adjustment

The programmer can maintain a more consistent load on the cutting tool with no feedrate optimiser needed. VoluMill toolpaths include precise and automatic feedrate optimisation.

These key features of NCL will help companies get the most out of their software investment by increasing programming proficiency, in addition to improving the quality and accuracy of their NC programs.

Don Schultz, president of NCCS, says: "NCCS is dedicated to constantly improving our software technology, giving the end user what they want. The latest release of NCL is yet another example of the entrepreneurial spirit that has made the company successful."

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Workflow simplified with new RADAN 2020.0

Automated and refined processes save time and admin

With user experience as a top priority, the new release of RADAN is set to make this leading CAD/CAM software for the sheetmetal industry easier to use than ever before. A further reduction in mouse clicks and improvements to nesting and reporting allows customers to see a real increase in efficiency, saving both time and costs.

Olaf Körner, product manager for RADAN says: "After introducing a strong enhancement to our nesting engine last year, users have increased their operation of the automatic nester. The reporting is really powerful and the number of mouse clicks needed has been reduced by around half, to use automatic nesting, or to work on a 3D model, the workflow is so much easier."

The new quick nest mode in RADAN 2020.0 provides a more visual interface, with limited upfront setup for projects, while a redesigned new project dialog allows users to 'get nesting quicker'. Time benefits can also be achieved with machine specific projects and templates. Olaf Körner continues: "If a user wants to begin nesting quickly, we've made it much easier to get started, with fewer questions and machine specific templates. The template contains automation, for example, a fibre laser template will switch to your correct laser machine and put in all the settings needed."

As well as a quicker start to projects, it is also easier for users to pick up on previous projects. The new streamlined mode benefits from reduced mouse travel and an autosave function so that work is never lost. The ease-of-use ensures the software is

simple to learn and allows more complex projects to be completed efficiently.

Complex projects can also be achieved using the new punching tool type. Punching plays an important part of the manufacturing process and he says customers are getting more creative with their tooling for punch presses, to set them apart from lasers. Now there's a new tool type for flattening features in the tool editor.

Radtube sees further improvements to the popular common line cutting feature, added in the previous release. Users can now optimise the nest either by material usage or by cycle time. When optimising the cycle time, the nest starts looking for common cuts more aggressively.

Olaf Körner says: "It doesn't sacrifice all the material usage but does look harder for opportunities to use common line cutting. This gives the customer a choice between using as little material as possible or optimising the cycle time.

"As common line cutting is becoming increasingly popular, customers asked us to allow their old legacy parts to be nested for it, too. They want RADAN to assume those parts can be common cut, if it's safe. So, we've brought in automatic common cut selection on legacy parts, giving more automatic common cutting."

Radtube reporting has also been improved to include QR codes, bar codes and images, making the recognition of parts simpler and more accurate. The reports can be outputted automatically and in the required format.



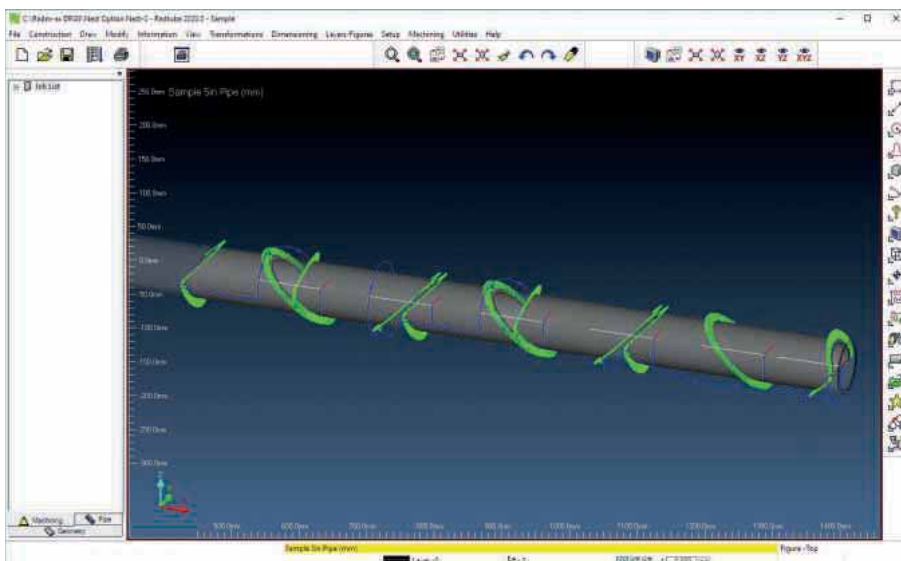
In this release, Radquote has been enhanced with many updates; a highlight being the new nesting engine for material calculations. This feature has the ability to increase the number of orders won due to its accurate and achievable estimates. As soon as a quote turns into an order, Radquote automatically exports all the information needed, in the form of a PDF file for records; for emailing to the customer as an order confirmation; or as data in CSV or text format. This can be seamlessly linked to the company's ERP/MRP system.

A new Radquote feature, Customer Specific Import Template, allows information such as DXF files to be automatically analysed according to the specific customer by setting up a template.

A default delivery time can also be added automatically to the quote, along with a calculation for delivery costs based on a new 'distance' field for customer data.

Olaf Körner says: "As delivery costs will be more for a customer who's 200 miles away, than for a customer just 20 miles away, when setting up a customer in Radquote you can now specify how far away they are. This is used in a formula to calculate, with the order weight, the total delivery costs."

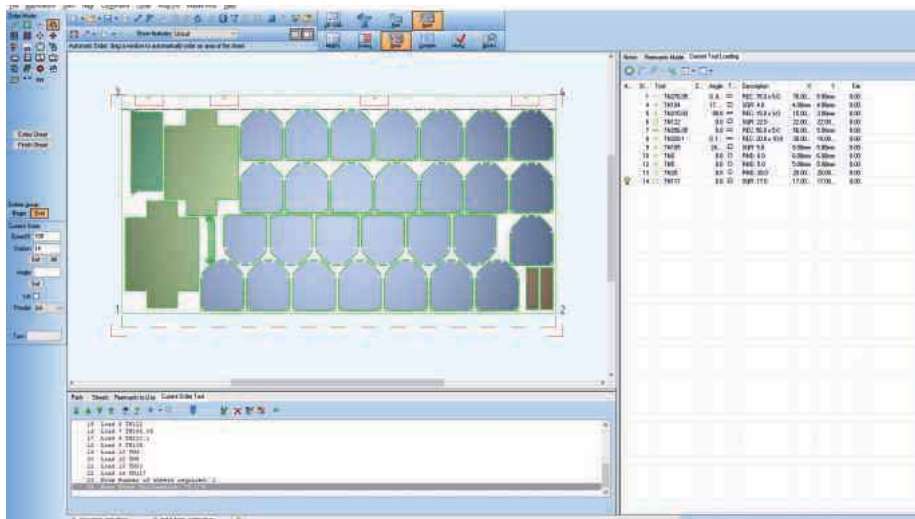
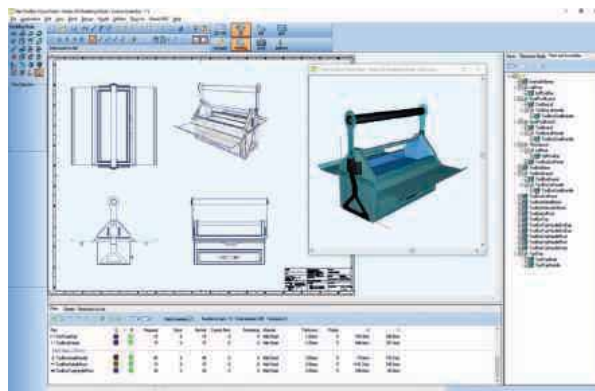
Radbend now has additional monitoring in place which checks the unfold geometry in a number of stages to ensure it is manufacturable. Olaf Körner explains: "For example, automatic checks can be carried out for holes too near to bends. Analysing the part, we can see whether the design is



manufacturable in terms of whether any holes in the part are going to be deformed by the bending process." Further checks have also been added to support intermediate bends, breaking down the process into two steps where needed, to ensure accurate results. Previously this could only be accomplished by physically changing the model and making different bends and stages; therefore this new function saves a considerable amount of time.

Overall RADAN 2020.0 benefits from further upgrades to workflow, increasing efficiency, saving time and optimising resources.

Olaf Körner concludes: "Manufacturers are getting real benefits from the software which has the ability to connect seamlessly to their ERP/MRP software. Achieving



results more naturally and quicker, with much less manual input and fewer mouse clicks, not only saves time but also ensures the software is easier to use and learn. The automatic nesting algorithm will allow users to be more creative in using their material due to quality layout proposals, and the option of making different decisions on sheet sizes and manual nests."

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Automated intelligent manufacturing and feature technology

Paul Scally, operations manager at Tebis UK, on the company's automation and features-based technology

Many companies have engineers who are programming in different ways, there is inconsistent quality in the parts or maybe they are not getting the best use out of their CAD/CAM systems and this is where Tebis can help. What we aim to do is to standardise your processes with automation and improve the quality with all the components at the same time.

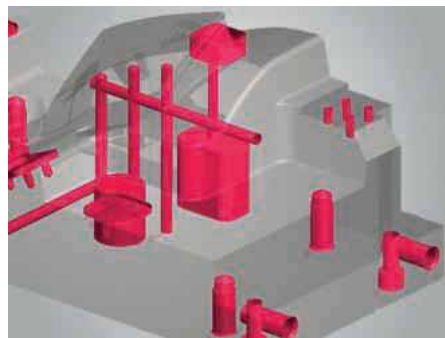
Feature based technology

Tebis is able to scan a component and auto-detect all of these features from CAD-geometry. In Tebis, there are libraries with the features and attached to these features are variables. The cutting hole can be range, for example, from 5 mm to 8 mm. The software can then automate the machine process with variables. So, it picks the correct tools for the correct size hole automatically.

Templates

Tebis has the technology packages which can help to begin, or the company can also send out an engineer who can come and help the user setup everything. Tebis will make sure that the software is working in the most efficient manner from the beginning.

It can apply different surface finish or tolerance to part colours. When you apply these to CAD geometry, with the feature-based technology with standard automation, or the whole process automation, then the software can actually

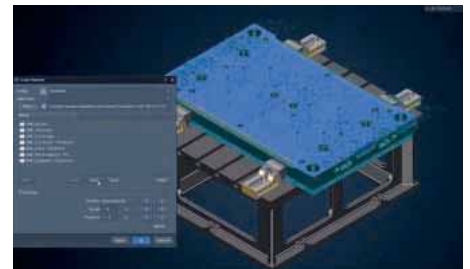


give the correct surface finish and strategy directly to these objects automatically. Tebis has also built in a filtering system which allows it to link the automation. The system is not just running external plug-ins; it is all built within the software so it will not break if you have a new release of the software.

The centralised tool library is the one to start with. This sounds easy but, in reality, maybe on certain software we have the tool library on one PC and a tool library on a different PC and these are possibly running out of sync. We have these located on a shared server drive so everybody gets the latest version if something is updated and the same applies with the machine tools, where Tebis has Virtual Machine technology with all the limits built into the machine. This can be used in the programming environment, so it is not possible to produce a toolpath which is not achievable in reality. All of these things are built up to make very stable and safe processes to protect your business.

Tebis also can store manufacturing knowledge inside the software, if a company wants to bring new engineer on board then, with the automation, it will be a very fast way to enable people to program and achieve the same quality in a very short period of time.

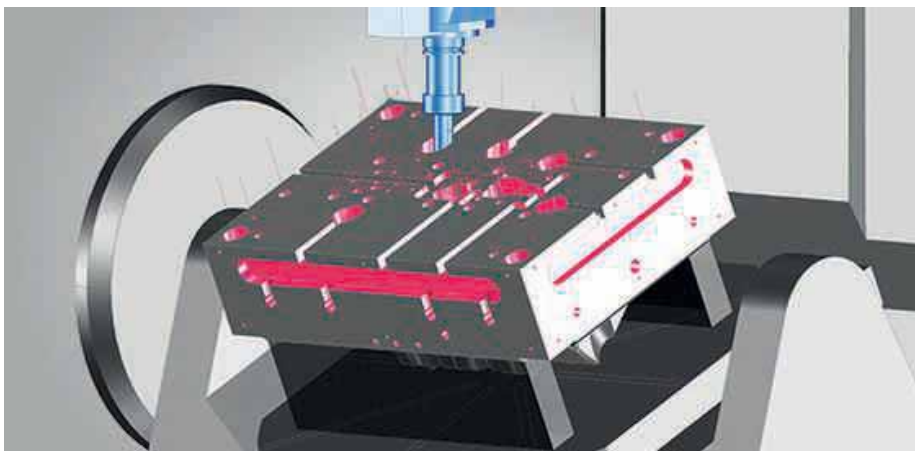
It is not just the feature-based technology which we talked about in automation, it could be the whole machining process. If we take a look at a video where the car is being machined, then the whole process is completely automated with automated tool direction, but this doesn't have to be a car, it can be anything.



In most businesses, standards for cutting tools, speeds and feeds and stopovers are most likely written down and are being used by an engineer on a day to day basis. The Tebis template technology allows all of this information to be stored and used efficiently, automatically and has the toolpath made very quickly, to a high quality, at the same time.

For over 30 years, Tebis has ensured process efficiency and a technological edge in international die, mould and model manufacturing, in industrial design and, in machinery and equipment. It works responsibly and follows clear principles, wholly in the interest of its customers. The company supports you on-site, around the world as a process provider.

Tebis (UK) Ltd
Tel: 02476 158178
Email: info-uk@tebis.com
www.tebis.com



ModuleWorks releases 2019.04 CAD/CAM components

ModuleWorks has announced the release of its 2019.04 CAD/CAM software components. In this first major release of 2019, ModuleWorks has introduced its new Selective Laser Melting (SLM) module for additive machining, as well as new features and enhancements for 5-axis geodesic machining, 2-axis machining and the MultiXPost post processor.

Selective Laser Manufacturing

The new Selective Laser Manufacturing (SLM) component is especially designed for fast and efficient manufacturing and rapid prototyping using a high-performance CO₂ laser and a range of materials including plastics, metals, ceramics and sand.



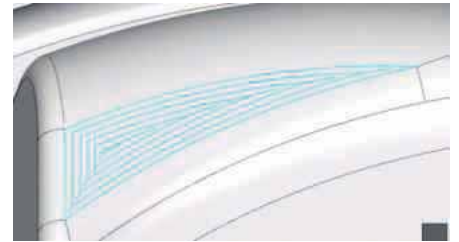
For performing infills on different regions, ModuleWorks SLM offers chess, striped and parallel hatching. Features such as Rotational angle increment and Opening limit angle allow you to create toolpaths within a specific range for optimal control and flexibility over the manufacturing process.

5-axis geodesic machining

A new quality optimising feature lets you use the medial axis for defining the drive curves. This generates a smoother toolpath, resulting in higher quality machining. Users can specify how the medial axis is used. In morph mode, the first containment curve and the best contour of the medial axis are used as drive/morph curves. In parallel mode, the entire main part of the medial axis is used as the drive curve.

2-axis machining

The ModuleWorks 2-axis components now support customised pocket and boss structures for 2D and 2.5D machining. Each of the specified drive curves can be defined as a pocket or a boss area.



MultiXPost post processor

The new all-inclusive parameter list takes all axis limit parameters into consideration and incorporates the full machine configuration for a more accurate and higher quality simulation.

The intuitive matrix multiplication ensures easy and fast tool and workpiece setup.

For further details about the ModuleWorks 2019.04 release, watch the latest ModuleWorks YouTube videos.

ModuleWorks GmbH

Tel: 0049 241 9900040

Email: info@moduleworks.com

www.moduleworks.com

Hypertherm unveils new home for CAM software content

Hypertherm, manufacturer of industrial cutting systems and software, is unveiling a brand new home for its CAM software content, migrating content previously found at HyperthermCAM.com to its global Hypertherm website at www.hypertherm.com.

hypertherm.com.

As part of the move, the company's web team worked to improve the user experience for customers of Hypertherm CAM software products like ProNest, Design2Fab and Rotary Tube Pro by re-thinking how information is presented.

Information on Hypertherm's CAM software products, customer case studies, trial requests and the product's popular Knowledge Base which includes training modules, videos, articles, troubleshooting guidance and more are all available on the website.

Tom Stillwell, Hypertherm's CAM product manager, says: We are excited to unveil this new home for our customers as we know it will streamline their experience with our products by providing all the information they need in one place. With this change, customers can now see the entire portfolio

of Hypertherm offerings and have easier access to customer support and our technical service resources."

All content is available now via the website. Alternatively, customers can access the three popular content areas directly by clicking on the links entitled: Product Information, Technical Support and the Knowledge Base.

Hypertherm designs and manufactures industrial cutting products for use in a variety of industries such as shipbuilding, manufacturing and automotive repair. Its product line includes cutting systems, in addition to CNC motion and height controls, CAM nesting software, robotic software and consumables. Hypertherm systems are trusted for performance and reliability that result in increased productivity and profitability for hundreds of thousands of businesses. The New Hampshire-based company's reputation for cutting innovation dates back 50 years to 1968, with its invention of water



injection plasma cutting. The 100 percent associate owned company, consistently named a best place to work, has more than 1,400 associates along with operations and partner representation worldwide.

Around the world, Hypertherm products are used in the construction and repair of ships, skyscrapers, trains, trucks, heavy equipment, pipelines mines, tunnels, bridges and even rollercoasters.

Hypertherm Europe B.V

Tel: 0031 165596907

Email: info@hypertherm.com

How 3D printing is revolutionising manufacturing

3D printing is already well established in the prototyping, aerospace and automotive sectors, but there are plenty of other industries that can benefit from this additive manufacturing technology. Here, three examples illustrate how 3D printing can save time, money and materials.

Simple, high-precision nozzles for cleaning sewers

TRUMPF recently joined forces with nozzle manufacturer USB Düsen and the Heilbronn University of applied sciences to demonstrate the benefits of 3D printing in the fabrication of cleaning nozzles for sewers. These nozzles are positioned around the head of a 'cleaning bomb', a machine that travels through large sewers on a carriage, spraying jets of water at a pressure of 300 bar to blast sludge off sewer walls. Although the nozzles' design is simple, it takes four steps to manufacture them: cutting the raw material, forming a thread, cutting the contours of a nut into the front face and then gluing in a ceramic insert. Workers have to constantly move from one machine to the next and gluing often leaves imperfections.

The 3D-printed variant eliminates the need for milling and gluing. What's more, the component's design means it can be printed without any supporting structures, so there is no finishing work to be done afterwards. This printing process is software-driven, which makes it much more accurate than gluing by hand. Measurements reveal that this new method has shortened the time required to manufacture the nozzles by 53 percent,



enabling the company to produce up to 10,000 parts a year for the first time. Additional benefits include: a smoother flowing jet of water and the TRUMPF engineers expect the new nozzles to reduce water consumption and boost cleaning performance.



Sturdy, tailored craniomaxillofacial implants

Since early 2018, Russian medical device manufacturer CONMET has been using a TRUMPF 3D printer to manufacture craniomaxillofacial implants. Creating implants for use in surgery has traditionally been a stressful business. The surgeon has to cut the craniomaxillofacial implant out of a perforated titanium plate during the actual operation and then shape it to size. As well as increasing stress levels, this method can potentially lead to variations in the quality of fit. 3D printing makes the whole process much simpler.

First, hospitals provide CONMET with the



CT data of patients who require an implant. Next, the company's engineers create a CAD model and design the implant in consultation with the surgeon. The 3D printer can then get down to work. By the time the surgeon begins the operation, the perfectly fitting implant is already clean and ready for use. This makes the process safer for the patient, while simultaneously cutting costs and shortening the duration of the surgery. The system makes light work of the kind of complex geometries that implants often require and it can print parts that are sturdy and durable while still offering plenty of cushioning against blows. The porous structures fuse well with healthy tissue and prices are lower because additive manufacturing only uses as much material as the implant actually needs. This new method provides an economical means of producing one-off items such as replacement body parts. In CONMET's case, it has reduced the cost of manufacturing craniomaxillofacial implants by around 40 percent. The company is now looking to increase its output of implants and add another TRUMPF 3D printer to its facility.

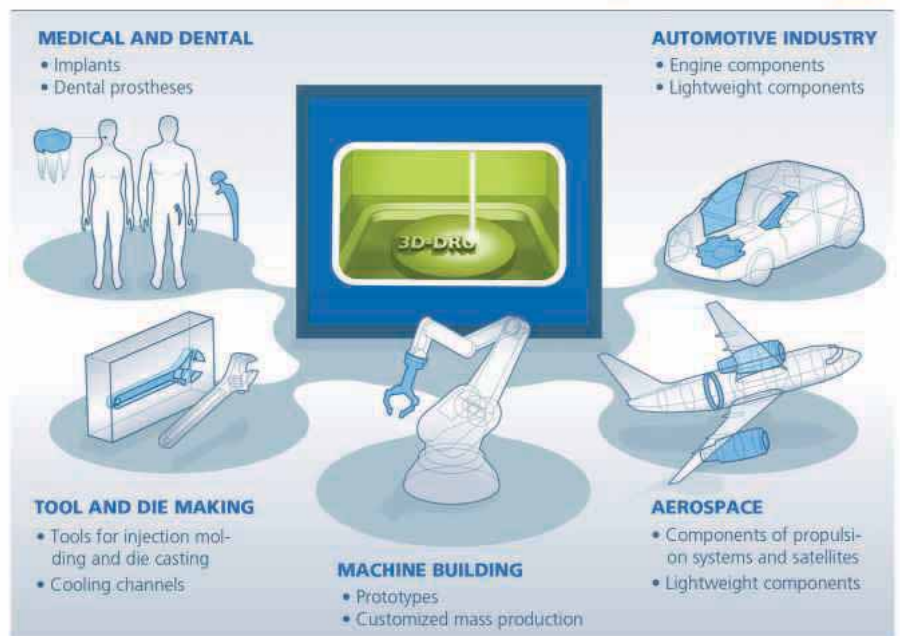
Specialist 3D designs, rethinking grinding
Companies use a technique known as internal cylindrical grinding to eliminate roughness on inside surfaces. One of the challenges they face is the limited space between the part and the tool, which makes it difficult to accommodate a conventionally produced coolant nozzle. That's why, in practice, manufacturers tend to carefully inject the lubricoolant required for grinding from the outside. That makes the process very slow, however and it poses a risk that not enough lubricoolant will reach the machining site, potentially damaging the part before it is even finished. With the help of Bionic Production GmbH, the company Grindaix has now succeeded in designing a new nozzle "in 3D" and printing it on a TRUMPF 3D printer. As well as fitting in the smallest of spaces, the new lubricoolant nozzle can also be individually tailored to each customer application. It can achieve the specified coolant exit velocity with a lower pump pressure and energy consumption, up to 20 percent less depending on the particular case. The curved channels and optimized jet trajectory take the lubricoolant to the precise place it is needed. The previous nozzle was produced in a total of four production steps, while the 3D-printed nozzle requires just two.

The benefits of 3D printing for production



Quelle: TRUMPF

Which industries use 3D printing?



Quelle: TRUMPF

TRUMPF offers production solutions in the machine tool and laser sectors. It is driving digital connectivity in manufacturing industry through consulting, platform and software offers. TRUMPF is a world technological and market leader for machine tools used in flexible sheet metal processing and also for industrial lasers.

In 2017/18 the company, which has around 13,400 employees, achieved sales of 3.6 billion euros. With over 70 subsidiaries, it

is represented in nearly all the countries of Europe, North and South America and Asia. It has production facilities in Germany, France, Great Britain, Italy, Austria, Switzerland, Poland, the Czech Republic, the USA, Mexico, China and Japan.

TRUMPF Ltd
Tel: 01582 725335
Email: sales@uk.trumpf.com
www.uk.trumpf.com

3D printing reduces costs and manufacturing time

The production of tools for prototype injection moulding is extremely complicated and costly, especially when steel or aluminium is used for the production. The tools must therefore be milled and hardened, which means that not only is there production relatively expensive, it may well take a week. But the time pressure on companies is increasing. In order to provide tools in a significantly more time and cost-effective manner, Hans Geiger Spritzgießtechnik GmbH recently tested the process of additive manufacturing for production. With this method, the first tools can be made available for viewing in just under six hours. The printing process uses a special synthetic resin that is much cheaper to buy than the materials used so far, which reduces production costs by up to 70 percent. By eliminating milling and hardening, the prototype can be tested in just a few hours instead of several days, resulting in up to 90 percent time savings.

Injection moulding tools have to withstand enormous loads. For this reason, resistant metals are preferred in production, which requires an expensive and time-consuming manufacture. This is not a problem for mass production, thousands of operations mean investment costs pay off

shortly. But the fixed costs are out of proportion, in particular for small batch sizes or individual pieces needed to produce prototypes, especially if the prototype does not lead to the order acquisition. In addition, time is playing an increasingly important role. An alternative is 3D printing.

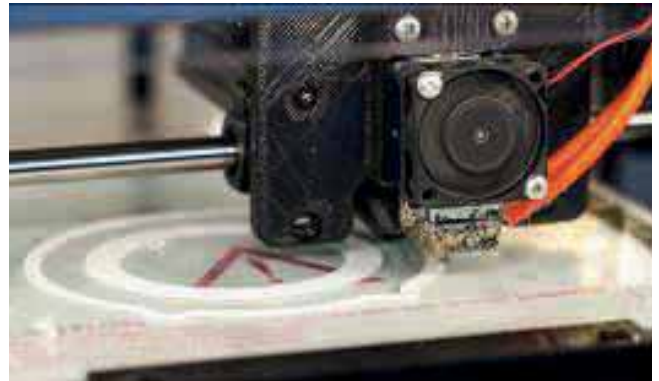
Initial tests have already been carried out at Hans Geiger Spritzgießtechnik GmbH, resulting in significant advantages for the manufacturer and the customers.

Acceleration of the development and test phases

Previously, manufacture at Geiger took several days. With the help of additive manufacturing, it was possible to shorten the duration to just six hours.

Hans Kolb, process engineer at Geiger, explains: "That significant reduction in time has made it much easier to test whether an object can actually be injection-moulded as planned."

Consequently, tool manufacturers can



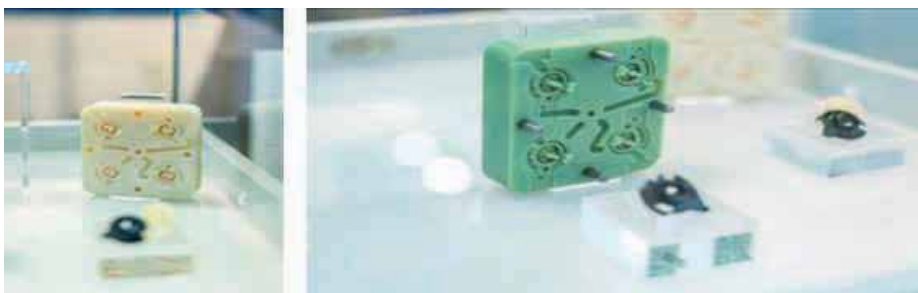
test quickly whether a prototype is fully functional or if any improvements are necessary.

"3D printing even makes a functional test, an early test run with series-like moulds, possible quite quickly," adds Hans Kolb. This means that not only can prototypes be tested for functionality, it is also possible to choose a design and materials early on. With the accelerated process comes a cost minimisation of up to 70 percent, which greatly reduces the financial risk involved in prototype manufacture and makes it possible to offer more attractive prices.

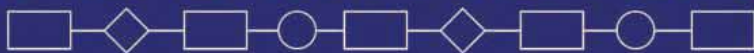
Hans Kolb says: "It is easy to demonstrate quickly how certain requirements can be met without any great time and money expenditure. This is a significant advantage in the tendering phase, for instance."

PolyJet process with synthetic resin

There are several ways to make tools using 3D printing. A liquid starting material can be hardened layer by layer, or a powder can be selectively melted. With the PolyJet process, as used by Geiger, the workpiece is built up in layers. First, tiny droplets are



PSL DATATRACK



Flexible Production Control software
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engsub@psldatatrack.com

twitter.com/psldatatrack

www.psldatatrack.com

08456 345931



sprayed onto a building platform and crosslinked via UV light.

"We use synthetic resin for printing. The best results have been achieved with Digital ABS, especially for complex geometries," explains Hans Kolb. Following the UV curing, the support material is removed in a water bath or with a jet of water. If necessary, the printed workpiece is reworked by hand.

The components can be used directly from the 3D printer, post-curing is not necessary. This has the advantage of generating less waste than milling, cutting or casting, which keeps material costs down and makes disposal easier. The precision of the prints is about 1/10 mm.

Hans Kolb says: "Not every little detail can always be accurately represented,



occasionally you have to reprocess a part mechanically. But for prototypes, the focus is not primarily on exact details but on the option of testing different solution procedures." It is also possible to print finished parts directly for viewing. In this case, Geiger uses polyamide with glass fibre reinforcement.

Suitable for thermoplastic injection moulds

In principle, 3D printing is suitable for all thermoplastic injection moulding tools, but it may be advisable to reinforce the workpieces in part with steel or aluminium. The injection moulding machines, which are suitable for 3D printing processes, range between 100 and 800 kN. The parts are manufactured according to CAD plans submitted by the customer and converted to STL. This allows the customer to gain an idea of what his workpiece looks like and how it fulfils its functional purpose within a very short time.

Hans Kolb concludes: "If a tool does not meet the manufacturer's expectations, the manufacturer has not invested large sums of money and valuable time, but can use this knowledge to make immediate improvements to the product and re-test it a

little later thanks to 3D printing. For our customers, this means faster processes with reduced risk, a clear verdict for the new technology."

HG Hans Geiger Spritzgießtechnik GmbH
Tel.: 0049 911 9612970
Email: kontakt@geiger-formenbau.de
www.geiger-gruppe.de



Atherton Bikes accelerates with Renishaw additive manufacturing

Global engineering company Renishaw is working with new mountain bike brand Atherton Bikes to produce additively manufactured titanium lugs for the company's bike frames. The new brand was launched in January by the Atherton siblings, Gee, Rachel and Dan and co-founded by Piers Linney of Dragons' Den fame.

The Atherton family are World Championship-winning mountain bikers who will now race their own downhill mountain bikes during competitions as well as sell a range of bikes all over the world. The introductory bike range will be manufactured from carbon fibre tubing and lugs produced on a Renishaw multi-laser high productivity RenAM 500Q metal additive manufacturing (AM) system. Initial production will be at Renishaw's Additive Manufacturing Solutions Centre located in Staffordshire, UK, followed by a transition towards in-house manufacture by Atherton Bikes.

Also partnering in the project is Dave Weagle, the renowned suspension designer, along with Ed Haythornthwaite and other

members of the former Robot Bike Company. Renishaw had previously worked with the Robot Bike Company by manufacturing the titanium lugs for its R160 bike frame. The lugs for Atherton Bikes are the first bike components to be built on the four-laser RenAM 500Q system, which enables increased productivity, without compromising on quality.

Jono Munday, additive manufacturing applications manager at Renishaw, says: "Renishaw is a world-leader in metal additive manufacturing machines. Due to our position as a leading metrology business, we are also perfectly positioned to help customers develop an end-to-end solution, from AM build, all the way through machining and post-processing, providing an end-use engineered component.

"Manufacturing the lugs on the RenAM 500Q enables rapid production time. This means that the bike frame development can be turned around quickly and customised to the exact requirements of the rider, whether that is the Atherton Racing team on the World Cup circuit or an individual retail customer. Whereas traditionally a lot of



tooling is required, additive manufacturing is an entirely digital process, meaning that the lugs can be modified in CAD and reproduced more efficiently."

During the development of the new Atherton Bikes, Renishaw has been giving feedback and modifying the lugs so that they can be built accurately and successfully. The AM build process, machining and post processing are managed by Renishaw at its Solutions Centre.

Renishaw plc
Tel: 01453 524524
Email: uk@renishaw.com
www.renishaw.com

Be the best you can be with PSL Datatrack

The real time Status Board display system for the shop floor is the latest acquisition by Sheldon Precision Engineering for its PSL Datatrack production control software system. The fast-growing, Barnstaple-based company provides specialist subcontract engineering and turned parts manufacturing services which have been effectively managed using PSL Datatrack since the business started.

Managing director, Howard Sheldon says: "What sets us apart is our people and the culture we have of trying to provide the best service we can. I provide my team with the best equipment, tooling and support to enable them to be the best they can be." With this philosophy and prior experience of using PSL Datatrack, Howard Sheldon invested in the software on day one of the company's trading. Its ability to improve production efficiency and, in his words, "cut out the paper shuffling, the bugbear of many smaller engineering organisations, was essential to having effective business administration from the outset."

Continuous investment in a number of PSL Datatrack modules over the intervening years has not just prevented a paperwork burden, but enabled the company to

maximise the efficiency of its operation in all areas. The modularity of the software has allowed the company to add elements when it has suited in terms of the company's growth.

Howard Sheldon continues: "With PSL Datatrack, you don't have to invest in functionality you do not need immediately all at once. You know that each of its modules will seamlessly integrate with all the others and so you can take them on when you are ready."

PSL Datatrack manages everything from initial quotations to final invoicing and throughout this process also takes daily care of works orders, purchase orders, delivery notes, goods received notes, component and material stocks as well as quality management.

Howard Sheldon acknowledges that at the beginning, some time had to be invested entering information into the blank canvas of its PSL Datatrack database. However, that has more than been rewarded further down the line with the ability to quote customers ever more quickly and transform quotations into works orders in a matter of seconds.

For repeat orders, PSL Datatrack has

proven particularly fast. With just a few clicks it recalls the information associated with previous quotations for a customer. Costs, tooling, materials and batch sizes can be recalled, analysis can be undertaken very quickly and new quotations for different batch sizes can be generated easily. What is more, all customer paperwork is presented professionally with corporate branding to create an excellent impression.

With production fully controlled by PSL Datatrack, attention was turned to improving communication between the management offices of the business and the shop floor. The company had been using printed lists to provide information on the sequence and detail of orders to be progressed through the factory on any given day. Circumstances, however, could change rapidly so that by the time an engineer had picked up the instructions another order may have arrived which needed priority treatment.

Howard Sheldon says: "We needed real-time information to be readily available and so we turned again to PSL Datatrack for advice and a solution." They could provide real-time visual information on any aspect of production, including the current



work-to-list, all jobs requiring work that day and updates including whether any material or component stocks required to complete a job have fallen below minimum quantity levels and which customer deliveries are due out of the door. With this knowledge, informed decisions can be made about production priorities.

PSL Datatrack provided a customised Status Board to Howard Sheldon's specific requirements and he is delighted that the system is making a major impact on improving communications between office and shop floor. He says: "This is key to ensuring our customers get the best service. Status Boards have cut out the difficulties that could be encountered by not having real-time information available where it matters most, on the shop floor. We can now make better decisions on priorities, ensuring machines and materials are readily available to fulfil any order."

Indeed, Howard Sheldon believes his company's customers benefit from his investment in PSL Datatrack in one vital way, efficiency. He explains: "There are always efficiency gains when you invest in the latest technology, whether it is software, plant

machinery or facilities. It is well known that in the UK productivity output per person is well behind that of major competing countries, so if we are to address this we must invest. PSL Datatrack has smoothed out and made my back office and shop floor systems flow seamlessly, giving us more time to be productive."

Today, Howard Sheldon says that PSL Datatrack is literally "running the Sheldon business." It has played just as major a role in the development and success of the company as any of its other significant investments, whether these are state-of-the-art CNC lathes or quality management, including its ISO 9001:2015 UKAS certification.

The company is growing rapidly, at 50 percent per year at present and will add further PSL Datatrack modules to help manage this. While, at the present time, the business is still small enough for Howard Sheldon to know exactly what is happening on all machines, there will come a time when extending the system to include Shop Floor Data Collection (SFDC) and a full-blown sequential scheduler will be necessary to manage work even more effectively.

The service and training provided by PSL Datatrack has also been positively reviewed by Howard Sheldon who concludes: "I never get an answer machine and the company is well-staffed, polite and helpful. I would and do, refer their services all the time. It is a great affordable system that has never let me down."

Prospec Systems Ltd is a market leading author and supplier of PSL Datatrack production control software. The company was established in 1988 and has supplied computer software solutions to manufacturing businesses for over 30 years. Its aim is to supply a practical, simple and logical solution to controlling your production which will help you manage your business more efficiently. It is proud to support British manufacturing and all of its software is designed, developed and supported from its offices in Bracknell, Berkshire.

PSL Datatrack
Tel: 08456 345931
Email: sales@psldatatrack.com
www.psldatatrack.com

Babcock International to develop cutting-edge composite test facility with the University of Edinburgh

A £2.4 million state-of-the-art engineering composite test centre is being developed in Scotland as part of a new industrial partnership between the University of Edinburgh and Babcock International.

The FASTBLADE facility will be based at Babcock's Rosyth dockyard and forms part of the Group's wider plans around innovation, technology and composite research in the area. FASTBLADE'S primary aim is to speed the development of materials and structures for a variety of industries, including those in marine, transport, nuclear and aerospace sectors.

It will be the first test facility of its kind in the world designed to carry out large-scale accelerated testing of tidal blades. Testing will use complex forces that simulate real environments, limiting the risks for product developers.

Babcock is the principal engineering designer of the FASTBLADE centre, which will test new materials within full-scale structures such as tidal blades, plane components and bridge sections. The initial

testing will be on tidal blades, but the international appeal of the facility and its wider aims will mean testing can take place across many industries.

Engineering researchers will use an efficient hydraulic technology that enables structures to be tested significantly faster and using less energy compared with existing technologies. The system will recover energy between load cycles, reducing the cost of testing.

Professor Conchúr Ó Brádaigh, head of school of engineering at the University of Edinburgh and leader of the research activity, says: "This collaboration is an opportunity to develop a world-class engineering facility to accelerate and support the development of new efficient technologies and will be a great benefit to the tidal energy sector."

Pioneering measurement systems will enable developers to learn from test datasets to understand damage accumulation and optimise blade structures through data-driven design.



FASTBLADE will help fulfil the University's commitments as part of the Edinburgh and South East Scotland City Region Deal, which includes targets to help improve digital skills across the whole of the region.

Funding for the facility has been received in part from the Engineering and Physical Sciences Research Council and University of Edinburgh. As well as coordinating, Babcock is the principal designer and host of the facility. The partnership with UoE complements Babcock's other industrial partnerships with the universities of Cranfield and Strathclyde.

Babcock International Group PLC
Tel: 020 7355 5300
www.babcockinternational.com

Aluminium cutting with XL package

Behringer has designed a sawing system that sets new standards, both in solid material as well as in pipes and profiles with sophisticated cross-sectional geometry. The powerful VA-L 560 machine scores with its unparalleled high output and very short rest pieces of only 50 mms. The VA-L is designed for using carbide tipped circular saw blades with a diameter of 500 mm to 560 mm. With the XL package, it is possible to achieve a cutting range of 240 mm round or 340 x 175 mm square material, using a 620 mm diameter blade.

The robust overall design, with the latest drive technology in the feed axis and a very stiff saw blade guiding, ensures an optimum, low vibration sawing process with excellent cutting performance and surface quality at maximum availability. The frequency controlled main drive offers facility for adjusting the cutting speed to the sawing process to allow cutting of both solid material made of high-strength AL-SI alloys and also thin-walled pipes and profiles. The servo motor-driven feed system, in the optional performance version, defines a whole new performance category: Using either constant or dynamic saw feed, significantly higher cutting outputs can now be achieved. Precise positioning of the saw head reduces downtime to a minimum.

Used in combination with a pneumatic material clamping system, the servo motor-driven feed system allows machine hydraulics to be completely dispensed with. This radically simplifies the achievement of sustainable environmental management.

Maximum safety, good accessibility

The unique VA-L machine concept focuses on the twin themes of occupational safety and ergonomic design. The circular saw is completely encased in a full machine enclosure, eliminating any risk of injury. Another positive knock-on effect of full enclosure is reduced noise development and consequently a more pleasant working environment. Despite the full enclosure, all the important components and parts of the VA-L can be easily accessed. Large swivel doors offer optimum access for easy saw blade changeover, cleaning and machine maintenance. Extruded profiles with complex profile geometries are generally very difficult to machine. To ensure that the material is securely clamped, while avoiding unwanted marks produced by pressure points on parts, the use of specially adapted shaped jaws is advisable. Rapid jaw changeover in conjunction with optimum machine accessibility helps reduce tooling times to just a few minutes.

Automation is the key word when it comes to economic production processes. Savings with personnel and the use of additional low-operator shifts are only two options to make inroads into costs. The use of transport and removal systems and the possibility of linking up to magazines and storage systems means that operation becomes independent of day and night shifts with aluminium machining as well. A high level of automation gives employees more time for other activities and helps to save their capacities. Material is no longer positioned manually but is program controlled. Operators are then mainly busy with process monitoring. Strength-reducing work becomes an exception. Operating automated machines is also the superior alternative in terms of safety as well.

Manfred Grüniger, head of sales at Behringer Eisele, says: "With the handling of materials, you shouldn't only look at aspects of economy but also the safety of operating personnel when handling heavy, unwieldy parts. Particularly where large production batches are being processed, producers should consider link-up to downstream machining steps such as sorting or chamfering to ensure added streamlining effects.

Daily practice has also demonstrated that



adaptation to continuously changing markets requires a high level of flexibility with material handling and with the use of personnel for many customers.

Manfred Grüniger adds: "We don't yet know the demands of future orders of course, which is why customers want to be prepared, so in many branches they invest in a diversity of automation components."

In a class of its own

Opening up new fields of business, extending the performance spectrum or replacing an old machine, these are among the most frequent reasons given by users for investing in an up to date, more efficient mitre sawing machine. With its newly presented model from the HBE series, Behringer is offering the perfect way of combining the benefits of modern high-performance machines for individual sawing tasks with the robust and proven characteristics of a classical mitre saw.

"We deliberately integrated various features from our Behringer high-end models into this machine, raising the HBE320-523G into a class of its own and all at an optimised cost-to-performance ratio", says the company's CEO Christian Behringer with confidence. High cutting outputs, simple handling and precise angular cuts are among the key attributes of the new

Behringer mitre-cutting bandsaw HBE320-523G.

With its extensive application spectrum, it reliably covers the wide-ranging requirements of metalworking workshops, the profile steel trade and machine builders.

Christian Behringer says: "Even small and medium-sized operations in these fields are reliant on their sawing machines dividing a wide range of different materials with optimum process reliability, to a high standard of quality and at high speed." With a cutting range in flat materials of 520 x 320 mm, bilateral mitre cuts of 45° and up to 30° on the left, this machine is the perfect all-rounder for all kinds of sawing operations.

"For reasons of cost and flexibility, profiles are generally purchased in starting lengths of up to 12 m and then sawn to size" Christian Behringer adds. The new mitre cutting bandsaw is easily able to cope with both structural steels and stainless-steel profiles.

In design terms, the new mitre saw has many features in common with the HBE Dynamic series, which has already proved a resounding success. The guidance system in its torsionally rigid gantry design and the bilateral band wheel bearings ensure quiet running and precise cuts. The band guiding components are made of vibration-damping

grey cast iron, which has a highly positive impact on the quality of the cut surface, but also makes for a longer blade life.

Electrically powered chip brushes clean the saw blade of adhering chips synchronously with the saw drive system, an added bonus in terms of process reliability.

The tilt of the band wheels helps prolong the life of bandsaw blades by reducing fatigue due to cyclical bending. A fully automatic height adjustment facility for the saw frame, depending on the material height and lowering of the saw when in rapid traverse, help cut non-productive time to a minimum.

The inclined position of the bandsaw blade allows components such as girders, angled steel and U profiles as well as hollow rectangular profiles to be sawn at higher speed and with less burr.

The sawing unit is mounted for easy turning in generously dimensioned axial roller bearings and can be swivelled with a simple manual action. The closed material table simplifies material handling directly at the cutting point. The machine comes with a micro-spray system as standard.

Behringer Ltd

Tel: 01296 668259

Email: simon.smith@behringerltd.co.uk

www.behringerltd.co.uk



Great craftsmanship, combined with innovative technology, for exceptional design ideas in metal

Those seeking to turn original and distinctive ideas into metal products would be well advised to make the trip to Burgwedel near Hannover, where Rosenhagen Metallbau's state-of-the-art production facilities are located. Operating under third-generation management, Rosenhagen Metallbau provides customers with custom-built products, whether classic wrought-iron work or contemporary metal items. It concentrates mainly on indoor and outdoor staircases for non-commercial customers, commercial enterprises and public institutions. Its 23-person team handles every step in the process, from planning to manufacturing and installation, turning even the most unusual ideas into reality.

Here, Rosenhagen general manager Heiko Rosenhagen describes the secret to his company's success:

We combine tradition with innovation. We employ advanced CAD technology in planning and development, applying the best technical and mechanical means to production, together with our long tradition of craftsmanship.

Our customers' special needs and unique design ideas require not only the highest levels of professional skill, but also the equipment and methods necessary to carry out projects with the requisite precision and efficiency. Individuality often goes hand in hand with complexity. But, particularly when

it comes to stairways, the variety of materials used for railings, handrails and steps place great demands on production. A variety of railings, steps, handrails and spindles may produce a very individualised design and that in turn requires the right kind of processing methods and technologies to achieve the proper balance between precision manufacturing, optimum use of materials and efficient use of personnel. Moreover, where creative designs are involved, the proper labelling of the numerous components often involved in such designs can greatly simplify both shipping logistics as well as subsequent assembly, an economic consideration that should not be overlooked.

Innovation that meets even the most demanding needs

Technical innovation and maximum precision are especially important when individual components need to be cut to meet a set of specified requirements. It's no surprise, therefore, that we at Rosenhagen decided a year ago in favour of the universal mitre saw KKS 463 NA from KALTENBACH, a leading producer of equipment used in working with steel, aluminum and other non-ferrous metals. Sawing technology used in manufacturing and production has, for a long time, involved more than simply cutting various kinds of materials. It now involves the combination of advanced technology

with multi-purpose software applications and other functions to produce long-term savings and optimum manufacturing processes. This is certainly our business philosophy at Rosenhagen and the KKS 463 NA provides what we need to make it reality.

At our facilities in Burgwedel, we make use of every type of mitre cut the KKS 463 NA offers, whether it's the 45-degree zigzag cut for stair steps or the +30 to -30 range of mitre cuts used for various types of handrails and railing spindles. The servomotor makes it possible to place the rotary table in practically any position and automatically set it to a pre-selected cutting angle. Another important advantage is that changing the bevel angle has no effect on operating speed, this occurs as the material is being fed in or components are being extracted.

In addition, a vertical clamping vice on the side of the saw bench automatically pivots to a pre-selected bevel angle. This ensures that residual lengths are kept as short as possible, < 15 mm and that materials are clamped firmly in place. Moreover, this unique technology eliminates the need for so-called aluminum yokes. These are cut by bevel angle and must therefore be switched out at regular intervals. The KKS 463 NA thereby reduces recurring costs for replacement parts.

The KKS 463 NA fully automated circular saw has replaced the manual saws previously in use at our company and scores high marks by allowing us to make optimum use of personnel. Automation results in changes in terms of cost planning, which in practice lets us shift more personnel over to final assembly. In addition, it also improves production times while lowering error rates. For us, this means higher productivity at less time per unit, which really pays off in terms of competitive advantage.

The KKS 463 NA is programmed and operated entirely via touch screen using the Windows graphic user interface PROFICUT. Rosenhagen uses specialised software specifically designed for stair manufacturers, from Hartmann. Component lists, along with all programmed geometries and bevels, are exported via a special interface directly from the stair production program in CSV-format,



Excel or via DSTV files, NC files. Precision and optimum use of materials play a decisive role in stair construction. Only precision cutting ensures a proper fit, while the costs for material mean waste should be avoided as much as possible. At KALTENBACH, mechanical and software innovations were employed to minimise projecting edges and to reduce minimal offcut lengths to roughly 15 mm. In addition, the program automatically calculates feed rate and cutting speed and transfers this information directly to the saw. This results in the kind of precision cutting and perfect bevelling that we at Rosenhagen have come to appreciate.

As we have to handle a large variety of different materials and dimensions, the employees at Rosenhagen have come to value this saw's tremendous flexibility. Clamping vices and clamp pressure, e.g. when manufacturing thin-walled profiles, are set automatically through the use of a long-stroke tensioning cylinders, requiring no action on the part of the operator. Maximum allowable clamp pressure can be recorded in a database for raw materials.

Inkjet system for marking saw cuts

In order to keep packaging and installation of the many components that go into a

stairway from turning into an indecipherable puzzle, the KKS 463 NA uses inkjet labelling system so that parts can be easily identified later on. This helps avoid errors during shipping and final installation. Components are marked with UVresistant ink that is either waterproof or can be wiped clean. Components are marked automatically as they are being transported to a predetermined sorting position, so no additional processing time is required. Since final, customised painting is usually carried out by the customer on site, Rosenhagen considered it especially important that the ink not show through after painting is completed. Customer-specific software is employed to set the labelling to be used on each individual component. This process has been perfected to the point that it's now possible to automatically program 80 percent of the information used in labelling.

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Steel stockholder's new bandsaw is twice as productive

Established in 1892 and employing more than 200 staff, family-run firm Thomas Graham & Sons, now in its fifth generation, operates a multi-faceted business in Carlisle. One division is devoted to steel stockholding, which has seen a significant rise in cutting capacity following the purchase of a new KASTOwin 4.6 bandsaw built by KASTO, Germany and supplied through its Milton Keynes subsidiary.

The machine was installed in 2018, specifically to fulfil a new contract for cutting annually 350 tonnes of mild steel alloyed with boron. Used by a forestry industry truck manufacturer for producing chain links, the lengths of flat bar need to have a high boron content to promote hardness during heat treatment.

Bundles of 24 bars of 50 mm x 20 mm cross section and with two bevelled edges are sawn into 280 mm lengths, each cycle comprising 10 cuts, producing 240 billets. They are removed from the output roller table before the next cycle starts.

Thomas Graham's operations director Phil Barnes, who has been with the company for 17 years, says: "The KASTOwin is our first bandsaw from this supplier but our 11th on site. Boron steel is not especially difficult to cut using a standard bimetal blade, so it is a simple contract to fulfil, but the automatic KASTO saw does it extremely well, day in



day out, easily holding the required ± 1 mm tolerance.

"We were expecting each bundle cutting cycle to take eight hours but in fact it is completed in just three and a half hours."

He explained that the high performance is partly down to the 10 minutes per cycle that is saved by the KASTO saw's ability to start the trim cut automatically when each new

bundle is loaded. On other machines it is necessary first to cut the bundle to level the face, then measure the bar before production can start.

More important for achieving the high level of productivity is the adaptive downfeed on the bandsaw, called KASTOrespond. It allows a band feed rate that is higher than would otherwise be feasible, as it is automatically backed off momentarily if the built-in pressure sensor detects a rise in cutting force. This can occur as the blade reaches the transitions between layers of bars in the bundle, or if it encounters a hard spot in the material. Optimal force on the blade is therefore maintained throughout the cycle, ensuring a good quality of cut and avoiding damage to the blade.

Phil Barnes adds: "When it came to buying a new bandsaw for this work, bearing in mind we use three makes other than KASTO, we benchmarked various options and asked the potential suppliers to process a sample batch of our boron steel.

"Our welding division manager Jim Hunter and I were impressed with the KASTO demonstration in their Milton Keynes showroom, added to which the price of the machine was acceptable. In particular,



we appreciated the consultative nature of their sales approach, which prompted us to place the order."

Since the bandsaw was installed, the higher than expected productivity on the boron steel job has provided spare capacity for general-purpose cutting of engineering steel bar, such as EN8 and EN24T, from 10 to 300 mm in diameter either singly or in bundles. Phil Barnes advises that work transferred from other machines onto the KASTO is completed in approximately half the time, commenting further that when the operator returns to the saw, the job is nearly always finished and ready to be unloaded.

The stockholder's management is in no doubt that the KASTOwin is highly beneficial to business, not only due to the bandsaw's productivity on the contract for

which it was purchased, but also because of the machine's ability to cut other materials including stainless steel and aluminium so precisely. A tolerance of -0, +1 mm is held routinely, saving wastage by not having to program extra allowance, as would be the case on the company's other, less accurate saws.

Phil Barnes concludes: "We have an evolving customer base, more than half of which requires material sawn to size, so bandsawing is a crucial function for us. Certainly, the KASTOwin has been a revelation in terms of its productivity and accuracy of cut.

"We have also been impressed with KASTO as a company and feel that we have entered into an alliance whereby we can consult with them on bandsaw technology and receive unbiased advice."



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Quick and easy time savings through control upgrade

Optimised MultiTherm shortens cutting process by 40 percent

Contoured tread plates made of steel make an important contribution to safety on stairs or as a floor covering. To produce them cost effectively and economically is an easy task with modern gantry cutting machines. To run their production at maximum efficiency, steel fabricator Stahlbau Spinner GmbH from Renchen used a system consisting of a Messer MultiTherm® cutting machine, the control Global Control plus and specially tuned software. About 40 percent time saving was their reward for this optimisation.

For a customer order, Spinner Stahlbau GmbH in Renchen-Erlach had to cut some 7,500 pieces of 3 mm thick contoured tread plates in one-man operation. To be able to complete this order faster than previously and with the highest quality, the customer wanted some optimisations on their Messer MultiTherm 3600. "The biggest potential for this order was in the control. For this we carried out an appropriate upgrade of the Global Control to enable the customer to save the maximum amount of manual work", explains Thorsten Wittek, project manager at Messer Cutting Systems in Groß-Umstadt.

Upgrade achieves savings potential

Where a high manual effort from the machine operator is required by many contract cutters, namely for loading the cutting table, Spinner achieved an enormous relief through the software upgrade of the Messer control. The "Joblist" function now made it possible for four plates, for example, to be loaded simultaneously and then to be cut one after another. As soon as the first plate is finished, the torch travels to the following second plate whilst a special lifting device already removes the first plate. When the third plate is reached then two new plates are loaded again. The result is that the programmed job is continuously processed without interruption. Within one hour, Spinner GmbH achieved a throughput of 14 plates instead of the previous seven.

A further requirement to improve efficiency was to reduce non productive times. The process "optimisation function" makes it possible to reduce or eliminate



Efficient production cycles at Spinner Stahlbau GmbH: The "Joblist" function on the Messer Global Control CNC makes it possible to load four plates at a time to cut them then one after the other with the Messer MultiTherm

non-productive times through a specially developed algorithm. This occurs in the Global Control automatically depending on the cutting process. Parameters which can be adjusted permit a fine tuning to be carried out by the operator. The result is an optimisation of the process cycles and an increase in the machine efficiency.

Data safety though automatic back-up optimised process parameters usually require tedious establishment and are the capital of a company. To save such data was very high on the list of requirements. However, gantry cutting machines are not necessarily employed under the optimum conditions for sensitive computer technology; above all the hard disc in the computer is exposed to tough conditions. To achieve data security in this area, Messer integrated a back-up program which mirrors the contents of the control hard disc onto an appropriate server or back-up drive. Thus all data is always saved

to a safe place, should the hard disc fail or the installation be destroyed.

Optimum service - smooth operation

Ralf Siebert, who is responsible for the development of thermal cutting at Spinner GmbH, says: "We are completely satisfied with what is in the meantime our second Messer machine. The good consultancy, cooperation and fast order processing for the upgrade from Messer all ran perfectly. The results not only satisfied our requirements and expectations but significantly exceeded them. The fact that we did not have one single complaint with the roughly 200 tonne order for about 7,500 plates speaks volumes for the high quality we achieved with the machine upgrade."

Fast and flexible

The Messer MultiTherm is a gantry cutting machine with many facets, which can be tailored to the application required quite

individually, for example with plasma units, multiple torch oxyfuel cutting, marking or a combination of all processes. Coupled with the newest generation of plasma cutting equipment, the system achieves the highest cutting quality and maximum productivity. What is more, a MultiTherm can be re-equipped for another cutting operation at any time, creating a flexible system ready for the future. The unit can be set up very quickly thanks to the userfriendly CNC control Global Control With a touchscreen and database, all parameters can be entered or called up in the shortest time. Gas pressures, plasma current and consumables can be read off the TFT monitor. Through the possibility of combining oxyfuel and plasma cutting processes, the MultiTherm covers a wide spectrum of materials and cutting tasks. With twin-sided longitudinal drives and high accelerations, the torches can be sped over the plate at up to 35 m per minute. This saves time between cuts and ensures a smooth production.

To sum up, Spinner Stahlbau GmbH has achieved enormous time savings through the upgrade of the Global Control to their Messer MultiTherm system when cutting contoured tread plates. Thanks to the comprehensive service and fast order processing by Messer, Spinner was able to complete a major order in even shorter time and with the highest quality.

Messer Cutting Systems GmbH
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The Messer cutting system is particularly easy to operate with the Global Control CNC. An automatic back-up program saves the database contents to a server



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The perfect cut for high-strength materials

Coil processing line requirements are ever more demanding on account of the increasing use of modern materials. High-strength aluminum, highly resilient and extraordinarily flexible, is opening up entirely new possibilities in industries like automotive and aerospace, but it is extremely hard to process, especially in sheet processing and assembly, precision and cut quality matter if you want to avoid failed batches. Much of the machinery introduced over the years lacks the capability to cut modern materials with enough precision, due to customer requirements for thickness and width in the geometrics of the slit strip. That's why Manfred J.C. Niemann Zentrale KG (NIE•MET) added a new Burghardt + Schmidt wide-material slitting line to its machine fleet in late 2018. The new line is designed to process particularly wide aluminum coils of 800 to 2,100 mm. Thanks to high-precision shears and a circumferential setting mechanism on the coiler, it can also set an outer diameter of 1,850 mm efficiently and accurately.

The new production hall at Manfred J.C. Niemann Zentrale KG (NIE•MET) in Bremen, Germany has been producing aluminum strips since fall 2018.

Managing director Jörn Niemann says: "Our aluminum slit strips are 0.5 to 4.0 mm thick and a minimum of 80 mm wide. As a result, they're suitable for a very wide range of applications. Depending on the thickness of the material, the yield strength is 20 to 580 N/mm² and the tensile strength 65 to 600 N/mm², so it's especially demanding having to cut them to custom sizes."

Hence, the company went looking for a machine designed for wide coils. Based on decades of positive experience, NIE•MET opted for a wide-material slitting line from Burghardt + Schmidt.

Efficient planning and production ensures timely commissioning

Having secured the order, the Burghardt + Schmidt team made a site visit to establish the ideal position for the line in the production hall. The two companies have been working together for years, so Burghardt + Schmidt experts have a track record of trust built on previous projects. Thomas Baral, managing director at Burghardt + Schmidt GmbH, says: "As the



site is so close to the Weser river, we had to make sure the foundations were not too deep, otherwise groundwater would get in."

Experts in metal cutting and leveling lines also met NIE•MET's processing range specifications for the new precision slitting setup, with coil widths of 800 to 2,100 mm. Thanks to Burghardt + Schmidt's efficient forward planning and extensive existing knowledge, it delivered the turnkey line in mid-2018, right on time.

Special cutting and coiling systems for large coil diameters up to 1,850 mm

The heart of the new line is the TWIN CNC slitting shear, with a pretensioned precision roller bearing and zero backlash linear guide designed for accurate and above all stable positioning.

Thomas Baral continues: "To meet the sophisticated processing requirements and cut strips of the required width with minimal burring, the shears have to guarantee tension-free cutting every time. So, when producing the line, we gave particular attention to the blade shaft in terms of precision and calibration. The installed blades are 400 mm in diameter and are assembled together with rubber-bonded

spacers. This means that in one pass at a working speed of 200 m/min, depending on the material strength and thickness, the line makes no more than 22 cuts for 21 cuts.

The slitting shears feature a push-off plate to guarantee rapid retooling with the four-arm tool change system outside the line.

Jörn Niemann explains: "Retooling is often complicated, but the Burghardt + Schmidt tool changer makes it much faster and simpler." Having it in our new line gives us semi-automation and therefore faster retooling." This speeds up workflow, thus significantly improving not only availability but also safety, as workers no longer have to position the tools in the line by manually.

User-friendly operation for high productivity and quality

For a perfect cut, you need parallel blade shafts, which is made possible through active repositioning during the cutting process. A specially developed transfer table transports the cut strips, while a deflector with roller bearings separates the strips. The recoiler is fitted with a quick-change fastener for easy mandrel changes. What's more, a circumferential setting mechanism on the recoiler boosts

line efficiency and improves operator ergonomics. "Our employees really appreciate the occupational safety improvements in terms of handling," adds Jörn Niemann.

The central main control panel and the latest software, which is tailored to customer requirements, guarantees intuitive handling with straightforward data entry. It also has a clear, well-structured display that shows faults, line speed and other information. The decoiler and coiler feature auxiliary control panels to ensure that operators can keep an eye on the whole line. This means they can adjust and monitor all the key quality and safety parameters from different positions, ensuring smooth production despite the challenges of the material.

To allow in-process quality monitoring, cameras continuously check the upper and lower surface. This means that faults are easier to identify without stopping the line and taking random samples for assessment. In this way NF metal experts guarantee fast, flawless coil throughput with precision-made strips.

Thomas Baral concludes: "We're

delighted to have helped such a long-standing business partner meet its demanding quality requirements. We value NIE•MET's confidence in our lines and look forward to working with them on future projects."

Burghardt + Schmidt GmbH was founded in 1945 and manufactures technologically innovative machines and plants for cutting and levelling metal strips. Its products are tailored to meet specific customer requirements. The company profits from many years of experience in the thin strip sector and specialises mainly in slitting lines, stretch-bend-levelling lines, packaging lines, traversing spoolers, levellers, cut-to-length lines and coil processing lines.

At its German site in Remchingen, machines are developed and produced with the "Made in Germany" quality seal. Burghardt + Schmidt GmbH founded the b+s group in 2014 after having acquired well-known companies with long tradition,



which were firmly established on the world market. By means of the competences of its subsidiaries, Schnutz GmbH and Delta Technik GmbH, Burghardt + Schmidt was able to enlarge its portfolio in the fields of levellers, strip feeding lines and automation technology.

Burghardt + Schmidt GmbH
Tel: 0049 723236610
Email: info@b-s-germany.de
www.b-s-germany.de

Increase in demand for brake film that protects metals

Rhodes Interform, the Group Rhodes business which specialises in bespoke composite and metal forming machinery, has seen a sharp increase in demand for Tuff Brake film, the product which eliminates markings on sensitive metal materials. Rhodes Interform is the UK and Ireland distributor of Tuff Brake film, an innovative material which, when placed over metal sheet, eliminates press brake die witness marks. These can be caused by the lower die when used for bending stainless steel, aluminium, sheet metal and pre painted metals.

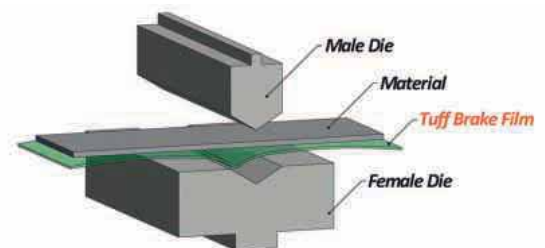
Steve Jackson, technical sales manager for Rhodes Interform, explains: "Metal manufacturing companies are recognising how Tuff Brake Film can help them to reduce production costs, while increasing productivity. It protects the workpiece and dies and means that labour is saved, therefore second operations are avoided. Ultimately, the end result is a better paint finish."

A spokesperson for Durham Sheet Metal says: "Rhodes Interform's Tuff Brake is very effective at eliminating contamination and bend marks when forming stainless steel products."

Tuff Brake Film is available from Rhodes Interform in tough .015" & .030" thicknesses, with bespoke sizes available. Known for its longevity, the same piece of Tuff Brake Film can be used many times before there is a need to form fresh material, therefore maximising cost-effectiveness.

As well as manufacturing state-of-the-art presses, Rhodes Interform reconditions and upgrades existing machines at a fraction of the cost of buying new. This includes complete machine refurbishments on all Group Rhodes metal forming, material handling, clay preparation and concrete working machinery, as well as undertaking refurbishment work on equipment of other makes. The company can also offer full PLC or CNC control system upgrades with software designed to meet the individual requirements of each customer.

Rhodes Interform's machine refurbishments offer customers a cost-effective solution to dramatically improve equipment life and increase productivity. The company provides a complete one-stop refurbishment service,



from arranging for the machine to be transported to the company's maintenance facility in Wakefield, through to retrofitting new components and re-commissioning on site.

Rhodes Interform's parent company, Group Rhodes, boasts a 200-year metalforming history and has also been manufacturing presses to form composite materials from as early as the 1930s.

The company has won Queen's Awards for both innovation and international trade in recent years, particularly for its work in the aerospace sector.

Group Rhodes Ltd
Tel: 01924 371161
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Curved metal fabrications enhance fabrication of towed agricultural equipment

Towed agricultural equipment has a hard-working life. Shocks and loads are typical mechanical stresses associated with all aspects of farming, from ploughing to harvesting. Trailers, rollers, ploughs, mowers, rakes and balers require strong construction to ensure maximum reliability and secure overall return on harvest. This level of fabrication can take time though, so businesses are now offering manufacturers of towed equipment a way to expediate fabrication with the inclusion of curved metal elements.

Matthew Pritchard, group project manager at Barnshaws Section Benders, explores the benefits curved steel can provide to manufacturers of towed agricultural equipment:

As anyone in steel fabrication knows, welding takes time. While welds are required in most towed equipment, minimising them can expediate the fabrication process. A viable alternative is to instead use curved metals, which offer a comparatively fast production process. Using a bending machine, such as a press brake or a roller, metals can be precision curved to design specification without employing multiple welds. As well as offering faster production, bending can offer more value to the customer than multiple welds, as less operator input is required. Furthermore, as the bending process can be conducted with high

repeatability, it is more suitable for servicing the high quantity orders associated with large scale manufacturing.

But where can you utilise curved steel sections in towed agricultural equipment, and what are its specific benefits?

In chassis construction, press braked, high strength materials such as Hardox® can be processed by some equipment in lengths up to 12 m, with a maximum pressing capability up to 1,000 tonnes. This can serve to eliminate welds across the design, while also allowing the use of a stronger metal in the chassis which can be challenging and time consuming to weld. The result is a stronger chassis overall, improving the service life and return on investment (ROI) of the equipment in question.

Another suitable application is in material flow. Chutes and pipes which are induction bent instead of welded, ensure a more laminar flow of material within equipment, for example a wood chipper, which helps to reduce wear over an extended period. Again, this translates to greater reliability in operation. Tubes and pipes can be induction or mandrel bent to specific requirements, suitable to fit almost any design and application requirement.

Despite agricultural equipment being designed to promote overall reliability and durability, nobody can deny that towed equipment has become more aesthetically pleasing in modern times, as new



manufacturing and fabrication techniques allow brands to indulge in distinctive design language. Precision curved steel offers an advantage in this regard, as it offers a more organic look than a frame section with multiple welds. By specifying curved metal, manufacturers and fabricators can ensure their product offers a truly modern design aesthetic.

Barnshaws is the UK's most capable metal bending company, with a proven track record in the construction, civil, sculpture and transport sectors. While curved metal is a feature in many of these industries, it has been slow to catch on in the agricultural sector. Precision curved steel's combination of expediated production, high repeatability and application versatility presents an opportunity to manufacturers of towed agricultural equipment to increase time efficiency and add value to their production activities.

Established in 1969, Barnshaws has grown to become a premier specialist profile bending company; supplying market sectors such as construction, power generation, mining, transport and general manufacturing with shaped beams, tubes, plate and other profile section materials. More recent developments have seen the company's engineering expertise expand from mostly steel to non-ferrous materials including copper and aluminium as well as specialist materials such as Hardox.

Barnshaws has ISO 9001:2015 approval and was Europe's first bending company to achieve CE Marking of curved sections to Execution class 4, the highest standard available.

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CERATIZIT is a high-tech engineering group specialised in tooling and hard material technologies.