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Hurco Open House seals a successful 2019

Despite many machine tool companies selling into the UK reporting a softening in the market in 2019, machining centre and lathe manufacturer Hurco Europe reported its second-best turnover ever, only slightly below that of the record year of 2018.

At an Open House held on 2nd and 3rd December at the firm's new, 26,000 sq ft headquarters, showroom and technical centre in High Wycombe, attended by more than 88 visitors representing 53 companies from the UK, Ireland and Sweden, a successful trading year was sealed by three further orders for machining centres including a double-column model.

David Waghorn, managing director of Hurco Europe comments: "We were pleased to be able to preview a cobot, collaborative robot, following our group's purchase earlier this year of Pittsburgh manufacturer, ProCobot.

"It was demonstrated feeding one of our VMX30UHSi 5-axis machining centres with aluminium billets from a table automatically and returning finish-machined components."

He said that Hurco is developing plug-and-play solutions built around the ProCobot systems that they hope will offer seamless integration with an application that is being tested in the Hurco machine's proprietary WinMAX control. There are four standard products of different sizes in the ProCobot range and they are all equally well suited to feeding lathes or machining centres. As was reflected at the EMO 2019 show in Hannover in September, there are currently strong trends towards automated feeding of machine tools as well as to higher levels of factory connectivity. This latest company acquisition by Hurco feeds into both. Hurco plans to have sellable ProCobot options available in time for MACH 2020. Hurco Europe has already seen a rise in automation, having sold around half a dozen machining centres equipped with a Swiss-built Erowa pallet storage and retrieval system. David Waghorn also noted that one customer, a subcontractor in Rutland, has recently automated Hurco 5-axis machining centre with a Belgian RoboJob Milling Assistant as well as a 3-axis model with a US-made Midaco automatic pallet changer. These examples reinforce the notion of a gathering pace towards autonomous machine tending.

Another direction in which Hurco Europe's business is going is the supply of a greater number of 5-axis machining centres, both B-axis and trunnion-type, which now account for 30 percent of company turnover.

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Southern Manufacturing & Electronics 2020

Southern Manufacturing & Electronics returns to Farnborough from February 11th to 13th 2020. The show, now in its 22nd year, brings together an impressively wide selection of exhibitors covering the complete spectrum of engineering activity, from high-tech machine tools and automation to components and subcontract services. With the 20,000m² Farnborough International Exhibition Centre filled to capacity with firms from across the UK, Europe and beyond, the show is an excellent opportunity to see all the latest manufacturing technologies in one convenient location.

As a major show in the annual event calendar, Southern traditionally enjoys strong support from many of the leading machinery makers and vendors and 2020 is no exception. Trumpf returns, exhibiting its wide selection of sheet metal fabrication equipment and industrial lasers, together with 3D printing systems, power tools and electronics. Yamazaki Mazak will demonstrate a selection from its huge, 260-model range of CNC lathes, machining centres, multi-tasking machines and laser processing machines. No less substantial is regular exhibitor Haas Automation, returning for 2020 with examples from its portfolio of over 100 CNC machine tools. Other popular marques returning for 2020 include Bystronic, C.Dugard and Unison.

Hurco will be showcasing the latest software version for the Max5 control. New features include a Solid model import option aimed at reducing programming time even further. The new XP model enhancements mean that concurrent programming, improved graphics and roller guideways are now a standard feature. The firm will be demonstrating two of its most popular machines, the versatile VM10i machining centre and the TM8i 2-axis CNC lathe. The VM10i machining centre has a working volume of 660 x 406 x 508 mm and packs a lot of performance into a compact space. The TM8i turns parts up to 356 mm in diameter, 525 mm long, and is well suited to bar work up to 64 mm diameter. The performance of this compact, accurate turning machine is complemented by the Max5 control. The slant-bed lathe is supplied as standard with a 6-inch hydraulic three-jaw chuck, parts catcher, swarf conveyor and vouchers for MacInnes coolant and lubricants, plus £500 worth of Dormer Pramet tooling.

Centrepiece of the XYZ Machine Tools stand at Southern will be its Robo-Tend robot-based automation cell, demonstrated with an XYZ 750 LR VMC. XYZ says the aim is to bring automation within the reach of traditional subcontract engineering businesses. The interface has been developed to make programming the automation process as easy as possible, and payback is possible in just a few months of operation says the firm. Simultaneous 5-axis machining will also be demonstrated on the XYZ UMC-5X, a cost-effective machine featuring a direct drive 90 rpm table and 500 mm of Y-axis travel forward of the table surface when tilted, allowing larger workpieces to be machined. Finally, the latest version of the ProtoTrak control system will be shown on an RMX 3500 bed mill and an RLX 355 ProTurn lathe. The RX adds new features and benefits, primarily a 15.6-inch touchscreen for machining information at the users' fingertips and pinch-to-zoom, twist-to-rotate operation for closer inspection.

Additive manufacturing is becoming much more mainstream and, as a consequence, a fast-growing feature of the show, with several new machines being exhibited for the first time. Laser Lines introduces the XM200C metal powder-bed fusion 3D printer from Xact Metal. The XM200C is a compact and affordable system that can produce quality metal parts from a

variety of metal powders at a low cost. Also demonstrated will be the new Method 3D printer from MakerBot that combines the speed and accuracy of an industrial 3D printer with the space-saving design of a desktop unit, plus the latest Form 3 3D printer from Formlabs. Another interesting product on show on the CREAT3D stand is the Nexa3D, which is capable of printing up to 1 cm per minute in the Z-axis. Rapid 3D print technology enables tool-less low volume batch production, the ability to iterate a dozen designs in a single day or produce a revised prototype during a design meeting.

One of the most interesting displays at this year's show will be Matsuura's fusion of additive and subtractive manufacturing techniques. The firm will be machining live on its popular single table 5-axis MX-520 CNC machine tool the MX-520, making use of fixtures and workholding printed on an HP Multi-Jet Fusion 4200 3D printer, demonstrating the incredible time & cost savings generated by "printing" workholding. There will also be live 3D colour printing on a HP 580 Multi-Jet Fusion 3D printer.

Production and tooling solutions on show this year number in the thousands, including workholding, industrial storage, consumables and a myriad of others. Specialist tooling vendor ITC returns with its range of high precision cutting tools. The firm is also a supplier of WIDIA products as well as being the UK distributor for all BIG KAISER products. Guhring will exhibit a number of new products, including its high-performance line of end mills and the latest addition to its extensive holemaking portfolio. Workholding specialists exhibiting this year include AMF Andreas Maier and Roemheld. YMT Technologies will highlight its comprehensive range of tooling, including rotary tables, vices and spindle tooling.

Blum will be showing the latest software advances for its recently introduced Digilog probe series, designed to bring the integration and everyday use of fully automated solutions within reach of even the smallest of CNC machining companies. Faro highlights its recently launched 8-axis Quantum ScanArm, which integrates an eighth axis into the company's Quantum FaroArm to create, according to the firm, the world's first 8-axis Portable Coordinate Measuring Machine (PCMM). When combined with the company's Blu Laser Line probe or Prizm Laser Line probe, it becomes a 3D laser scanning system.

Returning to Southern for the third successive year, E-Max Systems will share some exciting developments for its ERP and MRP software, designed specifically for manufacturing and engineering businesses. New features include new financial functionality such as Making Tax Digital and standard costing, as well as a new speeds and feeds calculator.

Following last year's successful cooperation, Southern Manufacturing & Electronics 2020 will once again be teaming up with the Farnborough Aerospace Consortium, together with national bodies including Composites UK, NetComposites, the SMMT, the Confederation of British Metalforming, the GTMA and the British Gear Association. Also participating this year is Locate in Kent, an organisation offering a wide variety of services and support to firms aiming to locate in the region. Much of this combined expertise will be accessible via the show's excellent free seminar programme, which covers a wide-ranging agenda, from advanced materials, additive manufacturing and Industry 4.0 to real-world examples of business transformation and Lean.

Award winning author of Staying Lean, creator of the Lean Iceberg Model and partner at S.A. Partners, Gary Griffiths, will discuss how organisations have successfully delivered results for their business by embedding and sustaining Lean & Continuous Improvement. Popular presenter Ailsa Carson of Onsite Insights gives examples of best practice in manufacturing through ten, real-world case studies. Steven Barr and Ravi Gidoomal of Edge Digital Manufacturing discuss how to develop a digital roadmap for your business and identify the right digital technologies to maximise value.

Mark Knowlton from Locate will present Delivering Industry 4.0, an examination of how SMEs can benefit from embracing digital manufacturing. In 4.0 The Quality Revolution, Mike John of The Sempre Group looks at how British Industry must evolve its quality control in a global competitive market. Nick Aitken and Dr Alex Martin of the RINA take a look at Counterfeit components and product compliance challenges, while Dr Chris Robertson discusses Life after Brexit. Mike Foster, managing director of The CE Marking Association, will explore another aspect of the post-Brexit landscape in CE Marking 2020 and Beyond.

Farnborough International Conference and Exhibition Centre provides free car parking for 3,500 vehicles and is well-served by road and public transport links. A regular complimentary shuttle bus service operates from both of Farnborough's mainline railway stations directly to the exhibition. The venue itself provides a high standard of facilities including a free WiFi service in the foyer area and high-quality catering outlets.

Admission to Southern Manufacturing & Electronics 2020 is free. More information and tickets are available from **www.industrysouth.co.uk**

European Trade & Exhibition Services
Tel: 01784 880890
Email: philv@etes.co.uk
www.industrysouth.co.uk

ITC launches new product lines at Southern Manufacturing

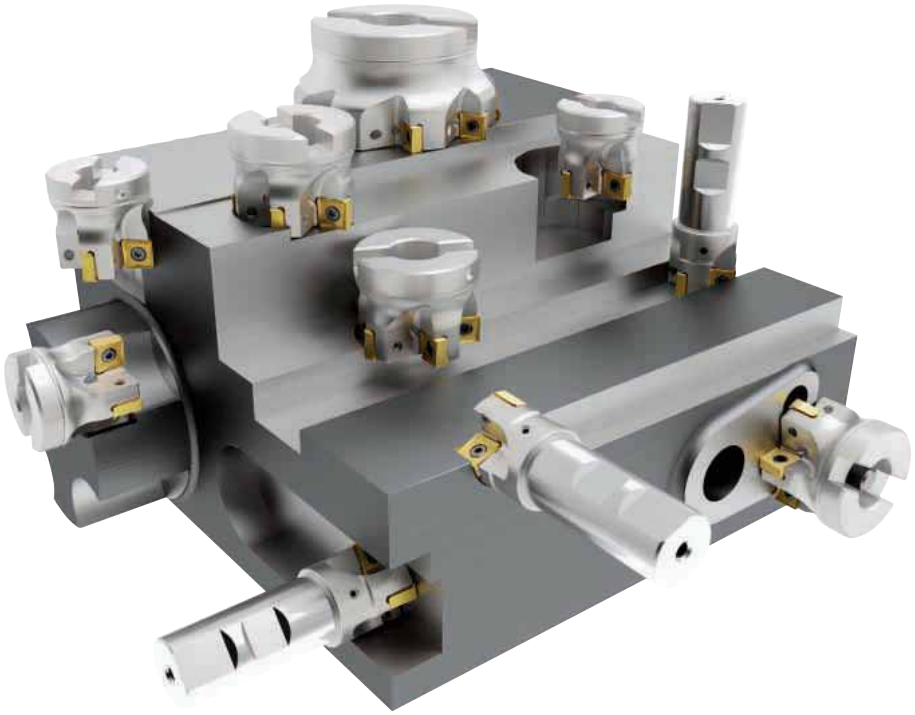
The Southern Manufacturing Show will be the very first opportunity for UK manufacturers to see the new 2020 cutting tool launches from Industrial Tooling Corporation (ITC). Using the event as the launchpad for its new innovations, the Tamworth based cutting tool manufacturer is inviting engineers to its stand to witness the next generation of cutting tool technology.

The new additions to the ITC portfolio that will be receiving their world premiere at Southern Manufacturing will include the new ITC 6071 Series of solid carbide end mills. This stub-length end mill has been specifically developed for the high-performance machining of steel and aerospace grade alloys such as titanium and inconel. ITC has evolved the geometry design and extensively trialled this in the marketplace to introduce an end mill line that surpasses all that went before.

With an unrivalled reputation for aluminium machining, ITC has further extended its leading line with the arrival of the new 3202 3-flute long series and the optimised length 3203 Series ball nose tools. Perfect for profiling and reaching difficult to access surfaces, the 3202 and 3203 offer manufacturers the complete solution for cutting aluminium and aerospace grade alloys. Complementing the new additions is the much-anticipated arrival of the 4204 Series of long length 4-flute square-end milling cutters with a chipbreaker geometry.

Supporting the new ITC product lines at the event will be the latest arrivals from Widia. Representing Widia in the UK, application experts from ITC will be on-hand to discuss the benefits of the new Widia product lines. Some of the latest Widia tools on show will include the new VSM890-12 face and shoulder milling series. The new VSM890-12 is hailed as one of the very few eight-edged double-sided milling lines with genuine 90-degree milling.

The new high-performance milling line generates superior metal removal rates on a complete range of materials when conducting face, shoulder, Z-axis plunging and contour plunging and 100 percent radial engagement slotting. The new



VSM890 series is available with a 32 mm diameter Weldon end mill configuration, while the shell mill tool bodies are available in diameters from 40 mm up to 250 mm with a cartridge face mill providing a 315 mm diameter.

The VSM890 will be alongside the impressive Widia 70NS Victory X-Feed Series of high-feed end mills that have now been extended to cater for the machining of stainless steel and heat resistant alloys. The extension provides manufacturers that machine challenging materials, with all the benefits the 70NS demonstrates on steel, cast iron and a host of other material types. The 70NS Series provides a significantly increased radial engagement when compared to ball nosed end mills and this geometry revision has been optimised for circular plunging, 3D machining, face milling and pocketing applications on heat-resistant alloys and stainless steels.

Complementing the 70NS and the VSM890 at Southern Manufacturing will be the new Widia range of 4U50 and 4U80 shallow pitch roughing cutters. Perfect for stainless steel and high-temperature alloys, the new solid carbide end mills demonstrate reliable consistent performance at higher machining parameters when conducting prolonged machining cycles on challenging aerospace grade materials.

Designated as shallow pitch roughing tools for high material removal rates in the aerospace industry, the new Widia 4U50 and 4U80 Series is available with four or six cutting edges with a harmonically designed flute geometry and the choice of a short cut length, 4U50 Series, for superior rigidity or a regular cut length, 4U80 Series, with both enhanced cutting performance and stability when conducting heavy-duty roughing.

ITC will of course have a comprehensive display of existing product lines alongside the new innovations. Likewise, the stand will display a myriad of new innovations from Widia as well as a selection of BIG KAISER toolholding and clamping technology. Make sure you are among the first to see the new product lines by visiting the ITC stand.

Industrial Tooling Corporation Ltd
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www.itc-ltd.co.uk

Stand - H250

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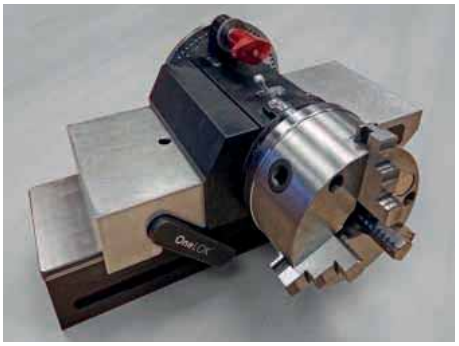
Workholding and positioning systems to be launched

Efficient workpiece clamping for 5-axis machining



Salisbury-based 1st Machine Tool Accessories will show for the first time in the UK, at Southern Manufacturing, the new Kitagawa Swift Klamp, a rigid workholding product that uses the proven HSK tool interface 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 setup offline 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.

Manual indexing head saves programming and setup times

Demonstrated also at Southern Manufacturing will be the new RotaVice workpiece positioning system, ideal for production shops where manual mills may still be in operation, but equally well suited to use on a CNC vertical machining centre (VMC). It is a new, manually adjustable indexing head that can be rapidly set to position a component at a multiplicity of rotary angles in the horizontal plane for milling and drilling.

Produced in the UK, the unit is designed to be secured in a One-Lok workholding device manufactured by Chick in the USA, for which 1st MTA is the sole agent in the UK and Ireland. RotaVice can also be exported to manufacturers worldwide that use similar Chick equipment.

Expensive fixtures and the need to change machine setups can be avoided, saving money and time. In smaller job shops employing 4-axis VMCs equipped with a full or indexing rotary table, where there may be only one or two people able to program the machine, the load can be lightened by having an operator of a lower skill level set up a component manually for 3-axis machining.

Everything about the RotaVice is fast. First, a One-Lok may be bolted quickly onto a VMC table. Next, positioning the moveable jaw using the built-in, time saving ratchet mechanism leaves only a few turns of the handle to clamp the indexing head in a special RotaVice jaw, also made by 1st MTA, which replaces the standard One-Lok jaw. Lastly, the workpiece is secured in moments in a horizontal orientation using an array of workholding options, which include a 3-jaw chuck.

Adjusting the angle is also rapid and accurate. It is effected by turning a circular locating plate to the required angle and inserting a pin into the relevant hole, an array of which are pre-drilled into the plate at the most common angles. In the standard configuration, 5, 10 and 45 degrees are available. The standard plate can be changed for a specific plate to suit any job that involves the use of non-standard angles.

Another advantage of the RotaVice is that once the angle has been selected, it uses the clamping force of the One-Lok to secure the rotary angle.

1st Machine Tool Accessories Ltd
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Email: enquiries@1mta.com
www.1mta.com

Stand - G205

Mazak to display new UK-made compact 5-axis machining centre

Yamazaki Mazak will be taking its new UK-made, fully simultaneous 5-axis machining centre, the CV5-500, to Southern Manufacturing.

The CV5-500 has been entirely designed and built at Mazak's European Manufacturing Plant in Worcester, specifically for machine users engaged in, or aspiring to, 5-axis machining. The machine, which is being brought to market at a highly competitive price point, has a high-rigidity bridge construction with a fully supported trunnion table, which delivers an accurate and extremely compact machining solution.

It is equipped with a new versatile 12,000 rpm spindle, capable of a peak performance of 18.5 kW and 119.4 Nm, making it highly suitable for a wide range of materials. The machine benefits from a compact footprint, making it ideal for smaller machine shops and it can also be easily automated with a side-loading door and robot interface. The CV5-500 is equipped with SmoothX CNC, Mazak's specialist 5-axis version of its SMOOTH Technology.

Alan Mucklow, managing director of UK & Ireland sales division at Yamazaki Mazak, comments: "The CV5-500 is set to become one of the flagship machines produced at our manufacturing facility in Worcester. Crucially, customers were heavily involved in the R&D process, to ensure the end product is equipped to deliver stand-out performance across a range of vertical markets, including both the subcontract and autosport sectors.

"The bridge construction promotes both high rigidity and high accuracy, while easy integration with ancillary automation equipment can be achieved by a new side-loading door. Ultimately, we feel this is the most compact, fully simultaneous 5-axis machining centre on the market, with a price point that offers a real opportunity for those with the ambition to move into more complex machining processes."

On Southern Manufacturing, he concludes: "High-mix work, both in terms of component type and sector, remains the order of the day for the UK subcontract market looking ahead to 2020. However, we

feel that more and more companies are looking to either expand or commit to their first investment in 5-axis machining over the coming months. The CV5-500 is perfectly placed to meet this appetite and there is no better place for subcontractors to see the machine for themselves this winter than at Southern Manufacturing."

Yamazaki Mazak UK Ltd
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www.mazakeu.co.uk

Stand - J220

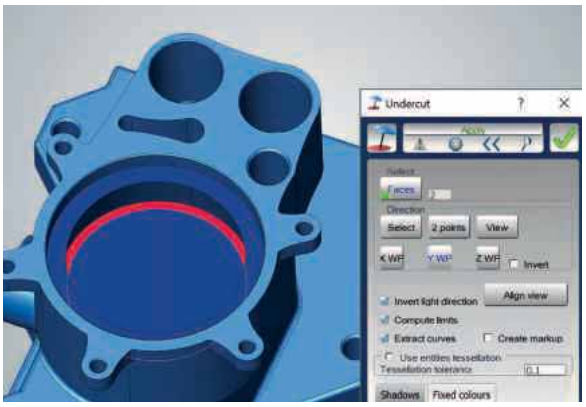
Latest hyperMILL developments on show

OPEN MIND Technologies will be demonstrating the latest version of its hyperMILL® CAM software at Southern Manufacturing. On its stand, the leading CAM developer will be introducing the latest features to its CAM system.

With a range of new features that include high-precision 3D finishing, 5-axis tangent machining, high-performance turning and new CAD-for-CAM technologies, hyperMILL 2020.1 is integrating more and more functions that previously required extra CAD machining steps. The previous version of hyperMILL already featured high-precision profile finishing. Now, hyperMILL 2020.1 offers a comparable function for 3D shape Z-level finishing. The 'high-precision surface mode' option ensures ultra-smooth surfaces with tolerances in the µm range. This saves time on post-machining finishing processes, particularly when applied to mould making.

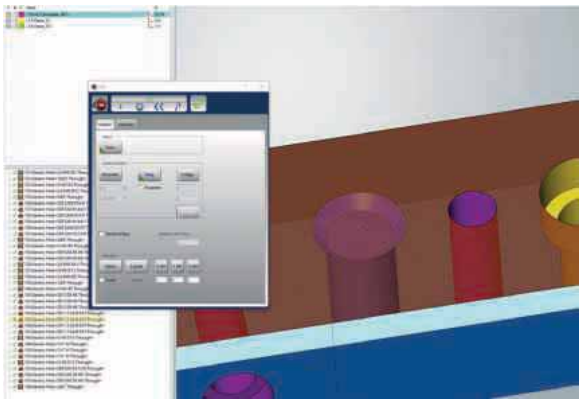
In hyperMILL 2020.1, the hyperCAD®-S function 'Global fitting' is directly integrated into the CAM strategy in 5-axis tangent machining. With this function, multiple faces can be joined into one face with defined ISO orientation. The principle of using CAD elements for CAM programming is also applied, for example, for automatic face extension. With the automatic face extension, the bounding surfaces are automatically extended during programming to improve the edges of the machined surfaces. This greatly simplifies programming, since these adjustments are made within the CAM strategy, without switching to the CAD environment.

OPEN MIND has also further improved the feature and macro technology in the new version to enable more secure and simpler programming for users. One function that is generally useful for everyday work is the definition of macros for recurring geometries. OPEN MIND has now added full text searching to the macro database. Users can also define machine and material groups as defaults to make it easier to select macros. Hole feature linking means that model changes made to CAD features are automatically transferred to hyperMILL. Since design changes in CAD are associatively linked with the CAM system, users can quickly and securely make updates.



Visitors to Southern Manufacturing will also be able to gather information on the latest special strategies from OPEN MIND's high-performance hyperMILL MAXX Machining package and the high-performance turning module. Perfect pocketing technology ensures more efficient pocket machining with high-feed cutters. An intelligent algorithm fits the largest possible pocket into the area to be roughed and automatically generates linear toolpaths for high feed milling. Innovative applications for conical barrel cutters will be a central theme of the show once again.

An interesting new function is available for users who work with very large parts with hyperCAD®-S. It enables the workpiece mass and centre of mass to be calculated with a material definition for solid, mesh and stock models. Another highlight of the CAD portion of the suite is the 'Undercut' function, which makes it possible to detect undercut areas on components quickly and reliably. Moreover, the new 'Local curvature' analysis function makes it possible to detect curvature radii on components. The minimum curvature radius, which often plays the biggest role, is output immediately. The user can then determine the best possible lead angles or tool radii for machining curved faces. To find out more about the latest version of hyperMILL and how your business can benefit, visit the Open Mind stand at the Farnborough event.



OPEN MIND is one of the world's most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND develops optimised CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2.5D, 3D as well as 5-axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the hyperMILL CAM system. hyperMILL provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND Technologies UK Ltd
Tel: 01869 290003
Email: adrian.smith@openmind-tech.com
www.openmind-tech.com

Stand - B210

Products to benefit the entire value chain

Henkel will demonstrate how its latest generation LOCTITE®, BONDERITE® TECHNOMELT® and TEROSON® products can benefit the entire value chain. Whether the task is in system building, assembly or repair, these engineering adhesives, sealants and functional coatings improve performance and cut costs.

Core technologies including threadlocking, sealing, gasketing, retaining, instant and structural bonding, will be demonstrated using the latest product introductions. Regardless of which substrates are chosen and the conditions that prevail, if it's technically possible, Henkel can provide the most appropriate solution.

Its range of adhesives incorporate five core technologies; epoxies, acrylics, polyurethanes, silane modified polymers and silicones. Continuous development across the range has now led to products that are more tolerant of contamination, able to support a wider range of operating temperatures and therefore be applied to a greater number of tasks.

As a result of these ongoing developments, adhesive technology is being widely adopted across all engineering sectors to improve the performance and longevity of products, as well as allow dissimilar materials to be joined to reduce overall weight and energy consumption.

Henkel will also focus on the merits of its Universal Structural Bonders. Based on Henkel's Hybrid Technology these products massively extend the scope of application for structural adhesives in both design and repair. They harness the strengths of different adhesive technologies to provide a unique combination of characteristics. Currently four different adhesives complete this range, each with its own distinguishing features and benefits

Across the board, how products are applied significantly influences their overall performance and cost efficiency. This is why Henkel will again be emphasising its expertise in the design and supply of dispensing equipment. The choice ranges from manual through to fully automatic and standard to bespoke.

Henkel Ltd
Tel: 01442 278000
www.henkel.co.uk

Connect with Hexagon production control software for Industry 4.0

First UK trade show for NCSIMUL and FASYS under Hexagon portfolio

NCSIMUL and FASYS will be on show for the first time at the forthcoming Southern Manufacturing exhibition as part of Hexagon's production software portfolio. The latest releases are being demonstrated on its stand, along with Hexagon's range of CADCAM and production control packages designed specifically for different manufacturing methods.

Helping manufacturers bring their factories in line with the Industry 4.0 philosophy of smart production, Hexagon's solutions fully support data-drive smart factories. They mesh seamlessly with each other to harness data which improves processes from design and engineering through to production.

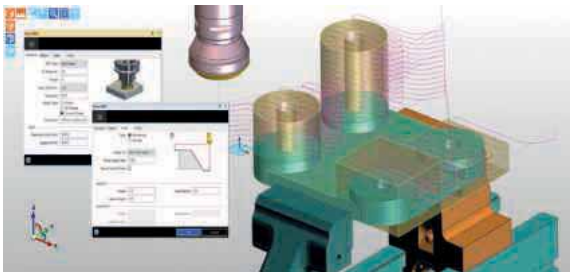
It is expected that visitors to the stand will be particularly interested in the latest additions to the Hexagon production software business, NCSIMUL and FASYS.

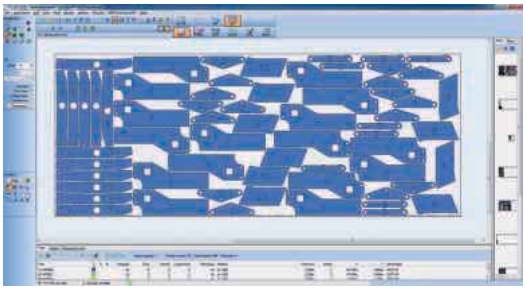
Continuing Hexagon's ethos of powering a successful digital ecosystem, NCSIMUL manages the complete machining process from the NC program to the machined part, including automatic G-code reprogramming and powerful G-code simulation. The current release contains a number of important enhancements to both high-end machining verification and to the module which automatically converts CAM and NC programs to different machines.

FASYS supports the entire manufacturing workflow from conception to the final product, including design and planning through to NC programming, during tool presetting or at the machine, by providing relevant production information and securely integrating all the systems involved.

Specialists will also be on hand during the show to guide visitors through the range of CADCAM, MRP and MES systems:

EDGECAM is the leading production CAM solution combining sophisticated toolpath generation with seamless CAD integration. Visitors to the stand will see a number of updates in the latest version, including toolpath associativity in the Face Mill cycle, extension to the Parallel Lace toolpath, and enhanced additive undercutting. Also, the optional CAD for CAM EDGECAM Designer module has now replaced Part Modeler.





The latest release of VISI CADCAM for the mould and die industry enhances the progressive die design processes, along with containing enhancements for the Reverse module.

WORKNC 2020.1's latest Roughing with Advanced Toolform technology allows the milling process to deliver a more accurate roughing stock, eliminating imprecisions which were characteristic to the traditional parametric toolpath calculation.

Visitors will also be able to see how Hexagon's sheet metal solution, RADAN, now allows for an endless nesting workflow, enabling parts for additional jobs to continuously go on to the nest, which leads to improved machine and sheet utilisation. It means manufacturers can react to changing priorities by simply adding more parts without having to clean up the workspace, so the nesting process, and production, keeps going with no interruption.

The WORKPLAN MES solution is designed to support management by automating business processes, providing control from creating quotes and sending order confirmations, through to the final invoicing.

Demonstrations of JAVELIN 2020.1 will look at items of new and enhanced functionality which have been added to nine well-used areas of the MRP and production control software, including Works Orders, Bill of Materials, Purchasing, Advanced Scheduling, and Traceability.

Updated two-way file flow features in the latest release of WORKXPLORE, Hexagon's powerful high-speed CAD viewer and analyser and printing is easier and more interactive.

Hexagon is a global leader in sensor, software and autonomous solutions. It puts data to work to boost efficiency, productivity and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Its technologies are shaping urban and production ecosystems to become increasingly connected and autonomous, ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter.

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Stand - J240

New software enhancements

MIE Solutions, the developer of MIE Trak Pro Production Control Software, has announced several new and improved features.

Users of MIE Trak Pro are now able to login using their own Windows user account, making data more secure than ever before. Enhancements have also been made to Sales Order Processing, meaning there is now an optimised electronic sales order input, making the process of importing bulk orders from customers faster and more efficient. The ultimate gain is that orders can now be passed to production more rapidly.

As an addition to MIETrak Pro's Shop Floor Data Capture options, the company has developed a new portable Warehouse application. Available now on the Android platform, the application maintains connectivity to MIE Trak Pro even when used remotely.

In other areas, enhanced menu customisation means users are able to create a unique view allowing each user/department to focus on the tasks most important to them. Also hot off the press is MIE Web, an online platform which enables dashboards to show all important information in real-time, designed not only for users of MIE Trak Pro but also for customers and suppliers using a unique login, minimising phone calls or emails and ultimately saving you time.

Visitors to Southern Manufacturing are invited to meet the company's friendly team who will be available to advise you on all aspects of MRP Production Control software. You will be able to see first-hand how MIETrak Pro can revolutionise your business.

Based in Worcestershire, MIE Solutions UK Ltd is one of the country's leading providers of Material Requirements Planning (MRP) production control software for the entire manufacturing sector. With over 25 years' experience and a worldwide presence, MIE Solutions has developed capacity planning software made by manufacturing professionals for manufacturing professionals.

Its Enterprise Resource Planning (ERP) manufacturing software, MIETrak Pro, is an industry specific, complete MRP software solution, applicable in all manufacturing industries. With hundreds of satisfied UK customers, MIE Solutions UK can provide you with an affordable, no hidden cost solution and will then support your business as it develops and grows.

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Stand - K120

Laser focus for TRUMPF

Tubes and profiles are used in many applications from mechanical tubes and profiles for mechanical engineering and system construction through to the furniture industry. At this year's show, manufacturing technology company TRUMPF will be focussing on how its TruLaser Tube machines are opening up new design possibilities in this sector.

If high speed cutting is a priority, TRUMPF's solid state laser machines provide a distinct advantage, especially when cutting thin sheet. The fibre models build on this solid-state capability to ensure short processing times for the widest possible range of parts. The TRUMPF TruLaser Tube 7000 fiber for extra-large tubes is a good example. With this flexible high-end machine, manufacturers can cover a broad range of parts and investigate new areas of application for laser tube cutting. The second focus process on the TRUMPF stand is bending. The company now has an extensive portfolio of TRUMPF bending machines that incorporates the TruBend 7000 Series for the high-speed bending of small parts to the TruBend 3000 Series and 5000 Series for processing medium and large-scale parts with a press force of up to 3,200 kN.

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Stand - D230

Pushing the boundaries

Cambridge University students collaborate with F1 and supercar experts to create one of the world's most energy efficient cars

A team of undergraduate students enlisted the support of Formula 1 engineering experts and the world's largest tyre company to design and build a four-seat solar powered electric car which can travel from London to the Scottish Highlands at a speed of 50 mph on the same power it takes to boil a kettle.

Cambridge University Eco Racing (CUER) has just returned from its first international race with Helia, an epic 1,864-mile drive from Darwin to Adelaide as part of the Bridgestone World Solar Challenge.

The cutting edge vehicle pushes the boundaries of automotive battery technology, efficient tyres and aerodynamics, weighing only 550 kg (1,200 lb) due to a specialist ultra-lightweight carbon-fibre chassis and body panels tooled by Portsmouth-based Formaplex, a leading lightweight manufacturer for some of the world's biggest Formula 1 teams and automotive companies producing multi million pound high-powered supercars.

Use of composites allowed the team to drastically reduce weight while maintaining structural integrity, allowing Helia to travel further and faster than would be possible with other materials.

Helia's streamlined aerodynamic design and lightweight construction significantly enhance the overall energy efficiency, using power from high performance lithium-ion battery packs produced in collaboration with Silverstone-based Danecca. The battery pack has much higher energy density than most production vehicles, which gives Helia more than double the range of a Tesla Model 3, while being a quarter of the size.

Bridgestone, the world's largest tyre and rubber company, also worked with the team to develop low rolling-resistance tyres.

Unfortunately, some early electrical issues prevented the team from progressing beyond the first stage of the gruelling race, but the only British team in its category was placed third out of 13 by the judges in the practicality category, where Helia was marked against criteria including design, versatility and desirability.

Recently arriving back in the UK, the team is now looking ahead to other potential solar races in Europe and beyond, while considering some potential modifications to the vehicle.

Xiaofan Zhang, CUER's Programme Director, says: "While the Bridgestone World Solar Challenge didn't go exactly as we had hoped, it is still a tremendous achievement when you look back at the progress we have made over two years. The conditions this year were particularly challenging and this is the first time this model had competed. Nevertheless, Helia's performance numbers showed her to be very competitive and this it bodes extremely well for future events.

"Working with teams from Formaplex, Bridgestone and Danecca was a real step-change for CUER in the overall research, design and manufacture process. It's allowed us to share expertise and improve the efficiency of the overall vehicle.

"Many of our partners are world leaders in automotive engineering, R&D and high value manufacturing but are not necessarily household names. The UK has an abundance of this expertise and we have been very fortunate to leverage their capabilities in Helia.

"Helia was designed to demonstrate technology behind electric vehicles and renewable energy and will visit schools next summer with the aim of inspiring the next generation of engineers. We have plenty of positives to take forward and are already in search of our next challenge."

Formaplex sales director, Matt Sellens says: "We knew the team's biggest focus had to be reducing the weight of their vehicle in order to increase its overall range. Using our experience developed over almost 20 years of working with cutting edge motorsport teams and supercar manufacturers, we fed into their design process and created the mould tooling, a special mould to produce a highly durable but ultra-light carbon fibre weight chassis.

"Our engineers designed, machined and

sealed the moulds, then worked with the student team to laminate layers of carbon fibre in the moulds to create the chassis and body panels. The assemblies were then autoclave cured. The resulting product is fantastic and a real showcase of our lightweighting capabilities in manufacturing and tooling."

For more information about the project visit **www.cuer.co.uk**

Key stats about Helia: battery range of 900 km; top speed 120 kph; carbon fibre chassis tub and carbon fibre body panels; 550 kg kerb weight; five square metres of 25 percent efficient silicon solar cells on the roof; created by a team of 20 Cambridge University students working part time (one full time team member); chargeable from a conventional electric vehicle charger.

CUER is the largest student-run engineering project within Cambridge University. The team is comprised entirely of undergraduate students with ages ranging from 18 to 23.

One of the team's primary aims is to serve as a learning platform for students across the University by providing the opportunity to work on a multidisciplinary practical project.

Past CUER alumni have used this unique experience to go on to successful careers in areas such as Formula One, electric vehicle development, artificial intelligence and biotechnology. In the last few years alone, several successful technology start-ups have been formed by previous team members. The three most successful start-ups (Prowler, Bios and Vivacity) have collectively raised over $50 million of funding and now employ over 150 people.

They will be sharing their journey across their social media channels as the 2019 Bridgestone World Solar Challenge approaches.

Formaplex is a UK-based full solution supplier of tooling and lightweight polymer and composite components. Formaplex operates across four sites around Portsmouth, designing and manufacturing a diverse range of tooling, moulding, assembling and painting injection moulded components and creating lightweight composite components.

Established in 2001, Formaplex has grown its revenue to over £60 m with over 730 employees. Its polymer and composite parts can be found on many UK built luxury and supercars as well as jet engines and submarines.

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Thermoreg is keeping its cool

Thermoreg thermostatic valves can be found all over the world. Deployed in ships, submarines, hospitals, locomotives, power generators; anywhere the temperature of a fluid needs to be regulated. The 3-way valves control oil flow between compressor and oil cooler, ensuring oil remains at the desired temperature. Using their 'buy local' policy, castings are sourced from nearby manufacturers and foundries then machined, assembled and painted in the 9,000 sq ft factory in Mildenhall, Suffolk.

Established in 1979 in a small unit in the heart of East England, Denis Smith began with just a manual lathe and mill. The company has seen significant growth, particularly in the last 15 years, which Denis' daughter, director Abbie Chapman attributes to marketing. "We focused on improving our website, which has brought in a lot of business. It was then that we took the decision to invest in our first CNC machine."

Thermoreg opted for a Haas VF-2 vertical machining centre. "We knew Haas were a trusted brand, so we felt confident in our choice."

Now over 20 years old, the machine is still run daily and is an integral part of the workshop. Two more Haas verticals have since been added. The latest, a VF-4, comes with 8,100 rpm direct drive spindle, 20 station carousel tool changer and an impressive 1,270 x 508 x 635 mm capacity.

"The valves we machine range from 3/4 to 6-inch diameter and the castings weigh up to 150 kg. The VF-4 can tackle even our largest pieces; we use it for everything we do. We've really noticed the difference in performance as well. It's cut some of our cycle times by 50 percent."

The factory has just taken delivery of their fourth Haas, an ST-15Y turning centre. "The Haas sales team have been very supportive and the training engineer is extremely knowledgeable. If we have a query, we can give him a call and he helps us on the spot."

The company's success has helped Abbie, together with husband and Thermoreg valve tester Kevin Chapman, to realise their dream of running a top fuel drag racing car. The Thermoreg Racing Team runs in the prestigious European Funny Car Series; known as the Formula One of drag racing. Held at the Santa Pod raceway in Northamptonshire, the team were runners up in their first year and were crowned European Funny Car Champions 2019. A very proud achievement for all involved.

"I've been watching drag racing for 40 years," explains Kevin Chapman. "The car we bought was made in the USA, just like the Haas machines. We couldn't turn down the opportunity to compete."

A funny car race is generally over in the time it took you to read half this sentence. During a race Kevin experiences the fastest acceleration on earth, zero to 282 mph in 4.4 seconds. The G-forces endured are intense; 5G when pulling away from the line and minus 5G when the parachute is deployed at the end. The car boasts 10,000 bhp and its 78 gallons to the mile results in regular fuel refills.

"The feeling is indescribable. We're very lucky to be able to take part and we're delighted to involve Thermoreg with the team," he concludes.

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Wet and dry 5-axis machining of composite components

Founded in 2003 jointly by John Biddlecombe and Simon Kingdon-Butcher, Global Technologies Racing (GTR) is the undisputed leading manufacturer of laminated carbon fibre components for the motorsport sector in the UK, supplying most of the Formula 1 teams.

Metallic materials are also machined and the components produced are to be found in all parts of a race car, chassis, transmission and engine. GTR caters for everything from concept and design through patterns and moulds to complete assemblies.

Prior to starting the subcontract machining firm, the two directors owned G Force, which designed and built racing cars for various motorsport series including IndyCar, Formula Nippon and Le Mans Prototype sports cars. Another notable success was the construction of Thrust SSC, which holds the current land speed record of 763 mph set on 15th October 1997.

Over the last decade and a half, GTR has become so successful that the constantly rising demand on its machine shop in Easthampnett, West Sussex, meant that it needed to expand into a second facility in nearby Bognor Regis at the beginning of 2018. Shortly after moving in, a pair of Hermle C 400 machining centres was ordered from UK agent Kingsbury to boost the contract machinist's capability for 5-axis processing.

The first, with a coolant tank for 'wet' machining and an additional 50-pocket tool magazine to supplement the standard 38 cutters, was delivered in mid-2018. It was followed in February 2019 by a second model equipped with dust extraction for 'dry' machining of composite materials without coolant. Both machines have a

trunnion-mounted table that provides the fourth and fifth CNC axes.

Simon Kingdon-Butcher explains: "Wherever possible we avoid wet cutting carbon fibre, but some of the components produced at our Fontwell factory have aluminium or titanium inserts within their structure, depending on the customer's specifications.

"In those cases, we have to cut in the presence of coolant to avoid the heat that would be generated if we were to machine metals without coolant. This ensures that the structural properties of the adjacent areas of composite are not affected."

Although 95 percent of the ISO 9001:2008 and AS 9100 approved subcontractor's turnover is derived from motorsport projects, there is a growing need to machine metallic parts for road-going supercars as well as for other industrial sectors such as defence, aerospace, medical and offshore. The Hermle machining centre with coolant is ideal for fulfilling those contracts and the often-complex parts benefit from the machine's fully interpolative 5-axis contouring capability. Alternatively, the ability to reposition and clamp one or two rotary axes in-cycle for less complex 4- and 3-axis cycles leads to reduced fixturing costs, fewer component setups and better accuracy.

The 'dry' machining centre, which is preferred for producing a majority of the carbon fibre parts, is linked to a Hermle-built external extraction unit by a large diameter, flexible hose that is normally connected to a port on the side of the guarding so that composite dust generated during machining is continuously sucked away from

the working area. However, to remove residual dust that can collect inside the machine, the operator can remove the hose nozzle from its mount and use it as a portable vacuum to clean the machine base, trunnion table and other surfaces.

Tolerances down to ± 0.01 mm have to be held and while this is commonplace when machining metals, on carbon fibre parts it is challenging. GTR's success in this area is down to its long experience working with composites coupled with the rigidity of the Hermles, which avoids generation of harmonics when trimming thin carbon fibre sections. Thin-wall structures are needed to minimise weight in race cars, supercars and aircraft, but edges must be nearly perfect to avoid stress fractures, so vibration when using the mainly PCD (polycrystalline diamond) cutters cannot be tolerated.

When GTR moved into its new Bognor Regis premises, in so doing it took over another subcontractor supplying the motorsport sector and inherited a number of machine tools, one of which was a nine-year-old Hermle B 300 5-axis machining centre.

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Chance purchase of a second-hand lathe triggers transformation of subcontractor's machine shop

When a customer of subcontractor Apsley Precision Engineering suddenly stopped manufacturing components in-house, one of the redundant machine tools, a Miyano fixed-head, twin-spindle, single-turret lathe, was purchased by the contract machinist's managing director, Peter Aymes.

Its arrival in 2012 on the shop floor at the company's 12,000 sq ft facility in High Post, near Salisbury, heralded the start of a big improvement in CNC turning capability. Following the purchase of two more second-hand Miyanos, August 2019 saw the arrival from Citizen Machinery UK of the first new model, a BNJ-51SY twin-spindle, twin-turret lathe with a Y-axis.

Peter Aymes says: "We were aware of this make of bar auto and knew they rarely come onto the second-hand market, so we were lucky to be able to buy the first machine, a BND-51S twin-spindle lathe with live tooling in the turret.

"Compared with our single-spindle, bar-fed lathes without driven tools, it approximately halved cycle times for machining parts up to 51 mm diameter. Generally, we were able to start producing components in one hit rather than two or three operations, reducing handling and work-in-progress.

"That in turn improved accuracy and allowed us to manufacture more cost-effectively, so we became more profitable. It is difficult to overstate the improvement the machine made."

Another notable benefit was that an operator could set the Miyano and walk away for long periods to carry out other tasks, as it is unusual to have to change offsets owing to the consistency of machining. That is not the case with the subcontractor's other bar autos, which tend to occupy an experienced setter for much of the time, raising the labour cost content of manufacture.

Based on all these advantages, a second Miyano BND arrived one year later. Purchased at auction, it turn-mills parts from bar up to 42 mm in diameter but is otherwise similarly specified to the first machine. Despite being 12 years old at the time, it was and still is capable of holding tolerances down to ± 5 microns, which Peter Aymes describes as "amazing".

He continues: "By that time it was abundantly clear just how good these machines are. They are heavy, compact and very robust, which leads to high accuracy, repeatability and reliability. They need very little money spent on them for repair, so cost of ownership is low.

"It is rare to operate a machine that is almost completely trouble-free. With the Miyanos, that applies to the electronics and electrics as well as the mechanics."

The third Miyano to be installed at the High Post factory, in 2015, was a second 42 mm machine of similar age acquired from another subcontractor, this time a BNJ model with two turrets. It was bought to cope with the increasing amount of work these machines were generating and to exploit the higher productivity possible due to the presence of a second turret to serve the sub-spindle while the other turret operates at the main spindle. It resulted in higher production output, better prices for customers and shorter delivery lead-times.

With a view to increasing production output still further, as well as to access the latest technology and provide back-up for the 51 mm capacity lathe, the subcontractor's first new Miyano, a BNJ-51SY, was delivered in July 2019 by Citizen Machinery UK. As its designation implies, the machine has additional Y-axis movement on the main turret that is proving invaluable for machining off-centreline and providing flexibility and accuracy of milled features.

Peter Aymes cited one component that is produced much more efficiently with this

feature. It is a tubular, thin-wall aerospace part machined from solid 304 stainless steel bar of 38 mm diameter. It requires a blind, longitudinal hole to be drilled and bored and the outside diameter (OD) to be turned to leave two lugs. Not only does the Y-axis allow the lugs to be drilled in-cycle, instead of the component having to visit a machining centre for completion, but by being able to program both Y-and C-axis movements into the OD turning, cutter deflection is minimised and accuracy is improved. As the component is required in batch sizes ranging from 200 to 800, the benefit is considerable.

Even more advantageous with the new machine, however, is the ability to take advantage of ghost-shift running, which is theoretically possible with the other Miyanos but practically not feasible due to the absence of load monitoring to detect worn or broken tools and automatically stop the machine.

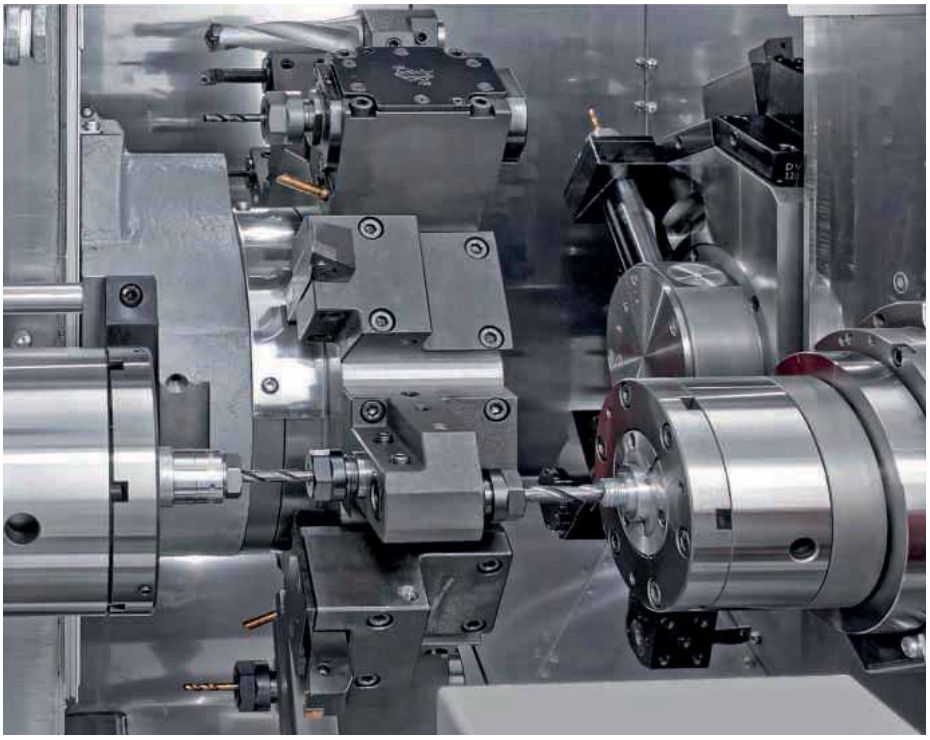
The latest lathe, with its fail-safe features and reliability, is regularly left to operate unattended overnight. So, also, is a multi-pallet, 5-axis machining centre added to Apsley's prismatic machining department in April 2018. Peter Aymes predicts that these two machines will pay for themselves faster than all the others on the shop floor. He asserts that if a production centre is capable of running lights-out and is of the right quality, rapid amortisation renders the initial purchase price much less important.

When Citizen installed the latest lathe, it also supplied the subcontractor with the latest version of its Alkart CNC Wizard programming software. It assists and

simplifies the creation of even complex cycles using a built-in G-code and M-code library plus reference material and diagrams. Inexperienced users in particular benefit, such as Apsley's Jay Pritchard, who is halfway through a four-year mechanical engineering apprenticeship. He said he finds the wizard useful when operating the new Miyano if his mentor is not available and the relevant manuals are not to hand. It also helps with understanding how to use the machine.

Founded in 1984 by Peter Aymes' father Graham, the subcontract engineering firm has always split its machining approximately half and half between turning and milling. Key sectors supplied with high tolerance, complex parts and assemblies are aerospace, defence, medical and pharmaceutical. Non-kanban batch size is typically in the range 20 to the low hundreds and the company also operates a toolroom facility for smaller batch runs, prototype production and the manufacture of tooling and fixtures.

However, one-third of the company's business derives from supply of components and assemblies just-in-time, providing price stability through the ability of the subcontractor to produce much larger quantities for consignment stock, with customer call-off typically at a rate of 1,000 pieces per week.



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Machining centre is both compact and ergonomic

German machine tool builder Spinner has introduced a new, vertical-spindle, 3-axis machining centre with a generous working volume of 850 x 510 x 510 mm and a small footprint of 1.8 x 1.85 m. The impressive ratio is achieved by adopting a patented method for protecting the saddle's Y-axis guideway from swarf and coolant ingress using a single wiper system, eliminating the need for a telescopic cover. The depth of the machine is consequently shorter, leading to a 30 percent reduction in the area needed for installation.

The machine is available in the UK through sole sales and service agent Whitehouse Machine Tools, which points out three other notable attributes of the Spinner VC850. One is that the height with the spindle when raised to its maximum is just over 2.4 m, catering to users that have restricted headroom in their factory. A transport height of 2.3 m without significant disassembly helps access to buildings.

The second feature is that the X-axis guideway also has a single wiper for protection, allowing the table to move to the extremes, so automated loading and unloading from the sides is simplified. Thirdly, a short distance of 160 mm from table to operator leads to ergonomic use that is assisted further by a height-adjustable, swivelling control panel. The latest generation Siemens 840D sl CNC with 24-inch touch screen is fitted, while availability of the Heidenhain TNC640 control is imminent.

The machine has an FEM-optimised, cast construction that provides a high level of rigidity and vibration damping for elevated cutting performance and high standards of surface finish on machined components. Further advantages are that tool life is extended and accuracy of machining is enhanced. Rapid traverse and maximum cutting feed rate are 40 m/min, contributing to high productivity and table load is up to half a tonne.

Often overlooked when drawing up a machine tool shortlist is the aspect of chip disposal. Spinner has optimised efficiency in this area by providing a pair of spiral augers to deliver chips to a conveyor at the front of the machine for convenient removal.

There are two variants of powerful spindle, a high-torque 12,000 rpm / 18.2 kW SK40 or BT40 version as standard or optionally an HSK63 alternative offering 18,000 rpm / 18 kW.

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Tool manufacturer is also a facilitator

When Suttner adopted a growth strategy 15 years ago, it was decided to significantly increase the manufacturing depth. Its priority was to focus on parts with complex designs and high added value. The executive management brought ARNO Werkzeuge on board as its partner and facilitator to also increase productivity. This success story has brought about manufacturing competences and products that were inconceivable in the past. At the same time, it is an effective solution to the lack of skilled workers.

"Today, we manufacture parts which were inconceivable in the past," says Steffen Zunkel, head of R & D at Suttner GmbH in Leopoldshöhe. "We even manage this on only one machine that has a maximum of two clamps and, in many cases, in less than half the time," adds Andreas Rempel, head of the manufacturing division. Today, complex parts are produced with a high level of automation at the company which is a member of the R+M de Wit Group. These parts include injectors for high-pressure cleaners to dose and add media.

In the past, the company regarded itself as a contract manufacturer and preferred to outsource complex parts. Today, it's the other way around. Suttner now manufactures complex parts almost completely in-house with a great deal of know-how and high added value. As a result, simpler parts are outsourced depending on in-house machine capacity. This has also resulted in a change in corporate perception, as sales director Rahman Tokalak affirms: "Today, we are a solution provider for complex components, mainly in the field of professional high-pressure cleaners. Every high-pressure cleaner probably contains some component or other that we manufactured."

Since 2004, Thomas Bach has paved the way for ARNO Werkzeuge to facilitate the way towards this situation and in 2007, Frank Deisler joined the team as on-site tool consultant. Together with development, production and sales at Suttner, the team implemented the growth strategy to achieve a sustainably functioning production system. This took numerous discussions and situations based on trust and with no hierarchical barriers. The focus was placed on product and process optimisation as well as increasing productivity and the level of automation.

How can a tool manufacturer be a facilitator?

Many may ask the question what contribution a tool manufacturer can make apart from supplying tools. ARNO sales director Klaus-Dieter Krüger explains: "We also consider ourselves to be a solution provider since we understand the customer's manufacturing process and know how to possibly optimise it by selecting the right tools." That is exactly what the experts at Suttner were looking for. "I can browse through tool catalogues myself and order products from any provider," says Andreas Rempel. "But if someone tells us how we can become faster and better by using the right tools, perhaps even in modified manufacturing processes, that's what we were looking for and what we appreciate right from the very start."

This is how the ARNO team contributed to a substantial increase in competence that has raised Suttner's competitiveness. It was achieved by a generous transfer of knowledge, which is nothing unusual for Thomas Bach. "We encounter so many manufacturing situations. It's only logical that we share this wealth of experience without revealing any secrets." Dieter Krüger supports him on this point: "This obviously requires a competent team located close to the customer." That's exactly what ARNO has since every specialist adviser comes from the trade. Many are application engineers like Thomas Bach. He has gained great respect and trust from Suttner for many years.

Detailed machining plans support manufacturing to optimise productivity

What does this mean in essence? Ultimately, turning and metal-cutting is all about productivity, for example in the production of injectors. At Suttner, injectors are the core product. Injectors consist of three basic bodies containing a total of about 30 components. For example, they include an internal Venturi nozzle and spindle as well as connections with non-return valves. The base bodies also have connection bores and threads, valve seats, oblong holes and overflows. It is a special challenge for machines and tools to produce them since the internal radii are located at places that are difficult to access. The products are required to be resistant to chemicals and this defines the material, in some cases forged stainless steel which is difficult to machine. Many components are FDA compliant so that the high-pressure cleaners can be used in the food industry, such as in meat factories, although they do not come into direct contact with foodstuffs.

Together with the machine manufacturer and in close collaboration with design, manufacturing and sales at Suttner, Thomas Bach came up with concepts to optimise component production: "From all these inputs, we derive machining proposals

which we work out in every detail, exactly describing every operation and parameter." The table lists each of the processes, such as rough facing, finish machining, parting off, drilling or thread milling as well as the matching tools to execute each machining step. Then the parameters are listed, such as cutting depth, cutting speed, rotational speed, feed with distance and time. In the end, the complete machining operation is described including process times and non-productive times.

Top priority given to process automation

The results are convincing. The machining time for the middle section of an injector now takes under six minutes whereas before it needed eleven minutes. "With a new holder we even managed to reduce this time to four and a half minutes," mentions Thomas Bach. The result was even more drastic for the valve body made of forged stainless steel. The part is located in the handles of high-pressure guns. In the past, they were produced on four machines using just as many clamps. Today, multitasking machines produce the workpieces in two clamps in a fraction of the time. The machines comprise a main spindle, counter spindle, milling spindle and tool turret. The entire process is now fully automated since a loading robot assumes the task of fitting, re-clamping from the first to the second clamp and removal. Just as it should be when automation assumes a higher overriding principle.

The close, long-standing partnership between Suttner and ARNO Werkzeuge is a wonderful example of how increased productivity comes from mutual trust and task-oriented collaboration. In addition, the significant growth in Suttner's competences has boosted the company's position in the competitive field.

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Hurco to promote powerful, easy-to-use software

Programming simplicity will be Hurco's theme for Southern Manufacturing 2020 and the company will be showcasing the latest software available on its proprietary Max5 control. The 19-inch, colour, touch-screen control has always been popular due to the ease with which a first-off part can be programmed.

On demonstration will be the latest Solid Model Import option, capable of reducing programming times even further. Whereas previously only 2D DXF files could be loaded directly into the control to create conversational data blocks, now it is possible to import 3D STEP or IGES files including splines and Z-depths. For machining 5-sided parts, transform plane commands are calculated automatically.

Two of Hurco's best-selling machines will be on the stand. One will be the versatile Hurco VM10i machining centre, which despite having a working volume of 660 x 406 x 508 mm fits into a compact space on the shop floor. Steel cutting demonstrations will take place throughout the show and visitors are likely to be impressed by the ability of the machine to offer true machining centre performance.

Sharing equal prominence will be a Hurco TM8i XP 2-axis CNC lathe. It turns parts up to 356 mm in diameter by 525 mm long and is well suited to bar work up to 64 mm diameter. The performance of this compact, accurate turning machine is complemented by the Max5 control. Simple, easy-to-follow graphics guide the user through tooling selection and all operations.

The new XP model enhancements mean that concurrent programming, improved graphics, roller guideways and faster rapids are standard features. The slant-bed lathe is supplied as standard with a 6-inch hydraulic three-jaw chuck, parts catcher and swarf conveyor. Vouchers for MacInnes coolant and lubricants as well as Dormer Pramet tooling are being offered.

From 5-axis machining centres to large format machining centres designed for the aerospace and energy sectors, there is a Hurco CNC machine for you. The flagship

VMX line is the workhorse of 3-axis CNC machining centres, but Hurco does not stop at milling. The company works diligently to ensure its turning centres are up to par with its mills. The TMX, TMM, and TM lines include a range of turning centres with chuck sizes up to 25 inches and mill turn machines that support the done in one philosophy.

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The year of automation

As 2020 begins, attention inevitably turns towards what lies ahead in the year. Tom Bouchier, managing director at FANUC UK, reflects on the state of automation over the last 12 months and looks forward to what could be a pivotal year for UK manufacturing.

A report published by the Business, Energy and Industrial Strategy Committee (BEIS) in September highlighted the disadvantageous position of UK automation. Falling behind its G7 counterparts in terms of robot density, Britain will struggle to keep pace with the productivity of international competitors if action is not taken.

If UK manufacturing is to realise its potential, it must overcome its apparent reluctance to automate. There is undoubtedly a superb base of technology and research in British industry, which, providing it can overcome the current barriers to automation, provides a fantastic platform for economic growth and prosperity. However, barriers remain, and the UK must work together to move industry forward.

Address misconceptions

The biggest challenge we face as a nation is to generate awareness around the benefits that robots and automation can bring to businesses. There are a number of misconceptions that must be addressed, which are ingrained into our society for various reasons.

One of the most damaging beliefs is that automation is expensive. This is particularly prevalent amongst those that need it most, specifically SMEs that are ready to expand their business but perhaps feel they do not have the capital to do so. The fact is that automation is not out of the financial reach of many UK manufacturers and the economic gains of introducing robots into a production line more than offsets any upfront cost.

In addition to the subject of expense, there is a general lack of awareness over the numerous applications that automation can be used for. With benefits for a whole host of industries, such as automotive, aerospace, food & beverage, OEM and medical, there are a wide range of industries which could enjoy significant economic growth by adopting automation. Plus, advances in collaborative robots, or cobots, add another tool to a manufacturer's armoury.

The way we, as an industry, educate the end user on the benefits of automation is crucial. Business owners are understandably protective of their company and no one is interested in being lectured on how they could be improved. Last year, FANUC hosted its first ever UK Open House, showcasing the potential of automation by providing manufacturers with a hands-on experience with the latest robots. These events are very important for industry and manufacturers should endeavour to attend similar open days in the years ahead.

Educate for tomorrow

Alongside upskilling those already working in manufacturing, we must provide pathways for those seeking to enter the industry. The most effective way to secure the future of UK businesses is to provide a stream of enthusiastic and automation-literate employees, capable of engaging with the latest technology.

There has to be a concerted effort to engage young people and the best way to do this is to continue to provide strong apprenticeship programmes. The key is to take a cross-party approach to this because the health of UK industry is too important to be politicised. We must look at how funding can be used to foster growth, for example

tax breaks could go to OEMs to enable them to improve training and prioritise apprenticeships.

It is also important that organisations, such as WorldSkills, continue to inspire young people and develop their skills. It raises awareness over the need to address growing skills gaps, which we can see all too clearly in UK manufacturing. FANUC's ongoing partnership with WorldSkills is part of its commitment to raise awareness of automation and by equipping apprentices with the competencies and knowledge to take into the future, British businesses can continue to compete on a world stage.

Attitude change

Changing perceptions of automation and robots should not be limited to UK manufacturing, it is something that needs addressing on a much wider scale. Resistance to automation can largely be attributed to the distrust of robots that is inherent within British society. The pervasiveness of this mindset should not be underestimated, and everyday features as prevalent as 'I am not a robot' buttons on websites are indicative of the negative attitudes towards robotic technology.

By educating those outside of UK industry as well as those within it, we can break down some of the barriers to robotics by removing the stigma associated with the word. Rather than fighting against the introduction of modern technology, Britain should be pioneering automation and changes to attitudes will help make this possible.

Inclusiveness

Encouraging people to talk about automation is a great start, but to foster inclusion within technologies is something which is beneficial to UK industry as a whole. The Industrial Internet of Things (IIoT) refers to the networking of devices for the purpose of interaction and data exchange and is likely to be a major trend in 2020.

FANUC is introducing its own IIoT platform into the European market, known as the FIELD system, which stands for FANUC Intelligent Edge Link and Drive. It is great for breaking down barriers to automation within factories themselves, enabling communication between various machines and robots of different generations and manufacturers. This type of open platform technology can play a major role in encouraging a wider adoption of automation and it is an exciting prospect for the year ahead.

This type of open communication can actually be applied to the way UK industry liaise with Government. Many, myself included, frequently call on the Government to be more decisive in leading the transition to new technologies and to provide a platform upon which British businesses can grow. However, a certain degree of responsibility lies with experts to support the Government, by providing a crucial base of industry-specific knowledge to support their efforts to influence a change in attitudes.

Final thoughts

There is clearly room for improvement in the UK when it comes to adopting automation into manufacturing and the low robot density compared with our G7 counterparts is worrying. However, there is sufficient appetite for progress and technological advancement to be optimistic that 2020 will be a pivotal year for British businesses.

Addressing misconceptions and tackling barriers to automation with a positive mindset is the key to improving productivity in UK industry and by generating awareness and offering training, there is no reason to believe that the year ahead will be anything but successful.

For more information on FANUC UK's automation and robots offering, please visit: **https://www.fanuc.eu/uk/en**

At its state-of-the-art headquarters in Ansty Park, Coventry, FANUC UK brings together world-leading capabilities in industrial robots, machine tools and plastic injection moulding machines to facilitate the complete integration of factory automation systems for UK manufacturers.

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Robot paves the way for productivity boost

Concrete evidence has emerged of another export success for Stoke-on-Trent based engineering firm Morris Brothers, following the delivery of a custom-built slab moulding machine to an overseas customer. Morris Brothers is one of the UK's oldest established manufacturers of concrete moulding machines and for this latest export success, a Kawasaki robot proved invaluable in helping it to secure the contract.

Located in Burslem, near Stoke, the business was established by brothers Fred and Harry Morris in 1948 and remains a family run firm. The evolution of the business into a premier producer of concrete moulding equipment is an interesting one. The company began as a repair centre maintaining, servicing and repairing trucks and buses and not long after it had been established, Morris Brothers staff returned a repaired truck to a nearby business that specialised in producing products made from china clay. Whilst there, they were asked if they might be able to help out by having the truck workshop manufacture an urgently needed 'bottom retaining strip' for a clay moulding machine. This was duly made and, before long, Morris Brothers had moved into the manufacture of parts for clay moulding machines. From there, the company evolved into specialist manufacturers of the complete, bespoke concrete presses that it is known for worldwide today.

The export order for Morris Brothers came from an enquiry the company received from Turkey. The customer needed a 3-station press capable of manufacturing large concrete slabs and lots of them. So, Morris Brothers works manager Mick Humphries, a 43-year veteran of the business who began there as an engineering apprentice in 1977, assembled a team and got to work on formulating a detailed design based around the initial drawings that accompanied the enquiry.

A key part of the moulding process in this application and, one which had the greatest potential to retard production rates, was the demoulding process where completed slabs of formed concrete are removed from the press and placed onto an adjacent pallet. With a typical individual slab weight, dependent on the design being produced, of between 9.5 kg and 12.5 kg and with up to 4,500 slabs in need of demoulding and placing onto pallets in each nine hour shift, it became clear to Mick Humphries and his team that a call to a robot company was a priority.

"We have, over the years, worked with many robot suppliers," says Mick Humphries. "But some time ago we settled on Kawasaki as our preferred provider. They have earned their place in becoming our first port of call for all robot-related applications now. In addition to providing good quality equipment, their attitude, engineering skills and confidence to let us do as much, or as little, of the design and integration as we want to ourselves has been of significant assistance to us."

In this application, the demoulding operation required each slab to be picked up using vacuum holders in the horizontal plane. The slabs are lifted and then rotated through 90° into the vertical as the robot arm moves across to the adjacent stacking pallet, where they are placed vertically into storage and transportation racks.

Kawasaki Robotics' Ian Hensman and Alan Williams oversaw the Morris Brothers project, and mindful of the tight timescales described for the project, immediately asked their colleague Harry Nakis, Kawasaki Robotics' experienced application engineer, to create an active simulation based on the known facts at that point. The Kawasaki Robotics team had agreed that the company's ZX-165U robot was the most appropriate choice in this case. It is a heavy-duty machine which offered the speed and precision required and which was easily capable of lifting the weights on the specification sheet. Kawasaki's ZX-165U robot is a 6-axis unit, with a reach of 2.651 metres. It features a rotating wrist which, even when fully laden, can rotate at 260°/sec whilst delivering guaranteed repeatable accuracy, at maximum reach, of +/- 0.3 mm. Using this particular model of robot also provided Morris Brothers' new customer

with another advantage, one which they hadn't asked for, but which was nevertheless warmly welcomed: inbuilt expansion potential, or future-proofing.

As the robot would be working well within its design specification, the customer could also use the robot, should it be required at any point in the future, for even heavier loads, or on different tasks and at increased speeds with minimal reprogramming.

Ian Hensman states: "When we first spoke with Morris Brothers about this project, their team had already honed down the detail design of the press and identified exactly what they wanted a robot to do as part of this 3-station machine. Being able to agree the precise operating parameters with Morris so early in the project meant that we were able to provide them with a computer-generated simulation very quickly from our CAE facility in Warrington. As a result, all parties were able to confirm in record time that the proposed ZX-165U robot would indeed be ideal for the requirements set out in the specification."

Morris Brothers new concrete moulding machine, complete with Kawasaki Robot, was delivered to a delighted customer well

inside the agreed delivery time and is now producing thousands of concrete slabs a week at the plant in Turkey.

Mick Humphries concludes: "Choosing to work with Kawasaki Robotics as part of our team on this project helped my colleagues and I take it from an initial enquiry to a fully commissioned installation more than 2,000 miles away in just 26 weeks."

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The rise of the cobot

When we think of industrial robots, we often get an image of a car factory, with robots welding panels, lifting large car bodies and spray painting finished assemblies. These powerful robots are designed to work quickly and autonomously for hours at a time. Because of this, they need to be separated behind barriers to avoid causing any risk to workers in the factory.

Yet, this isn't the complete story. A new generation of robots, designed to work right alongside people, is increasingly making its presence felt in the workplace. These collaborative robots, or 'cobots', are intended as automated co-workers, interacting with people and cooperating on shared tasks.

Cobots can trace their origins to the mid-1990s, starting with an unpowered device that allowed people to control the movement and positioning of heavy loads. However, it wasn't until the last few years that cobots really blossomed, with the advent of devices such as ABB's YuMi®.

Of course, safety when working alongside people is paramount and cobots are designed with several features that minimise the risk to workers. YuMi has a combination of physical and software safety features, ranging from lightweight soft-padded arms, to motion control software and speed-limited hardware. It also has no pinch points on its arms that could trap or injure people.

YuMi comes in both dual and single arm variants, with the dual-arm robot weighing just 38 kg and the single-arm variant only 9.5 kg. These lightweight features reduce the power the robot can exert in a collision, while its rounded geometry lessens any impact.

The arms themselves are a significant factor. Featuring an "elbow", the arms of the seven and 14-axes YuMi robots look a lot like those of humans, a friendly design that encourages people to feel safe around the robot, increasing the willingness to work closely with them.

There is also no external wiring or hardware on the arms, which also have soft-padding to add another layer of safety. A human operator can also push the robot's arms away if they come into contact with them.

It also incorporates force sensing technology built throughout the YuMi's arm and gripper, as well as advanced friction modelling and collision detection technology. These limit the robot's power and force capabilities, ensuring that collisions with humans won't cause any harm. This also allows the robot to continue working at high speeds, even when working very closely to a human operator.

Even the big 'mainstream' robots can act more collaboratively with people. ABB's SafeMove2 robotic safety solution safeguards operators by replacing physical barriers like fences with laser scanners that ensure a moving robot will always stop before it collides with a human.

The ability to work safely alongside people on the same assembly station or bench gives cobots many advantages over their larger, more conventional relatives. One of the major benefits they bring is the need for much less space, some can be mounted on walls or ceilings to maximise the use of the assembly area.

The single arm YuMi takes light weight and flexibility to new levels. The robot's ultra-light magnesium arm rotates on seven axes to mimic human-like movements with greater agility than 6-axis robots. The robot was specifically designed to meet the flexible production needs of small parts assembly processes, including electronics and consumer goods, and for small and medium enterprises.

These features make cobots ideal for a wide range of applications, from simple assembly of small parts to more complex tasks involving packaging and palletising.

Cobots can also maximise flexibility and efficiency through synchronised collaboration, in which the human and the robot work together in a planned but more intermittent manner. Examples include final trim and assembly in automotive manufacturing, which requires some amount of human interaction combined with the speed and precision of the robot. These tasks are ideal for such a collaborative setup.

The highest level of collaboration is for the robot and human to cooperate with each other to share workspaces and tasks continuously. This is especially useful for small parts assembly lines.

However, It's not just the largest companies that are going for cobots. Smaller manufacturers are finding that cobots have some qualities that make them ideal for their set up. Cobots like YuMi feature lead-through programming. This involves programming by demonstration, where a person guides the YuMi arms and grippers through the required series of movements to perform a specific task.

This means that even someone without specialised training can program the robot and have it running in minutes.

Together with easy mounting where they are needed, these easy-to-install and program features make cobots ideal first

automation solutions, improving productivity, cutting operating costs and even improving the retention rate of employees.

Productivity is the main reason that Panda Confectionery chose YuMi, which it is using to remain competitive in the rapidly changing and high growth pick and mix candy market. Working alongside people to pack confectionery products in plastic boxes, the company's robots help it respond quickly to rapidly changing customer demand. With no need for safety barriers, the lines are also easier to clean and maintain.

With their smaller size and lower need for peripheral equipment, cobots are less expensive than the bigger industrial robots, with investment needed for a robotic work cell falling from over $200,000 to under $50,000.

One of the biggest factors driving the adoption of cobots is the rise in demand for personalised or customised products. Deloitte reports that some 36 percent of consumers expressed an interest in personalised products or services, while the UK market for personalised goods is estimated at over £1 billion.

Cobots help manufacturers meet this demand by giving them the flexibility to manage the shift to low-volume/high-mix production. Collaborative robots add the agility needed to change rapidly between products and introduce new products faster. People working with cobots on the production line contribute their unique problem-solving capabilities, insights and adaptability, while robots bring their strengths of tireless precision and endurance for repetitive tasks.

Fewer people these days want to spend hours performing dirty, dull, dangerous and repetitive tasks. Also, many small manufacturers in high labour cost countries cannot simply outsource labor to low-cost countries like large corporations do. Cobots are ideal here, as they not only reduce the need for manual labour but can work tirelessly and with higher quality. The result is that human co-workers are freed to perform higher skilled, more interesting work.

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Latest Shark tap provides high security

Dormer Pramet has expanded its range of Shark Line taps with a new assortment for high strength steels and titanium alloys.

Available in spiral point E334 and spiral flute, E335, geometries for through and blind hole threading respectively, the new taps provide high performance and process security in hardened and tempered materials below 45 HRC.

Immediately identifiable due to the black ring on its shank, the new taps incorporate a robust geometry which significantly increases cutting edge strength and supports problem-free, high quality thread production.

In addition, both feature a TIAlN-Top coating and are manufactured from a unique powder metallurgy tool steel for toughness, longer tool life and increased performance at higher operating temperatures.

Johan Bodin, product manager for threading at Dormer Pramet, states: "With our Black Shark range, we offer customers the opportunity to machine high strength, high value workpiece materials, with a strong level of reliability.

"Imagine threading an expensive component in the final stages of a complex machining process and either the tool breaks or worse, the resulting thread is out of tolerance. Our Black Shark taps provide the user with the process security needed to ensure this does not happen.

"This introduction further strengthens the Shark Line's position as one of the world's leading assortments of HSS performance taps."

The E334 spiral point tap provides through-hole threading up to 2.5xD with a low rake angle for good chip control and edge strength. With a balanced higher relief on the chamfer and lower relief on the guidance threads, the E335 spiral flute tap supports blind hole threading up to 1.5xD.

Each tap within Dormer Pramet's Shark Line assortment features a colour ring denoting material suitability, promoting quick and easy tool selection. Other material types covered in the range include red ring for alloy steels, yellow for structural, carbon and low alloy steels, blue for stainless steel, green ring for aluminum and white for cast iron.

Versatile long-grooving options expanded

Dormer Pramet has expanded its parting-off and grooving assortment with several significant additions.

This includes a complete offer for a variety of machining conditions and materials comprising a new insert, two new geometries, a grade, blades and toolholder.

The new 25 mm GL double-edged insert is available in a variety of widths from 2-6 mm. Targeting long-grooving applications, GL supports 60 percent deeper capacity, over Dormer Pramet's LCMF16 insert.

A PVD grade, G8330, has been introduced for the GL insert to provide a versatile and stable option when machining steel, stainless steel and cast iron.

The insert is also supported by two new geometries. PR is the first choice for medium to high feeds in a variety of machining conditions. Its cutting-edge strength resists cracking when grooving interrupted cuts and is ideal for the parting-off of bars.

The PM geometry is an option for low to medium feeds on soft materials, such as austenitic stainless steel, as it offers greater resistance to built-up edge and reduces the burr left when parting-off tubes.

A new range of external toolholders are available with shank dimensions from 16-25 mm. The advanced design supports stable cutting and resists vibration, promoting high-quality surface finish. The holders provide an overhang up to 32 mm.

Designed for small part machining, the tools feature a 30-degree angled screw position for easier indexing and a brace to increase toughness.

In addition, a line of universal tool blades, offering heights between 26-32 mm, are now available. It features a double-sided clamping key and a new design which enables inserts to be replaced with one hand.

Meanwhile, Dormer Pramet has launched a new grooving system, including an insert, X61 and toolholder, P61 for light machining, specifically the external and internal turning of lock rings and sealing rings.

Widely used in the bearings and automotive industry, lock rings, also known as circlips and sealing rings, require highly durable and accurate tools due to the small dimensions involved.

The new insert offers deeper grooves with widths up to 1.85 mm and is available in both single and doubled-edge designs. Its positive geometry reduces cutting forces

and temperature generated, meaning less power and stress on the workpiece, tool and machine.

Available in the new G8330 grade, the X61 includes a negative T-land to improve cutting edge strength and reliability, making it suitable for smooth machining of steel, stainless steel and cast-iron.

New toolholders are included as part of the launch to support internal and external grooving. Designated P61, the range offers a productive solution for finishing operations on small workpieces.

Dormer Pramet update tooling data classifications

Dormer Pramet has upgraded the way it presents product data descriptions and Workpiece Material Groups (WMG) across all its assortment of cutting tools.

The global manufacturer is introducing standard tooling data, such as diameters and lengths, according to ISO 13399, allowing for easier and faster exchange of information between computer systems and software.

The ISO standard features a total of 133 parameters, covering a wide range of cutting tools, helping to support manufacturing planning, machining operations and product supply.

By supporting a common language in its descriptions, Dormer Pramet will save customers and partners a significant amount of time, providing an easier gathering of high-quality data across its 40,000 solid and indexable tools.

Meanwhile, the company is providing a greater level of detail than ever before on its Workpiece Material Groups (WMG).

Helping customers to find the right tool for the application and supporting the machining process, this change is also based on the commonly used ISO standard. However, it is taken a step further as it includes recommended starting values for speed and feed.

For each of its products, Dormer Pramet now provides three levels of data within the new Workpiece Material Group structure.

It features the standard ISO material definitions, based on the six coloured groups, plus additional classifications on material structure, composition, hardness and ultimate tensile strength.

The new standard and improved WMG data has been implemented in all of Dormer Pramet's product material from November 2019 onwards.

ISO is the International Organisation for Standardisation and a worldwide federation of national standards bodies.

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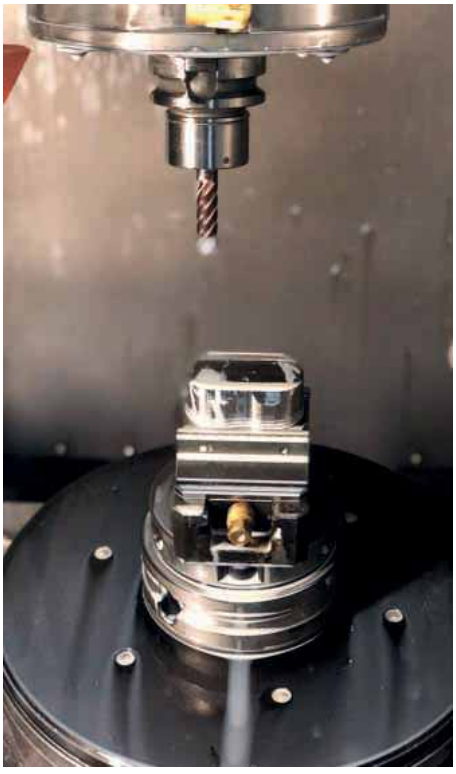
ITC increases productivity for automotive subcontractor

Leading Scottish subcontract manufacturer, Euro Precision Ltd has now specified cutting tools from Industrial Tooling Corporation (ITC) to improve productivity on a range of automotive components. The Glenrothes subcontract engineering company has built its reputation upon manufacturing critical precision components and assemblies to exacting quality standards for the aerospace, automotive, medical, telecommunications petrochemical and electronics sectors.

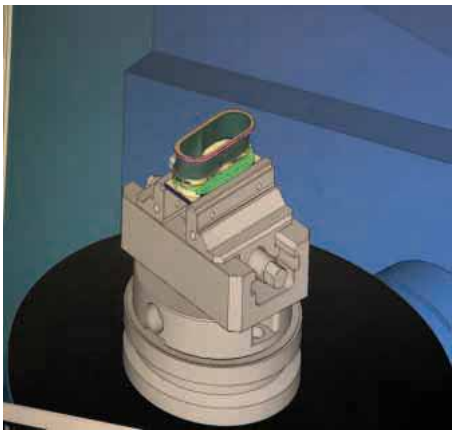
The diverse customer base has been established over a 25 year history and from its 30,000 sq/ft factory, the company boasts clients such as Siemens Healthcare, Glenair, Leonardo, Zeiss and AMG Petronas as a small selection. With a customer base that any subcontract business would be proud of, Euro Precision has established a reputation for the production of high-quality workmanship, inspired innovation, cost effective solutions and customer service.



The Fife Company recently undertook a project for Mercedes HPP (High Performance Powertrain) that required programming, tooling efficiencies and improvements for the machining of a series of engine components. The complex outlet manifolds and valve waste assembly are manufactured from inconel 625 on Euro Precision's high-spec Matsuura MAM-72 5-axis multi pallet machining centre. Manufactured for the next generation of supercar, the Mercedes HPP project requires over 2,700 manifold outlets and 2,000 valve waste assemblies. With such production volumes, it was critical for Euro Precision Ltd to get the process running efficiently as possible and this is where ITC entered the fray.

By implementing a machining strategy that incorporated a 3XD axial depth of cut instead of the previous 1.5XD strategy, Euro Precision was able to conduct most of the rough machining in a single pass. The machining parameters far exceeded the realms of possibility for the previous tools supplied by a prominent international tooling vendor. The performance of the ITC Cyber Series and its ability to prolong machining on such a challenging material led to further ITC solid carbide end mill introductions to the prestigious project.

The Scottish manufacturing success story at Euro Precision is built upon the foundation of high-specification machine tools like the two Matsuura MAM72 5-axis machining centres. The Matsuura machines incorporate the BIG KAISER face and taper dual contact spindle interface, which is the only genuine face and taper contact system on the market. To benefit from the performance, rigidity and precision of the BIG KAISER face and taper system that guarantees run-out of one micron at the nose and three microns at 4xD, Euro Precision has installed a complete range of BIG KAISER precision collet and chuck systems that are available from ITC.



The stability of the Matsuura spindle configuration and the BIG KAISER face and taper interface has enabled ITC to introduce a variety of high-performance tooling solutions. This has included a complete suite of five and six flute VariMill end mills as well as indexable face and shoulder milling tools from Widia with both rough and finish machining insert designations. The solid and robust machining platform has enabled ITC's Gary Heaney to utilise both the ITC and Widia tools to full effect. The results have been a revelation to the Fife manufacturer, which has also implemented Widia indexable drilling and turning as well as solid carbide drilling to great success following the results on the Mercedes inconel project.

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Walter taps into solid carbide for superb threading of hardened steels

Tooling expert Walter GB has announced a range of two new solid carbide taps and a thread milling cutter targeted specifically at producing threads in hardened steel. TC388 Supreme and TC389 Supreme solid carbide taps are for 50-58 HRC and 55-65 HRC materials respectively, while the TC685 Supreme thread mill is for workpieces up to 44 HRC hardness levels.

The TC388 and TC389 Supreme taps have special cutting geometries that fully shear off the root of the chip when reversing, minimising torque peaks that are common with blind hole machining; for example, when the reversing of the tap can result in fractures.

In addition, the new geometries also prolong the tool life and increase process reliability and the need for oil lubrication has been replaced by the use of emulsion.

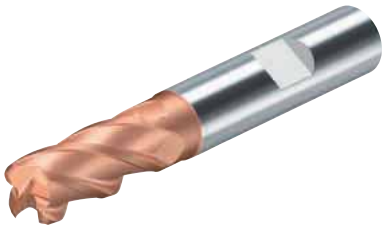
Generating maximum process reliability and long tool life, the TC685 Supreme orbital drill thread mill produces the core hole and thread as well as chamfer, if required, in a single operation.

Its face milling geometry produces stabilising forces in the axial direction to improve stability and reduce deflection, with the result of fewer radius corrections and reduced wear. In addition, its 15° helix angle and internal coolant guarantee chip evacuation.

Corner radius and reduced neck diameter boost performance of Walter's solid milling cutters

For the first time, tooling expert Walter GB has introduced a solid milling cutter with a corner radius and reduced diameter neck to enable improved access to component features at varying depths and with improved tool life, especially on ISO P materials as well as ISO M and ISO K workpieces.

The new MC232 joins other solid carbide



milling cutters in the cost-effective Perform range, which also includes types without reduced necks and without a corner radius.

Walter's Perform range, which is now available in 126 different dimensions of 2-20 mm diameter, can be used for all typical milling applications including lateral milling, full slotting, pocket milling, helical plunging and ramping and are suitable for a variety of materials and milling strategies.

In addition, cutters within the range can utilise Walter's WJ30ED grade coating which provides a high level of wear resistance.

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Guhring to show new ranges at Southern Manufacturing

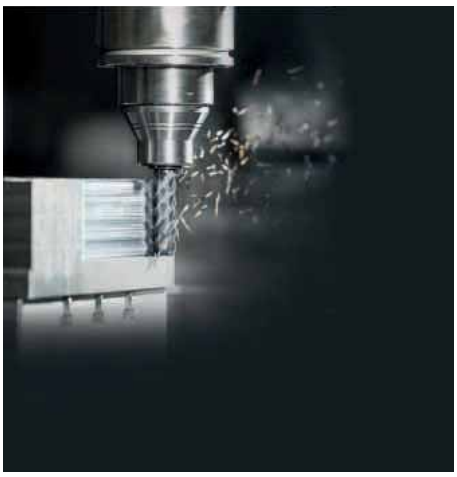
At the Southern Manufacturing exhibition, Guhring will be giving exhibition premieres to a number of new products that were launched at the end of 2019.

Visitors to the show will have an opportunity to investigate the new Guhring RF Speed milling range that has been developed for the machining of very tough materials. The latest arrival, the new RF100 5-Speed and RF100 7-Speed solid carbide end mills, is proven to take cutting speeds and process reliability to a new level and show visitors can discuss the opportunities with the Guhring team.

The increased tooth number of the five-fluted 5-Speed and seven-fluted 7-Speed generate high metal removal rates with stable process reliability, even when processing the most difficult-to-machine materials. Providing high-performance roughing at high cutting depths, the two new ranges maximise feed rate parameters during large metal removal rates. As part of the highly dynamic Guhring Trochoidal Cutting (GTC) series, the new RF100 5-Speed and RF100 7-Speed are suitable for machining tough stainless steels, special alloys and a wide variety of steel and cast-iron grades.

Alongside the RF Speed milling line will be the new RT100XF; the latest in a long line of high-performance drilling products from Guhring. Branded as 'Extreme and Powerful', the new RT100XF has been developed to generate outstanding feed rates and exceptional metal removal rates. Created to reduce cycle times for difficult-to-machine materials and special applications in series production, the extremely hard new drilling line is said to be extremely resilient to potential breakages. This bold claim is based upon the new carbide grade developed by Guhring for the RT100XF that performs a balancing act between hardness and toughness.

The design and geometry of the new RT100XF supports the robust performance of the carbide grade and surface treatment with an early double margin support that perfects the coaxiality to ensure perfect bore size and roundness. This makes the RT100XF the drill of choice for precision,



concentricity and performance for hole making from 5xD upwards. Available in 5XD and 7XD, the new drills can be purchased in diameters from 3 mm to 20 mm diameter with 0.1 mm increments.

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CERATIZIT takes on milling of HRSA materials with new ceramic inserts

Team Cutting Tools from CERATIZIT has introduced two new Ceramic insert grades and associated cutter bodies, developed specifically by CERATIZIT Group, to meet the growing demand for the milling of Heat Resistant Super Alloys (HRSA) such as Nimonic, Waspaloy, Hastelloy and Stellite, often found in the burgeoning aerospace sector, particularly turbine blade manufacture.

The benefits of ceramic over carbide inserts are the greater heat resistance of ceramic which allows cutting speeds up to 20 times higher than could be achieved previously, with surface speeds up to 1,000 m/min possible. While carbide inserts remain as the cutting material of choice for finish machining these materials, the development of ceramic insert technology is cost-effective for 'rough' machining due to the significant cycle time reductions brought about by elevated cutting data. Team Cutting Tools has two new ceramic grades for this purpose, these being the Silicon Nitride (SiAlON) based CTIS710 and CTKS710 a whisker reinforced ceramic, which benefits from greater toughness than the Silicon Nitride based inserts. These newly developed grades, as well as delivering high surface speed, also provide extended tool life. For example, machining a turbine blade from Nimonic 80A at 1,000 m/min speed and a feed per tooth of 0.1 mm with a 3 mm depth of cut using a CTIS710 insert, tool life was 50 percent greater than the customer had experienced with its existing ceramic inserts.

To complement the new inserts, CERATIZIT has developed the MaxiMill 261 series of milling cutter bodies. The cutter bodies are available with either a positive or negative approach angle, with the positive cutter bodies capable of supporting helical plunge and ramping machining operations. Swarf removal and cooling is enhanced by the design of the tempered steel clamping claw, which directs the compressed air directly to the cutting edge.

"With the demands of the aerospace sector and their use of HRSA growing, the challenge to provide ever more efficient and cost-effective metal cutting solutions is vitally important. Therefore, the development work the CERATIZIT Group is undertaking and the delivery of that technology by engineers within Team Cutting Tools is playing an important role in keeping cycle times to a minimum and delivering productivity gains to our customers," says Tony Pennington, managing director of CERATIZIT UK & Ireland.

WTX Co-Pilot drills from Team Cutting Tools aids deep hole drilling

Developed as an intermediate step between the WTX-UNI and WTX-Quattro 4F pilot drills and the WTX High Performance Deep Hole drills in the WNT range, the new WTX Co-Pilot solid carbide drills enhance the machining of holes up to 50xD by piloting to as much as 20xD.

By using these intermediate length WTX Co-Pilot drills after an initial 3xD pilot hole has been created, the ideal conditions are generated to follow up with the WTX High Performance drills to depths of up to 50xD. To ensure correct point alignment with the following deep hole drill, the point angle geometry of the WTX Co-Pilot drills has been set at 137 degrees with either four or six facets, which is three degrees less than the pilot drill and two degrees greater than the WTX deep hole drills. The WTX Co-Pilot drills are also tolerance to j6 in order to create the correct sized pilot hole to provide clearance for the following deep hole WTX drills which are tolerance at h7 and fg6.

The productivity gains generated by use of the WTX Co-Pilot drills are centred around the elimination of the need to peck for holes, up to 20xD, for the Co-Pilot drills and no requirement for pecking at up to 50xD when followed up with the WTX deep hole drill. Process security is also enhanced along with enhanced tool life. The WTX Co-Pilot drills are available in a range of diameters between 3 mm and 9 mm and are suitable for materials in the P, M and K categories for steel, stainless steel and cast iron.

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New tool geometry allows multi-functional machining

A variant of Horn's successful Supermini precision tooling system has been introduced with new HP geometry, allowing higher infeed rates and other cutting parameters. It also enables multi-functional use on a lathe across a range of operations including drilling, boring, face turning and skimming.

Holes from 3 mm to 7 mm in diameter may be drilled into solid material using Supermini HP tools without a chipbreaker. While the performance data cannot compete with normal drills, the system is a practical solution if the number of cutter locations in a machine is limited. With the single-edged version, various hole diameters can be produced with a single tool.

The Supermini HP offers the option of immediately boring an inner contour after drilling without having to change the tool. An accurate 90-degree shoulder can be achieved at the base of the hole and the wiper geometry produces excellent surface quality, even at high feed rates.

Horn also provides tools with a chipbreaker, which are recommended for turning applications. The slightly twisted flute helps to remove chips efficiently from the machining zone, while an EG35 coating allows versatile machining of both standard and stainless steels.

In addition to the HP geometry, Horn has developed a new design of toolholder for the Supermini type 105, whereby clamping is achieved using a tensioning wedge on the face rather than on the circumference, as was previously the case. The tool is held in place with more force, which in turn makes the entire system more rigid. Additionally, the new clamping design results in a higher level of repeatability when changing the tool and allows a more compact construction. Even when working with Swiss-type lathes, a user is able to change the tool without removing the holder.

Horn Cutting Tools Ltd is the wholly owned UK subsidiary of Horn S.A. Luxembourg, a leading European supplier of grooving tools and a leader in precision

grooving technology. The company was incorporated in the UK in 2008, having previously traded as Horn UK since 1995.

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Round inserts promote better profiling with long overhangs in narrow grooves

Cutting tool and tooling system specialist Sandvik Coromant is adding round geometry inserts to its programme of CoroCut® QD parting off and grooving tools. Round geometry allows profiling with long overhangs in narrow grooves, while further applications include external profiling, the generation of recesses and undercuts and the potential to use non-linear turning and grooving with a full radial bottom.

"The features and benefits of using round geometry inserts with CoroCut QD holders include better tool life and chip control with a rigid insert seat, internal over and under coolant for improved process security and chip evacuation with the potential for use with a Y-axis blade," explains Dr Angélica González, global product manager for turning tools at Sandvik Coromant.

A customer case example ably demonstrates the potential gains on offer. A shaft made from 42CrMo4 alloy steel required grooving operations on a Niles-Simmons N30 CNC lathe. Using a CoroCut QD holder, with -RM geometry inserts in place of a competior solution, saw tool life doubled with far better chip control. The cutting data was identical for both tools: 290 rpm spindle speed; 160-180 m/min, 525-591 ft/min, cutting speed; 0.3 mm/rev, 0.012 in/rev, feed rate; 2.7 mm, 0.079 in, axial depth of cut.

Three grades are available for the inserts. GC1125 grade is ideal for finishing in all materials, as well as certain roughing operations in non-ferrous metals, Heat-Resistant Super Alloys, HRSAs and titanium, while GC1135 grade is first choice for roughing in stainless steel and HRSAs. Also offered is GC4335 grade for roughing steel and cast-iron workpieces. The assortment is available in four insert sizes of 3, 4, 6 and 8 mm, 0.008, 0.157, 0.236 and 0.315 inch.

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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Quality is everything

IBAK is a global manufacturer of pipeline inspection equipment and systems for the sewer pipe industry, with quality the key characteristic that sets the company apart in the market. It thus pursues exactly the same strategy as clamping tool manufacturer REGO-FIX, with its powRgrip system.

Well-functioning sewer systems are a major asset. In Germany, there are approximately 515,00 km of public sewer lines which is enough to wrap around the earth 13 times. There are also private and commercial sewer lines that, as building connections, direct sewage from homes and company facilities to the public sewer system. Experts estimate that this underground network is equivalent to a million km, which is enough to wrap around the world 25 times. If lines like these rupture, chemicals such as detergent and cleaning agents, human waste, bacteria and viruses can compromise the quality of drinking water. The pipelines therefore need to be inspected on a regular basis, so that any repairs can be carried out as soon as possible. During inspections, it is not only important to document the condition of the pipes, but also their positions underground. Pipeline route surveying and hydrostatic level measurement thus help to complete information about the piping system and create maps of branching access networks, many of which are still unknown. One of the systems that allows you to do just that is the IBAK company's 3D-GeoSense pipeline route surveying.

As a market leader in pipeline inspection systems, IBAK also offers systems for testing pipeline tightness as well as electrically powered grinding and repair robots for use in sewer pipe repair. The corresponding software systems developed in-house round off the product portfolio. With these products, IBAK offers a solution for just about any application in the sewer pipe industry; from small-scale sanitation systems to large-scale vehicle-based systems, the company plans, constructs and produces

everything. This portfolio is managed by a team of 370 employees at the company headquarters in Kiel and at four branches in Germany, with one in six team members involved in research and development. The products are sold in the global market, with IBAK supported by 40 commercial agencies around the world. The customer groups in Germany include network operators, such as local governments, as well as industrial companies with their own networks. There are also service providers for inspection and repair that serve network operators.

100 percent of all inspection and repair products are manufactured in Kiel, with production characterised by a high vertical range of manufacture, including creation of electronic components and provision of all inspection vehicle equipment. In other words, IBAK is first and foremost able to fulfill high quality standards internally, which is also reflected in meticulous quality and performance checks on devices that include tightness checks. Mechanical production in Kiel focuses on the manufacture of cubic and turned parts and is traditionally broken down into CNC cutting and CNC turning. However, more and more complete machining centres are being used, leading to increased consolidation in this area. While Kiel primarily machines brass and aluminum, it occasionally also processes plastics and stainless steel. Why so much brass and aluminum? The reason is weight, after all, the inspection and repair devices have to pull cables up to 600 m long through pipes without flipping over.

The powRgrip toolholders provided by REGO-FIX have been key components of IBAK's production process for many years, first generating interest back in 2003. "Up until that point, we'd primarily worked with traditional collets. We were looking for an alternative that would allow us to streamline processes and increase concentricity accuracy," says Carsten Büll, head of production. "Taking our staff into account, shrinking wasn't an option for us. We didn't want the temperature or the induction radiation, which is up to 80 times higher than that of a microwave. And when you're in a hurry, you often skip the apron and gloves." So they began to learn about powRgrip at a different company that was already using the system. "In our search for a dealer near us, we came across the

company Meyer + Münster," explains Carsten Büll. Without delay, an employee of the company that supplies tool and workpiece clamping technology, machine tools and tools stopped by and initiated the first tests. Toolholders were left with the company for weeks for further testing. "It didn't take us long to realize that powRgrip was exactly what we needed," adds Carsten Büll. "After all, we only get high-quality parts from the machine if the process chain consisting of spindle, toolholder, collet and tool is up to par. With powRgrip, we now had exactly the concentricity accuracy and compact design that we'd been looking for in a holder."

powRgrip is now widely used in Kiel for milling, drilling, turning, spindling, threading, and reaming. powRgrip holders are generally used when high precision and quality are essential, as revealed by the 3D-GeoSense pipeline route surveying, which provides a 3D plan of the lines and thus simplifies the process of locating any areas that require repair and adding new lines. In this system, too, the lower part of the camera tractor is made from brass. The complicated part is machined in two clampings, with the first clamping taking 1.5 hours. "This requires 68 tools, with a new one used on average every minute," explains Hauke Schlotfeldt, planning engineer and head of the CNC Cutting Group. "When it comes to tractor tightness, precision is the top priority." Because the camera tractor also needs to feature pockets and tapped holes, the interfering contour has to be as small as possible.

"As an integral component of the process chain, powRgrip plays an important role in the production of high-quality parts like these," says Hermann Meyer, CEO of Meyer + Münster.

With the integration of new machine generations in recent years, IBAK has systematically switched from SK 40 to HSK 63, which required a corresponding investment in toolholders. These days, the company not only uses Tenniken's entire range, from the smallest to largest powRgrip holder, but also, as a matter of course, incorporates into its portfolio the latest developments that REGO-FIX launches on a regular basis, and thus increases the flexibility of its machining.

One thing is clear: the higher concentricity accuracy of the powRgrip holders already ensures a longer tool life. Future assessments will reveal exactly how much that is and the tool savings achieved with powRgrip.

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Industry 4.0 press die clamping

For automatically clamping dies on a press ram, Roemheld demonstrated for the first time, at Blechexpo, a system that uses integrated sensors to measure real-time data on holding forces and transmit the information to the machine control. The new Flexline rapid clamping system is therefore suitable for predictive maintenance and use in Industry 4.0 applications.

The operator has access to information concerning the actual clamping force on the die and is immediately able to detect overloads, the occurrence of unusual forces during operation and die wear and breakage. The system facilitates error analysis and enables rapid problem-solving when servicing is required.

Due to the availability of a wide range of configuration options, Flexline can be used on almost all press models and for every die. It is suitable for either factory installation or retrofitting.

For reducing setup times in sheet metal forming, Roemheld also provided an overview of its ergonomic products for efficient, fast and safe transportation and change of heavy dies. On display were four transport carts with different load-carrying capacities up to 1,600 kg, hanging and swivelling carrying consoles that facilitate insertion of a die into a press and economical, freely configurable ball and roller bars to allow dies to glide easily over tables and other surfaces for effortless positioning.

Various Roemheld components such as magnetic clamping plates, locking cylinders, carrying consoles and roller bars were demonstrated on a TOP Line 2000 press from automatic stamping and metal forming press manufacturer, Andritz Kaiser, at the show.

Efficient clamping technology solutions for workpieces, as well as for dies in forming technology and plastics processing, form the core of Roemheld's ever-increasing portfolio of products. In evidence were some of the group's hydraulic, mechanical, electro-mechanical and magnetic clamping elements. These are supplemented by components and systems for assembly and handling, drives technology and automation and locking mechanisms for rotors on wind turbines.

In addition to having a constantly growing range of more than 30,000 catalogue items, the owner-managed group specialises in the development and realisation of customised solutions.

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Innovative new gripper

AMF has introduced 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 therefore 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," states 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 1,000 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," Martin Tinger emphasises.

In addition, the gripper has compensating play for the C-axis of plus-or-minus three degrees and for the Z-axis of 5mm, 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 tool

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.

Andreas Maier Fellbach (AMF), originally founded in 1890, today is a one-stop supplier in clamping technology and is one of the world market leaders. With a global market presence, the company and its employees always have an open ear for the resolving customer issues. By listening to these needs and, through its strong problem-solving ability, professional consultancy, intelligent engineering and high manufacturing quality, AMF repeatedly develops project fabrications and customised solutions for customers as well as standard solutions that succeed in the market again.

With an extensive range of hand tools, clamping elements and toggle clamps, AMF meets the highest quality standards and requirements for all applications. But in some cases, however, there may be individual requirements that are not included in its standard program.

For this reason, there are always custom-made products for special requests. Depending on requirements, the company rely on existing tools and modify these or, if necessary, design and construct a new product, tailored to very specific applications.

With more than 5,000 products and numerous patents, it ranks among the top innovators in the industry. Speed, flexibility and 230 well-qualified employees guarantee success at Andreas Maier GmbH & Co. KG. In 2018, AMF earned revenue of more than 50 million euros for the first time.

By focussing on its core areas of expertise, the company has long set new standards for innovative clamping technology, driven by its own development, the greatest possible flexibility and passion for individual solutions.

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Gewefa UK now offering Fahrion Centro P Premium range of collet chucks

Gewefa UK, the Corsham-based supplier of toolholders and tool holding accessories, is expanding its partner portfolio with the addition of products from the Fahrion Precision Centro P Premium range of collet chucks.

The company will concentrate on sales and support for three key products from the Premium programme: ultra power chucks; dynamic performance chucks; mini precision chucks.

The standard Centro P collet chuck system is widely available with features integral to all Fahrion systems including the tried-and-tested Fahrion 'Protect' coating on the collets. However, features of the Premium specialist programme create new application areas and opportunities.

The Ultra Power Chucks (UPC) are designed to optimise material removal rates on high-performance machines with high rigidity and drive power. Radial rigidity, compact length and mechanical pull-out protection produce a holding torque of 1,000 Nm.

The very high clamping force usually requires rigid connections which in turn results in the creation and propagation of vibration. Micro creeping also sets in earlier here. If the connection is less rigid but has a higher damping rate, much better results can be achieved.

With Centro P Premium UPC chucks, good damping rates are achieved and micro creeping is eliminated by positive locking.

The Dynamic Performance Chucks (DPC) are designed for machines with less stability and drive power, but usually with higher spindle and axis speed. DPC is ideal for trimming, finishing and roughing with all processing tasks able to be performed using the same chuck.

User features include high removal rates on machines with contemporary milling strategies, making them ideal for applications in tool and mould manufacture, automotive and supply industries and upscale components and subcontractors.

Finally, the Mini Precision Chucks (MPC) are designed for use with high speed spindles or for operating in tight spaces.

MPC chucks feature smaller clamping diameters for high spindle speeds and frequently, very slim outer contours for deep immersion/pocketing in cavities requiring very stable tool clamping.

To discuss individual requirements, contact Gewefa directly.

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Taking ER further

Kennametal makes turrets more flexible and collet chucks more capable

Kennametal has announced an expansion of its turret adapted clamping units, TACU ER-ready driven units, in conjunction with a line of solid ER collets which are threaded to accept screw-on milling cutters.

"Together the new TACU ER units and the solid ER collets are a great marriage of technology. Available in sizes ER25 through ER40, with thread sizes ranging from M08 through M16, this innovation provides machining centre-like capabilities to your live tool lathe. These new products provide the flexibility to use standard ER collets with solid end mills, or the new solid ER collets together with screw-on indexable milling cutters," says Ronald West, manager for tooling systems.

Sealed for through-the-tool coolant, there is a 1 mm standoff for additional clearance on larger end mills with a precision-ground locating boss for minimal runout. It's a very compact design, reducing the chance of interference on smaller machines. Compared to a standard spring-style ER collet, they're very rigid, so you can take heavier cuts.

The TACU offering can be used on seven leading brands of CNC lathes, both VDI and bolt-mounted turrets (BMT) with a variety of static and driven blocks. TACU's are equipped for internal and external coolant, with up to 12,000 rpm possible on specified driven tools. "This addition greatly increases the capabilities of our TACU offering", adds Ronald West.

With over 80 years as an industrial technology leader, Kennametal Inc. delivers productivity to customers through materials science, tooling and wear-resistant solutions. Customers across aerospace, earthworks, energy, general engineering and transportation turn to Kennametal to help them manufacture with precision and efficiency.

Through the skill and innovation of its people, the company delivers industry-leading tools and technologies that solve customer challenges and enable

exceptional performance. Its mission is all about performance for customers, with tools and wear-resistant solutions that enable them to run longer, cut faster and machine with greater precision.

Every day approximately 10,000 employees are helping customers in more than 60 countries stay competitive.

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Metal Assemblies chooses FARO

Located at the heart of one of the UK's traditional industrial areas in the West Midlands, Metal Assemblies produces high-quality stampings and assemblies for its customers who are mainly involved in the global automotive industry.

Approximately 25 percent of Metal Assemblies' production is exported. Although the majority of these sales are made into Europe, the company also has loyal customers in Asia and South and Central America.

Continuous investment in the latest production aids means that Metal Assemblies' 75,000 sq ft production facility boasts a very impressive plant list. The company's advanced manufacturing facilities enable a wide range of procedures to be undertaken, including presswork, machining, tube manipulation, robot welding and toolmaking. The high yield nature of the company's modern plant, along with the work of its dedicated, 130 strong workforce, allows the business to continue to thrive in what is an extremely competitive environment.

The company's comprehensive production facilities and its autonomous nature means that it is able to satisfy the vast majority of its customers' requirements in-house, although a small amount of specialist work is subcontracted to trusted suppliers. When the volumes of its outsourced work dictate, where possible Metal Assemblies pursues a policy of sourcing the required equipment and taking this work in-house. A case in point is the recent purchase of a 2.5 m capacity, FARO 8-axis QuantumE ScanArm featuring a Laser Line Probe SD and advanced 8-axis capabilities.

As Metal Assemblies has been experiencing rising demand, an increasing amount of the company's important 3D component scanning work was being subcontracted. In addition to the delays that this caused, this out-sourced work was also proving to be expensive. As the volume of subcontracted 3D scanning recently reached a critical mass, a potential return on investment was calculated and a search was made for a suitable scanning system.

Even though Metal Assemblies' 3D scanning subcontractor used a FARO 3D scanning system, other brands were also considered. Although, after witnessing

practical demonstrations of several companies' products, Metal Assemblies' quality manager Simon Bullows believed that the 8-axis QuantumE ScanArm was the most impressive system. Endorsements from several enthusiastic FARO users further convinced the company to place an order.

Simon Bullows explains: "In order to carry-on achieving the highest possible standards we design quality into our processes from the start of each project. Through actions such as design reviews, training, in process Poka yoke and constant process monitoring, we strive to maintain the highest standards at all times.

"Our company wide policy of continuous improvement can be seen, not just in the high-quality presses and machine tools that we use to produce parts, but also in areas such as the bespoke manufacturing computer system that is used to support our processes from concept to despatch.

"This policy of constantly upgrading our facilities also applies to our quality department. To ensure that we continue to make use of the latest quality control technologies, we make regular investments in the latest digital inspection equipment, such as our recently installed FARO 8-axis QuantumE ScanArm.

"Although we have a high-specification, fixed Coordinate Measuring Machine (CMM), it is unable to make the surface scans that we need when performing work such as product development. Therefore, for some time we have been outsourcing this work. As the volumes of subcontracted 3D scanning work grew, it recently reached a level where it became feasible to purchase our own scanning device.

"Having considered equipment from other metrology companies, following an excellent demonstration, we came to the conclusion that the FARO 8-axis QuantumE ScanArm fitted with the company's FAROBlu Laser Line Probe was perfect for our needs."

The recently launched, advanced FARO product seamlessly integrates a FARO QuantumE FaroArm with an eighth axis, making the FARO 8-axis QuantumE FaroArm the world's first 8-axis Portable Coordinate Measuring Machine (PCMM). FARO claim that the QuantumE is the ideal, portable solution for companies that are looking for a cost-effective, user-friendly, efficient factory inspection system.

The accurate yet robust FaroArm has been tested to withstand the harshest shop-floor environments and delivers market-leading portability and ergonomics. When combined with the FARO Blu Laser Line Probe or the FARO Prizm Laser Line Probe, the FARO QuantumE FaroArm becomes a class-leading 3D laser scanning system.

As it was ideal for Metal Assembly's use, the company ordered its 8-axis QuantumE ScanArm fitted with the FAROBlu Laser Line Probe. This optically-superior, next

generation of blue laser technology enables extremely fast scanning and delivers excellent results even on complex, dark, and reflective materials.

As the first portable CMM arm in the market to be internationally certified to ISO 10360-12 standards, FARO provides the ideal inspection tool solution, setting a new industry performance bar and ensuring maximum measurement consistency and reliability. The FARO 3D measuring arm can perform in a wide range of work in conditions, including operating in extreme temperatures and in shop floor situations.

An industry exclusive, the integrated 8-axis rotary scanning platform decreases scan time by up to 40 percent, as of now, there is no need to move around an object to scan it, instead, users simply rotate the platform as they probe or scan the part under inspection.

Simon Bullows concludes: "After our FARO training sessions, we are quickly becoming competent in the QuantumE's use. In addition to performing all of the 3D scanning tasks that we previously outsourced, our FARO Quantum ScanArm is now proving ideal for a range of tasks such as First Article Inspection (FAI). Given the speed and accuracy of our new FARO device, once our parts pass FAI inspection our production processes can proceed with confidence.

"Also, when a production run is underway, the QuantumE is ideal for quickly identifying component features that begin to deviate from nominal conditions, allowing prompt machine adjustments to be made before out of tolerance situations occur.

"Although purchased mainly for use in our QC department, as the QuantumE is portable and quick and easy to setup, when needed, we can also perform in-process component inspection, on the shop-floor. "While not yet used for this application, in future we anticipate using our FARO ScanArm to capture precise digital measurement data for reverse engineering parts that do not have relevant blueprints or CAD drawings."

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Manufacturers turn their attention to adaptive machining

Adaptive machining is fast giving manufacturers a 'golden opportunity' to secure greater control, speed and accuracy when setting tools and controlling workpieces according to a leading manufacturing boss.

David Mold, managing director of Blum-Novotest, has seen a 25 percent rise in demand for his firm's 'in-machine' probes and laser systems since the launch of LC50-Digilog, with the new technology now in place in some of the world's largest aerospace and automotive companies and tens of subcontract manufacturers.

The boss of the metrology specialist believes industry has finally realised that it can no longer stand still with the way it controls the production process, especially companies that are making their living out of cutting and shaping metal.

He states: "Adaptive machining has been around for some time and is basically about being able to measure and control the three main variables in the machining process, which are the cutting tools, temperature and the workpiece itself.

"Controlling these variables on the machine reduces the tried and tested method of setting tools off the machine or taking the workpiece off the machine to make the measurements on a Coordinate Measuring Machine (CMM)."

He continues: "By utilising on-machine tool setting systems, you can quickly tell if a tool is slightly off, meaning you can reset or change the settings immediately before a component is damaged or ruined."

Blum-Novotest launched the LC50-Digilog last year, the next generation of the laser and the latest addition to the hugely successful DIGILOG family.

This new technology evaluates the analogue signal rather than the digital one, taking thousands of measuring values of all cutting tool edges per second, resulting in highly dynamic measurement of all tool parameters.

In essence, this breakthrough is 60 percent quicker than conventional in-machine measuring.

Other benefits of LC50-Digilog include: Digilog calibration, due to more tool data you can accurately measure tools whilst eliminating coolant or dirt on the tools or in

the machine, providing higher accuracy than ever before; spindle or tool run-out can be measured accurately and incorporated into the measured result; premium laser optics - higher grade laser diode provides much higher accuracy achievable; high pressure tool cleaning nozzle provides much better cleaning functionality of the tool. This equates to a reliable system, more accurate measurements/less effects of coolant or swarf.

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Reduce inspection to seconds with the Sylvac Scan F60T from Bowers

Qualiturn Products Ltd has reduced the inspection time of its turned parts to just seconds using the Sylvac Scan F60T optical measurement centre. Located in Hertord, Qualiturn Products Ltd was founded in 1974 and is now one of the leading suppliers of precision mill-turned components in the UK.

Nick Groom, managing director at Qualiturn Products Ltd says: "We've made a commitment at Qualiturn to update our processes in a way that makes everything much more efficient, and the Sylac Scan has been a key tool in achieving that.

Measurements are so fast they're practically instant, increasing our speed of measurement immeasurably and adding the reassurance of consistent process and quality. Anyone can load the machine with a part for measurement and get the same answer every time. It completely removes the problem of human error, in turn significantly raising accuracy and quality levels."

Many of the parts manufactured by Qualiturn are required to meet exceptionally high levels of accuracy and tight tolerances. Manufactured components range from those used by hobbyists, parts for the electronics industry, as well as medical products that require strict process traceability and assurances of consistent quality.

As the sole distributor for Sylvac products in the UK, Bowers Group provided Qualiturn with a Sylvac Scan F60T. Designed especially for the non-contact measurement of cylindrical turned parts, this sophisticated optical measurement centre was the perfect solution for Qualiturn.

The Sylvac Scan is used by staff at Qualiturn to capture measurements at various stages of the production process; from first off measurements, checks during production, and for final part inspection. It has successfully allowed Qualiturn to increase productivity with a significant reduction in inspection time; providing fast, accurate and repeatable measurement for manufactured components.

The Sylvac Scan enables Qualiturn to carry out a complete component scan in under three seconds, taking multiple precision measurements at the same time, and with easy data output. Able to accommodate a measuring range of 60 mm diameter and 300 mm in length, and a scanning speed of 100 mm per second, the Sylvac Scan enables all parts to be measured quickly and accurately. This enhanced measurement capability not only increases the speed of measurement, but also the return on investment.

Nick Groom continues: "We carried out a capability study on the Sylvac Scan F60T and found such a massive improvement that it made perfect sense for us to invest. The Sylvac Scan F60T allows us to set up and save measurement programmes that can be repeated for the job life of the components that we produce. This reassurance of process is invaluable to us. We've made a commitment at Qualiturn to update our processes in a way that makes everything much more efficient and the Sylac Scan has been a key tool in achieving that.

We were able to transfer our old measurement programmes onto the new scan centre with ease, essentially allowing us to pick up where we left off and the support from Bowers Group was excellent during this process."

After more than 40 years at the cutting edge of CNC precision turning and milling component manufacture, Qualiturn strives to provide customers with the complete package; quality products, customer support and high levels of service. Qualiturn manufactures 8.75 million turned parts per year, is heavily focussed on driving efficiencies within the business and on the quality and credibility of its products.

As part of a drive to make Qualiturn's processes even more efficient, the business carefully assessed ways it could improve. The company has always had a scanner as part of its inspection department, but due to the modernisation of the factory and the businesses' ongoing investment in a variety of new machines, Qualiturn decided it was time to replace its Tesa-Scan 50 with a more sophisticated machine.

The Sylvac Scan F60 range is designed for use on the shop floor; its enclosure includes a door and safety curtain, integrated calibration master, temperature sensors and LED status light. The Reflex One Click technology also offers part recognition and auto measure with one button click.

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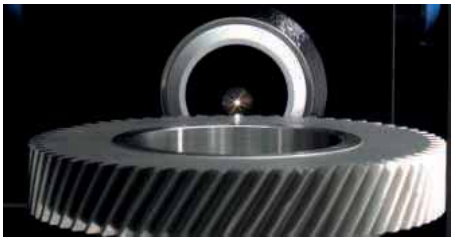
Klingelnberg optical metrology



Klingelnberg optical metrology successfully combines the advantages of tactile and optical measurement in one system. With the precision of the tactile 3D NANOSCAN and the speed of the optical HISPEED OPTOSCAN, Klingelnberg precision measuring centres are ideally equipped to handle all measurement tasks. Now, development engineers at Klingelnberg have gone one step further. Through an ingenious combination of optical and tactile measurement, the total measuring time for cylindrical gear measurements can be reduced by up to 30 percent without compromising accuracy.

Decades of the system supplier's experience have shown that tactile measurement cannot be fully replaced by an optical measurement method. That is why Klingelnberg has opted for a hybrid solution combining the best of both measurement types. A prerequisite for such a system is a rapid changeover from one method to the other. Thus, the precision measuring centres combine conventional and modern analysis methods for gearings with fast, automated sensor changeover.

The two methods are now also applied in rapid succession for cylindrical gear measurements. Specifically, this can be illustrated using an application example taken from e-mobility. For a gear with 48 teeth, the total measuring time can be reduced from 2.5 minutes to 90 seconds. To achieve this, the time-intensive measurements are performed in a very targeted manner with the optical sensors and are significantly reduced as a result, by up to 90 percent in the ideal case.

Measurement tasks in which tactile measurement presents advantages with respect to measurement time, flexibility or accuracy are performed in turn using the tactile method. The fact that this operational sequence has been integrated into the world-renowned Klingelnberg cylindrical gear software is particularly noteworthy.

As a result, the measurement methods are combined in a fully automatic, time-optimised manner, simply by making the appropriate selection. No special knowledge of optical measuring technology is required for data input and operation.

Founded in 1863, the machine manufacturing firm Klingelnberg is one of the leading companies in the gear industry. Thanks to numerous innovations in the areas of calculation, production, and measuring technology, Klingelnberg considers itself a leader in this industry. With its acquisition of Höfler Maschinenbau GmbH's core business in 2012, Klingelnberg has added machines for machining cylindrical gears to its range of products.

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New 3D scanner measures smallest parts and complex shapes

The ATOS 5 product family has gained a new member. GOM has introduced its new optical measuring machine that is particularly designed for small parts and complex freeform surfaces. The sensor is ideally suited for the inspection of airfoil components like turbine blades, nozzle guide vanes or blisks in the aerospace and power generation industries.

The new ATOS 5 for Airfoil expands the ATOS 5 series in the measuring area for small parts. While the ATOS 5 successfully performs a wide range of measuring tasks in measuring areas from 170 to 1,000 mm in length, the ATOS 5X is particularly effective when used for large surfaces and parts due to its strong, focused light. It fully demonstrates its superiority, for example, in the automotive industry, where even entire car bodies can be digitised quickly.

Gas turbine products operate in harsh environments exposed to large forces and the extremes of temperatures. In particular, the performance and demands on airfoil components are critical. Characteristics like edge radii, edge thickness and throat area are monitored during production, maintenance and repair.

With the introduction of a 3D measuring machine particularly designed for small parts with a size of 100 x 70 mm^2 to 400 x 300 mm^2, GOM closes the gap in the lower measuring area. At the same time, the ATOS 5 for Airfoil is particularly well-suited for the inspection of turbine components produced for the aerospace industry, such as blades, blisks and air-conducting structures. Their complex-shaped edges and surfaces have been a challenge during

3D digitisation until now. The ATOS 5 for Airfoil sensor also excels during maintenance and repair of nozzle guide vanes. The costs associated with the maintenance, repair and overhaul sector are large, replacing turbine blades can exceed 10,000 EUR. Using ATOS technology, partnered with techniques such as additive manufacture and adaptive machining, can lead to considerable savings.

Along with the introduction of ATOS 5 for Airfoil, GOM offers a corresponding software update. The 2019 releases of ATOS Professional and GOM Inspect Professional feature new modules that, among other things, make it much easier to analyse demanding edge geometries.

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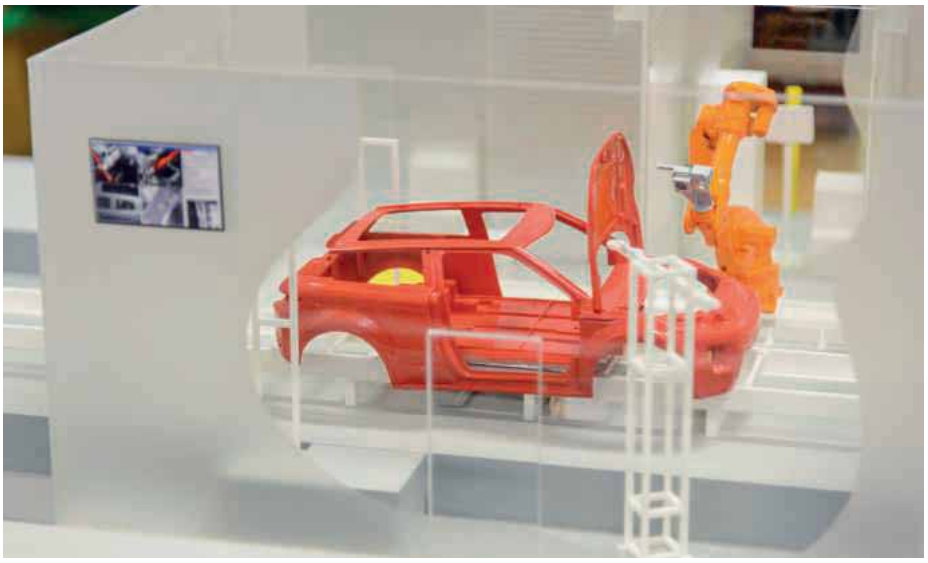
Automated laser marking helps improve speed, quality and flexibility at Jaguar Land Rover

The Vehicle Identification Number (VIN) is a car's unique fingerprint. Usually applied to the vehicle body after painting, but before other components have been installed on the assembly line, the VIN serves many purposes throughout the life of a car. It helps mechanics identify the right parts and procedures to use in service and repair activities, for example. It also allows insurers and law enforcement agencies to identify vehicles that have been stolen, or illicitly put back on the road after a serious accident.

Applying the VIN has always presented challenges to manufacturers, however. The mark, which today is an internationally agreed standard combination of 17 numbers and letters, must be accurate and clear enough to remain legible for the life of the vehicle. It must also be applied rapidly, on production lines that may have a cycle time of just a few seconds.

Those demands have encouraged carmakers to find automated approaches to vehicle marking. The manual marking approach used in the 20th century is simply too slow and too error-prone to suit modern manufacturing environments.

Companies have used various technologies to apply identifying marks. Dot Peen technologies, for example, use an electrically or pneumatically controlled pin to build up the letters from a series of indentations punched into the metal of the vehicle's structure. The technology is fast, flexible and reliable, but it has several



drawbacks for body-marking applications, two of which are significant: noise and cycle time. Punching a dent into the large, thin panel of vehicle body is bit like hitting a gong or cymbal. Repeating the same process dozens of times a minute for each vehicle makes for an unpleasant and potentially dangerous environment for operators working nearby. And the time taken to punch these marks can be a limiting factor in time-critical high volume production environments.

The search for a quieter, more operator-friendly approach has encouraged many manufacturers to use a scribe marking technique, in which a hard steel 'pen' operating under computer control 'writes' the mark into the body panel. Scribe marking is quieter, but it presents other challenges. Scribing requires a lot of force to create a good mark, and that in turn calls for elaborate tooling to clamp the marking head in place and support the panel while marks are made. And that tooling must be custom made for every model in a manufacturer's range. As carmakers put more models down the same production lines, that means extra cost and complexity. Worse, scribe marking on vehicle body panels can be prone to quality issues, leading to delays, rework and higher scrap rates.

In 2013, production engineers at Jaguar Land Rover were wrestling with all these problems and wondered if laser marking technology might provide a solution, they approached marking and verification specialist Pryor for support.

After looking at the requirements of the task, it quickly became clear to the Pryor team that conventional laser marking technologies would not be up to the task. Jaguar Land Rover's specification required marks with a depth of 0.5 mm, to ensure the VIN was tamper-resistant and would remain readable throughout the life of the vehicle. After much research and experimentation, Pryor developed a high-powered laser system that could be adapted to give a consistent mark of the right depth in very short cycle times.

The next challenge was integrating that technology into the production environment. That required Pryor to apply a host of other smart technologies. By its nature, laser marking is a non-contact process. By mounting the marking head on a robot arm, it would have a system that could seamlessly adjust to suit the requirements of different models, with no need to switch tooling between vehicles, or to build new hardware when future models were introduced. However without a physical connection to the vehicle, ensuring that

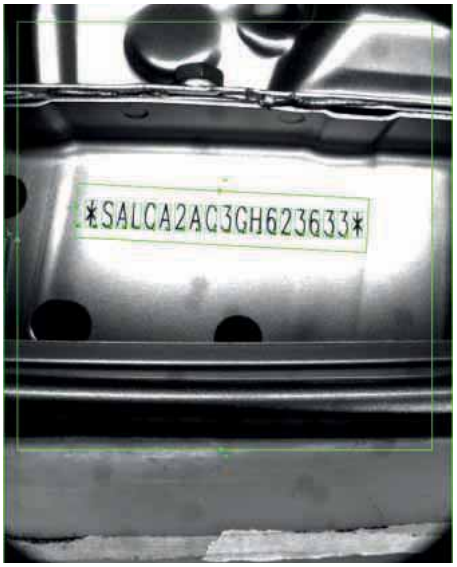
marks were made in exactly the right place was difficult. A difference in position of just a few mm between one body and the next on the production line could lead to a misplaced, or unreadable, mark.

To overcome the alignment issue, Pryor used its expertise in machine vision to develop a novel solution. A camera, mounted on the robot next to the marking head could be used to locate defining features on the vehicle's body. Combined with a laser displacement sensor that measured the distance of the panel from the marking head, the vision system could be used to define the precise position of the marking location in 3D space, allowing the robot arm to adjust the position of the marking head accordingly.

Then there was the challenge of verifying the marks. The laser system burns through the layers of paint onto the vehicle and into the metal below, but the appearance of the resulting mark differs depending on the colour of the vehicle, showing up white on dark vehicles and black on light ones. To ensure these marks could all be read and verified automatically, Pryor developed an adaptive lighting system that alters both the colour and the angle of the illumination of the cell after marking. Dedicated verification software then takes images from the camera on the robot end-effector and checks each mark for clarity and accuracy. By providing this 100 percent quality check of every vehicle marked, rejections for mark quality have fallen to zero since implementation.

Jaguar Land Rover initially commissioned Pryor to provide marking cells for its plants in Solihull and Halewood, UK. The contract called for two identical cells, with the second acting as a backup to keep production running in the event of a failure in the first.

Each cell is a light-proof box, with roller shutter doors that close automatically once a vehicle body is inside. The sealed environment serves two purposes: it protects staff from the high-powered laser light, and allows precise control of light levels inside the cell to ensure optimum performance of the vision system used for alignment and for mark verification. To allow process supervision and aid quality control, multiple CCTV cameras inside the cell monitor the whole marking process and their output is recorded along with other key process data for later review.



Before any mark is made, the robot tests its laser using a power meter, which will alert production personnel to any issues, like dirt on the lens of the laser head, which may affect performance.

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Pennine Tools Aerospace benefits from the height of laser marking expertise

A family-run engineering business, Pennine Tools Aerospace Ltd. was established in Earby, Lancashire in 1974. Originally called Pennine Tools Ltd, the company provided both precision and general engineering services to a broad range of sectors. These included medical devices, furniture manufacturing, commercial products and military aerospace.

By the mid-1980s, Pennine's reputation for uncompromising levels of precision and expertise was attracting significant interest across the aerospace industry, so much so that an additional manufacturing facility was opened in nearby Barnoldswick. Then, in 1989, the directors decided to focus exclusively on commercial and military aerospace engineering and manufacturing. A wide customer base was developed over the following years, one that today includes BAE Systems, Airbus and GE Aviation. To meet the increasing demand for its services, in 1999 Pennine transferred all its activities to Barnoldswick, later moving to a purpose-built facility in the town.

In those early days, Pennine manufactured components for aircraft such as the Vickers VC10 and the Nimrod maritime patrol aeroplane. Today, Pennine works on contracts involving the F-35 Lightning, the BA Jetstream, the BAE Systems Hawk, the BAE 146RJ short-haul airliner, the Eurofighter Typhoon and Airbus's A380, A350 and A400M.

Laser marking requirement

As a business that regularly invests in new manufacturing technologies, Pennine currently operates a suite of more than 30 machining centres. These include 3- and 5-axis milling machines, turning machines, grinding machines and coordinate measuring machines. Perhaps the only capability not available on site by the beginning of 2019 was component marking, with Pennine relying on the services of external specialists to laser traceability data onto bolt heads of various sizes.

"As you can imagine, the very nature of our business means we work to incredibly tight deadlines," comments quality manager, Robin Chapman. "As such, outsourcing our laser marking requirements could occasionally prove challenging, with orders sometimes taking up to two weeks to fulfil. That timescale simply wasn't acceptable to our production schedules. Outsourcing component marking was also expensive and, in my view, the cost was disproportionate to the level of work involved."

In spring 2019, the decision was therefore made to invest in an in-house laser marking solution. After completing a web search of technology providers, Robin Chapman invited three organisations, one of which was Technifor, to demonstrate their laser marking machines.

"One machine was far too complex and

expensive for our relatively straightforward needs," continues Robin Chapman. "Another, while first appearing to represent good value, wasn't really up to the task in hand. By contrast, Technifor offered precisely what we were looking for. Technifor's technical sales engineer, Simon Tims, took the time and trouble to find out exactly what we wanted to achieve and gave a thorough product demonstration. The Technifor solution, the LW2 stand-alone Laser Station equipped with their F20,

20-watt, fibre laser marking machine, was simple to programme, quick and easy-to-use, sensibly priced and delivered first-class results."

The Technifor LW2/F20 combination was chosen by Pennine for its ability to precision-mark an extensive range of metals and ABS plastics, while a laser marking area of 110 mm2 provided the flexibility to mark components of various sizes. The order was placed in May 2019 and Pennine's new Technifor LW2 Laser Station was installed just a few weeks later.

"It was all done in a day," says Robin Chapman. "Simon Tims installed and commissioned our laser station and provided full user training. He also arranged a follow-up visit just to check we were happy with everything and were using the station to our full advantage. We've now been running the Technifor system for around five months. The machine is quick and simple to operate and the lasering, typically adding up to three lines of traceability data to bolt heads, is always of the highest standard. As a measure of the quality of our laser marking process, it has been signed off by Airbus.''

Robin Chapman concludes: "All in all, we're delighted with our Technifor Laser

Station and the convenience, quality and savings it is providing us with. Technifor as a company is very easy to deal with. They took the time to fully understand our needs. We received clear, straightforward advice and the training was perfect. From start to finish, the whole process has been hassle-free."

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TLM launches world's smallest and lightest fibre laser head to UK market

TLM Laser, the UK distributor for FOBA Laser, has announced the launch of the FOBA Titus™ system. Titus is the world's smallest and lightest fibre laser head and is set to be a game changer in laser marking applications.

The new Titus Vector Scan laser marking head is just over 20 cms in length and weighs in at just 630 grams. Available as part of the new 20W or 30W FOBA fibre laser marking systems, Y.0200-xs / Y.0300-xs, this new and innovative system offers unprecedented flexibility in terms of line integration, usability and speed.

The Titus marking head can be easily integrated into a wide range of production lines. Due to its small format and tubular shape, the marking head is easily mounted with a simple clamping bracket and is available with an optional supply line up to ten metres in length. Its flexibility is further enhanced through the option of either a straight or 90 degrees exit angle for the laser beam, together with the ability to adjust the marking field size to the specific application requirements.

During installation, users can expect to save of up to 90 percent of the time normally required for installation of a laser marking system. An integrated pilot laser and focus finder significantly reduce the time required for adjustment and focus.

The new laser marking system was developed in collaboration with and taking into account the needs of system integrators and the automotive industry. "Titus positions FOBA Laser and therefore TLM as their UK distributor, ahead of the market. This is the first time such a compact, quick-to-install, easy-to-use and remotely operable laser marker has been available," says Andy Toms, director of TLM Laser.

The advantages of the new fibre laser not only stem from its design, but also from the device software. All three available FOBA user interfaces can be used to operate the system. In addition to the FOBA MarkUS and FOBA Draw user interfaces, the new remote FOBA Go software is particularly suitable. This can be operated from any PC, touch display, tablet or other mobile device. All common industrial communication protocols are also compatible.

Maintenance of the system is also simplified by the capability of a minute-fast removal or conversion. In harsh production conditions, the IP65 or IP69 standard of the marking head provides protection against dust and moisture, as does the lens, which is also protected from dust. The very small number of wearing parts also enhances the low maintenance characteristics of the system. This new laser generation will redefine line compatibility, ease of installation, ease-of-use and speed. FOBA's innovative Y.0200-xs / Y.0300-xs laser systems, together with the unique Titus scanning head, will allow users to fully exploit direct marking of components and achieve optimum profitability.

The new Titus scanning head is available from Bromsgrove based TLM Laser, FOBA Laser's UK and Ireland distributors and is just part of the comprehensive range of laser-based technologies and systems offered by the company.

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Benchtop marker with integrated control unit

The new, compact benchtop marking system FlyMarker® mini 120/100 STATION is the perfect addition to the already proven FlyMarker mini-series. The dot peen marking system is an all-in-one device, which means that the control unit is directly integrated in the housing. Due to the electromagnetic driven marking pin, no compressed air supply is needed.

Besides the attractive price-performance ratio, the marking system convinces due to its easy handling. The benchtop marking system must only be set on the work surface and be connected to the power supply.

The large marking area of 120 x 100 mm is equipped with a switchable LED-lighting, which makes the adjustment of the workpieces to be marked very easy. Due to the integrated, high-quality guiding systems, high stability and a very precise marking result can be guaranteed.

In addition to the standard fonts in the 9 x 13 and 5 x 7 grid, logos and Data Matrix codes can be marked optionally. The marking force can be adjusted individually depending on the material to be marked.

Due to the automatic height tolerance compensation of up to 5 mm, a constant marking depth can be guaranteed, also when marking uneven workpieces. Nearly all materials can be marked; from plastics, aluminum, stainless steel up to hardened steel.

The input of the marking file can be done either via an USB-keyboard or optionally via a capacitive touchscreen. The input screen is integrated directly on the marking head, no further screens or control units are necessary.

For the data transfer an USB-A, an USB-B and an Ethernet-interface are available. The integrated software is similar to the software of the proven FlyMarker battery operated marking systems and can be used intuitively and without any programming skills.

Latest processor technologies allow fast and smooth navigation and quick access times to the marking files. Several language versions of the software are available. The internal memory of the dot peen marking system offers space for several hundreds of marking files, fonts and logos. The files can

be imported and exported very easily via the USB-interfaces on the marking device.

The electronic cables run inside a cable track and the whole electronic is protected from pollution. This minimises the wear in a workshop environment enormously.

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Component marking and traceability: one size doesn't fit all

Specialising in the three main direct part marking technologies: laser marking, dot peen and electrochemical, enables UMS to advise you on the most appropriate technology for your particular marking application

Laser marking

Laser marking has become the "go to" technology for an increasing number of marking applications and is fast, accurate and delivers a high-quality mark. It is good for large batch runs of the same component, can mark onto a wide variety of materials and can handle different types of data easily, most commonly used with a Class 1 workstation enclosure but also for production line marking.

A few things UMS believes sets its Graphix Workstation apart are as follows: software operates predominantly from a single layer making it very quick and easy to set up a marking file; optimum material settings can be save in a materials database for easy retrieval; flat and rotary marking within one marking cycle; multiple jobs can be open in a task bar so enables easy switching between jobs; motorised Z-axis as standard, in-built diagnostics, giving real time management of the laser operating state; side opening for marking long bar; built-in electronics keep the overall workstation footprint small. Once installed laser operating costs are low.

Electrochemical marking

Developments in the lower cost electrochemical technology make it a credible alternative for many applications. It can deliver similar high contrast marks on conductive metal surfaces and is very fast too for both small and large marks. Electrochemical marking can also mark thin wall sections that can be distorted by the heat of laser marking and the impact of dot peen. UMS' own Metaletch branded range of equipment is wholly manufactured in the UK.

Most marks are produced in 2-4 seconds. Stencil software enables you to produce datamatrix, serial numbering, date/timestamp, logos, symbols and graphics, text on an arc etc. It is mostly hand applied but UMS also offers a pneumatic jig for batch marking small to medium-sized components.

UMS' electrochemical marking systems are aerospace compliant. The high purity aerospace and nuclear grade electrolytes are independently lab tested to ensure they comply with the most stringent standards. It is used widely for marking critical flying parts and is still the lowest stress direct part marking technology available. The ME3000T was originally developed for the aerospace market as it has very fine control for marking materials such as titanium which marks in 0.25 of a second. It has 15 programs for storing different material settings, can do a combined mark of an etch plus oxide in one operation, while a buzzer indicates the end of the marking cycle.

Electrochemical marking is used widely across industry including aerospace, automotive, nuclear, tooling, food processing and medical where the electrolyte has been cytotoxicity tested and deemed safe for surgical items and implants.

Dot peen

Dot Peen marking uses a solid carbide stylus to indent a component's surface with a series of dots to make up characters, shapes and logos. The mark quality is good and is low stress. It's available in bench-top, hand-held and integrated models. The electromagnetic assembly stylus is quiet and can be used for serial and part numbers, date/batch codes, logos and data matrix codes including mark and read applications. They work well in harsh environments and marks can still be read after post marking treatments such as galvanising or painting. Dot Peen can mark up to 62HRc onto both metals and some plastics.

The Multi4 range of dot peen systems offer real versatility with one controller for all marking head configurations. The Combo has proved extremely popular, combining a handheld and bench configuration in one system costing only a fraction more but giving you two systems in one. The more recent addition to the range, the Multi4 Mini, is the lightest hand-held head on the market weighing in at only 2.3 kg. It has been developed with an even weight distribution, so is easy to hold in any orientation for marking and great for getting into difficult to reach areas. It can be supplied with a V foot for marking tube and pipe easily and has a patented feature that automatically calculates the correct part to stylus offset making it easy for the operator.

The Multi4 Bench system with Autosense

has been widely adopted for datamatrix applications and is aerospace compliant. The Autosense system is also used for marking in recessed areas.

Many UMS customers comment on how easy the software is to use when setting up marking files. This is because most of the features are accessed from a single layer, so editing files is easy. Combined with a very large high definition colour screen, creating a marking file is quick and easy. In addition to its ease-of-use, the Multi4 range is also gaining a reputation for real robustness and reliability. The machines are made from high quality components, sourced locally and manufactured to a high standard.

Data Input

Across all three marking technologies, UMS can offer various options for data input which is becoming increasingly important to ensure marking meets the needs for companies moving towards greater levels of automation and embracing new technologies. This is extremely important to sectors such as aerospace where reject parts can be costly and time consuming.

Options include barcode entry, either 1d or 2d, from a job card or works order that contains the data to be marked. This reduces operator by avoiding data entry mistakes and speeds up the whole process. Data can also be accepted from a database or spreadsheet and downloaded to either the electrochemical or laser software or directly to the Multi4 dot peen controller.

Tooling

Fixtures can provide a consistent marking location and repeatability of mark as well as speeding up the overall marking cycle. For small to medium sized components UMS has in-house capability with 3D CAD software and can produce 3D printed fixtures which are good for locating parts, so no clamping is required. They can also be useful for array marking with laser applications where multiple components can be marked in one cycle. For larger, heavier components that require a fixture tooling can be produced made from metal and engineering plastics.

Universal Marking Systems has been manufacturing and supplying marking systems for over 55 years. It supports customers both in the UK and worldwide. It also has a number of long-established partners supporting a large base of customers in France, Italy, Germany, Spain,

The Netherlands, Czech Republic, USA, Japan, China, Taiwan and South Africa. So wherever you are based, UMS is able to support you.

If you would like to discuss a new marking application or simply review your existing setup then please get in touch and UMS would be delighted to assist. The company will also be at the MACH exhibition from 20th-25th April 2020 on stand 19-432 where it will be demonstrating a full range of products.

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Getting the best laser marking results

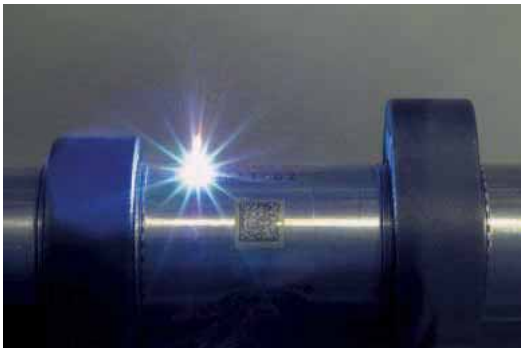
ES Precision Ltd is only two years' old but the three staff that program its eight laser marking workstations have been working with industrial lasers for a long time; about 75 years. Enough time to develop a few 'tricks of the trade'.

ES's business is a jobshop, subcontract laser marking of components or finished goods on behalf of its customers. It has tested out hundreds of different materials: metals, plastics, coated products, ceramics, wood, leather, etc. The company mark tiny ID matrices and alphanumerics barely visible to the eye, cut and mark tamper-evident labels and produce scales and etch other functional marks on medical devices and automotive parts.

Laser marks are permanent, high resolution and can have excellent contrast. The way the laser interacts with materials can be in many different ways. Metals such as stainless steel can be engraved with depth but little contrast or can be annealed to generate a smooth, black oxidised surface mark. Plastics can be carbonised, dark mark, or foamed, white mark. Coated materials such as back-illuminated car dash switchgear or laminated labels show the layer below after the top layer is cleanly ablated.

The action of the laser, delivered at high speed by galvo mirrors, depends not only on the material but also on the characteristics of the laser selected. Lasers commonly used in laser marking and engraving applications can be solid state, Nd:YAG, fibre; Vanadate, or gas, CO_2. Most operate in the invisible infrared part of the spectrum but some can be frequency-doubled or even tripled to generate laser pulses in the green or UV part of the spectrum. Choice of the best laser for a task is critical for optimisation of results.

Some of the main characteristics are intrinsic to the type of laser source to be used, generally the wavelength and maximum power available for example. Other parameters will be programmable



during testing; perhaps the peak power, Q-switch frequency, galvo speed, etc.

ES has five laser types: Nd:YAG, Vanadate, Fibre, CO_2 and frequency-tripled Vanadate. The company can therefore choose from a wavelength range of 355 nm to 10,600 Nm and outputs which are continuous wave or pulsed or Q-switched.

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Optimal reliability in 5-axis machining

The Optimizer, an optional module in the hyperMILL® VIRTUAL Machining simulation solution from OPEN MIND, enables users to improve NC programs based on the kinematics of the individual machine. The machining process is simulated by using a digital twin. This enables the users to overcome the complexity associated with alternative setup and orientation options in 5-axis machining.

The hyperMILL VIRTUAL Machining Optimizer automatically finds the best solution for collision-free orientation with efficient traverse movements for multi-axis machining. This allows programmers to avoid errors when manually optimising axis positions. Given the high degree of complexity, it is difficult to determine the effects on all subsequent machining steps and make decisions about the best overall solution. The hyperMILL VIRTUAL Machining Optimizer analyses complete machining sequences with powerful optimisation algorithms while considering axis limitations. Time-consuming repositioning is avoided. The Optimizer ensures efficient and safe machining operations.

Consider specific machine properties later

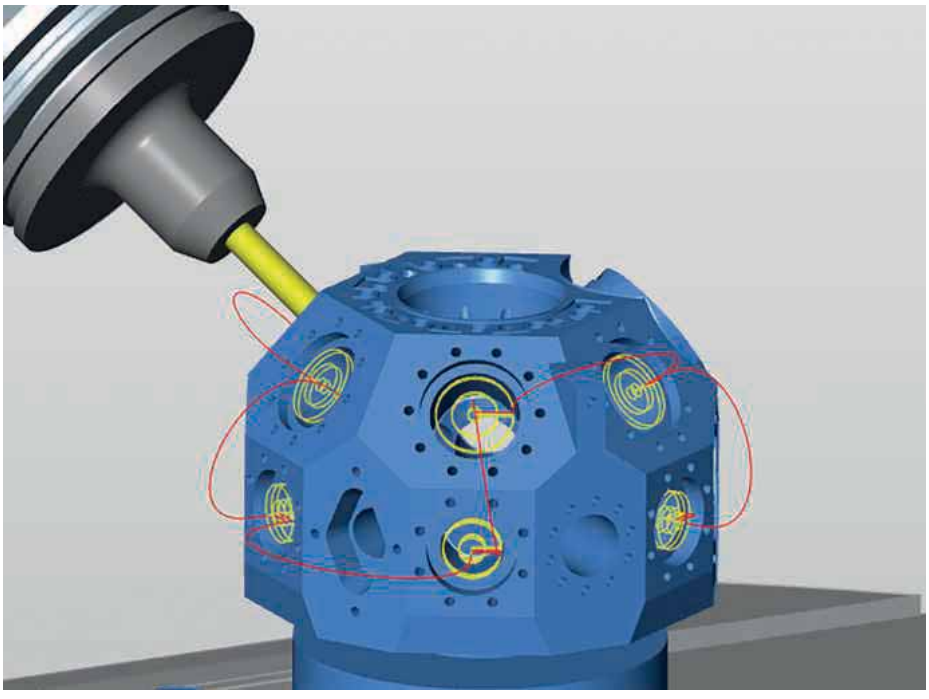
Another major advantage of the Optimizer comes into play when programming on a wide variety of machining centres. CAM programs can be created completely independently of machine properties because the simulation software automatically adjusts to the machine in use and it performs comprehensive collision checks. This gives companies greater flexibility when it comes to assigning machining capacity.

Optimizer detects limitations

The Optimizer can also detect other possible problems. For example, if a machine has a limited axis rotation, the software takes this into account when selecting tool positions and ensures smooth machining. If there is an axis limitation, the Optimizer interrupts the tool path, gently retracts and rewinds the axis to avoid the limitation. The tool then gently approaches again and machining continues. This method enables spiral machining in a limited machine. Fork head machines can also be used with the Optimizer to enable dynamic machining.

As many axes as necessary

The software from OPEN MIND optimises infeed movements and automatically determines whether positioning is faster with the aid of a rotational axis. The rotation axes are moved along the shortest path and the movements of the linear axes are minimised. This allows greater speeds to be achieved during the movements. If a 3-axis movement is not possible due to detected collisions or axis limitations, the hyperMILL VIRTUAL Machining Optimizer changes the movement with the aid of a fourth or fifth axis. The various operations, whether 2.5D, 3D or 5-axis, are linked in such a way that auxiliary processing times are shortened. The tool travels close to the workpiece while being checked for collisions and it is not retracted to a clearance plane between movements, drastically reducing cycle times.



OPEN MIND is one of the world's most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND develops optimised CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2.5D, 3D as well as 5-axis milling/mill turning and machining operations like HSC and HPC are efficiently built into the hyperMILL CAM system. hyperMILL provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CADCAM manufacturer in the world, helping it become one of the top five in the CAM industry according to the NC Market Analysis Report 2019 compiled by CIMdata. The CADCAM solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries.

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Tebis offers more than just CADCAM solutions

Tebis is a leader in CADCAM and MES technology with vast experience serving customers in many industries. It is also a process provider and technical partner for companies who offer specialist solutions for model, pattern, die and mould making as well as component manufacturing, together with professional training and consultancy services that can help you to increase productivity and reduce lead times.

Operations manager, Paul Scally from Tebis UK explains: "Tebis aims to standardise your processes. We don't just sell CADCAM software, which is our core business, but what we also aim to do is to be a process provider and technical partner for companies.

"Tebis has a consultancy team that comes into to your business to measure and check how you are currently working. The team will compare your business to industry standards and provide guidance on where improvements could be made. Tebis has already received special awards and it is very well recognised for the results we have produced."

Tebis' consultants will focus on factors such as: what is the situation with tooling and their management? What is the setup process and the flow of material like? Is there a lot of reworking required? Is production reliable and are the machines fully utilised? Tebis works together with the customer to define goals that they want to achieve. Are these strategic goals, such as alignment for the future or increased sales? Or are they process-based goals such as reducing throughput times or increasing efficiency and productivity? This is where Tebis software can help by implementing five libraries.

Tebis' five main libraries are to aid and organise your CAM and best practice activities for your workshop. These consist of cutting tools, machine tools and fixturing, feature libraries, pre-defined milling, drilling operations and predefined manufacturing processes. These tool libraries contain extensive information on all speeds and feeds, even if making a roughing or finishing operation.

Tebis also has libraries of machines available to contain the actual machine limits and kinematics. Standardised toolpaths are able to define tool magazines that reflect reality or, if this is not available, a tool cabinet and trolley next to the machine. Therefore, all tools are ready for the process and not hidden away.

The libraries contain the standards and processes for fast programming times through automation and achieve consistent quality.

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Lantek signs a worldwide collaboration agreement

Lantek, a pioneering multinational in the digital transformation of the sheetmetal and fabrication industrial sectors, announced that it has signed a collaboration agreement with the multinational HSG Laser Group. This agreement will involve the use of Lantek software in HSG's high-end sheetmetal fibre laser cutting machines, a segment in which the company is growing significantly worldwide.

The agreement reached by the companies will allow HSG customers worldwide to use powerful, scalable and open software to get the most out of their investments in machinery and software.

As Alberto López de Biñaspre, CEO of Lantek, explains: "The agreement reached with HSG is part of our policy of partnerships with sheetmetal cutting technology manufacturers worldwide. Thanks to this partnership, we will integrate our software into the broad base of fibre laser sheet cutting machines that HSG has all over the world, making our market knowledge and experience available to its customers."

Through these solid product integrations, the company seeks to boost and strengthen both its relationship with partners and customers and generate greater synergies with them. It also aims to maximise and simplify implementations and improve interoperability, increasing the capability and productivity of users. Lantek currently has more than 100 cutting machine manufacturing partners worldwide.

Under this agreement, HSG and Lantek will be able to better address the opportunities and growth of the sector, as well as to satisfy the demands of the global market in terms of productivity and competitiveness. This collaborative agreement with HSG will make it possible to integrate the Lantek Expert CADCAM solution with its different fibre laser cutting machines, which are available in power levels up to 12 kW.

López de Biñaspre concludes: "The sheet metal and fabrication industrial sector is at a critical moment and must take a step towards digitalisation. To ensure they are not left behind, companies need to interconnect their machines, processes and plants distributed around the world, by using technologies that allow them to meet production needs in real time, anticipate possible incidents and perform more efficient maintenance. The open, scalable and versatile nature of Lantek's software solutions makes this possible.

"At Lantek, we want to help companies in the sector with their digitalisation, adapting ourselves to their needs and different levels of digital maturity. We are continuing to focus on improving our customers' competitiveness."

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NCSIMUL digital twin ensures Nuclear AMRC gives clients accurate data

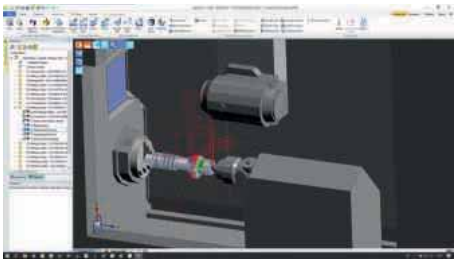
Being able to import completed NX assemblies into G-Code simulation software is proving to be a valuable time-saver for the Nuclear Advanced Manufacturing Research Centre.

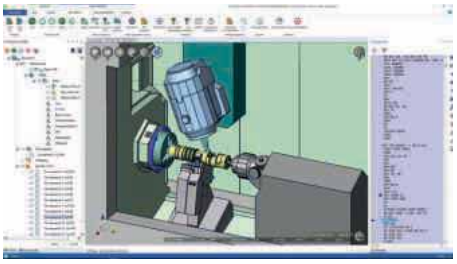
NCSIMUL, part of Hexagon's Production Software portfolio, guarantees that finished G-Codes sent to CNC machine tools are 100 percent accurate and collision free. "It gives us an exact representation of what's happening on the machine. Having this digital twin is absolutely vital in ensuring cutting paths are correct," says Tom Parkin, production engineer at the Nuclear AMRC.

And the software's ability to import full NX assembly files is an added bonus. "CAM and simulation systems generally aren't particularly user-friendly when it comes to positioning individual models. But being able to take an NX assembly, including a fixture, stock model and the final part, is particularly beneficial.

"Without it, we'd have to import single models one at a time, import the fixture by itself and position it and import the stock model and position that in relation to the fixturing. But NCSIMUL allows us to import a full assembly file from the NX package straight into the simulating environment. From there, I can select where my datum positions are, select the tooling, put the NC program in and run the G-Code simulation. This is a great benefit to us."

A point reiterated by principal production engineer Andrew Wright: "Some of our





setups are quite complex, in that they have multiple pieces of stock and workpieces, plus fixture items. So being able to take in a file containing full assemblies which have been designed in CAD and not have to manipulate them, saves us considerable time."

As part of the UK's High Value Manufacturing Catapult, the Nuclear AMRC is a partnership between academia and industry, supporting manufacturers in winning work, mainly, but not exclusively, in the nuclear industry. This is achieved by assisting them to apply advanced and novel manufacturing techniques to drive up quality and drive down costs in high value components.

Hexagon products have featured extensively in the Nuclear AMRC's machining and metrology sectors since the centre opened. "We use a large amount of inspection and non-contact inspection equipment such as scanning and structured light systems," says Andrew Wright. "And EDGECAM is one of our principal CAM systems for generating NC files for all our machine tools. It has multi-platform support, so we can bring models into EDGECAM from any format, quickly and seamlessly."

Wesley Tonks, Hexagon Production Software's strategic partnership manager, states: "Nuclear AMRC have been an Edgecam product user for many years and it is great to see the benefits of further product adoption as the Hexagon product portfolio grows. This is a fantastic example of how multiple products have been positioned whilst providing a manufacturing solution; enhancing product quality.

"Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting, the collection, analysis and active use of measurement data, gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality."

NCSIMUL is being used as part of the Nuclear AMRC's philosophy of assisting manufacturers to have zero prove out times on their CNC machines and analyse toolpaths in depth before putting them on to the shop floor. Andrew Wright says: "As it's new to the UK market it appealed to us as another strand in our simulation capability."

They currently have one seat of the software, which runs on their Mazak Integrex i-200 5-axis mill-turn machine tool. NCSIMUL gives the Nuclear AMRC total assurance that the toolpath data they supply to their clients is the very best to optimise their processes.

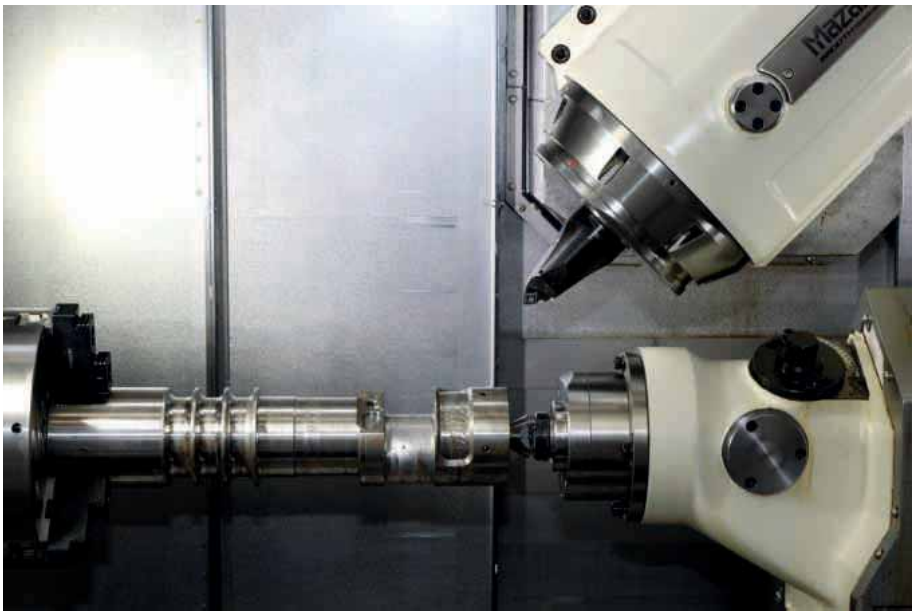
Tom Parkin explains how he has two different ways of using NCSIMUL. As well as importing full assemblies, he also uses the direct EDGECAM interface: "I simply export

the EDGECAM file into NCSIMUL, check everything's in the right place, that the tooling and datum are both correct and then run the simulation. If all's well, the program goes to the shop floor."

In line with the Industry 4.0 philosophy of smart manufacturing, the NCSIMUL G-Code simulation gives CAM programmers accurate information and technical assistance by building a virtual copy of the real-life machining environment. This digital twin eliminates errors, decreases setup time, reduces manufacturing costs and increases shop floor productivity.

Both CAM and simulation are involved in the companys work with the nuclear Small Modular Reactor sector, in which they're helping companies with product development. They're also working with manufacturers as part of the 30-year nuclear decommissioning programme, which involves looking at ways of reducing machining time on up to 100,000 individual waste containers funded by UK taxpayers.

Summing up the importance of NCSIMUL to its operation, Tom Parkin says: "When we're working on a prototype part with a client, we need to verify that the toolpaths we send to the machine are 100 percent



accurate. If we're developing a process, NCSIMUL gives is confidence that it's going to work."

Hexagon is a global leader in sensor, software and autonomous solutions. It is putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Its technologies are shaping urban and production ecosystems to become increasingly connected and autonomous, ensuring a scalable, sustainable future.

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All-in-one Pelton wheel

Pelton wheels are the driving force of the hydro-power industry, extracting energy from fast-flowing water to generate electricity. However, manufacturing a Pelton wheel is a challenge. Due to the wheel's complicated design, the impulse blades are usually machined separately and then mounted onto the rim, which is time consuming and adds to the production costs.

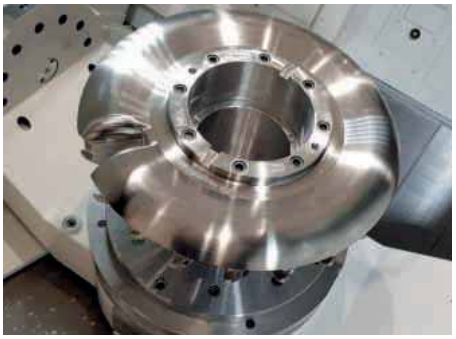
In a new collaboration project, Okuma and ModuleWorks have devised a solution that enables the entire Pelton wheel to be machined from a single block of metal. This new procedure accelerates production and reduces manufacturing costs.

5-axis machining with high-quality patterns

To overcome the sheer physical limitations, the wheel is machined in two stages. One half of the wheel is machined and then the workpiece is turned 180 degrees to enable the tool to reach the other half. The industry-proven ModuleWorks triangle mesh roughing components were used to cut the rough shape of the Pelton wheel.

For creating the bucket-shaped blades, the ModuleWorks adaptive roughing strategy uses consistent toolpath engagement and a smooth toolpath motion to generate an impressive dynamic pattern and high-performance roughing process that reduces the overall costs of producing non-prismatic shapes. For optimal finishing, ModuleWorks geodesic machining delivers a high-quality finishing pattern and comes with advanced features for producing rounded corners using a morph or constant stepover pattern. This enables Okuma to meet the high demands on the workpiece to ensure optimal energy transfer from the high-pressure flowing water.

ModuleWorks 5-axis calculation strategies also extend the reach of the tool to provide enhanced tilting strategies on complex workpiece geometries and areas with deep grooves. This makes the strategies ideal for machining the narrow areas between the impulse blades and enables the machine to



work efficiently with the heavy workpiece to perform toolpath moves that optimize productivity and ensure an economically viable product. Combining the special toolpath generation strategies with the advanced tilting and collision avoidance algorithms extends the reach of the tool to its full limit to successfully navigate the extremely tight spaces.

ModuleWorks GmbH
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www.moduleworks.com

One of the broadest waterjet product portfolios in the world

High precision abrasive waterjet cutting has been an area of expertise for decades within Water Jet Sweden. Since the international breakthrough in 1999, winning the prestigious order from Daimler Chrysler Aerospace, Water Jet Sweden has been serving high-tech industries, like aerospace, defence, chemical, power corporations, oil and gas, all over the world.

Water Jet Sweden has one of the broadest waterjet product portfolios in the world. Each FiveX machine system is a unique solution based on specific customer requirements. Built on the same platform but bespoke in width, length, height and technology features. When challenged the company even redefines the machine specification to find the best machine solution for the task given. Product development driven by customers' demands and industry needs.

When building a FiveX machine, made for cutting in space, you need to look extra carefully at the safety aspects. If not protected, a waterjet beam carrying abrasive media at speeds near twice the speed of sound could be lethal up to many meters away; therefore all FiveX machines are designed with full size walls and automated front and back protection.

The FiveX Machine System is the top of the line machine model in the portfolio. With a Z-movement of 750-1,500 mm and a ± 0-91° cutting angle, it is specifically designed to manage high precision 3D abrasive cutting in space.

"This time the challenge was to cut holes with a countersink, on a vertical surface, says Tony Ryd, technical director at Water Jet Sweden. "The machine specification has a maximum cutting angle of ± 91° which wouldn't be enough, so we were forced to redefine machine specification and introduce a new cutting head with ± 0-120° cutting angle. After a thorough evaluation of possibilities, we finally found a solution that met our long life and high-performance standards."

The alignment of the 3-dimensional pressed parts within the machine volume also presented technical challenges. Non-contact probing was developed to gather point data on the product, perform a best fit analysis and update the workpiece offsets to align the part perfectly within the control software. Automating the alignment negated the need for expensive fixtures, provided perfect alignment even for parts with form errors and reduced the setup time by more than 70 percent.

From its UK technical centre based in Yorkshire, WJS UK provides sales, advice and unrivalled service and support for all Water Jet Sweden machine requirements in the UK. Water Jet Sweden manufacture waterjet cutters in almost all sizes, for a variety of applications, from integrated compact machines to equipment with an operating size range of up to 18 m.

Reliability and accuracy

These are the guiding principles in the manufacture and production of high precision CNC controlled waterjet cutting machines. Water Jet Sweden has consistently transformed groundbreaking research and development technology into a comprehensive product range with over 700 installed water jet machines throughout the world.

Highest technical standards

The fundamental objective in developing equipment is to design a waterjet cutting machine that does more than just fulfil the daily requirements of productivity, flexibility and profitability. By using components that have been tested over many years and manufactured using the latest techniques, in high pressure waterjet cutting and drive engineering fields, Water Jet Sweden offers

CNC machines of the highest technical standard.

World class

The worldwide patent for the integrated guide system, high performance cutting heads and valves, as well as collaborative work with the world's leading control suppliers Fanuc and Siemens, has made it possible to manufacture a full range of 2D and 3D CNC waterjet equipment with the maximum accuracy and performance.

Dedicated R&D

The research and development of new technology, components and software is carried out in an impressive facility in Southern Sweden, together with the latest developments in CADCAM software. When compared to conventional waterjet cutting machine running costs, Water Jet Sweden machines are not only state-of-the-art but extremely cost effective and efficient.

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OMAX®
ADVANCED WATERJET SYSTEMS

South West manufacturer adds 5-axis waterjet capability

It was back in 2005, that Westcut Engineering initially decided to invest in advanced waterjet cutting technology to broaden its capability, enabling customers to source increasingly complex and intricate shapes manufactured from virtually any material. This new process also allowed extremely flexible quantity requirements to be met, from rapid prototyping for development work, to full volume production. Regardless of quantity requirements, waterjet technology cost-effectively produces components to a consistent quality standard.

As waterjet cutting manufacturing equipment has advanced so much over the past 15 years, where systems now offer higher levels of capability, increased productivity and higher quality cut parts, it was in mid 2019 that the management team at Westcut Engineering made the call to invest in the latest state-of-the-art abrasive waterjet package from Techni Waterjet.

Techni Waterjet has been operating for over 30 years and has an installation base of almost 1,000 waterjet machines or water cutting systems spread across six continents and some 26 countries. It has dedicated sales and service offices in the USA, Australia, Asia and Europe, with spare parts, sales and service support centres throughout the world.

The machine that Westcut Engineering specified was a Techjet TJ4100 which offers a 4 m x 2 m cutting area, the latest generation of Quantum NXT Electric Servo Pump (ESP), abrasive removal system, submerged cutting capabilities and also

included the all new PAC60 5-axis cutting head, capable of creating up to 60 degree bevels and includes a taper compensation feature. This was a particularly important feature for Westcut, as this is an area it has targeted for significant growth in the future.

Mike Scott, operations manager at Westcut Engineering says: "With the growth of our waterjet department increasing year on year, so were our maintenance costs. I decided to research how viable it would be to invest in modernising our current machine or to simply replace it with a newer model. Over the next 3-4 months, we spoke with several waterjet manufacturers, including AMC Jets, to identify how the market has changed and what new technologies were available going forward.

"We decided to partner with AMC Jets and Techni by investing in a larger waterjet with a 4 m x 2 m cutting area along with the PAC 60 5-axis head. The PAC head will cut countersink holes, taper free edges and offer +/- 60-degree cuts. These additional processes were previously completed by our machine shop, but having the PAC head has freed the machine shop up extra hours each week to take on more work as well as reducing the lead time on orders.

"Our goal moving forward is to grow all aspects of the business, but the investment in our waterjet department will offer new profiling methods with the capability of supporting many of the high-tech industrials based in our region."

On Westcut Engineering's previous machine which featured a hydraulic driven high-pressure pump, maintenance employees had previously had to strip this down every 50 hours, for 30 minutes to change the high-pressure seals. Due to the way the latest Techni Waterjet Gen4 Quantum ESP pump is designed, Westcut Engineering can now achieve a minimum of 500 hours of cutting without any maintenance intervention. When you do need to change a high-pressure seal, it takes less than five minutes. This results in higher machine productivity, increased 'up time' and therefore helps get orders shipped out to customers sooner. As the Quantum pump is also driven by an electric servo motor, this

results in lower running costs, higher efficiencies and a virtually silent operation.

Although its new Techni Waterjet machine has only been installed for three months, AMC Jets Ltd, the authorised UK distributor for Techni Waterjet systems, has had a healthy working relationship with Westcut Engineering throughout the past decade.

AMC Jets has been supplying high quality spare parts and machine servicing to the UK market for over 28 years and made the decision to collaborate alongside Techni Waterjet for waterjet sales and service in early 2017.

AMC Jets Ltd
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PAC60

TECHNI Waterjet

www.techniwaterjet.com

Precision Angle Control

5-AXIS CUTTING HEAD

Continuous Rotation
Patented technology incorportated allows the PAC 60™ for continuous rotation, enabling any shape to be cut without having to re-position the cutting head.

60 Degree Bevel Cutting
Capable of producing parts with true angle up to ±60 degrees.

Multi-Pass Cutting
Quick and easy chamfers, weld preparations, and countersinks on either or both sides of the plate.

Terrain Mapping
Capable of maintaining an exact standoff distance between the nozzle and the work piece, even on plate that is not flat.

Extremely Accurate Direct Drive Technology
Capable of producing parts to tolerances of ±0.1 degrees.

DIRECT DRIVE TECHNOLOGY

STM sets new standards with integrated service concept

STM now offers users a complete service that makes technical and strategic manufacturing excellence possible. This includes up to eight years warranty extension for cutting system and high-pressure pump. The Austrian waterjet specialist therefore protects its customers in a way that is unique in the industry.

As a medium-sized company, STM offers users a rare commodity in a market dominated by international corporations: In-depth waterjet know-how, efficient personal support and short distances. In other words, exactly what is required to turn a waterjet user into a successful waterjet user. Following this conviction, the waterjet pioneer has expanded its range of services and made them even more customer-friendly. The new service concept is based on three "all-around carefree" modules that guarantee users of all model series process reliability and effective quality management. The focus is hereby on comprehensive maintenance, unlimited support within 24 hours and a warranty extension of up to eight years. This applies not only to the waterjet cutting system itself, but also to the high-pressure pump; a globally unique service. The goal: optimising cutting performance permanently, minimising downtimes and unexpected incidental costs, maximising customer satisfaction; on the basis of partnership cooperation without the usual time and thematic restrictions.

The results are the three service modules: STM 108 Points Check, STM Annual Service and STM High Pressure Pump Service. The 108 Points Check was specially designed for customers who want to bring their system back to 100 percent performance after the warranty period has expired. Once all 108 points have been checked and restored to perfect condition, a yearly service for the waterjet cutting machine will be carried out in order to recover the guarantee. With an existing or newly concluded new maintenance contract, the customer receives a warranty on his STM waterjet cutting machine again. Both packages include maintenance as well as technical application advice and assistance, either by telephone or online via remote support as required. The maintenance contract term is one year and can be terminated at the end of the year.

The service package also includes a one-year warranty extension and a guaranteed repurchase price of 20 percent of the purchase price, the warranty extension of up to eight years after the commissioning of the system. The contractual partners in Europe undergo a parallel certification procedure in order to guarantee a consistently high standard of service. With this step, STM has consistently synchronised its plant and service pledge. No unnecessary functions, no highly complex processes, but tailor-made, economically meaningful solutions, quality down to the last detail and tangible support.

The 108 Points Check

After the warranty has expired, users can now have the system status determined with the STM 108 Points Check at an all-inclusive price. For this purpose, an experienced service technician checks all system components of the waterjet cutting system on site. This includes high-pressure lines and pumps as well as the process water flushing system. The current cutting parameters are additionally subjected to an efficiency analysis. On the basis of the results, the necessary repair measures are summarised in an individual offer. The warranty is automatically extended when a maintenance contract is concluded. The STM 108 Points Check is offered for all models in the STM portfolio. The only requirement is a maximum plant age of seven years from the first commissioning.

The STM annual service

With the STM annual service, users can ensure that, in addition to adjustment and maintenance work, all wearing parts required for smooth operation are replaced. In addition, this appointment can be used for a strategic production exchange in which the responsible STM specialists

demonstrate the best possible solution for the implementation of specific cutting tasks. The entire cutting system is inspected as part of this all-round service. These include high-pressure pumps, water circulation systems and safety devices and much more. In addition to the inspection, all relevant wearing parts of the waterjet cutting system are replaced free of charge. In case of technical questions or problems, the STM helpdesk can be consulted free of charge throughout the year. It provides unlimited support to users in the

event of problems or technical application questions by telephone or online via remote support. If a maintenance contract is concluded, the warranty is automatically extended by one year up to eight years. After a maintenance contract term of eight years, STM customers also make use of a buy-back guarantee that guarantees 20 percent of the purchase price.

The STM HP pump service

STM recommends regular high-pressure pump services, especially for users who use their system in continuous operation and cut it at a high level. In order to guarantee a perfect cutting result, as well as maximum system availability, the company offers all-round carefree packages for all BFT and STM high-pressure pumps. If STM carries out a corresponding service, the manufacturer's warranty is extended by one year each time up to a maximum of eight years, or 20,000 operating hours. After a maintenance contract term of eight years, users can make use of a buy-back guarantee, similar to the waterjet cutting system, which guarantees 20 percent of the purchase price.

Interested parties who would like to gain a greater understanding of this system and the service concept at STM, are invited at any time to inform themselves without obligation at **www.stm.at** or to visit the STM test centres in Austria, Germany or Switzerland. They can, among other things, have test cuts made and employees trained there, as part of training courses, in order to become application specialists.

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www.stm.at

Enhanced manufacturing capabilities with OMAX

Ansaldo Energia Group, a leading provider of engineering, manufacturing and testing in the nuclear decommissioning, nuclear energy and defense industries, maintains 3,500 employees worldwide and a £1.1 billion turnover. In the UK alone, Ansaldo Nuclear Ltd. employs more than 650 experienced suitably qualified and experienced personnel (SQEP) in the UK, including nuclear engineers and manufacturing specialists.

To maintain its position in the industry, the engineering department at Ansaldo Nuclear performs optioneering, developing concepts through to detail design, safety case support, design substantiation, peer reviews, feasibility studies, site surveys and various other reports. However, to do all of this work, the manufacturing side of the company must be able to keep up.

In 2019, Phillip Heeley, project manager and improvement engineer at Ansaldo Nuclear, was tasked with updating the company's Wolverhampton manufacturing site with technology that would enable the cutting department to produce high-quality parts with quicker lead times. At the same time, he sought to reduce the workload of the manufacturing site's milling machine operators by enabling the cutting specialists to create already inclined and beveled shapes out of flat raw materials.

Phillip Heeley concluded that a height sensor guiding a 3D cutting head would allow the machining of uneven material surfaces. Whatever the solution, it needed to allow the cutting department to prepare materials in a way that would avoid time-consuming alignments, clamping and manual rework on milling machines.

Aquajet Machining Systems, the Chorley-based UK OMAX distributor, suggested the perfect machine solution for Heeley's task: a MAXIEM 3060 JetMachining Center. A fast, smooth and exceptionally precise abrasive waterjet machining centre, the MAXIEM 3060 is ideal for full-scale advanced manufacturing needs. The exclusive IntelliTRAX linear drive system uses magnetic encoders to provide location feedback with one-micron resolution, so the machine knows precisely where the cutting head is at all times. The mobile control station with widescreen display provides flexibility in controller positioning.

Sue Learner, operations director of AquaJet, explains: "Ansaldo now owns one of the biggest 3D waterjet cutting systems in the UK. With the combination of a vast cutting envelope of 3,000 mm by 6,000 mm and a 60-degree bevel cutting head, Ansaldo is able now to realise nearly all cutting tasks, including thicker material, up to 150 mm."

Equipped with an A-Jet multi-axis cutting head, automatic terrain follower, rapid water level control and 50 hp direct-drive pump delivering 4.100 bar pressure, the MAXIEM 3060 is a complete waterjet powerhouse. The system also includes a fully automatic 170 L garnet feed hopper and solid removal system to keep the machine's water tank clean and free from slurry and sediments.

Andy Bull, operator and machining specialist at Ansaldo, praised the addition of the MAXIEM to the cutting department: "The new OMAX system replaces two older waterjet systems with intensifier pumps that we previously used. I am very happy that our management decided not only to replace the existing technology, but to upgrade our cutting department with the best waterjet cutting system available."

Particularly important to Ansaldo was the flexibility of the MAXIEM, which eliminated non-value-added time and allowed for the creation geometries that wouldn't otherwise be possible with the company's traditional CNC machines. The relatively clean manufacturing of an abrasive waterjet produces noise of approximately 76 dB, about the same as a household garbage disposal.

Tom Smethurst, CNC specialist at Ansaldo, adds: "The OMAX IntelliMAX software that we use to modify the drawings and prepare the cutting programs, that also runs the machine, is very easy to use and offers a wide range of features. That makes life much easier for us."

IntelliMAX is an all-in-one package CADCAM suite including LAYOUT (CAD) and MAKE (CAM). The software can control individual part features. For example, the perimeter of a part could be cut at a faster cut-quality while more precise features within could be cut with a slower/finer quality, which enables various part tolerances to be met. Likewise, IntelliMAX's LAYOUT CAD program is a quick way to get mental geometry onto the computer screen.

With its new MAXIEM 3060, Ansaldo will continue to reform its shop practices to be more efficient.

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Quality through technology

TMC is one of the UK's premier waterjet cutting companies, specialising in abrasive and non-abrasive cutting of resistant materials with superior quality 2D & 3D parts production using both Dynamic and Dynamic XD waterjet cutting technology.

Not only has TMC invested in the very latest waterjet cutting machinery, this has been further enhanced by the ability to deliver 87,000 psi to the cutting head. The waterjet beam is moving at Mach 4 and the company can cut faster, thicker and to a tighter tolerance to produce a lower cost, better part than any conventional water jet machine.

TMC is the first subcontractor in the UK to introduce XD waterjet cutting which offers all the advantages of dynamic abrasive cutting but with the ability to produce complex 3D parts by automatically tilting the cutting head both sideways and forwards during the cutting cycle to produce a higher quality part both dimensionally and visually. Historically parts such as these would have involved expensive secondary machining. TMC can now offer finished parts, dramatically saving its customers both time and money.

TMC continues to invest in the very latest waterjet cutting machines allowing it to offer unparalleled quality of parts production. Whether it is a single part or a large multiple part process, its Dynamic and XD capability, coupled with 87,000 psi, enables it to outperform any conventional fixed head waterjet machine to produce consistently superior results.

A commitment to quality is matched by an essential focus on customer service and technical support. The company works with customers in the aerospace, automotive, interior design, fashion design, defence, architectural and engineering industries to design and produce high-quality parts to meet specific needs.

The company is well known for its flexibility, attention to detail and 24-hour production, providing its customers with the fastest turnaround in the industry. It has grown year on year by delivering the level of service that its customers demand.

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Extended range of waterjet cutting options available from AXYZ

Leading supplier of high-performance CNC machining solutions, AXYZ Automation Group now offers an extended range of waterjet, routing and knife-cutting options. Collectively, these have been designed to meet every conceivable production and capital investment requirement. Based on well over 20 years of experience in waterjet cutting technology, AXYZ WARDJet machines can be used to process a wide range of materials that traditional CNC routing and knife-cutting systems cannot effectively handle.

Typically, these include more complex materials such as stainless steel and other non-ferrous metals, cast and wrought iron, various alloys like brass and bronze, stone, marble, ceramics, glass and fibreglass, high-density plastics and laminates, solid and composite rubber and soft goods materials. The machines are suitable for an equally diverse range of industrial applications, including primarily those in the general engineering, automotive, aerospace/aeronautical, electronics/electrical, metal and glass fabrication, plating/finishing, marine converters and educational facilities.

The waterjet cutting machines supplied by AXYZ Automation Group share individual as well as common design and performance characteristics to accommodate different production and workspace requirements. These range from small parts and components production carried out by engineering shops and machining centres to high-volume and large-format output manufactured by industrial-sized companies.

Key design attributes of the machines include the now familiar rigidly constructed CNC and tank design gantry that facilitates the most vigorous machine operation likely to be encountered, multiple cutting tool head options and ballscrew drive systems for optimum machining accuracy and the elimination of operating problems frequently associated with conventional belt-driven waterjet systems. An optional water level control system and machine enclosure help reduce splashback and conserve water, in addition to keeping machine noise levels at a minimum and

thereby enhancing environmental and workplace safety credentials.

Part of the A-Series of waterjet cutting machines, the latest A0612 small-format model is described as an ideal industrial compact waterjet solution that is capable of meeting the requirements of a market for which hitherto there were only limited options. The A0612 shares the same design and performance characteristics of a full-size waterjet machine but at a much lower cost. The comparatively small 213 x 124 cm footprint also makes for easier transportation, installation and portability, as well as an ability to fit perfectly into any workplace environment where available space and cost-to-performance efficiency are primary considerations.

The A-0612 features a single-carriage X-Y cutting area, an abrasive feed and removal facility and an optional water level control system. It provides a cutting speed of up to 12.7 m/min and is supported by the proprietary Move design and production CNC software.

A major factor contributing to the popularity of this particular waterjet cutting solution is that, by comparison with similarly configured alternative small-format machines that operate at pressures of between 30,000 and 45,000 psi, the A0162 can operate at the significantly higher 60,000 psi rate. This equates to the performance capabilities of a full-size waterjet cutting machine, allowing users to cut material with a thickness of up to 177 mm.

The X-Series and Z-Series of machines have been designed with a CNC platform that has an extensive range of configurations, including up to 16 cutting heads on one gantry. The X-Series is available in three different-sized models, 1515, 1530 and 2040, with a maximum cutting speed of 20 metres/minute, while the Z-Series is available in a choice of five different machine sizes, 2043, 2543, 2546, 3043 and 3064, each of which provides a maximum cutting speed of 12.7 m/min.

All of the waterjet cutting machines supplied by AXYZ Automation Group are backed by powerful and comprehensive performance warranties. They are supported with ongoing technical and routine machine maintenance advice and product training. This can be carried out at either a customer's own premises or the AXYZ Automation Group main facility in Telford, where machines can be viewed and assessed in the purpose-built showroom and demonstration area.

For further information and/or to arrange a machine demonstration, visit **www.axyz.co.uk** or call to speak with an AXYZ technical sales engineer.

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Continuous cutting performance using only water and abrasive

The technology company ANT AG offers an innovative solution for a continuous suspension process with the ConSus® abrasive mixing unit. With this technology, the Water Abrasive Suspension (WAS) can now also be used in the manufacturing industry. The suspension jet enables a more efficient cutting performance and a lower user load compared to the conventional Water Abrasive Injection, WAIS, systems.

In contrast to three-phase WAIS systems with water, abrasive and air, WAS systems work with a two-phase blasting tool. The cutting jet consists only of water and abrasive with a precisely adjustable flow rate. This suspension is created by the interaction of a mainstream and a bypass stream.

Before the WAS arrives at the remotely handled cutting nozzle, it is put under high-pressure. The high energy creates a cutting jet in the nozzle which exits at nearly twice the speed of sound. The efficiency is considerably higher than in the injection process, where turbulent mixing losses occur due to the contained air. In addition, due to the smaller nozzle diameter, the jet is more focused and cuts even the hardest materials precisely.

ANT's ConSus (Continuous Suspension) system is operated at working pressures between 500 and 1,500 bar. Compared to conventional waterjet cutting processes, the ANT suspension jet operates at less than half the pressure and, depending on the desired cutting performance, twice to three times the feed rate. The user receives thin kerfs without hardening or material deformation.

ConSus also offers advantages in work safety with its worldwide patented lock system. Even at maximum working pressure, 1,500 bar, the noise exposure is still 70 percent below an injection jet operated at 5,000 bar with conventional industrial waterjet cutting systems. Lower system pressures and high abrasive loads, which are characteristic for ConSus, also reduce the emission of solid particles. Injection systems operating at much higher working pressures

for the same cutting performance cause up to twice the particle emission concentration.

ConSus can be integrated into any existing waterjet cutting system, whereby only the pump and control need to be adapted. It can be operated both above and below water without the influence of air or heat. It thus meets the requirements of the manufacturing industry, the offshore sector and nuclear energy companies as well as explosive ordnance disposal (EOD/IEDD).

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Material innovation using metal additive manufacturing

Uniform Wares partnered with Betatype to explore the advantages of Additive Manufacturing (AM) technology, pushing the boundaries of design in an industry traditionally centred around heritage. The two companies worked closely together, using Design for Additive Manufacturing (DfAM) principles and AM technology to overcome limitations faced by more traditional manufacturing methods. As a result, they produced a superior quality, mesh 3D printed titanium watch strap which is featured in Uniform Wares' 2019 collection.

Uniform Wares, a luxury watchmaker established in 2009, set out with an objective to build a brand whose entire creative output was designed and developed in its London based studio, working exclusively with local and international partners who share the company's devotion to detail. The company prides itself on creating contemporary time pieces that embody character and distinction through intelligent design, not branding. Uniform Wares teamed up with Betatype specialists in advanced design and additive manufacturing, to design and develop a unique woven AM watch strap for its new PreciDrive M-Line collection.

Launched in October 2018, the watch strap is manufactured by combining Betaype's unique scanning technologies with Renishaw's AM250 additive manufacturing technology. Using a titanium T5 alloy material made it possible to create a strong, yet lightweight 'metal fabric' strap which has already gained popularity and prestigious reviews from clients of Uniform Wares. Betatype and Uniform Wares have worked together for over three years, refining their woven material to mimic and exceed traditional fabric behaviour while benefiting from the mechanical strength and lightness of titanium. They continue to explore designs and technology that exploit the detail and precision that AM can offer.

In an industry centered around traditional designs, methods and heritage, Uniform Wares has always been an innovator, experimenting with technologies like AM to achieve more with its designs. Previous Uniform Wares watches had featured a mesh-like bracelet manufactured using more traditional methods. When Betatype presented an idea that could simplify the process by allowing the woven strap to be printed in any texture or grain, incorporate new materials and produce less waste, Uniform Wares was keen to get involved.

Founded in 2012, Betatype has worked across a variety of industries such as aerospace, automotive and medical sectors to design and develop functionally advanced components using AM. Betatype applied its unique multi-scale approach to exert greater geometric control over the watchstrap designs and used Renishaw's AM technology to bring the Uniform Wares watchstrap to life.

Taking full advantage of working together to create a design specifically for Additive Manufacturing, Uniform Wares and Betatype were able to make the most of additive technology to create a strap that was more accurate and intricate than any previous design. The bracelet is made up of over 4,000 interlocking links and weighs just 10.5 g.

The asymmetric design of these links allows each side of the strap to have a different bend radius, meaning it can easily fit over the hand, allowing flexibility, whilst remaining secure on the wrist. The strap uses microscopic 'teeth' and a new type of directional clasp interlocking with the mesh itself, which can only be achieved using additive manufacturing, to hold the watch in place.

By controlling the laser's scanpath, exposure settings and material microstructure, down to the micron of each link in the strap, Betatype was able to achieve the best possible fit and mechanical performance of the watch strap. By optimising laser powder bed fusion, Betatype's processes also mean that the watch straps can be produced in smaller batches, more quickly.

Working together with Betatype means that the PreciDrive M-Line collection is designed, developed and manufactured in London and finally assembled with care in Switzerland, amplifying Uniform Wares' ethos to work only with select local and international partners.

With an initial objective to prove the validity of and innovate with AM in the watch industry, the results that Betatype and Uniform Wares achieved far surpassed any expectation. This collaboration has produced, without compromise, a commercially viable product. It is is superior in terms of quality and level of detail and has demonstrated the power of AM and the freedom it can bring to design for manufacture.

Sarat Babu, managing director at Betatype explains: "When we looked at all of the reviews, of the new watch strap, that were coming out, none talked about the additive manufacturing. They talked about it as a product which works and is superior in terms of the way it behaves, the quality that it provides and that's really the measure of when you get to an end use part. It's not just that, this is an additively manufactured watch strap, it's because it's one of the best metal watch straps that you can buy today." Betatype and Uniform Wares are already in discussion regarding future projects to continue an exciting journey of additive manufacturing and its influence on the creative industry.

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3D printing powder optimisation is key to part quality and productivity

The global 3D printing metals market is growing and is expected to reach USD 3.05 billion by 2025, according to a recent report by Grand View Research, Inc. However, to take full advantage of this growth and efficiently produce high-quality parts, powder producers, 3D printer manufacturers and others will need to ensure the consistent, repeatable quality of the metal powders used in the process.

3D printing applications range from aerospace, defense and automotive to medical and jewelry. The metals involved can include aluminum, titanium, stainless steel, cobalt-chrome, copper or nickel alloys and precious metals such as gold, silver, platinum, or palladium.

In the 3D printing process, parts are created from digital specifications by laying down successive layers of metal powder and using a laser to fuse the particles until the part is complete. Like ink-based printers, 3D printing has its own consumables, in this case, metal powder, in extremely fine, sub-micron sizes.

Although there are a wide range of metal powder suppliers, the industry is turning to contract powder processors for sophisticated heat treatments that improve the quality of the powder. As 3D printing techniques and equipment continue to advance, optimising the powders with such heat treatments can improve powder flowability to prevent clogging, speed the process and produce a higher-quality part.

Most metal powders used in 3D printing, such as iron, nickel, cobalt, aluminum, and titanium alloys, are produced by gas atomisation. In this process, a feedstock is melted in a crucible before it is ejected from a nozzle into a high-pressure gas stream. This breaks the molten metal into fine particles, typically under 50-150 microns in size.

While the metal powders produced by this process are typically spherically shaped, it is also important to address the porosity of the surface of the powder particles to improve the flow. Otherwise, the powder can clog or slow during the process, affecting the speed and quality of printing.

The attractive force between tiny, sub-micron size particles also increases as the particles become smaller. So, finer powders are typically less free flowing anyway.

From a quality standpoint, metal particle porosity can also reduce the load bearing, fracture toughness and fatigue properties of the finished part. Under cyclic stress conditions, it can also lead to cracks and part failure.

To eliminate porosity and enhance flowability, George Paffendorf, director of operations at Advanced Powder Solutions (APS), says a growing number of proactive powder suppliers, as well as 3D printer manufacturers, are adding a heat treatment step in the manufacturing process that involves tumble dryers to achieve a more consistent, high quality product.

As an example, APS utilises advanced vacuum tumble dryers that provides sparging, gas injection, in addition to heat application. With this approach, a perforated tube is positioned under the bed of material and distributes a flow of inert gas such as nitrogen. This helps to circulate heat evenly amid the powder.

The gas purge also provides a solution to protecting oxygen-sensitive or volatile powders, which can otherwise compromise certain alloy chemistries. When a blanket of inert gas is used to cover the material bed, it provides a protective barrier that prevents the powder from being exposed to atmospheric oxygen.

This also improves operator safety. 3D printing with metal powder can involve working with some materials like nickel that can be potentially dangerous to operators in powder form, containing these may be necessary to eliminate fire or explosion risk.

From the 3D printer end user's point of view, it is also important to efficiently reuse any unused metal powder at the bottom of the tray for the next print job because it is costly and cannot be wasted.

When this is necessary, vacuum tumble blenders from leading manufacturers like GEMCO can be used to re-blend the powder in with new material. Advanced tumble blenders are designed to apply even turbulence in all corners of the mix. This is accomplished through a combination of macro and micro blending that produces a better distribution.

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3D printing capabilities exceed Colin McAndry expectations

It may be in its infancy, but the 3D scanning market is growing at a tremendous rate and, according to recent research, is expected to close in on a worth of $6 billion by the end of 2020. Much of this progression is the result of advancements in technology in manufacturing and quality assurance and the growing use of 3D scanners in more industries. Scanning offers the benefit of lower manufacturing costs while maintaining high-quality output. It is this combination that has made 3D scanners a priority investment for so many businesses in recent years and this trend is only expected to continue. It is no surprise that 3D scanning has become such an attractive proposition for manufacturing businesses when it is anticipated that the technology will eventually reduce the cost of manufacturing processes by 75 percent. Evidence of this shift is no more apparent than in design industries.

Colin McAndry, the owner of a 2007 Honda CBR1000RR Fireblade, is a motorbike enthusiast. He has owned the 2007 Honda CBR1000RR Fireblade for three years and it is one of three identical bikes owned by him.

Sports bikes like Fireblades are challenging to ride on the road. This is due to the riding position being designed primarily for racing. This was an issue for Colin McAndry as it resulted in him having a lot of weight put on his hands. Combined with vibration and road impacts it became a regular occurrence for him to be left with tingling and numbness in the hands. For racing this would be tolerable but for comfortable road use, which is his primary use of the bike, this would be quite dangerous if he continued to take the effects put onto his hands when using the bike and may even have resulted in him struggling to or no longer being able to ride.

Colin McAndry began to source something that would help reduce the amount of weight on his hands by utilising the shape of his motorbike. He first began producing a prototype part to prove it would be effective. Following this, he began to research a way to develop something more permanent and visually appealing in comparison to the prototype. The surfaces

involved are compound curves that would be very difficult to perceive and work with. After discovering the 3D printing service offered by Manchester Metrology, he decided that this would be the optimum solution.

Colin McAndry states: "The part Manchester Metrology designed and printed is a permanent and much better made copy of my prototype. It works very well indeed, both as a part and as an example of how 3D additive engineering can solve what otherwise would be a very tedious and uncertain process to replicate. Manchester Metrology were prepared to help me from my first enquiry and I was grateful for their open-minded attitude to grasping what I wanted. The facilities and capabilities I have seen at Manchester Metrology appear very comprehensive and capable of meeting virtually any request large or small. "

The advanced Mark 2 3D printer is one of the latest advancements in 3D printing technology created by Markforged. The Mark Two industrial grade 3D printer uses materials that no other 3D desktop printer can, such as carbon fibre, fibreglass and Kevlar. Printing a part to be flexible or strong is easy and intuitive with this industry leading piece of technology. Offering limitless possibilities, whether you are an engineer operating in aerospace, automotive, biotechnology, construction,

marine or transport, or a manufacturer producing high-strength end-use parts and prototypes, the Mark 2 is unquestionably the best solution for most 3D printing requirements.

Daniel Haughton of Manchester Metrology concludes: "Given our need to produce a high quality and durable version of Colin's' prototype, we chose to use the Mark 2 3D printer by Markforged as I believed this to be the perfect solution to meet the needs of our customer. The advanced Markforged product has exceptional material capabilities and is a very reliable piece of technology. Having this piece of equipment enabled me to produce the bike part with ease and precision to ensure customer satisfaction.

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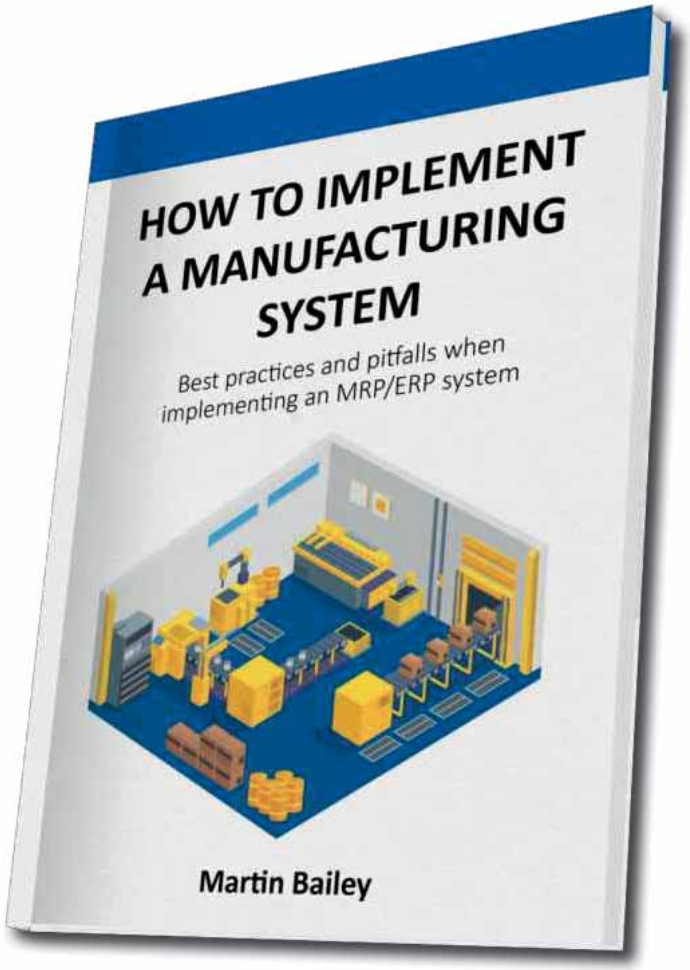

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